

**BASIC NETWORKING COMMANDS IN WINDOWS OPERATING  
SYSTEM**

**Aim:**

To study the basic commands operating system in window 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.

**SYNTAX-** ipconfig

**EXAMPLE :** ipconfig

**OUTPUT:**

```
Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix  . : 
IPv6 Address. . . . .           : 2401:4900:627c:2a61:9862:5395:90c1:5276
Temporary IPv6 Address. . . . . : 2401:4900:627c:2a61:fc13:88d:9b99:9c25
Link-local IPv6 Address . . . . . : fe80::f8bb:f0d2:58f7:6e8c%6
IPv4 Address. . . . .           : 192.168.92.14
Subnet Mask . . . . .           : 255.255.255.0
Default Gateway . . . . .       : fe80::8e0:3bff:febf:798d%6
                                  192.168.92.49
```

**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.

**Syntax–** nslookup

**Example :** nslookup [www.google.com](http://www.google.com)

**OUTPUT:**

```
C:\Users\Windows>nslookup www.google.com
Server: UnKnown
Address: 192.168.92.49

Non-authoritative answer:
Name: www.google.com
Addresses: 2404:6800:4007:82b::2004
          142.250.193.100
```

### 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.

SYNTAX- hostname

EXAMPLE : hostname

OUTPUT:

```
C:\Users\Windows>hostname
DESKTOP-B1SLH79
```

### 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 [www.destination\\_host\\_name.com](http://www.destination_host_name.com)

EXAMPLE : ping [www.facebook.com](http://www.facebook.com)

OUTPUT:

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

Pinging star-mini.c10r.facebook.com [2a03:2880:f184:186:face:b00c:0:25de] with 32 bytes of data:
Reply from 2a03:2880:f184:186:face:b00c:0:25de: time=23ms
Reply from 2a03:2880:f184:186:face:b00c:0:25de: time=54ms
Reply from 2a03:2880:f184:186:face:b00c:0:25de: time=47ms
Reply from 2a03:2880:f184:186:face:b00c:0:25de: time=37ms

Ping statistics for 2a03:2880:f184:186:face:b00c:0:25de:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 23ms, Maximum = 54ms, Average = 40ms
```

## 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 OR tracert [www.destination\\_host\\_name.com](http://www.destination_host_name.com)

EXAMPLE : tracert [www.facebook.com](http://www.facebook.com)

OUTPUT:

```
C:\Users\Windows>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [2a03:2880:f184:186:face:b00c:0:25de]
over a maximum of 30 hops:
  0  6 ms  4 ms  3 ms  2401:4900:627c:2a61::4c
  1  *      *      *      Request timed out.
  2  43 ms  25 ms  33 ms  2401:4900:c4:46bb::1
  3  62 ms  46 ms  41 ms  2401:4900:0:6f8::6
  4  *      59 ms  34 ms  2401:4900:0:6f8::1
  5  *      *      *      Request timed out.
  6  27 ms  31 ms  20 ms  2404:a800:3a00:1::4c5
  7  56 ms  25 ms  26 ms  2404:a800::92
  8  36 ms  24 ms  32 ms  ae5.pr01.tir1.tfbnw.net [2620:0:1cff:dead:beef::952]
  9  38 ms  20 ms  22 ms  po101.asw02.tir3.tfbnw.net [2620:0:1cff:dead:beef::3ca]
 10  59 ms  24 ms  24 ms  po238.psw03.tir3.tfbnw.net [2620:0:1cff:dead:beef::886f]
 11  22 ms  28 ms  31 ms  po3.msw1ad.02.tir3.tfbnw.net [2a03:2880:f09d:ffff::6f]
 12  75 ms  30 ms  25 ms  edge-star-mini6-shv-02-tir3.facebook.com [2a03:2880:f184:186:face:b00c:0:25de]

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.

SYNTAX- netstat

EXAMPLE : netstat

OUTPUT:

```
C:\Users\Windows>netstat

Active Connections

Proto Local Address           Foreign Address         State
TCP    127.0.0.1:49990          DESKTOP-B1SLH79:49991  ESTABLISHED
TCP    127.0.0.1:49991          DESKTOP-B1SLH79:49990  ESTABLISHED
TCP    192.168.92.14:60089      20.212.88.117:https     ESTABLISHED
TCP    192.168.92.14:60145      4.193.45.35:https       ESTABLISHED
TCP    192.168.92.14:60149      13.83.65.43:https       ESTABLISHED
TCP    192.168.92.14:60158      13.83.65.43:https       ESTABLISHED
TCP    192.168.92.14:60165      20.249.168.26:https     ESTABLISHED
TCP    192.168.92.14:60212      relay-058f44e1:https    ESTABLISHED
TCP    192.168.92.14:60377      52.96.190.162:https     ESTABLISHED
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60189 [2603:1063:15::10]:https ESTABLISHED
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60316 [2603:1040:a06:6::]:https ESTABLISHED
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60365 g2600-140f-2400-0000-0000-0000-173b-af33:https CLOSE_WAIT
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60366 g2600-140f-2400-0000-0000-0000-173b-af33:https CLOSE_WAIT
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60369 [2603:1046:c06:803::2]:https ESTABLISHED
TCP    [2401:4900:627c:2a61:fc13:88d:9b99:9c25]:60370 g2600-140f-2400-0000-0000-0000-173b-af33:https CLOSE_WAIT
TCP    [fe80::fe7e:8045:d871:a810%41]:1521 DESKTOP-B1SLH79:54128 ESTABLISHED
TCP    [fe80::fe7e:8045:d871:a810%41]:54128 DESKTOP-B1SLH79:1521 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.

SYNTAX- arp

EXAMPLE : arp -a

OUTPUT:

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

Interface: 192.168.92.14 --- 0x6
    Internet Address      Physical Address         Type
    192.168.92.49         0a-e0-3b-bf-79-8d       dynamic
    192.168.92.255        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 --- 0x29
    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
```

## 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

OUTPUT;

```
C:\Users\Windows>systeminfo

Host Name:                DESKTOP-B1SLH79
OS Name:                  Microsoft Windows 10 Pro
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
Registered Organization:
Product ID:                00330-52334-95812-AAOEM
Original Install Date:    27-05-2024, 01:04:28
System Boot Time:         18-07-2024, 20:39:06
System Manufacturer:      Dell Inc.
System Model:              Latitude 7480
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                          [01]: Intel64 Family 6 Model 78 Stepping 3 GenuineIntel ~2607 Mhz
BIOS Version:              Dell Inc. 1.36.0, 29-01-2024
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:     8,073 MB
Available Physical Memory: 3,074 MB
Virtual Memory: Max Size:  15,694 MB
Virtual Memory: Available: 8,540 MB
Virtual Memory: In Use:    7,154 MB
Page File Location(s):    C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\DESKTOP-B1SLH79
Hotfix(s):                 7 Hotfix(s) Installed.
                          [01]: KB5037587
```

```

Eugen Server: (DESKTOP-B15EN75)
Hotfix(s):      7 Hotfix(s) Installed.
                [01]: KB5037587
                [02]: KB5037592
                [03]: KB5011048
                [04]: KB5015684
                [05]: KB5039211
                [06]: KB5037240
                [07]: KB5037995
Network Card(s): 4 NIC(s) Installed.
                [01]: Intel(R) Ethernet Connection (4) I219-LM
                    Connection Name: Ethernet
                    Status:          Media disconnected
                [02]: Intel(R) Dual Band Wireless-AC 8265
                    Connection Name: Wi-Fi
                    DHCP Enabled:    Yes
                    DHCP Server:    192.168.92.49
                    IP address(es)
                    [01]: 192.168.92.14
                    [02]: fe80::f8bb:f0d2:58f7:6e8c
                    [03]: 2401:4900:627c:2a61:fc13:88d:9b99:9c25
                    [04]: 2401:4900:627c:2a61:9862:5395:90c1:5276
                [03]: Bluetooth Device (Personal Area Network)
                    Connection Name: Bluetooth Network Connection
                    Status:          Media disconnected
                [04]: VirtualBox Host-Only Ethernet Adapter
                    Connection Name: Ethernet 2
                    DHCP Enabled:    No
                    IP address(es)
                    [01]: 192.168.56.1
                    [02]: fe80::fe7e:8045:d871:a810
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.

SYNTAX – route print

EXAMPLE : route print

OUTPUT:



```
C:\Users\Windows>route print
```

```
=====
Interface List
```

```
16...8c 04 ba 33 04 12 .....Intel(R) Ethernet Connection (4) I219-LM
41...0a 00 27 00 00 29 .....VirtualBox Host-Only Ethernet Adapter
15...dc 71 96 ea 88 ba .....Microsoft Wi-Fi Direct Virtual Adapter
17...de 71 96 ea 88 b9 .....Microsoft Wi-Fi Direct Virtual Adapter #2
 6...dc 71 96 ea 88 b9 .....Intel(R) Dual Band Wireless-AC 8265
 5...dc 71 96 ea 88 bd .....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	192.168.92.49	192.168.92.14	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
	192.168.56.0	255.255.255.0	On-link	192.168.56.1	330
	192.168.56.1	255.255.255.255	On-link	192.168.56.1	330
192.168.56.255	255.255.255.255		On-link	192.168.56.1	330
	192.168.92.0	255.255.255.0	On-link	192.168.92.14	306
	192.168.92.14	255.255.255.255	On-link	192.168.92.14	306
192.168.92.255	255.255.255.255		On-link	192.168.92.14	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	192.168.92.14	306
	224.0.0.0	240.0.0.0	On-link	192.168.56.1	330
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	192.168.92.14	306
255.255.255.255	255.255.255.255		On-link	192.168.56.1	330

```
=====
Persistent Routes:
```

Network Address	Netmask	Gateway Address	Metric
-----------------	---------	-----------------	--------

```
=====
Persistent Routes:
```

Network Address	Netmask	Gateway Address	Metric
0.0.0.0	0.0.0.0	172.16.18.1	Default

```
=====
IPv6 Route Table
```

```
=====
Active Routes:
```

If	Metric	Network	Destination	Gateway
6	66	::	/0	fe80::8e0:3bff:febf:798d
1	331	::	/128	On-link
6	66	2401:4900:627c:2a61::	/64	On-link
6	306	2401:4900:627c:2a61:9862:5395:90c1:5276	/128	On-link
6	306	2401:4900:627c:2a61:fc13:88d:9b99:9c25	/128	On-link
6	306	fe80::	/64	On-link
41	281	fe80::	/64	On-link
6	306	fe80::f8bb:f0d2:58f7:6e8c	/128	On-link
41	281	fe80::fe7e:8045:d871:a810	/128	On-link
1	331	ff00::	/8	On-link
6	306	ff00::	/8	On-link
41	281	ff00::	/8	On-link

```
=====
Persistent Routes:
```

```
None
```

## **RESULT**

Hence, the study of basic networking commands in window operating system is studied.