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EX NO:1a DATE:27.7.24	BASIC NETWORKING COMMANDS IN WINDOWS OPERATING SYSTEM
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Aim:

To study the basic networking 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

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

EXAMPLE : ping 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

EXAMPLE : tracert 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:a800:3a80:1::4c5
  7  56 ms  25 ms  26 ms  2404:a800:181
  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.muw1ad.02.tir3.tfbnw.net [2a03:2880:f09d:ffff::6f]
 12  75 ms  30 ms  25 ms  edge-star-mini16-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	20.249.168.28: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:c06:003::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:~$ netsh
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	255.255.255.255	On-link	127.0.0.1	331
192.168.56.0	255.255.255.0	255.255.255.0	On-link	192.168.56.1	330
192.168.56.1	255.255.255.255	255.255.255.255	On-link	192.168.56.1	330
192.168.56.255	255.255.255.255	255.255.255.255	On-link	192.168.56.1	330
192.168.92.0	255.255.255.0	255.255.255.0	On-link	192.168.92.14	306
192.168.92.14	255.255.255.255	255.255.255.255	On-link	192.168.92.14	306
192.168.92.255	255.255.255.255	255.255.255.255	On-link	192.168.92.14	306
224.0.0.0	240.0.0.0	240.0.0.0	On-link	127.0.0.1	331
224.0.0.0	240.0.0.0	240.0.0.0	On-link	192.168.92.14	306
224.0.0.0	240.0.0.0	240.0.0.0	On-link	192.168.56.1	330
255.255.255.255	255.255.255.255	255.255.255.255	On-link	127.0.0.1	331
255.255.255.255	255.255.255.255	255.255.255.255	On-link	192.168.92.14	306
255.255.255.255	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	::1/128	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
```

CONCLUSION :

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