



# **Computer Network (01CE0410)**

## **Lab Manual (2024-25)**

---

**Name: Vadgama Harsh D.**

**ER No.: 92410103123**

**Class: 4 EC5**

**Lab Batch: C**

**Practical 3:** Demonstrate basic networking commands and Network configuration commands.

**1. ipconfig – Displays basic IP configuration details of the system's network adapters.**

C:\Windows\system32\cmd.exe

Microsoft Windows [Version 10.0.19045.4598]

(c) Microsoft Corporation. All rights reserved.

C:\Users\student>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

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

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::5649:3dcc:cfa6:9a23%14  
IPv4 Address. . . . . : 172.21.31.141  
Subnet Mask . . . . . : 255.255.254.0  
Default Gateway . . . . . : 192.168.16.3

Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::3161:aa1c:18f:4bd7%16  
IPv4 Address. . . . . : 192.168.209.1  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . :

Ethernet adapter VMware Network Adapter VMnet8:

Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::2602:103:6ce5:ef9e%13  
IPv4 Address. . . . . : 192.168.223.1  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . :

C:\Users\student>

## 2. ipconfig /all – Shows detailed information about all network interfaces, including MAC addresses and DNS servers.

```
C:\Windows\system32\cmd.exe

C:\Users\student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : MC220-CL141
Primary Dns Suffix . . . . . : mefgi.com
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : mefgi.com

Ethernet adapter Ethernet 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . : 
Description . . . . . : Sophos TAP Adapter
Physical Address. . . . . : 00-FF-3B-3D-0B-B1
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . : 
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : 8C-EC-4B-96-63-65
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::5649:3dccc:fa6:9a23%14(Preferred)
IPv4 Address. . . . . : 172.21.31.141(Preferred)
Subnet Mask . . . . . : 255.255.254.0
Default Gateway . . . . . : 192.168.16.3
DHCPv6 IAID . . . . . : 227339339
DHCPv6 Client DUID. . . . . : 00-01-00-01-2E-11-8B-28-8C-EC-4B-96-63-65
DNS Servers . . . . . : 192.168.12.101
                        192.168.12.201
                        192.168.12.203
                        119.160.192.2
                        119.160.192.3
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 00-50-56-C0-00-01
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::3161:aa1c:18f:4bd7%16(Preferred)
IPv4 Address. . . . . : 192.168.209.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 27 January 2025 13:24:32
Lease Expires . . . . . : 27 January 2025 14:09:24
Default Gateway . . . . . : 
DHCP Server . . . . . : 192.168.209.254
DHCPv6 IAID . . . . . : 469782614
DHCPv6 Client DUID. . . . . : 00-01-00-01-2E-11-8B-28-8C-EC-4B-96-63-65
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled
```

```
C:\Windows\system32\cmd.exe

NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 00-50-56-C0-00-01
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::3161:aa1c:18f:4bd7%16(Preferred)
IPv4 Address. . . . . : 192.168.209.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 27 January 2025 13:24:32
Lease Expires . . . . . : 27 January 2025 14:09:24
Default Gateway . . . . . : 
DHCP Server . . . . . : 192.168.209.254
DHCPv6 IAID . . . . . : 469782614
DHCPv6 Client DUID. . . . . : 00-01-00-01-2E-11-8B-28-8C-EC-4B-96-63-65
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VMware Network Adapter VMnet8:

Connection-specific DNS Suffix . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet8
Physical Address. . . . . : 00-50-56-C0-00-08
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::2602:103:6ce5:ef9e%13(Preferred)
IPv4 Address. . . . . : 192.168.223.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 27 January 2025 13:24:24
Lease Expires . . . . . : 27 January 2025 14:09:23
Default Gateway . . . . . : 
DHCP Server . . . . . : 192.168.223.254
DHCPv6 IAID . . . . . : 503337046
DHCPv6 Client DUID. . . . . : 00-01-00-01-2E-11-8B-28-8C-EC-4B-96-63-65
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
Primary WINS Server . . . . . : 192.168.223.2
NetBIOS over Tcpip. . . . . : Enabled

C:\Users\student>
```



**3. hostname – Displays the computer's hostname (system name) on the network.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>hostname
MC220-CL141
C:\Users\student>_
```

**4. getmac – Displays the MAC address of the network interfaces on the system.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>getmac

Physical Address      Transport Name
=====
8C-EC-4B-96-63-65    \Device\Tcpip_{AE6BAFD8-BF3F-407C-BC8F-959957514E44}
00-50-56-C0-00-01    \Device\Tcpip_{E630B2C5-8531-4353-9D41-18D3C063D040}
00-50-56-C0-00-08    \Device\Tcpip_{AC00086E-422C-451D-9EFD-9755656FF548}
00-FF-3B-3D-0B-B1    Media disconnected
C:\Users\student>
```

## 5.systeminfo – Provides detailed information about the system configuration, including OS, memory, and network adapter info.

```
C:\Windows\system32\cmd.exe

C:\Users\student>systeminfo

Host Name:                MC220-CL141
OS Name:                  Microsoft Windows 10 Pro
OS Version:               18.0.19045 N/A Build 19045
OS Manufacturer:         Microsoft Corporation
OS Configuration:        Member Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:         admin
Registered Organization:
Product ID:                00330-80000-00000-AA535
Original Install Date:     18-06-2024, 15:06:22
System Boot Time:          27-01-2025, 13:24:15
System Manufacturer:       Dell Inc.
System Model:              OptiPlex 3060
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 158 Stepping 10 GenuineIntel ~3000 Mhz
BIOS Version:              Dell Inc. 1.30.0, 29-03-2024
Windows Directory:         C:\Windows
System Directory:          C:\Windows\system32
Boot Device:               \Device\HarddiskVolume3
System Locale:              4090
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     16,207 MB
Available Physical Memory: 12,585 MB
Virtual Memory: Max Size:  18,639 MB
Virtual Memory: Available: 15,153 MB
Virtual Memory: In Use:     3,486 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    mefgl.com
Logon Server:              \\ADS-203
Hotfix(s):                  8 Hotfix(s) Installed.
                           [01]: KB5039865
                           [02]: KB5037592
                           [03]: KB5011048
                           [04]: KB5015684
                           [05]: KB5039299
                           [06]: KB5037995
                           [07]: KB5039336
                           [08]: KB5034441
Network Card(s):           4 NIC(s) Installed.
                           [01]: Realtek PCIe GbE Family Controller
                               Connection Name: Ethernet
                               DHCP Enabled:    No
                               IP address(es)
                               [01]: 172.21.31.141
                               [02]: fe80::5649:3dcc:cfaf:9a23
                           [02]: VMware Virtual Ethernet Adapter for VMnet1
                               Connection Name: VMware Network Adapter VMnet1
```

```
C:\Windows\system32\cmd.exe

Available Physical Memory: 12,585 MB
Virtual Memory: Max Size:  18,639 MB
Virtual Memory: Available: 15,153 MB
Virtual Memory: In Use:     3,486 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    mefgl.com
Logon Server:              \\ADS-203
Hotfix(s):                  8 Hotfix(s) Installed.
                           [01]: KB5039865
                           [02]: KB5037592
                           [03]: KB5011048
                           [04]: KB5015684
                           [05]: KB5039299
                           [06]: KB5037995
                           [07]: KB5039336
                           [08]: KB5034441
Network Card(s):           4 NIC(s) Installed.
                           [01]: Realtek PCIe GbE Family Controller
                               Connection Name: Ethernet
                               DHCP Enabled:    No
                               IP address(es)
                               [01]: 172.21.31.141
                               [02]: fe80::5649:3dcc:cfaf:9a23
                           [02]: VMware Virtual Ethernet Adapter for VMnet1
                               Connection Name: VMware Network Adapter VMnet1
                               DHCP Enabled:    Yes
                               DHCP Server:     192.168.209.254
                               IP address(es)
                               [01]: 192.168.209.1
                               [02]: fe80::3161:aa1c:18f:4bd7
                           [03]: VMware Virtual Ethernet Adapter for VMnet8
                               Connection Name: VMware Network Adapter VMnet8
                               DHCP Enabled:    Yes
                               DHCP Server:     192.168.223.254
                               IP address(es)
                               [01]: 192.168.223.1
                               [02]: fe80::2602:103:6ce5:ef9e
                           [04]: Sophos TAP Adapter
                               Connection Name: Ethernet 2
                               Status:          Media disconnected
Hyper-V Requirements:      VM Monitor Mode Extensions: Yes
                           Virtualization Enabled In Firmware: Yes
                           Second Level Address Translation: Yes
                           Data Execution Prevention Available: Yes

C:\Users\student>
```



**6.ping – Sends an ICMP echo request to check connectivity to a remote host.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>ping www.google.com

Pinging www.google.com [142.250.192.4] with 32 bytes of data:
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58

Ping statistics for 142.250.192.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 15ms, Maximum = 15ms, Average = 15ms
```

**7. ping {ip addr} – Pings a specific IP address to test connectivity to that address.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>ping 142.250.192.4

Pinging 142.250.192.4 with 32 bytes of data:
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58
Reply from 142.250.192.4: bytes=32 time=15ms TTL=58

Ping statistics for 142.250.192.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 15ms, Maximum = 15ms, Average = 15ms

C:\Users\student>_
```

**8. tracert – Traces the route packets take to reach a destination, showing the hops along the way.**

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

Tracing route to www.google.com [142.250.192.4]
over a maximum of 30 hops:

  1    6 ms    7 ms    5 ms  172.21.30.1
  2   <1 ms   <1 ms   <1 ms  192.168.15.91
  3    1 ms    <1 ms   <1 ms  119.160.199.81
  4    2 ms    2 ms    1 ms  10.50.79.1
  5   15 ms   15 ms   15 ms  10.250.10.205
  6   16 ms   16 ms   16 ms  72.14.202.41
  7   17 ms   15 ms   22 ms  74.125.37.7
  8   15 ms   15 ms   15 ms  108.170.231.79
  9   14 ms   14 ms   14 ms  bom12s14-in-f4.1e100.net [142.250.192.4]

Trace complete.
```

## 9. route print – Displays the routing table, showing routes and associated network interfaces.

C:\Windows\system32\cmd.exe

C:\Users\student>route print

### Interface List

```

5...00 ff 3b 3d 0b b1 .....Sophos TAP Adapter
14...8c ec 4b 96 63 65 .....Realtek PCIe GbE Family Controller
16...00 50 56 c0 00 01 .....VMware Virtual Ethernet Adapter for VMnet1
13...00 50 56 c0 00 08 .....VMware Virtual Ethernet Adapter for VMnet8
1.....Software Loopback Interface 1

```

### IPv4 Route Table

#### Active Routes:

Network	Destination	Netmask	Gateway	Interface	Metric
	0.0.0.0	0.0.0.0	192.168.16.3	172.21.31.141	281
	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
	172.21.30.0	255.255.254.0	On-link	172.21.31.141	281
	172.21.31.141	255.255.255.255	On-link	172.21.31.141	281
	172.21.31.255	255.255.255.255	On-link	172.21.31.141	281
	192.168.209.0	255.255.255.0	On-link	192.168.209.1	291
	192.168.209.1	255.255.255.255	On-link	192.168.209.1	291
	192.168.209.255	255.255.255.255	On-link	192.168.209.1	291
	192.168.223.0	255.255.255.0	On-link	192.168.223.1	291
	192.168.223.1	255.255.255.255	On-link	192.168.223.1	291
	192.168.223.255	255.255.255.255	On-link	192.168.223.1	291
	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	192.168.209.1	291
	224.0.0.0	240.0.0.0	On-link	192.168.223.1	291
	224.0.0.0	240.0.0.0	On-link	172.21.31.141	281
	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	192.168.209.1	291
	255.255.255.255	255.255.255.255	On-link	192.168.223.1	291
	255.255.255.255	255.255.255.255	On-link	172.21.31.141	281

#### Persistent Routes:

Network	Address	Netmask	Gateway Address	Metric
	0.0.0.0	0.0.0.0	192.168.16.3	Default



IPv6 Route Table

=====

Active Routes:

If	Metric	Network	Destination	Gateway
1	331	::1/128		On-link
16	291	fe80::/64		On-link
13	291	fe80::/64		On-link
14	281	fe80::/64		On-link
13	291	fe80::2602:103:6ce5:ef9e/128		On-link
16	291	fe80::3161:aa1c:18f:4bd7/128		On-link
14	281	fe80::5649:3dcc:cfa6:9a23/128		On-link
1	331	ff00::/8		On-link
16	291	ff00::/8		On-link
13	291	ff00::/8		On-link
14	281	ff00::/8		On-link

=====

Persistent Routes:

None

C:\Users\student>



## 10. pathping – Combines the functionality of ping and tracert, providing packet loss and latency information at each hop.

```
C:\Windows\system32\cmd.exe
C:\Users\student>pathping www.google.com

Tracing route to www.google.com [142.250.192.4]
over a maximum of 30 hops:
 0  MC220-CL141.mefgi.com [172.21.31.141]
 1  172.21.30.1
 2  192.168.15.91
 3  119.160.199.81
 4  10.50.79.1
 5  10.250.10.205
 6  72.14.202.41
 7  74.125.37.7
 8  108.170.231.79
 9  bom12s14-in-f4.1e100.net [142.250.192.4]

Computing statistics for 225 seconds...
```

Hop	RTT	Source to Here Lost/Sent = Pct	This Node/Link Lost/Sent = Pct	Address
0				MC220-CL141.mefgi.com [172.21.31.141]
1	5ms	0/ 100 = 0%	0/ 100 = 0%	172.21.30.1
2	0ms	0/ 100 = 0%	0/ 100 = 0%	192.168.15.91
3	1ms	0/ 100 = 0%	0/ 100 = 0%	119.160.199.81
4	1ms	0/ 100 = 0%	0/ 100 = 0%	10.50.79.1
5	15ms	0/ 100 = 0%	0/ 100 = 0%	10.250.10.205
6	20ms	0/ 100 = 0%	0/ 100 = 0%	72.14.202.41
7	15ms	0/ 100 = 0%	0/ 100 = 0%	74.125.37.7
8	15ms	0/ 100 = 0%	0/ 100 = 0%	108.170.231.79
9	15ms	0/ 100 = 0%	0/ 100 = 0%	bom12s14-in-f4.1e100.net [142.250.192.4]

```
Trace complete.
C:\Users\student>
```

## 11. arp -a – Displays the current ARP (Address Resolution Protocol) table, mapping IP addresses to MAC addresses.

C:\Windows\system32\cmd.exe

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

Interface: 192.168.223.1 --- 0xd
  Internet Address      Physical Address      Type
  192.168.223.254       00-50-56-ef-db-10    dynamic
  192.168.223.255       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: 172.21.31.141 --- 0xe
  Internet Address      Physical Address      Type
  172.21.30.1           00-19-e8-f8-26-4f    dynamic
  172.21.31.255         ff-ff-ff-ff-ff-ff    static
  192.168.16.3          00-19-e8-f8-26-4f    dynamic
  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

Interface: 192.168.209.1 --- 0x10
  Internet Address      Physical Address      Type
  192.168.209.254       00-50-56-f2-2b-de    dynamic
  192.168.209.255       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

C:\Users\student>
```

## 12. nslookup – Queries DNS servers to obtain domain name or IP address information.

C:\Windows\system32\cmd.exe

```
C:\Users\student>nslookup www.google.com
Server:  ADS-PRIMARY101.mefgi.com
Address:  192.168.12.101

Non-authoritative answer:
Name:     www.google.com
Addresses: 2404:6800:4009:827::2004
          142.250.192.4

C:\Users\student>
```

### 13. netstat – Displays active network connections, listening ports, and routing table.

C:\Windows\system32\cmd.exe

C:\Users\student>netstat

#### Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:49671	MC220-CL141:49672	ESTABLISHED
TCP	127.0.0.1:49672	MC220-CL141:49671	ESTABLISHED
TCP	127.0.0.1:50918	MC220-CL141:60110	ESTABLISHED
TCP	127.0.0.1:60110	MC220-CL141:50918	ESTABLISHED
TCP	172.21.31.141:50861	ADS-PRIMARY101:microsoft-ds	ESTABLISHED
TCP	172.21.31.141:50869	20.198.119.84:https	ESTABLISHED
TCP	172.21.31.141:51082	a23-38-59-250:http	CLOSE_WAIT
TCP	172.21.31.141:51127	13.107.213.254:https	CLOSE_WAIT
TCP	172.21.31.141:51435	sb-in-f188:5228	ESTABLISHED
TCP	172.21.31.141:53053	42.106.164.154:https	CLOSE_WAIT
TCP	172.21.31.141:53057	20.140.56.69:https	CLOSE_WAIT
TCP	172.21.31.141:53058	13.107.246.48:https	CLOSE_WAIT
TCP	172.21.31.141:53201	bom12s17-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53202	bom07s30-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53204	pnbomb-ad-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53211	pnbomb-ac-in-f3:https	ESTABLISHED
TCP	172.21.31.141:53213	pnbomb-ad-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53260	lb-140-82-113-22-iad:https	ESTABLISHED
TCP	172.21.31.141:53262	bom12s19-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53270	cdn-185-199-109-133:https	ESTABLISHED
TCP	172.21.31.141:53275	pnbomb-ab-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53276	pnbomb-ac-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53285	52.168.112.67:https	ESTABLISHED
TCP	172.21.31.141:53287	ADS-SERVER:epmap	TIME_WAIT
TCP	172.21.31.141:53288	ADS-SERVER:49693	TIME_WAIT
TCP	172.21.31.141:53289	20.207.73.85:https	ESTABLISHED
TCP	172.21.31.141:53290	bom07s30-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53292	20.207.73.82:https	ESTABLISHED
TCP	172.21.31.141:53293	s3-1-w:https	CLOSE_WAIT
TCP	172.21.31.141:53294	bom07s32-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53296	lb-140-82-114-25-iad:https	ESTABLISHED

C:\Users\student>\_



#### 14. netstat -a – Shows all active connections and listening ports.

```
C:\Users\student>netstat -a
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:80	MC220-CL141:0	LISTENING
TCP	0.0.0.0:135	MC220-CL141:0	LISTENING
TCP	0.0.0.0:445	MC220-CL141:0	LISTENING
TCP	0.0.0.0:902	MC220-CL141:0	LISTENING
TCP	0.0.0.0:912	MC220-CL141:0	LISTENING
TCP	0.0.0.0:3389	MC220-CL141:0	LISTENING
TCP	0.0.0.0:5040	MC220-CL141:0	LISTENING
TCP	0.0.0.0:5560	MC220-CL141:0	LISTENING
TCP	0.0.0.0:5580	MC220-CL141:0	LISTENING
TCP	0.0.0.0:5800	MC220-CL141:0	LISTENING
TCP	0.0.0.0:5900	MC220-CL141:0	LISTENING
TCP	0.0.0.0:7680	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49664	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49665	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49666	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49667	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49668	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49669	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49670	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49673	MC220-CL141:0	LISTENING
TCP	0.0.0.0:49674	MC220-CL141:0	LISTENING
TCP	127.0.0.1:4502	MC220-CL141:0	LISTENING
TCP	127.0.0.1:49671	MC220-CL141:49672	ESTABLISHED
TCP	127.0.0.1:49672	MC220-CL141:49671	ESTABLISHED
TCP	127.0.0.1:50918	MC220-CL141:60110	ESTABLISHED
TCP	127.0.0.1:60110	MC220-CL141:0	LISTENING
TCP	127.0.0.1:60110	MC220-CL141:50918	ESTABLISHED
TCP	172.21.31.141:139	MC220-CL141:0	LISTENING
TCP	172.21.31.141:50861	ADS-PRIMARY101:microsoft-ds	ESTABLISHED
TCP	172.21.31.141:50869	20.198.119.84:https	ESTABLISHED
TCP	172.21.31.141:51082	a23-38-59-250:http	CLOSE_WAIT
TCP	172.21.31.141:51127	13.107.213.254:https	CLOSE_WAIT
TCP	172.21.31.141:51435	sb-in-f188:5228	ESTABLISHED
TCP	172.21.31.141:53053	42.106.164.154:https	CLOSE_WAIT
TCP	172.21.31.141:53057	20.140.56.69:https	CLOSE_WAIT
TCP	172.21.31.141:53058	13.107.246.48:https	CLOSE_WAIT
TCP	172.21.31.141:53201	bom12s17-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53202	bom07s30-in-f14:https	ESTABLISHED
TCP	172.21.31.141:53204	pnbomb-ad-in-f10:https	ESTABLISHED
TCP	172.21.31.141:53211	pnbomb-ac-in-f3:https	ESTABLISHED



**15. netstat -e – Displays Ethernet statistics, such as the number of bytes and packets sent/received.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>netstat -e
Interface Statistics

              Received              Sent
Bytes          448387276          113275382
Unicast packets    454686          327523
Non-unicast packets 325440          5034
Discards           0              0
Errors             0              0
Unknown protocols   0
C:\Users\student>
```

**16. ipconfig /flushdns – Clears the DNS resolver cache to force fresh DNS lookups.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>ipconfig/flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.

C:\Users\student>
```

**17. nbtstat -r – Displays NetBIOS over TCP/IP statistics, including the resolution of names from the NetBIOS name cache.**

```
C:\Windows\system32\cmd.exe
C:\Users\student>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----

Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast    = 13
Registered By Name Server  = 0

C:\Users\student>
```