

# CSCI 31082 - Systems and Network Administration

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# Experiment 1

## 1.1 Hostname

```
wenura@wenura-VirtualBox:~$ hostname
wenura-VirtualBox
wenura@wenura-VirtualBox:~$ hostname -d
wenura@wenura-VirtualBox:~$ hostname -f
wenura-VirtualBox
wenura@wenura-VirtualBox:~$ hostname -i
127.0.1.1
wenura@wenura-VirtualBox:~$
```

Figure 1.1 – hostname

## 1.2 Ipconfig

```
C:\Users\FCT>hostname
FCT-LB106-29

C:\Users\FCT>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::fc65:f067:227f:f646%5
    Autoconfiguration IPv4 Address. . . : 169.254.246.70
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : kln.ac.lk
    IPv6 Address. . . . . : 2401:dd00:20:2060:c860:c280:b230:8773
    IPv6 Address. . . . . : 2401:dd00:20:2060:fc2e:ca4d:b15:743c
    Temporary IPv6 Address. . . . . : 2401:dd00:20:2060:adab:2fd8:cde5:82fb
    Link-local IPv6 Address . . . . . : fe80::c860:c280:b230:8773%19
    IPv4 Address. . . . . : 172.16.60.70
    Subnet Mask . . . . . : 255.255.254.0
    Default Gateway . . . . . : fe80::2e5a:fff:febc:e543%19
                               172.16.60.1

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::149f:b027:d83a:e379%16
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Wi-Fi:

    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* 2:

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

C:\Users\FCT>
```

Figure 1.2 – ipconfig

## 1.3 Ping

```
C:\Users\Wenura>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
    -t             Ping the specified host until stopped.
                   To see statistics and continue - type Control-Break;
                   To stop - type Control-C.
    -a             Resolve addresses to hostnames.
    -n count       Number of echo requests to send.
    -l size        Send buffer size.
    -f            Set Don't Fragment flag in packet (IPv4-only).
    -i TTL         Time To Live.
    -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                   and has no effect on the type of service field in the IP
                   Header).
    -r count       Record route for count hops (IPv4-only).
    -s count       Timestamp for count hops (IPv4-only).
    -j host-list   Loose source route along host-list (IPv4-only).
    -k host-list   Strict source route along host-list (IPv4-only).
    -w timeout     Timeout in milliseconds to wait for each reply.
    -R            Use routing header to test reverse route also (IPv6-only).
                   Per RFC 5095 the use of this routing header has been
                   deprecated. Some systems may drop echo requests if
                   this header is used.
    -S srcaddr     Source address to use.
    -c compartment Routing compartment identifier.
    -p            Ping a Hyper-V Network Virtualization provider address.
    -4            Force using IPv4.
    -6            Force using IPv6.
```

C:\Users\Wenura>ping 1.1.1.1

Pinging 1.1.1.1 with 32 bytes of data:

Reply from 1.1.1.1: bytes=32 time=103ms TTL=58

Reply from 1.1.1.1: bytes=32 time=46ms TTL=58

Reply from 1.1.1.1: bytes=32 time=55ms TTL=58

Reply from 1.1.1.1: bytes=32 time=18ms TTL=58

Ping statistics for 1.1.1.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 18ms, Maximum = 103ms, Average = 55ms

Figure 1.3 - ping

## 1.4 Host

```
wenura@wenura-VirtualBox:~$ host www.google.com
www.google.com has address 142.250.4.103
www.google.com has address 142.250.4.106
www.google.com has address 142.250.4.99
www.google.com has address 142.250.4.105
www.google.com has address 142.250.4.147
www.google.com has address 142.250.4.104
www.google.com has IPv6 address 2404:6800:4003:c06::68
www.google.com has IPv6 address 2404:6800:4003:c06::67
www.google.com has IPv6 address 2404:6800:4003:c06::6a
www.google.com has IPv6 address 2404:6800:4003:c06::63
wenura@wenura-VirtualBox:~$
```

Figure 1.4 - host

## 1.5 telnet

```
wenura@wenura-VirtualBox:~$ telnet osou.ac.in 80
Trying 103.174.102.53...
Connected to osou.ac.in.
Escape character is '^]'.
^
HTTP/1.1 400 Bad Request
Date: Mon, 31 Oct 2022 00:53:07 GMT
Server: Apache
Accept-Ranges: bytes
Cache-Control: no-cache, no-store, must-revalidate
Pragma: no-cache
Expires: 0
Connection: close
Content-Type: text/html

<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-type" content="text/html; charset=utf-8">
    <meta http-equiv="Cache-control" content="no-cache">
    <meta http-equiv="Pragma" content="no-cache">
    <meta http-equiv="Expires" content="0">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>400 Bad Request</title>
    <style type="text/css">
      body {
        font-family: Arial, Helvetica, sans-serif;
        font-size: 14px;
        line-height: 1.428571429;
        background-color: #ffffff;
        color: #2F3230;
        padding: 0;
        margin: 0;
      }
      section, footer {
        display: block;
        padding: 0;
        margin: 0;
      }
      .container {
        margin-left: auto;
        margin-right: auto;
        padding: 0 10px;
      }
      .response-info {
        text-align: center;
        color: #cccccc;
        font-size: 12px;
      }
    </style>
  </head>
  <body>
    <div class="container">
      <div class="response-info">
        <p>400 Bad Request</p>
      </div>
    </div>
  </body>
</html>
```

Figure 1.5 - telnet



## 1.6 arp

### 1.6.1 arp

```
C:\Users\FCT>arp

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

-a          Displays current ARP entries by interrogating the current
            protocol data. If inet_addr is specified, the IP and Physical
            addresses for only the specified computer are displayed. If
            more than one network interface uses ARP, entries for each ARP
            table are displayed.
-g          Same as -a.
-v          Displays current ARP entries in verbose mode. All invalid
            entries and entries on the loop-back interface will be shown.
inet_addr   Specifies an internet address.
-N if_addr  Displays the ARP entries for the network interface specified
            by if_addr.
-d          Deletes the host specified by inet_addr. inet_addr may be
            wildcarded with * to delete all hosts.
-s          Adds the host and associates the Internet address inet_addr
            with the Physical address eth_addr. The Physical address is
            given as 6 hexadecimal bytes separated by hyphens. The entry
            is permanent.
eth_addr    Specifies a physical address.
if_addr     If present, this specifies the Internet address of the
            interface whose address translation table should be modified.
            If not present, the first applicable interface will be used.

Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a          .... Displays the arp table.
```

Figure 1.6 – arp

## 1.6.2 arp - a

```
C:\Users\FCT>ARP -a
```

Interface: 169.254.246.70 --- 0x5		
Internet Address	Physical Address	Type
169.254.255.255	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 --- 0x10		
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

Interface: 172.16.60.70 --- 0x13		
Internet Address	Physical Address	Type
172.16.60.1	2c-5a-0f-bc-e5-43	dynamic
172.16.60.21	00-4e-01-aa-a4-ac	dynamic
172.16.60.24	50-3e-aa-10-73-b9	dynamic
172.16.60.25	48-4d-7e-a8-5e-74	dynamic
172.16.60.32	e4-54-e8-b5-80-bc	dynamic
172.16.60.47	50-3e-aa-0f-f9-7d	dynamic
172.16.60.51	4c-52-62-13-0c-b0	dynamic
172.16.60.58	2c-23-3a-6a-75-36	dynamic
172.16.60.63	fc-3f-db-52-49-fa	dynamic
172.16.60.75	e4-54-e8-b5-80-80	dynamic
172.16.60.81	e4-54-e8-b5-81-2c	dynamic
172.16.60.83	e4-54-e8-b5-81-25	dynamic
172.16.60.84	e4-54-e8-b4-f2-8a	dynamic
172.16.60.101	e4-54-e8-b5-c8-7d	dynamic
172.16.60.102	e4-54-e8-b4-f4-5a	dynamic
172.16.60.115	ec-9b-8b-c2-6f-17	dynamic
172.16.60.119	48-4d-7e-ad-29-ba	dynamic
172.16.60.143	e4-54-e8-b4-f1-44	dynamic
172.16.60.157	50-3e-aa-10-80-bf	dynamic
172.16.60.182	e4-54-e8-b5-81-60	dynamic
172.16.60.186	e4-54-e8-b5-81-29	dynamic
172.16.60.187	48-4d-7e-ad-23-ef	dynamic
172.16.60.193	e4-54-e8-b5-81-11	dynamic
172.16.60.202	e4-54-e8-b5-81-45	dynamic
172.16.60.212	e4-54-e8-b5-81-3c	dynamic
172.16.60.227	fc-3f-db-be-93-d9	dynamic
172.16.60.252	e4-54-e8-b5-81-46	dynamic
172.16.61.255	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

Figure 1.7 – arp -a

## 1.7 nslookup

```
C:\Users\FCT>nslookup
DNS request timed out.
    timeout was 2 seconds.
Default Server:  UnKnown
Address:  2401:dd00:20:2001::205
> _
```

Figure 1.8 – nslookup

## 1.8 netstat

### 1.8.1 netstat

```
C:\Users\FCT>netstat

Active Connections

 Proto Local Address           Foreign Address         State
 TCP    127.0.0.1:53887          FCT-LB106-29:53888     ESTABLISHED
 TCP    127.0.0.1:53888          FCT-LB106-29:53887     ESTABLISHED
 TCP    127.0.0.1:53890          FCT-LB106-29:53891     ESTABLISHED
 TCP    127.0.0.1:53891          FCT-LB106-29:53890     ESTABLISHED
 TCP    172.16.60.70:7680        FCT-LB106-45:52013     TIME_WAIT
 TCP    172.16.60.70:7680        172.16.77.46:50129     ESTABLISHED
 TCP    172.16.60.70:53860       40.113.110.67:https     ESTABLISHED
 TCP    172.16.60.70:53897       ec2-52-13-69-101:https  ESTABLISHED
 TCP    172.16.60.70:54436       13.71.196.227:8883     ESTABLISHED
 TCP    172.16.60.70:54759       a-0003:https           ESTABLISHED
 TCP    172.16.60.70:54796       172.16.83.33:ms-do     TIME_WAIT
 TCP    172.16.60.70:54802       13.107.21.200:https     ESTABLISHED
 TCP    172.16.60.70:54803       13.107.21.200:https     ESTABLISHED
 TCP    172.16.60.70:54804       13.107.21.200:https     ESTABLISHED
 TCP    172.16.60.70:54805       204.79.197.222:https    ESTABLISHED
 TCP    172.16.60.70:54806       131.253.33.254:https    ESTABLISHED
 TCP    172.16.60.70:54809       13.69.109.130:https     TIME_WAIT
 TCP    172.16.60.70:54810       13.107.136.254:https    ESTABLISHED
 TCP    172.16.60.70:54811       a23-44-11-89:https     ESTABLISHED

C:\Users\FCT>S
```

Figure 1.9 – netstat

## 1.8.2 netstat -a

```
C:\Users\FCT>NETSTAT -a

Active Connections

Proto Local Address           Foreign Address         State
TCP   0.0.0.0:135              FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:445              FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:3389             FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:5040             FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:5357             FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:5432             FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:7680             FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49664            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49665            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49666            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49667            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49668            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49669            FCT-LB106-29:0         LISTENING
TCP   0.0.0.0:49677            FCT-LB106-29:0         LISTENING
TCP   127.0.0.1:8884           FCT-LB106-29:0         LISTENING
TCP   127.0.0.1:50333          FCT-LB106-29:0         LISTENING
TCP   127.0.0.1:53887          FCT-LB106-29:53888     ESTABLISHED
TCP   127.0.0.1:53888          FCT-LB106-29:53887     ESTABLISHED
TCP   127.0.0.1:53890          FCT-LB106-29:53891     ESTABLISHED
TCP   127.0.0.1:53891          FCT-LB106-29:53890     ESTABLISHED
TCP   169.254.246.70:139      FCT-LB106-29:0         LISTENING
TCP   172.16.60.70:139        FCT-LB106-29:0         LISTENING
TCP   172.16.60.70:53860      40.113.110.67:https     ESTABLISHED
TCP   172.16.60.70:53897      ec2-52-13-69-101:https  ESTABLISHED
TCP   172.16.60.70:54436      13.71.196.227:8883      ESTABLISHED
TCP   172.16.60.70:54759      a-0003:https            ESTABLISHED
TCP   172.16.60.70:54811      a23-44-11-89:https      CLOSE_WAIT
TCP   172.16.60.70:54823      239:https               ESTABLISHED
TCP   172.16.60.70:54824      52.137.102.105:https    ESTABLISHED
TCP   172.16.60.70:54825      52.137.103.96:https     ESTABLISHED
TCP   172.16.60.70:54826      a104-84-169-247:https   ESTABLISHED
TCP   172.16.60.70:54829      172.16.70.138:ms-do     SYN_SENT
TCP   192.168.56.1:139        FCT-LB106-29:0         LISTENING
TCP   [::]:135                FCT-LB106-29:0         LISTENING
TCP   [::]:445                FCT-LB106-29:0         LISTENING
TCP   [::]:3389               FCT-LB106-29:0         LISTENING
TCP   [::]:5357               FCT-LB106-29:0         LISTENING
TCP   [::]:5432               FCT-LB106-29:0         LISTENING
TCP   [::]:7680               FCT-LB106-29:0         LISTENING
TCP   [::]:49664              FCT-LB106-29:0         LISTENING
TCP   [::]:49665              FCT-LB106-29:0         LISTENING
TCP   [::]:49666              FCT-LB106-29:0         LISTENING
TCP   [::]:49667              FCT-LB106-29:0         LISTENING
TCP   [::]:49668              FCT-LB106-29:0         LISTENING
TCP   [::]:49669              FCT-LB106-29:0         LISTENING
TCP   [::]:49677              FCT-LB106-29:0         LISTENING
TCP   [::1]:49670             FCT-LB106-29:0         LISTENING
UDP   0.0.0.0:123             *:.*                    LISTENING
UDP   0.0.0.0:3389            *:.*                    LISTENING
UDP   0.0.0.0:3702            *:.*                    LISTENING
UDP   0.0.0.0:3702            *:.*                    LISTENING
UDP   0.0.0.0:5050            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5353            *:.*                    LISTENING
UDP   0.0.0.0:5355            *:.*                    LISTENING
UDP   0.0.0.0:62014           *:.*                    LISTENING
UDP   127.0.0.1:1900          *:.*                    LISTENING
UDP   127.0.0.1:55029         *:.*                    LISTENING
UDP   127.0.0.1:57904         *:.*                    LISTENING
UDP   127.0.0.1:64500         *:.*                    LISTENING
```

Figure 1.10 – netstat -a

### 1.8.3 netstat -all

```
C:\Users\FCT>netstat -all

Displays protocol statistics and current TCP/IP network connections.

NETSTAT [-a] [-b] [-e] [-f] [-n] [-o] [-p proto] [-r] [-s] [-t] [-x] [-y] [interval]

-a          Displays all connections and listening ports.
-b          Displays the executable involved in creating each connection or
           listening port. In some cases well-known executables host
           multiple independent components, and in these cases the
           sequence of components involved in creating the connection
           or listening port is displayed. In this case the executable
           name is in [] at the bottom, on top is the component it called,
           and so forth until TCP/IP was reached. Note that this option
           can be time-consuming and will fail unless you have sufficient
           permissions.
-e          Displays Ethernet statistics. This may be combined with the -s
           option.
-f          Displays Fully Qualified Domain Names (FQDN) for foreign
           addresses.
-n          Displays addresses and port numbers in numerical form.
-o          Displays the owning process ID associated with each connection.
-p proto    Shows connections for the protocol specified by proto; proto
           may be any of: TCP, UDP, TCPv6, or UDPv6. If used with the -s
           option to display per-protocol statistics, proto may be any of:
           IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
-q          Displays all connections, listening ports, and bound
           nonlistening TCP ports. Bound nonlistening ports may or may not
           be associated with an active connection.
-r          Displays the routing table.
-s          Displays per-protocol statistics. By default, statistics are
           shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
           the -p option may be used to specify a subset of the default.
-t          Displays the current connection offload state.
-x          Displays NetworkDirect connections, listeners, and shared
           endpoints.
-y          Displays the TCP connection template for all connections.
           Cannot be combined with the other options.
interval   Redisplays selected statistics, pausing interval seconds
           between each display. Press CTRL+C to stop redisplaying
           statistics. If omitted, netstat will print the current
           configuration information once.

C:\Users\FCT>
```

Figure 1.11 – netstat -all

#### 1.8.4 netstat -e

```
C:\Users\FCT>NETSTAT -e
Interface Statistics


```

	Received	Sent
Bytes	4020585773	1096459740
Unicast packets	3410500	5108105
Non-unicast packets	323720	117765
Discards	655	0
Errors	0	0
Unknown protocols	0	

```
C:\Users\FCT>
```

Figure 1.12 – netstat -e

#### 1.8.5 netstat -f

```
C:\Users\FCT>NETSTAT -f
Active Connections


```

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:53887	FCT-LB106-29:53888	ESTABLISHED
TCP	127.0.0.1:53888	FCT-LB106-29:53887	ESTABLISHED
TCP	127.0.0.1:53890	FCT-LB106-29:53891	ESTABLISHED
TCP	127.0.0.1:53891	FCT-LB106-29:53890	ESTABLISHED
TCP	172.16.60.70:7680	172.19.45.46:63353	ESTABLISHED
TCP	172.16.60.70:7680	172.19.131.3:50484	TIME_WAIT
TCP	172.16.60.70:53860	40.113.110.67:https	ESTABLISHED
TCP	172.16.60.70:53897	ec2-52-13-69-101.us-west-2.compute.amazonaws.com:https	ESTABLISHED
TCP	172.16.60.70:54436	13.71.196.227:8883	ESTABLISHED
TCP	172.16.60.70:54759	a-0003.dc-msedge.net:https	ESTABLISHED
TCP	172.16.60.70:54811	a23-44-11-89.deploy.static.akamaitechnologies.com:https	CLOSE_WAIT

```
C:\Users\FCT>_
```

Figure 1.13 – netstat -f

### 1.8.6 netstat -n

```
C:\Users\FCT>NETSTAT -n

Active Connections

    Proto Local Address          Foreign Address         State
    TCP    127.0.0.1:53887         127.0.0.1:53888         ESTABLISHED
    TCP    127.0.0.1:53888         127.0.0.1:53887         ESTABLISHED
    TCP    127.0.0.1:53890         127.0.0.1:53891         ESTABLISHED
    TCP    127.0.0.1:53891         127.0.0.1:53890         ESTABLISHED
    TCP    172.16.60.70:7680       172.19.45.46:63353      TIME_WAIT
    TCP    172.16.60.70:53860      40.113.110.67:443       ESTABLISHED
    TCP    172.16.60.70:53897      52.13.69.101:443        ESTABLISHED
    TCP    172.16.60.70:54436      13.71.196.227:8883      ESTABLISHED
    TCP    172.16.60.70:54759      131.253.33.203:443      ESTABLISHED
    TCP    172.16.60.70:54811      23.44.11.89:443         CLOSE_WAIT

C:\Users\FCT>
```

Figure 1.14 – netstat -n

### 1.8.7 netstat -o

```
C:\Users\FCT>netstat -o

Active Connections

    Proto Local Address          Foreign Address         State      PID
    TCP    127.0.0.1:53887         FCT-LB106-29:53888     ESTABLISHED 5264
    TCP    127.0.0.1:53888         FCT-LB106-29:53887     ESTABLISHED 5264
    TCP    127.0.0.1:53890         FCT-LB106-29:53891     ESTABLISHED 4736
    TCP    127.0.0.1:53891         FCT-LB106-29:53890     ESTABLISHED 4736
    TCP    172.16.60.70:7680       172.16.77.46:50499     TIME_WAIT   0
    TCP    172.16.60.70:7680       172.19.55.17:50379     ESTABLISHED 4348
    TCP    172.16.60.70:53860      40.113.110.67:https    ESTABLISHED 3340
    TCP    172.16.60.70:53897      ec2-52-13-69-101:https ESTABLISHED 5264
    TCP    172.16.60.70:54436      13.71.196.227:8883     ESTABLISHED 10664
    TCP    172.16.60.70:54759      a-0003:https           ESTABLISHED 292
    TCP    172.16.60.70:54857      a23-44-11-89:https     CLOSE_WAIT  8136
    TCP    172.16.60.70:54858      13.107.21.200:https    ESTABLISHED 8136
    TCP    172.16.60.70:54859      13.107.21.200:https    ESTABLISHED 8136
    TCP    172.16.60.70:54860      13.107.21.200:https    ESTABLISHED 8136
    TCP    172.16.60.70:54861      152.199.43.62:https    ESTABLISHED 8136
    TCP    172.16.60.70:54862      204.79.197.222:https   ESTABLISHED 8136
    TCP    172.16.60.70:54863      172.19.136.204:ms-do   TIME_WAIT   0
    TCP    172.16.60.70:54864      13.107.4.254:https     ESTABLISHED 8136
    TCP    172.16.60.70:54870      172.19.52.147:ms-do    SYN_SENT    4348

C:\Users\FCT>
```

Figure 1.15 – netstat -o



### 1.8.8 netstat -p tcp

```
C:\Users\FCT>netstat -p udp
```

Active Connections

Proto	Local Address	Foreign Address	State
-------	---------------	-----------------	-------

```
C:\Users\FCT>netstat -p tcp
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:53887	FCT-LB106-29:53888	ESTABLISHED
TCP	127.0.0.1:53888	FCT-LB106-29:53887	ESTABLISHED
TCP	127.0.0.1:53890	FCT-LB106-29:53891	ESTABLISHED
TCP	127.0.0.1:53891	FCT-LB106-29:53890	ESTABLISHED
TCP	172.16.60.70:7680	172.19.55.17:50379	ESTABLISHED
TCP	172.16.60.70:53860	40.113.110.67:https	ESTABLISHED
TCP	172.16.60.70:53897	ec2-52-13-69-101:https	ESTABLISHED
TCP	172.16.60.70:54436	13.71.196.227:8883	ESTABLISHED
TCP	172.16.60.70:54759	a-0003:https	ESTABLISHED
TCP	172.16.60.70:54857	a23-44-11-89:https	LAST_ACK
TCP	172.16.60.70:54882	123:https	TIME_WAIT
TCP	172.16.60.70:54902	13.107.21.239:https	ESTABLISHED
TCP	172.16.60.70:54903	13.107.21.239:https	ESTABLISHED
TCP	172.16.60.70:54904	a104-120-65-72:http	TIME_WAIT
TCP	172.16.60.70:54905	a23-10-32-208:http	TIME_WAIT
TCP	172.16.60.70:54906	vip0x008:http	TIME_WAIT
TCP	172.16.60.70:54910	52.231.199.126:https	ESTABLISHED
TCP	172.16.60.70:54911	a104-91-41-38:https	ESTABLISHED
TCP	172.16.60.70:54918	13.107.21.200:https	ESTABLISHED
TCP	172.16.60.70:54919	13.107.4.254:https	ESTABLISHED
TCP	172.16.60.70:54920	13.107.21.200:https	ESTABLISHED
TCP	172.16.60.70:54921	a104-91-40-113:https	ESTABLISHED
TCP	172.16.60.70:54922	52.113.196.254:https	ESTABLISHED
TCP	172.16.60.70:54923	204.79.197.222:https	ESTABLISHED
TCP	172.16.60.70:54924	13.107.42.254:https	ESTABLISHED
TCP	172.16.60.70:54925	150.171.32.254:https	ESTABLISHED
TCP	172.16.60.70:54926	239:https	ESTABLISHED
TCP	172.16.60.70:54927	52.137.102.105:https	ESTABLISHED
TCP	172.16.60.70:54929	172.19.45.46:ms-do	SYN_SENT

```
C:\Users\FCT>
```

Figure 1.16 – netstat -p tcp



### 1.8.9 netstat -q

```
C:\Users\FCT>netstat -q

Active Connections

Proto Local Address           Foreign Address         State
TCP   0.0.0.0:135              FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:445              FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:3389             FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:5040             FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:5357             FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:5432             FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:7680             FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49664            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49665            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49666            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49667            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49668            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49669            FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:49677            FCT-LB106-29:0        LISTENING
TCP   127.0.0.1:8884            FCT-LB106-29:0        LISTENING
TCP   127.0.0.1:50333          FCT-LB106-29:0        LISTENING
TCP   127.0.0.1:53887          FCT-LB106-29:53888    ESTABLISHED
TCP   127.0.0.1:53888          FCT-LB106-29:53887    ESTABLISHED
TCP   127.0.0.1:53890          FCT-LB106-29:53891    ESTABLISHED
TCP   127.0.0.1:53891          FCT-LB106-29:53890    ESTABLISHED
TCP   169.254.246.70:139       FCT-LB106-29:0        LISTENING
TCP   172.16.60.70:139         FCT-LB106-29:0        LISTENING
TCP   172.16.60.70:7680        172.19.55.17:50379    ESTABLISHED
TCP   172.16.60.70:53860        40.113.110.67:https    ESTABLISHED
TCP   172.16.60.70:53897        ec2-52-13-69-101:https ESTABLISHED
TCP   172.16.60.70:54436        13.71.196.227:8883     ESTABLISHED
TCP   172.16.60.70:54759        a-0003:https           ESTABLISHED
TCP   172.16.60.70:54857        a23-44-11-89:https     CLOSE_WAIT
TCP   172.16.60.70:54861        152.199.43.62:https    CLOSE_WAIT
TCP   172.16.60.70:54864        13.107.4.254:https     ESTABLISHED
TCP   172.16.60.70:54874        172.19.23.4:ms-do      TIME_WAIT
TCP   172.16.60.70:54875        FCT-LB106-08:ms-do     TIME_WAIT
TCP   172.16.60.70:54876        52.137.106.217:https   TIME_WAIT
TCP   172.16.60.70:54880        172.19.129.82:ms-do    SYN_SENT
TCP   172.16.60.70:54881        se-in-f95:https        TIME_WAIT
TCP   172.16.60.70:54882        123:https              ESTABLISHED
TCP   192.168.56.1:139         FCT-LB106-29:0        LISTENING
TCP   0.0.0.0:53860            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:53888            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:53891            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:53897            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54674            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54675            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54677            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54680            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54693            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54694            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54695            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54700            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54704            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54731            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54759            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54857            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54858            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54859            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54860            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54861            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54862            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54864            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54882            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54885            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54886            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54888            FCT-LB106-29:0        BOUND
TCP   0.0.0.0:54889            FCT-LB106-29:0        LISTENING
```

Figure 1.17 - netstat -q

### 1.8.10 netstat -r

```

:\Users\FCT>netstat -r
=====
Interface List
  5...50 3e aa 10 dd c8 .....TP-Link Gigabit PCI Express Adapter
 19...e4 54 e8 b5 c7 c3 .....Intel(R) Ethernet Connection (7) I219-LM
 16...0a 00 27 00 00 10 .....VirtualBox Host-Only Ethernet Adapter
  4...04 ed 33 9e df d1 .....Intel(R) Wireless-AC 9560 160MHz
 18...04 ed 33 9e df d2 .....Microsoft Wi-Fi Direct Virtual Adapter
 12...06 ed 33 9e df d1 .....Microsoft Wi-Fi Direct Virtual Adapter #2
  1.....Software Loopback Interface 1
=====

Pv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway           Interface        Metric
 0.0.0.0                0.0.0.0         172.16.60.1       172.16.60.70      25
 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
 169.254.0.0            255.255.0.0       On-link          169.254.246.70    281
 169.254.246.70        255.255.255.255   On-link          169.254.246.70    281
 169.254.255.255        255.255.255.255   On-link          169.254.246.70    281
 172.16.60.0            255.255.254.0     On-link           172.16.60.70      281
 172.16.60.70          255.255.255.255   On-link           172.16.60.70      281
 172.16.61.255          255.255.255.255   On-link           172.16.60.70      281
 192.168.56.0           255.255.255.0     On-link          192.168.56.1      281
 192.168.56.1          255.255.255.255   On-link          192.168.56.1      281
 192.168.56.255         255.255.255.255   On-link          192.168.56.1      281
 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          192.168.56.1      281
 224.0.0.0              240.0.0.0         On-link           172.16.60.70      281
 224.0.0.0              240.0.0.0         On-link          169.254.246.70    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          192.168.56.1      281
 255.255.255.255        255.255.255.255   On-link           172.16.60.70      281
 255.255.255.255        255.255.255.255   On-link          169.254.246.70    281
=====
Persistent Routes:
None

Pv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
19 281 ::0 fe80::2e5a:fff:febc:e543
1 331 ::1/128 On-link
19 281 2401:dd00:20:2060::/64 On-link
19 281 2401:dd00:20:2060:adab:2fd8:cde5:82fb/128 On-link
19 281 2401:dd00:20:2060:c860:c280:b230:8773/128 On-link
19 281 2401:dd00:20:2060:fc2e:ca4d:b15:743c/128 On-link
16 281 fe80::/64 On-link
19 281 fe80::/64 On-link
5 281 fe80::/64 On-link
16 281 fe80::149f:b027:d83a:e379/128 On-link
19 281 fe80::c860:c280:b230:8773/128 On-link
5 281 fe80::fc65:f067:227f:f646/128 On-link
1 331 ff00::/8 On-link
16 281 ff00::/8 On-link
19 281 ff00::/8 On-link
5 281 ff00::/8 On-link
=====
Persistent Routes:

```

Figure 1.18 - netstat -r

### 1.8.11 netstat -s

```
C:\Users\Wenura>netstat -s

IPv4 Statistics

Packets Received                = 312970
Received Header Errors          = 0
Received Address Errors         = 7
Datagrams Forwarded             = 0
Unknown Protocols Received      = 0
Received Packets Discarded      = 1829
Received Packets Delivered      = 317468
Output Requests                 = 193815
Routing Discards                = 0
Discarded Output Packets        = 380
Output Packet No Route          = 38
Reassembly Required             = 0
Reassembly Successful           = 0
Reassembly Failures             = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created               = 0

IPv6 Statistics

Packets Received                = 109
Received Header Errors          = 0
Received Address Errors         = 40
Datagrams Forwarded             = 0
Unknown Protocols Received      = 0
Received Packets Discarded      = 10
Received Packets Delivered      = 829
Output Requests                 = 1890
Routing Discards                = 0
Discarded Output Packets        = 0
Output Packet No Route          = 0
Reassembly Required             = 0
Reassembly Successful           = 0
Reassembly Failures             = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created               = 0

ICMPv4 Statistics

                Received      Sent
Messages                672      893
Errors                   0         0
Destination Unreachable  664      885
Time Exceeded            0         0
Parameter Problems       0         0
Source Quenches          0         0
Redirects                 0         0
Echo Replies             8         0
Echos                    0         8
Timestamps               0         0
```

Figure 1.19 – netstat -s

### 1.8.12 netstat -t

```
C:\Users\Wenura>netstat -t

Active Connections

    Proto Local Address           Foreign Address         State       Offload State
    ----
TCP    127.0.0.1:50113         MSI:65001               ESTABLISHED InHost
TCP    127.0.0.1:50119         MSI:50130               ESTABLISHED InHost
TCP    127.0.0.1:50130         MSI:50119               ESTABLISHED InHost
TCP    127.0.0.1:65001         MSI:50113               ESTABLISHED InHost
TCP    192.168.1.103:50208     20.198.162.78:https     ESTABLISHED InHost
TCP    192.168.1.103:50411     52.98.33.130:https      ESTABLISHED InHost
TCP    192.168.1.103:50649     52.111.240.5:https      ESTABLISHED InHost
TCP    192.168.1.103:50652     52.111.240.5:https      ESTABLISHED InHost
TCP    192.168.1.103:50678     8.253.129.66:http       TIME_WAIT   InHost
TCP    192.168.1.103:50681     8.253.129.66:http       TIME_WAIT   InHost
TCP    192.168.1.103:50685     whatsapp-chatd-edge-shv-02-sin6:5222 TIME_WAIT   InHost
TCP    192.168.1.103:50687     13.107.21.239:https     ESTABLISHED InHost
TCP    192.168.1.103:50688     204.79.197.222:https    ESTABLISHED InHost
TCP    192.168.1.103:50689     13.107.21.200:https     ESTABLISHED InHost
TCP    192.168.1.103:50690     bingforbusiness:https   ESTABLISHED InHost
TCP    192.168.1.103:50691     bingforbusiness:https   ESTABLISHED InHost
TCP    192.168.1.103:50692     bingforbusiness:https   ESTABLISHED InHost
TCP    192.168.1.103:50695     52.98.33.130:https      ESTABLISHED InHost
TCP    192.168.1.103:50696     40.79.197.35:https      ESTABLISHED InHost
TCP    192.168.1.103:50697     a23-72-44-110:https     ESTABLISHED InHost
TCP    192.168.1.103:50698     117.18.237.29:http      ESTABLISHED InHost
TCP    192.168.1.103:50699     117.18.232.200:https    ESTABLISHED InHost
TCP    192.168.1.103:50700     152.199.43.62:https     ESTABLISHED InHost

C:\Users\Wenura>
```

Figure 1.20 – netstat -t

### 1.8.13 netstat -x

```
C:\Users\Wenura>netstat -x

Active NetworkDirect Connections, Listeners, SharedEndpoints

    Mode   IfIndex Type           Local Address           Foreign Address         PID
    ----
C:\Users\Wenura>
```

Figure 1.21 – netstat -x

### 1.8.14 netstat -y

```
C:\Users\Wenura>netstat -y

Active Connections

    Proto Local Address           Foreign Address         State       Template
    ----  -
TCP    127.0.0.1:50113          MSI:65001               ESTABLISHED Internet
TCP    127.0.0.1:50119          MSI:50130               ESTABLISHED Internet
TCP    127.0.0.1:50130          MSI:50119               ESTABLISHED Internet
TCP    192.168.1.103:50208      20.198.162.78:https     ESTABLISHED Internet
TCP    192.168.1.103:50411      52.98.33.130:https      ESTABLISHED Internet
TCP    192.168.1.103:50649      52.111.240.5:https      ESTABLISHED Internet
TCP    192.168.1.103:50652      52.111.240.5:https      ESTABLISHED Internet
TCP    192.168.1.103:50697      a23-72-44-110:https     CLOSE_WAIT  Internet
TCP    192.168.1.103:50698      117.18.237.29:http      ESTABLISHED Internet
TCP    192.168.1.103:50699      117.18.232.200:https    ESTABLISHED Internet
TCP    192.168.1.103:50700      152.199.43.62:https     ESTABLISHED Internet
TCP    192.168.1.103:50701      52.178.17.2:https       ESTABLISHED Internet
TCP    127.0.0.1:65001          MSI:50113               ESTABLISHED Internet

C:\Users\Wenura>
```

Figure 1.22 – netstat -y

## Experiment 2    Assigning IP address

### 2.1    Step 1– Opening Network Connection Settings

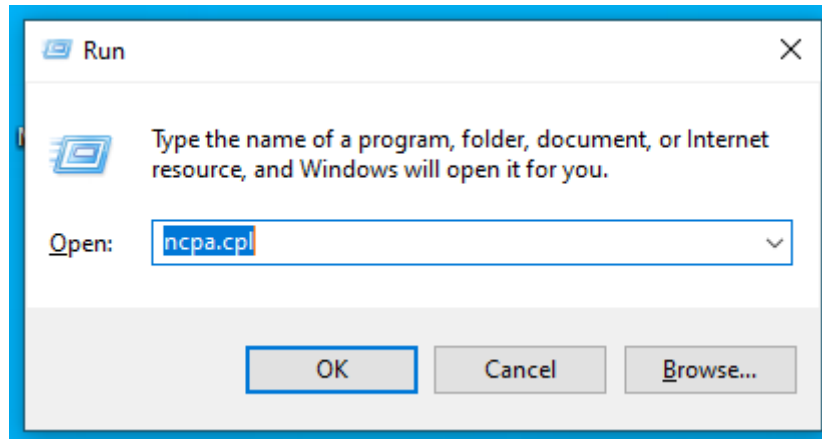


Figure 2.1 – step 1

### 2.2    Step 2 - Select properties of the network

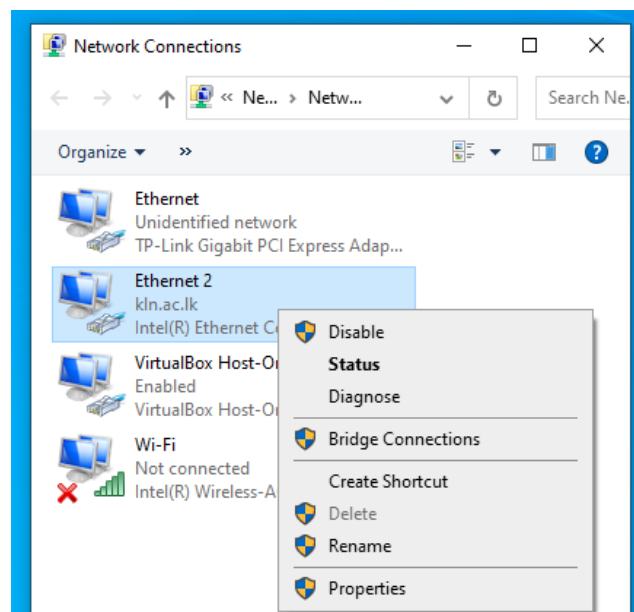


Figure 2.2 – step 2

## 2.3 Step 3 - Select IPv4

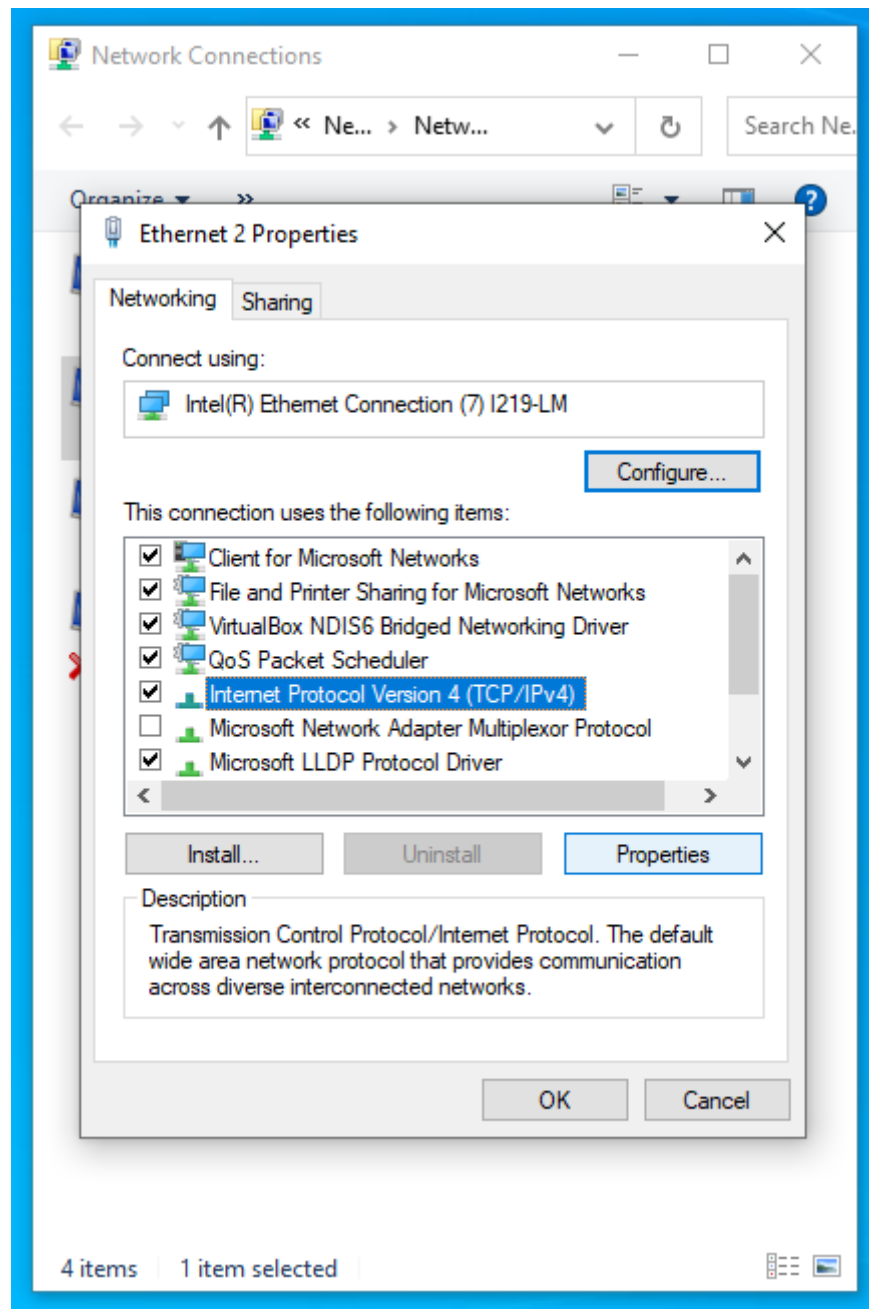


Figure 2.3 – step 3

## 2.4 Step 4 - Changing properties

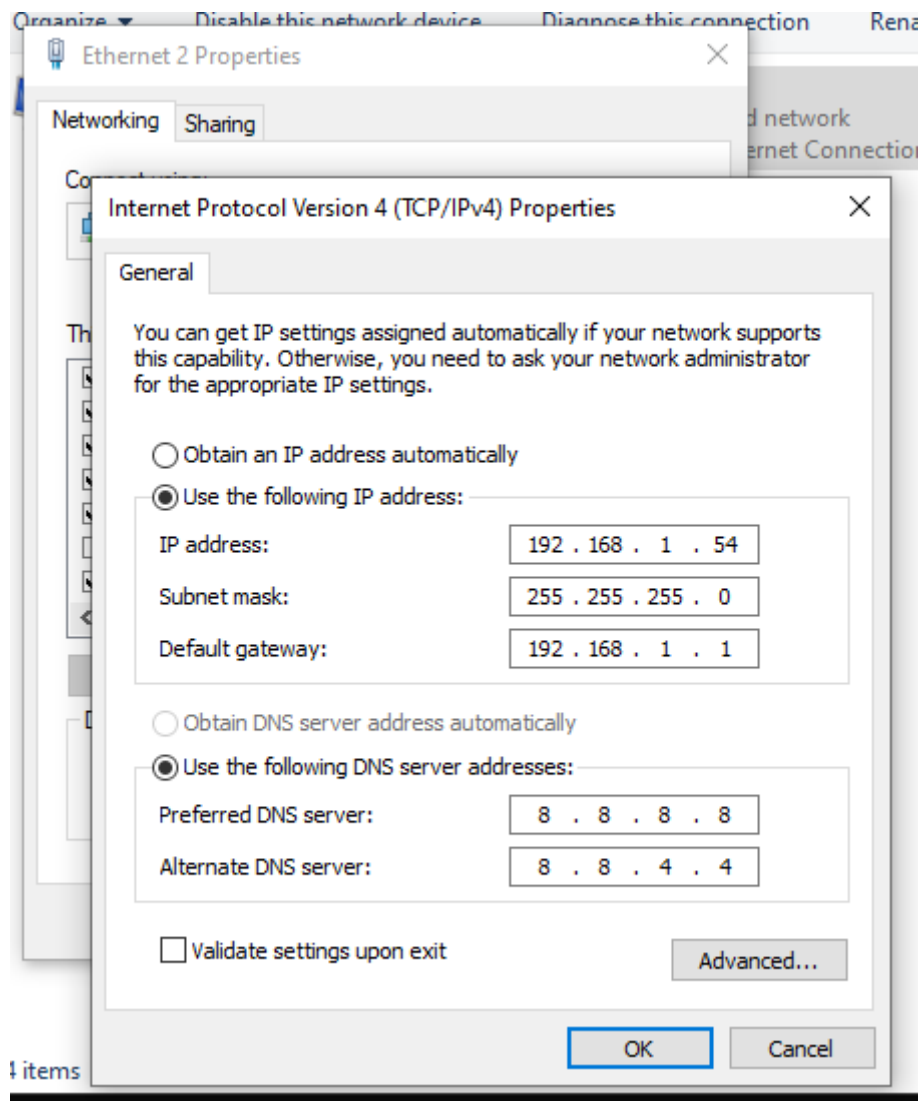


Figure 2.4 – step 4



## 2.5 Step 5 - Checking network status

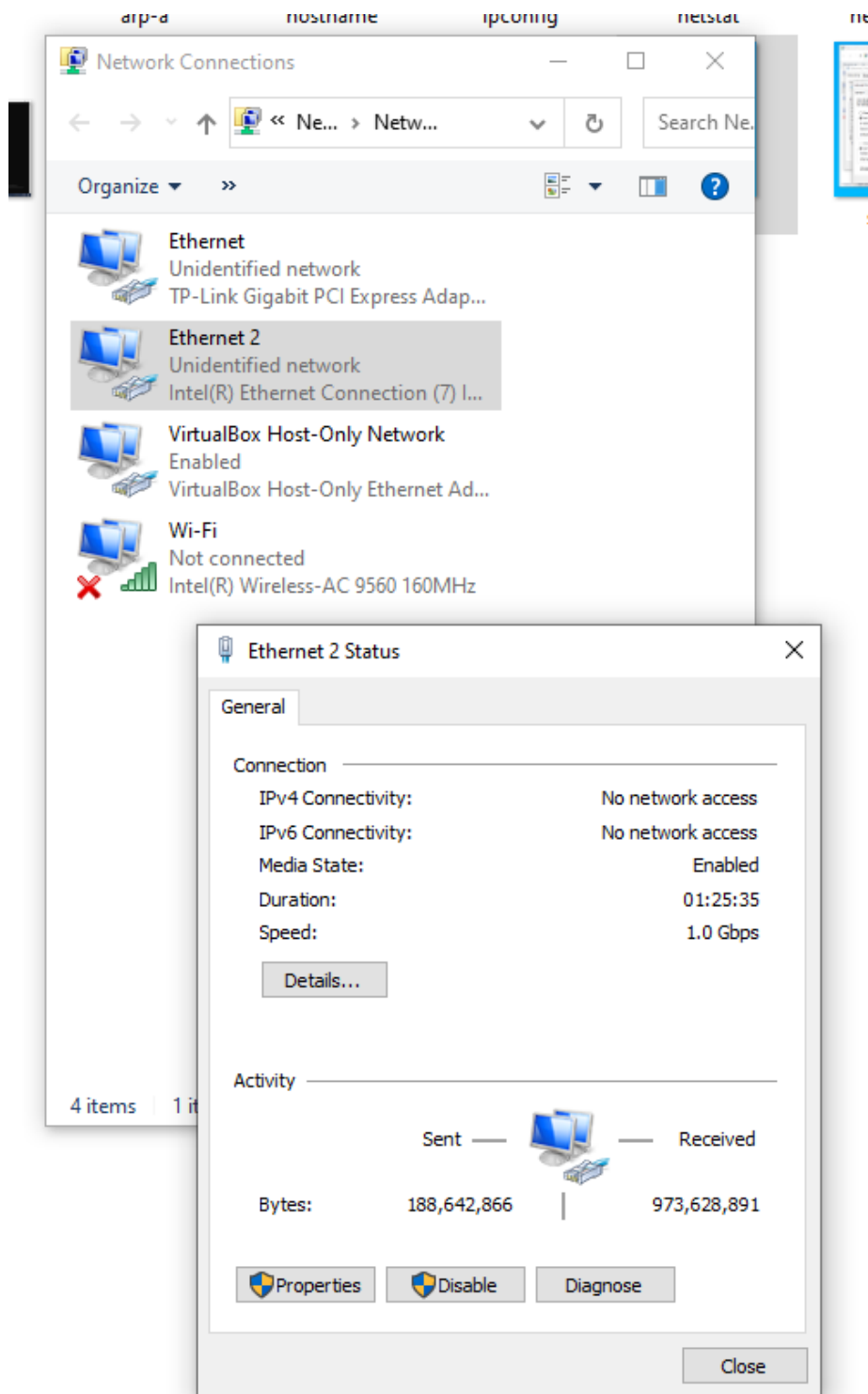


Figure 2.5 – step 5

## 2.6 Step 6 - Checking ipconfig

```
C:\Users\FCT>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::fc65:f067:227f:f646%5
    Autoconfiguration IPv4 Address. . : 169.254.246.70
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : kln.ac.lk
    IPv6 Address. . . . . : 2401:dd00:20:2060:c860:c280:b230:8773
    IPv6 Address. . . . . : 2401:dd00:20:2060:fc2e:ca4d:b15:743c
    Temporary IPv6 Address. . . . . : 2401:dd00:20:2060:adab:2fd8:cde5:82fb
    Link-local IPv6 Address . . . . . : fe80::c860:c280:b230:8773%19
    IPv4 Address. . . . . : 172.16.60.70
    Subnet Mask . . . . . : 255.255.254.0
    Default Gateway . . . . . : fe80::2e5a:fff:febc:e543%19
                                172.16.60.1

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::149f:b027:d83a:e379%16
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Wi-Fi:

    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* 2:

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

C:\Users\FCT>
```

Figure 2.6 – ipconfig before assigning IP address

```

C:\Users\FCT>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::fc65:f067:227f:f646%5
    Autoconfiguration IPv4 Address. . : 169.254.246.70
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : 
    IPv6 Address. . . . . : 2401:dd00:20:2060:c860:c280:b230:8773
    IPv6 Address. . . . . : 2401:dd00:20:2060:fc2e:ca4d:b15:743c
    Temporary IPv6 Address. . . . . : 2401:dd00:20:2060:adab:2fd8:cde5:82fb
    Link-local IPv6 Address . . . . . : fe80::c860:c280:b230:8773%19
    IPv4 Address. . . . . : 192.168.1.54
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::2e5a:fff:febc:e543%19
                                192.168.1.1

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::149f:b027:d83a:e379%16
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Wi-Fi:

    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* 2:

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

C:\Users\FCT>

```

Figure 2.7 – ipconfig after assigning IP address

## 2.7 Step 7 - Revert back

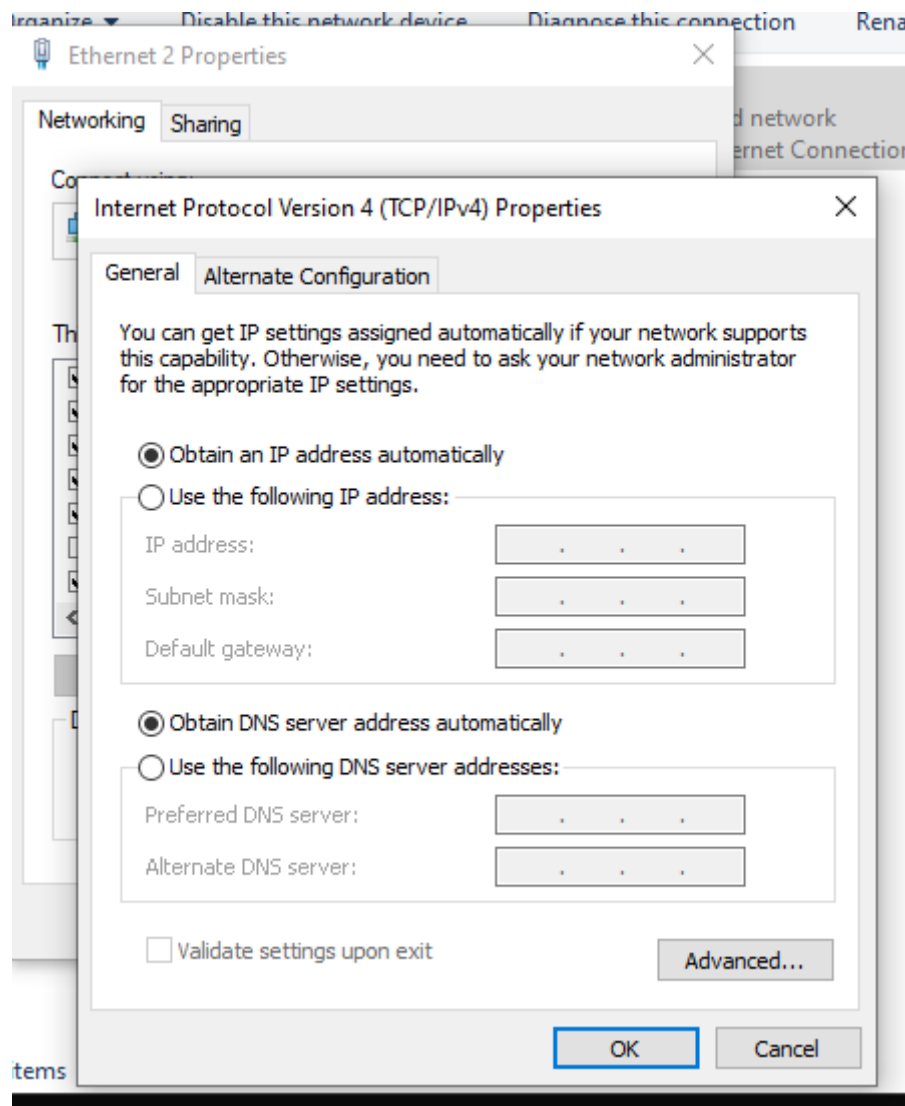


Figure 2.8 - step 7