Lab No : 01

Name of the Lab : Network configuration , Routing table & Virtual interfaces

ID : IT-17060

Objective :
- ❖ Finding IP,MAC
- ❖ Routing Table Basics
- ❖ virtual interfaces
- ❖ Add a network
- ❖ Multinetwork Scenario Configuration

1. **Introduction :**

If you have a network that ranges from 192.168.1.0 to 192.168.1.255 explain why Individual devices in the network can only be assigned IP addresses in the range of 192.168.1.1 to 192.168.1.254.

Ans : From a big picture perspective, consider this classful address: Network ID: 192.168.0.0 Subnet mask: 255.255.255.0 (I realize that 192.168.0.0 isn't a common example, but it is valid and helps illustrate the point.)Valid host IP addresses in the "neighborhood" for the "house numbers" are: 192.168.0.1 through 192.168.0.254 The network ID is 192.168.0.0 The broadcast address is 192.168.0.255Here's what is looks like if this is not a classful address: Network ID: 192.168.0.0 Subnet mask: 255.255.0.0Valid host IP addresses in the "neighborhood" for the "house numbers" are: 192.168.0.1 through 192.168.255.254 The network ID is 192.168.0.0 The broadcast address is 192.168.0.255

After all this give you a range 192.168.1.0 to 192.168.1.255, with .0 being called the loopback address and .255 being the broadcast address, used for discovering active (responding) IP's, and each ones features, by devices in the usable range of 192.168.1.1 to 192.168.1.254.

0	0	0	0	0	0	0	0

Denote to 0 (zero)

1	1	1	1	1	1	1	1

Denote to 255

2. Find IP and MAC :


```
sohag@sohag-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::2a5f:fe52:f9a9:ef77  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:fc:a7:86  txqueuelen 1000  (Ethernet)
        RX packets 611328  bytes 609309488 (609.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 213550  bytes 13290199 (13.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 1151  bytes 117132 (117.1 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1151  bytes 117132 (117.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

sohag@sohag-VirtualBox:~$
```

Fig : mac address


```
sohag@sohag-VirtualBox:~$ ip route list
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
sohag@sohag-VirtualBox:~$
```

Fig : IP address

3. Routing Table Basics :

The routing tables are an important part of Windows' TCP/IP protocol stack, but they aren't something that the operating system normally displays to the casual user.

```
sohag@sohag-VirtualBox:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         _gateway        0.0.0.0         UG        0 0           0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U         0 0           0 enp0s3
link-local      0.0.0.0         255.255.0.0     U         0 0           0 enp0s3
sohag@sohag-VirtualBox:~$
```

- **Destination** : The destination network or destination host.
- **Gateway** : The gateway address or 'â€™*â€™' if none set.
- **Genmask** : The netmask for the destination net; 255.255.255.255 for a host destination and 0.0.0.0 for the default route.
  - **Flags** : Possible flags include
    - U (route is up)
    - H (target is a host)
    - G (use gateway)
  - **MSS** : Default maximum segment size for TCP connections over this route.
  - **Window** : Default window size for TCP connections over this route.
  - **irtt** : Initial RTT (Round Trip Time). The kernel uses this to guess about the best TCP protocol parameters without waiting on (possibly slow) answers.
  - **Iface** : Interface to which packets for this route will be sent.

4. **Virtual interfaces :**

   a) I am going to create a new virtual interface with the following IP address, 192.168.2.32 and netmask 255.255.255.0 then check I want to see wheather the interface is created successfully.

```
sohag@sohag-VirtualBox:~$ nmcli connection add con-name etho type ethernet ifnam
e enp0s3 ipv4.address 192.168.2.32 ipv4.method manual connection.autoconnect yes

Connection 'etho' (b5609fac-ff01-4d9f-b7dd-24410314a00c) successfully added.
```

Now I want to check whether the IP is created with the help of following command

```
sohag@sohag-VirtualBox:~$ ping 192.168.2.32
PING 192.168.2.32 (192.168.2.32) 56(84) bytes of data.
^Z
[2]+  Stopped                 ping 192.168.2.32
sohag@sohag-VirtualBox:~$
```

b) I need to set up a route for this interface so that my computer can see it. Issue the needed command ,then issue the "$ netstat -r" command and check if the route to my added interface is visible?

```
sohag@sohag-VirtualBox:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         _gateway        0.0.0.0         UG        0 0          0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U         0 0          0 enp0s3
link-local      0.0.0.0         255.255.0.0     U         0 0          0 enp0s3
sohag@sohag-VirtualBox:~$
```

5. **Add a New network :**

a. Enter the command needed to add another network with the same values as your primary network meaning : (yourPrimaryNetworkAddress) and (netmaskforYourNetwork) .