



# Mawlana Bhashani Science and Technology University

## Assignment

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## 1) Introduction

If I have a network that ranges from 192.168.1.0 to 192.168.1.255  
Individual devices in the network can only be assigned IP addresses in the range of 192.168.1.1 to 192.168.1.254 because we can not use the first address is called network address and last address is called broadcast address but if we write a command before this ip address named “ip-subnet zero” then we can use those subnet So that’s why the first usable address is 192.168.1.1 and the last is 192.168.1.254.

## 2) Find IP & MAC

The MAC address and IP address are listed under the appropriate adapter as Physical Address and IPv4 Address.

```
masud@masud-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::1256:d071:904:f492 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:a9:5a:ab txqueuelen 1000 (Ethernet)
    RX packets 2050141 bytes 2153143817 (2.1 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 718625 bytes 50475115 (50.4 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 24682 bytes 3118098 (3.1 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 24682 bytes 3118098 (3.1 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

## 3) Routing Table basics

Enter the command: "\$ netstat -r" to print your computers routing table.

```
masud@masud-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
```

**Destination:** The network ID or destination corresponding to the route.

**Gateway:** This column indicates the defined gateway for the network. If you see an \* in this column, it means that no forwarding gateway is needed for the specified network.

**Genmask:** The mask that is used to match a destination IP address to the network ID. **Flags:** The U output in this columns means that the route is up. The G output indicates that specified gateway should be used for this route. D stands for dynamically installed, M stands for modified, and R means reinstated.

**MSS:** The MSS column indicates the default Maximum Segment Size for TCP connections over this route.

**Windows:** The Window column indicates the default window size for TCP connections over this route.

**Irtt:** The Irtt column indicates the Initial Round Trip Time for this route.

**Iface:** The Iface column shows the network interface. If you had more than one interface, you would see lo (for loopback), eth0 (first Ethernet device), and eth1 (for the second Ethernet device), and so on for the number of interfaces you have installed.

#### **4) Virtual Interfaces**

a) Creating a new virtual interface with following IP address, 10.0.2.15 and netmask 255.255.255.0.

b) Inserting Interface in the Routing Table:

```

masud@masud-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
masud@masud-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::1256:d071:904:f492 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:a9:5a:ab txqueuelen 1000 (Ethernet)
    RX packets 2296195 bytes 2366299230 (2.3 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 822695 bytes 56882909 (56.8 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 25868 bytes 3226893 (3.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 25868 bytes 3226893 (3.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

masud@masud-VirtualBox:~$ sudo route add default gw 10.0.2.15
[sudo] password for masud:
masud@masud-VirtualBox:~$ sudo route add default gw 10.0.2.15
SIOCADDRT: File exists
masud@masud-VirtualBox:~$ netstat -r
Kernel IP routing table
Destination        Gateway            Genmask           Flags   MSS Window  irtt Iface
default            masud-VirtualBo 0.0.0.0           UG      0 0        0 enp0s3
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
masud@masud-VirtualBox:~$ netstat -rn
Kernel IP routing table
Destination        Gateway            Genmask           Flags   MSS Window  irtt Iface
0.0.0.0            10.0.2.15         0.0.0.0           UG      0 0        0 enp0s3
0.0.0.0            10.0.2.2          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
169.254.0.0        0.0.0.0           255.255.0.0       U        0 0        0 enp0s3

```

### c) Deleting Interface from Routing table:

```

masud@masud-VirtualBox:~$ sudo route add default gw 10.0.2.15
[sudo] password for masud:
masud@masud-VirtualBox:~$ sudo route add default gw 10.0.2.15
SIOCADDRT: File exists
masud@masud-VirtualBox:~$ netstat -r
Kernel IP routing table
Destination        Gateway            Genmask           Flags   MSS Window  irtt Iface
default            masud-VirtualBo 0.0.0.0           UG      0 0        0 enp0s3
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
masud@masud-VirtualBox:~$ netstat -rn
Kernel IP routing table
Destination        Gateway            Genmask           Flags   MSS Window  irtt Iface
0.0.0.0            10.0.2.15         0.0.0.0           UG      0 0        0 enp0s3
0.0.0.0            10.0.2.2          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
169.254.0.0        0.0.0.0           255.255.0.0       U        0 0        0 enp0s3
masud@masud-VirtualBox:~$ sudo route delete default gw 10.0.2.15
masud@masud-VirtualBox:~$ netstat -rn
Kernel IP routing table
Destination        Gateway            Genmask           Flags   MSS Window  irtt Iface
0.0.0.0            10.0.2.2          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
169.254.0.0        0.0.0.0           255.255.0.0       U        0 0        0 enp0s3

```

#### d) Deleting Virtual Interface:

```
masud@masud-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::1256:d071:904:f492 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:a9:5a:ab txqueuelen 1000 (Ethernet)
    RX packets 2296205 bytes 2366300274 (2.3 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 822790 bytes 56888827 (56.8 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 25958 bytes 3236075 (3.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 25958 bytes 3236075 (3.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

masud@masud-VirtualBox:~$ sudo ip addr delete 10.0.2.15 dev enp0s3
Warning: Executing wildcard deletion to stay compatible with old scripts.
        Explicitly specify the prefix length (10.0.2.15/32) to avoid this warning.
        This special behaviour is likely to disappear in further releases,
        fix your scripts!
masud@masud-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet6 fe80::1256:d071:904:f492 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:a9:5a:ab txqueuelen 1000 (Ethernet)
    RX packets 2296226 bytes 2366310764 (2.3 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 822809 bytes 56890904 (56.8 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 25966 bytes 3236799 (3.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 25966 bytes 3236799 (3.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

### 5) Add a New Network

- a) Enter the command needed to add another network with the same values as your primary network meaning:
- b) Assign the default gateway for your newly added network (tip the same default gateway as your primary network), (Your default gateway address).
- c) Look for your newly added network in your routing table by issuing the “\$ netstat -r” command. You should now have a double setup of your primary network in the table.
- d) Now, remove your changes meaning the double routing table setup for your primary network. First issue the command needed to delete your newly added route then issue the command to delete your newly added default gateway.



## 6) Multinetwork Scenario Configuration

There are many configuration options for the interface configuration files. These are some of the more common options:

**DEVICE:** The logical name of the device, such as eth0 or enp0s2.

**HWADDR:** The MAC address of the NIC that is bound to the file, such as 00:16:76:02:BA:DB

**ONBOOT:** Start the network on this device when the host boots. Options are yes/no. This is typically set to "no" and the network does not start until a user logs in to the desktop. If you need the network to start when no one is logged in, set this to "yes".

**IPADDR:** The IP Address assigned to this NIC such as 192.168.0.10

**BROADCAST:** The broadcast address for this network such as 192.168.0.255

**NETMASK:** The netmask for this subnet such as the class C mask 255.255.255.0

**NETWORK:** The network ID for this subnet such as the class C ID 192.168.0.0-

**SEARCH:** The DNS domain name to search when doing lookups on unqualified hostnames such as "example.com" **BOOTPROTO:** The boot protocol for this interface. Options are static, DHCP, bootp, none. The "none" option defaults to static.