



## Lab-Report

Report No: 02

Course code: ICT-3208

Course title: Computer Network Lab

Date of Performance: 26 / 12 / 2020

Date of Submission: 30 / 12 / 2020

### Submitted by

**Name:** Golam Kibria Tuhin

**ID:** IT-18015

3<sup>th</sup> year 2<sup>nd</sup> semester

**Session:** 2017-2018

**Dept. of ICT**

**MBSTU.**

### Submitted To

**Nazrul Islam**

**Assistant Professor**

**Dept. of ICT**

**MBSTU.**

**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.**

**Answer:** If your IP address ranges from 192.168.1.0 to 192.168.1.255 then you are connected to a private network. Home routers have their local address set to a default, private IP address number. It's usually the same address for the other models from that manufacturer, and it can be seen in the manufacturer's documentation. Here's a look at the default private (also called "local") IP addresses for popular brands of routers: Linksys routers use 192.168.1.1 ,D-Link and NETGEAR routers are set to 192.168.0.1 ,Cisco routers use either 192.168.1.1, 192.168.1.254 or 192.168.10.2 Belkin and SMC routers often use 192.168.2.1

192.168.1.254 is a Private IP address, one of the addresses for private networks. This means that a device in this private network cannot be accessed directly from the internet using a Private IP, but by any other device on the local network.

While the router itself has a Private IP of 192.168.1.254, it assigns any device in the network a different private IP address. All IP addresses on the network must have a unique address on that network to avoid IP address conflicts.

Ipv4addresses are internally 32 bits, they're often divided into 4 groups of 8 bits. An octet can only be variety from 0 – 255, so as that leaves 256 possibilities for that last number. All addresses within the range of 192.168.1.0 to 192.168.1.255 are within an equivalent network. There are only 254 possibilities for variety. The addresses 192.168.1.0 and 192.168.1.255 are reserved for the network.

192.168.1.0, is reserved for the “network address”.192.168.1.255, is that the “broadcast address”.

**2. Find IP & MAC: Find out about network and hardware information for the computer you are currently using.**

**Answer: *ifconfig*** (interface configurator) command is use to initialize an interface, assign IP Address to interface and enable or disable interface on demand. With this command you can view IP Address and Hardware / MAC address assign to interface and also MTU (Maximum transmission unit) size.

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ ifconfig  
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 2229 bytes 241500 (241.5 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 2229 bytes 241500 (241.5 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.0.106 netmask 255.255.255.0 broadcast 192.168.0.255  
    inet6 fe80::ec08:bfee:832c:15c7 prefixlen 64 scopeid 0x20<link>  
    ether 60:f6:77:ee:e5:fd txqueuelen 1000 (Ethernet)  
    RX packets 32372 bytes 35874559 (35.8 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 30689 bytes 5489203 (5.4 MB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
Tuhin@tuhin:~$
```

### 3. Routing Table basics:

The netstat -r command is used to show the routing table:

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ netstat -r  
Kernel IP routing table  
Destination      Gateway          Genmask         Flags       MSS Window  irtt Iface  
default          _gateway        0.0.0.0         UG          0 0        0 wlp2s0  
link-local       0.0.0.0         255.255.0.0     U           0 0        0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0   U           0 0        0 wlp2s0  
Tuhin@tuhin:~$
```

### 4. Virtual Interfaces:

- a) Create a new virtual interface with the following IP address , 192.168.2.32 and netmask 255.255.255.0 then check to see if the interface was created successfully?

**Answer:**

```
tuhin@tuhin: ~
File Edit View Search Terminal Help
Tuhin@tuhin:~$ sudo ifconfig wlp2s0 192.168.0.106 netmask 255.255.255.0
[sudo] password for tuhin:
Tuhin@tuhin:~$ ifconfig
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 2334 bytes 250622 (250.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2334 bytes 250622 (250.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.106 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::ec08:bfee:832c:15c7 prefixlen 64 scopeid 0x20<link>
    ether 60:f6:77:ee:e5:fd txqueuelen 1000 (Ethernet)
    RX packets 33351 bytes 36443809 (36.4 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 31683 bytes 5705701 (5.7 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

Tuhin@tuhin:~$
```

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

**Answer:**

```
tuhin@tuhin: ~
File Edit View Search Terminal Help
Tuhin@tuhin:~$ sudo ip route add default via 192.168.0.106 dev wlp2s0
[sudo] password for tuhin:
Tuhin@tuhin:~$ ip route show
default via 192.168.0.106 dev wlp2s0
default via 192.168.0.1 dev wlp2s0 proto dhcp metric 600
169.254.0.0/16 dev wlp2s0 scope link metric 1000
192.168.0.0/24 dev wlp2s0 proto kernel scope link src 192.168.0.106 metric 600
Tuhin@tuhin:~$ route
Kernel IP routing table
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface
default          tuhin            0.0.0.0          UG        0      0      0 wlp2s0
default          _gateway        0.0.0.0          UG        600    0      0 wlp2s0
link-local      0.0.0.0         255.255.0.0      U         1000   0      0 wlp2s0
192.168.0.0     0.0.0.0         255.255.255.0    U         600    0      0 wlp2s0
Tuhin@tuhin:~$ netstat -f
netstat: feature 'AF BLUETOOTH' not supported.
Please recompile 'net-tools' with newer kernel source or full configuration.
Tuhin@tuhin:~$ netstat -r
Kernel IP routing table
Destination      Gateway          Genmask          Flags  MSS  Window  irtt Iface
default          tuhin            0.0.0.0          UG      0    0        0 wlp2s0
default          _gateway        0.0.0.0          UG      0    0        0 wlp2s0
link-local      0.0.0.0         255.255.0.0      U       0    0        0 wlp2s0
192.168.0.0     0.0.0.0         255.255.255.0    U       0    0        0 wlp2s0
```

```
tuhin@tuhin: ~
File Edit View Search Terminal Help
Tuhin@tuhin:~$ netstat r
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address          State
tcp      0      0 tuhin:36044             e2a.google.com:https    SYN_SENT
tcp      0      0 tuhin:57838             sa-in-f188.1e100.n:5228 ESTABLISHED
tcp      0    1221 tuhin:49342             maa05s13-in-f5.1e:https FIN_WAIT1
tcp      0      1 tuhin:36042             e2a.google.com:https    SYN_SENT
udp      0      0 tuhin:57387             _gateway:domain         ESTABLISHED
udp      0      0 localhost:41674          localhost:domain         ESTABLISHED
udp      0      0 localhost:35651          localhost:domain         ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State      I-Node  Path
unix  2      [ ]         DGRAM      -          30087    /run/wpa_supplicant/p
2p-dev-wlp2s0
unix  2      [ ]         DGRAM      -          31171    /run/user/1000/system
d/notify
unix  2      [ ]         DGRAM      -          33169    /run/user/121/systemd
/notify
unix  3      [ ]         DGRAM      -          2814     /run/systemd/notify
unix  9      [ ]         DGRAM      -          2829     /run/systemd/journal/
socket
unix  2      [ ]         DGRAM      -          2842     /run/systemd/journal/
syslog
unix  25     [ ]         DGRAM      -          2850     /run/systemd/journal/
```

c) Remove the route for this interface:

**Answer:**

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ route  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface  
default          tuhin            0.0.0.0          UG      0      0      0 wlp2s0  
default          _gateway        0.0.0.0          UG      20600  0      0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U       1000   0      0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U       600    0      0 wlp2s0  
Tuhin@tuhin:~$ route  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface  
default          tuhin            0.0.0.0          UG      0      0      0 wlp2s0  
default          _gateway        0.0.0.0          UG      20600  0      0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U       1000   0      0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U       600    0      0 wlp2s0  
Tuhin@tuhin:~$
```

d) Then remove the interface completely.

Command for removing the interface completely, sudo ifconfig wlp2s0 down is used

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ sudo ifconfig wlp2s0 down  
[sudo] password for tuhin:  
Tuhin@tuhin:~$ ifconfig  
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 4792 bytes 713466 (713.4 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 4792 bytes 713466 (713.4 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
Tuhin@tuhin:~$
```

**5. Add a New Network:**

- a) Enter the command needed to add another network with the same values as your primary network meaning.

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ sudo ifconfig wlp2s0 172.168.10.1 netmask 255.255.0.0  
[sudo] password for tuhin:  
Tuhin@tuhin:~$ ifconfig  
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 5005 bytes 729099 (729.0 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 5005 bytes 729099 (729.0 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 172.168.10.1 netmask 255.255.0.0 broadcast 172.168.255.255  
    ether 60:f6:77:ee:e5:fd txqueuelen 1000 (Ethernet)  
    RX packets 33570 bytes 36477225 (36.4 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 33976 bytes 5892010 (5.8 MB)  
    TX errors 0 dropped 3 overruns 0 carrier 0 collisions 0  
  
Tuhin@tuhin:~$
```

- b) Assign the default gateway for newly added network (Your default Gateway Address):

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ netstat -r  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags      MSS Window  irtt Iface  
default          _gateway        0.0.0.0          UG         0 0       0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U          0 0       0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U          0 0       0 wlp2s0  
Tuhin@tuhin:~$
```

- c) Look for your newly added network in your routing table by issuing the “\$ netstat -r” command.



```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ netstat -r  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags      MSS Window  irtt Iface  
default          _gateway        0.0.0.0          UG         0 0       0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U          0 0       0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U          0 0       0 wlp2s0  
Tuhin@tuhin:~$
```

## 6. Multi network scenario configuration:

a) Assign the firewall IP addresses to eth1 and eth2.

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ sudo ip route add 10.0.2.0 default via dev eth0  
[sudo] password for tuhin:  
  
Tuhin@tuhin:~$ sudo ip route add 192.168.0.106/255.255.255.0 default via dev eth1  
1
```

b) Add the routes for the networks, i.e. 192.168.0.0 on eth1 and 10.0.2.0 on eth0

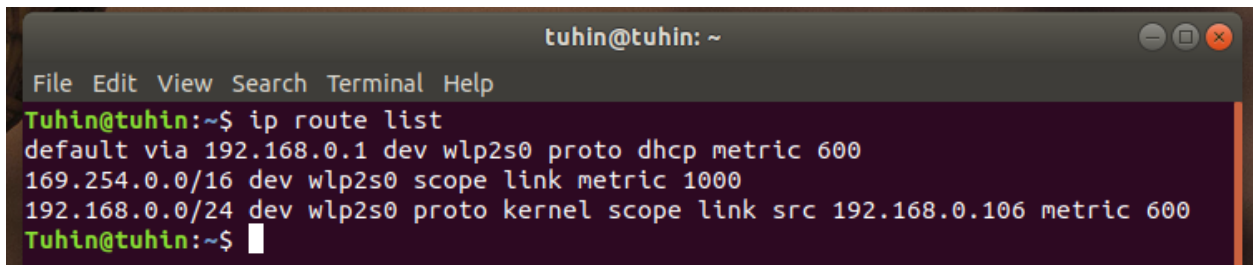
```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ netstat -r  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags      MSS Window  irtt Iface  
default          _gateway        0.0.0.0          UG         0 0       0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U          0 0       0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U          0 0       0 wlp2s0  
Tuhin@tuhin:~$
```

c) Assign the internet gateway (meaning: 192.168.1.1) as the default gateway.

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ netstat -r  
Kernel IP routing table  
Destination      Gateway          Genmask          Flags      MSS Window  irtt Iface  
default          _gateway        0.0.0.0          UG         0 0       0 wlp2s0  
link-local       0.0.0.0         255.255.0.0      U          0 0       0 wlp2s0  
192.168.0.0      0.0.0.0         255.255.255.0    U          0 0       0 wlp2s0  
Tuhin@tuhin:~$
```



- d) Enter the necessary commands in order for packets belonging to computers in the 10.0.2.0 network to be routed to the 192.168.1.0 network and the internet. In other words this should tell each computer on the 10.0.2.0, which the default gateway is, i.e., your firewall/router. You do not need to be worry about the route back configuration it is enough to assign the proper default gateway for the 10.0.2.0 network.

A terminal window titled 'tuhin@tuhin: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the command 'ip route list' and its output: 'default via 192.168.0.1 dev wlp2s0 proto dhcp metric 600', '169.254.0.0/16 dev wlp2s0 scope link metric 1000', and '192.168.0.0/24 dev wlp2s0 proto kernel scope link src 192.168.0.106 metric 600'. The prompt 'Tuhin@tuhin:~\$' is followed by a cursor.

```
tuhin@tuhin: ~  
File Edit View Search Terminal Help  
Tuhin@tuhin:~$ ip route list  
default via 192.168.0.1 dev wlp2s0 proto dhcp metric 600  
169.254.0.0/16 dev wlp2s0 scope link metric 1000  
192.168.0.0/24 dev wlp2s0 proto kernel scope link src 192.168.0.106 metric 600  
Tuhin@tuhin:~$
```