Assignment – 2

Date – 21/02/2019

Aim : Set up the complete network interface by configuring services such as gateway, DNS, IP tables etc. using ifconfig

1. View network settings of network interfaces in system

Purpose : Ifconfig is used to configure the kernel-resident network interfaces. It is used at boot time to set up interfaces as necessary. After that, it is usually only needed when debugging or when system tuning is needed.

Command : ifconfig
Input : ifconfig
Output :

```
hishamalip@ideapad-330:~$ ifconfig
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 8c:16:45:b9:9c:d4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        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 5799  bytes 487766 (487.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5799  bytes 487766 (487.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.5  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::f4d8:5fad:1058:9de4  prefixlen 64  scopeid 0x20<link>
        ether b0:fc:36:75:b2:0f  txqueuelen 1000  (Ethernet)
        RX packets 516  bytes 375801179 (375.8 MB)
        RX errors 0  dropped 408  overruns 0  frame 0
        TX packets 417  bytes 23147560 (23.1 MB)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

2. View details of all interafces including disabled interfaces
Command : ifconfig -a
Output :

```
hishamalip@ideapad-330:~$ ifconfig -a
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1450
        ether 8c:16:45:b9:9c:d4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        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 8143  bytes 699704 (699.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8143  bytes 699704 (699.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.5  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::f4d8:5fad:1058:9de4  prefixlen 64  scopeid 0x20<link>
        ether b0:fc:36:75:b2:0f  txqueuelen 1000  (Ethernet)
        RX packets 26864  bytes 442884771 (442.8 MB)
        RX errors 0  dropped 571  overruns 0  frame 0
        TX packets 20251  bytes 30569699 (30.5 MB)
        TX errors 0  dropped 8 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

3. View settings of a specific interface

Command : ifconfig <interface_name>
Input : ifconfig enp2s0
Output :

```
hishamalip@ideapad-330:~$ ifconfig enp2s0
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 8c:16:45:b9:9c:d4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

4. To enable or disable an interface

To disable an inteface
Command : sudo ifconfig <interface_name> down
Input : sudo ifconfig enp2s0 down
Output :

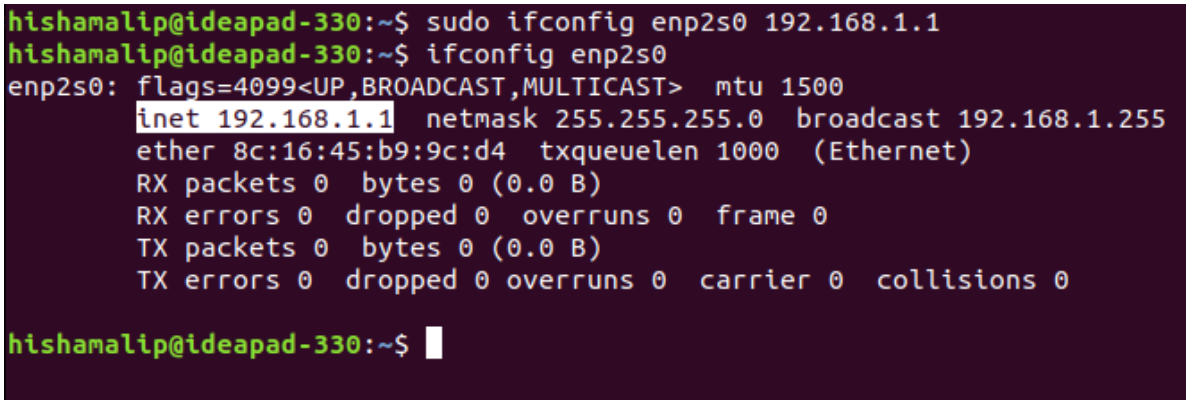
```
hishamalip@ideapad-330:~$ sudo ifconfig enp2s0 down
hishamalip@ideapad-330:~$ ifconfig
lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 5869  bytes 493646 (493.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5869  bytes 493646 (493.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.5  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::f4d8:5fad:1058:9de4  prefixlen 64  scopeid 0x20<link>
        ether b0:fc:36:75:b2:0f  txqueuelen 1000  (Ethernet)
        RX packets 27207  bytes 416277968 (416.2 MB)
        RX errors 0  dropped 409  overruns 0  frame 0
        TX packets 14353  bytes 24651080 (24.6 MB)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

To enable an inteface
Command : sudo ifconfig <interface_name> up
Input : sudo ifconfig enp2s0 up
Output :

```
hishamalip@ideapad-330:~$ sudo ifconfig enp2s0 up
[sudo] password for hishamalip:
hishamalip@ideapad-330:~$ ifconfig
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 8c:16:45:b9:9c:d4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        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 5879  bytes 494354 (494.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5879  bytes 494354 (494.3 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.5  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::f4d8:5fad:1058:9de4  prefixlen 64  scopeid 0x20<link>
        ether b0:fc:36:75:b2:0f  txqueuelen 1000  (Ethernet)
        RX packets 27371  bytes 416308542 (416.3 MB)
        RX errors 0  dropped 409  overruns 0  frame 0
        TX packets 14419  bytes 24669220 (24.6 MB)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

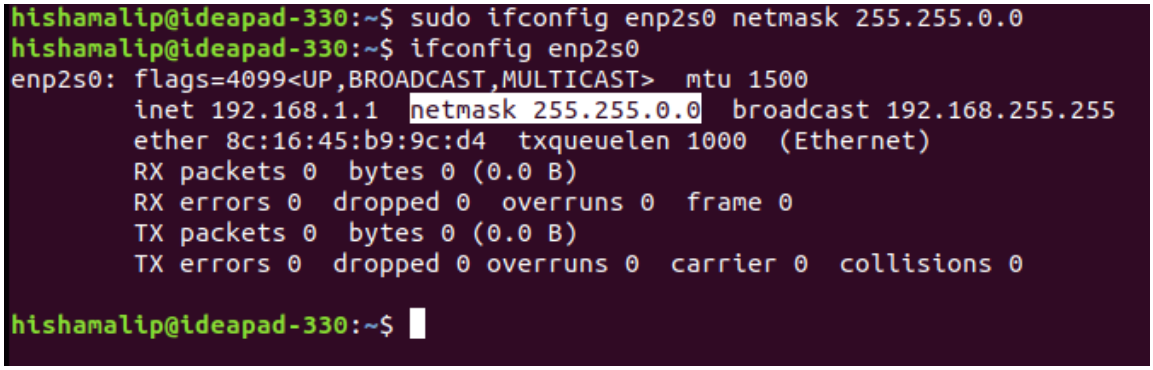
6. To assign an IP address to an inteface

Command : sudo ifconfig <interface_name> <ip_address>
Input : sudo ifconfig enp2s0 192.168.1.1
Output :



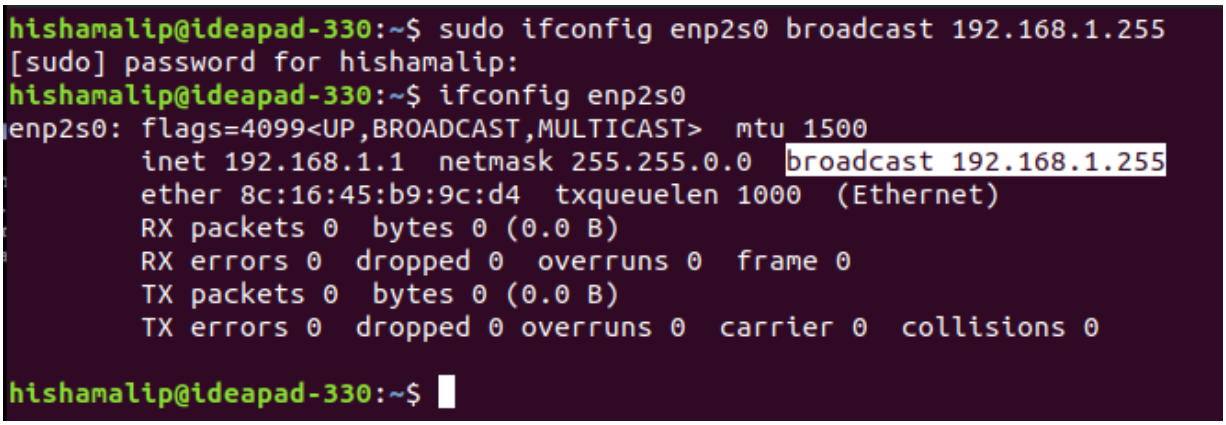
7. To change subnet mask of an inteface

Command : sudo ifconfig <inteface_name> netmask <subnetmask_address>
Input : sudo ifconfig enp2s0 netmask 255.255.0.0
Output :



8. To change broadcast address of an inteface

Command : sudo ifconfig <inteface_name> broadcast <broadcast_address>
Input : sudo ifconfig enp2s0 broadcast 192.168.1.255
Output :



9. To change MTU (Maximum Transmission Unit) network for an interface

Purpose : MTU is the size (in bytes) of the largest datagram that a given layer of a communications protocol can pass at a time.

Command : sudo ifconfig <inteface_name> mtu <size in bytes>
Input : sudo ifconfig enp2s0 mtu 1450
Output :

```
hishamalip@ideapad-330:~$ sudo ifconfig enp2s0 mtu 1450
[sudo] password for hishamalip:
hishamalip@ideapad-330:~$ ifconfig enp2s0
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1450
        inet 192.168.1.1  netmask 255.255.0.0  broadcast 192.168.1.255
        ether 8c:16:45:b9:9c:d4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

hishamalip@ideapad-330:~$
```

10. To dispaly default route

Purpose : The route command manipulates the kernel's IP routing tables. Its primary use is to set up static routes to specific hosts or networks via an interface after it has been configured with the ifconfig program.

Command : route
Input : route
Output :

```
hishamalip@ideapad-330:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    600    0        0 wlp1s0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlp1s0
192.168.0.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp1s0
192.168.0.0     0.0.0.0         255.255.0.0     U     0      0        0 enp2s0
hishamalip@ideapad-330:~$
```

11. To setup default gateway

Command : route add default gw <ip_address> <interface_name>
Input : route add default gw 192.168.99.4 enp2s0
Output :

```
hishamalip@ideapad-330:~$ sudo route add default gw 192.168.99.4 enp2s0
[sudo] password for hishamalip:
hishamalip@ideapad-330:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         192.168.99.4    0.0.0.0         UG    0      0        0 enp2s0
default         192.168.0.1     0.0.0.0         UG    600    0        0 wlp1s0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlp1s0
192.168.0.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp1s0
192.168.0.0     0.0.0.0         255.255.0.0     U     0      0        0 enp2s0
hishamalip@ideapad-330:~$
```

12. IP Tables

Purpose : To allows system administrators to manage incoming and outgoing traffic via a set of configurable table rules.

#Check all IPtables Firewall Rules
Input : iptables -L -n -v
Output :

```
hishamalip@ideapad-330:~$ sudo iptables -L -nv --line-
Chain INPUT (policy ACCEPT 850 packets, 480K bytes)
num   pkts bytes target     prot opt in     out     source               destination


Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
num   pkts bytes target     prot opt in     out     source               destination


Chain OUTPUT (policy ACCEPT 708 packets, 97364 bytes)
num   pkts bytes target     prot opt in     out     source               destination

hishamalip@ideapad-330:~$
```

13. DNS

To change DNS settings
The name servers are prioritized in the order the system finds them in the file. Use the Internet Protocol (IP) addresses of the name servers when you enter them into the configuration file because the system doesn’t know what to do with domain names until after it knows how to get to the DNS servers.

DNS servers that the system uses for name resolution are defined in the /etc/resolv.conf file. To cause your machine to consult with a particular server for name lookups you simply add their addresses to/etc/resolv.conf

To open /etc/resolv.conf
Input : nano /etc/resolv.conf
Output :

```
  GNU nano 2.9.8                  /etc/resolv.conf

# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 127.0.0.53


                [ File '/etc/resolv.conf' is unwritable ]
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell  ^_ Go To Line
```

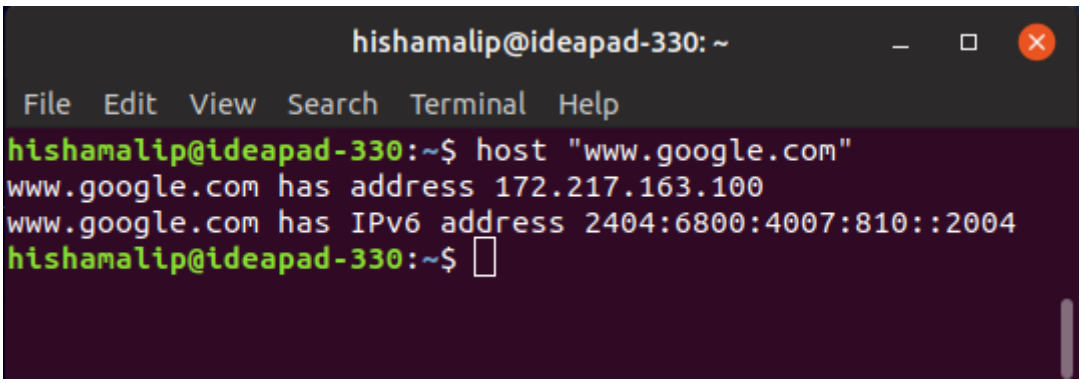
#Add a name server to /etc/resolv.conf
input : cat >> /etc/resolv.conf
nameserver 120.136.32.62
Output :

```
root@ideapad-330:~# cat >> /etc/resolv.conf
nameserver 120.136.32.62
^C
root@ideapad-330:~# cat /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 127.0.0.53
nameserver 120.136.32.62
root@ideapad-330:~#
```

14. Host

Purpose : To get the domain name of the server

Usage : host <domain_name>
Input : host “www.google.com”
Output :



15. Ping

Purpose : The ping command is a Command prompt command used to test the ability of the source computer to reach a specified destination computer.

Usage : ping -c 3 <ip_address/domain_name>
Input : ping -c 3 google.com
Output :

```
hishamalip@ideapad-330:~$ ping -c 3 google.com
PING google.com (172.217.163.174) 56(84) bytes of data.

--- google.com ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 30ms

hishamalip@ideapad-330:~$
```

16. iwconfig

Purpose : Iwconfig is similar to ifconfig(8), but is dedicated to the wireless interfaces. It is used to set the parameters of the network interface which are specific to the wireless operation

Input : iwconfig

Output :

```
hishamalip@ideapad-330:~$ iwconfig
lo        no wireless extensions.

enp2s0    no wireless extensions.

wlp1s0    IEEE 802.11bg  ESSID:"MOTOROLA-7E0DB"  Nickname:"<WIFI@REALTEK>"
          Mode:Managed  Frequency:2.412 GHz  Access Point: 90:3E:AB:63:D7:9D

          Bit Rate:54 Mb/s   Sensitivity:0/0
          Retry:off   RTS thr:off   Fragment thr:off
          Power Management:off
          Link Quality=100/100  Signal level=67/100  Noise level=0/100
          Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid frag:0
          Tx excessive retries:0  Invalid misc:0   Missed beacon:0

hishamalip@ideapad-330:~$
```

Result : Studied about the network interface commands configuring services such as gateway, DNS, IP tables etc. using ifconfig