Experiment 2

20th February 2019

Aim: To learn to set up a complete network interface by configuring services such as gateway, DNS, IP tables etc. using ifconfig.

---

1. ifconfig : it is used to configure kernel-resident network interfaces. It is used at boot time to configure as necessary. After that it is used when debugging or system tuning is required.

1.1 ifconfig -a : used to display all the interfaces even if they are currently unavailable.

Example usage:

```
ifconfig <flags> <interface>
```

Terminal==========

##Using the ifconfig to view all adapters

```
[protonegative@fedora ~]$ ifconfig
enp7s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 20:47:47:bd:81:d8  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 5068  bytes 1033314 (1009.0 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5068  bytes 1033314 (1009.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0
collisions 0

wlp6s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.43.31  netmask 255.255.255.0
broadcast 192.168.43.255
        inet6 fe80::e6f2:5164:15be:9642  prefixlen 64
scopeid 0x20<link>
        ether e4:f8:9c:aa:d9:49  txqueuelen 1000
(Ethernet)
        RX packets 468584  bytes 523733332 (499.4 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 282870  bytes 41834086 (39.8 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0
collisions 0
```

##View a specific adapter

```
[protonegative@fedora ~]$ ifconfig wlp6s0
wlp6s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.43.31  netmask 255.255.255.0
broadcast 192.168.43.255
        inet6 fe80::e6f2:5164:15be:9642  prefixlen 64
scopeid 0x20<link>
        ether e4:f8:9c:aa:d9:49  txqueuelen 1000
(Ethernet)
        RX packets 468632  bytes 523740915 (499.4 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 282922  bytes 41842725 (39.9 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0
collisions 0
```

##To turn an adapter on or off

```
[protonegative@fedora ~]$ sudo ifconfig enp7s0 down
[sudo] password for protonegative:
[protonegative@fedora ~]$ sudo ifconfig enp7s0 up
```

==========end

2. route : it is used to manipulate the kernel's 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.

Example usage:

```
route <flags>
route <flags> add <target>
route <flags> del <target>
```

Terminal==========

##Checking default gateways

```
[protonegative@fedora ~]$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags
Metric Ref    Use Iface
default         gateway         0.0.0.0         UG    600
0        0 wlp6s0
192.168.43.0    0.0.0.0         255.255.255.0   U     600
0        0 wlp6s0
```

##Deleting routes

```
[protonegative@fedora ~]$ sudo route delete default gw <IP
Address> <Adaptor>
```

##Adding routes

```
[protonegative@fedora ~]$ sudo route add default gw <IP
Adress> <Adaptor>
```

==========end

3. Changing DNS settings: If our DNS settings are misconfigured or preferred we can change it adding a name server into the ‘resolve.conf’ located in ‘/etc’

Example Usage:

Terminal==========

##Adding a DNS server to resolv.conf

```
[protonegative@fedora ~]$ sudo echo "nameserver <IPv4/IPv6 addr>" >> /etc/resolv.conf
```

##To get IPv6 addr

```
[protonegative@fedora ~]$ host `host <IPv4 addr> | awk {'print $5'} | sed 's/.$//'` | grep IPv6 | awk {'print $5'}
```

##This addr can be added to resolv.conf in the same way

##Restart NetworkManager after making changes

```
[protonegative@fedora ~]$ service NetworkManager restart
```

==========end

4. iptables: are used to set up, maintain and inspect the tables of IPv4 and IPv6 packet filter rules in the Linux kernel.

Example Usage:

Terminal==========

##To get a numerical list of our iptable rules

```
[protonegative@fedora ~]$ sudo iptables -L -nv --line-
numbers
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
num   pkts bytes target     prot opt in     out     source
destination
1     384K  514M ACCEPT     all  --  *      *
0.0.0.0/0            0.0.0.0/0            ctstate
RELATED,ESTABLISHED
2     2819  193K ACCEPT     all  --  lo     *
0.0.0.0/0            0.0.0.0/0
3     2891  394K INPUT_direct  all  --  *      *
0.0.0.0/0            0.0.0.0/0
4     2891  394K INPUT_ZONES_SOURCE  all  --  *      *
0.0.0.0/0            0.0.0.0/0
5     2891  394K INPUT_ZONES  all  --  *      *
0.0.0.0/0            0.0.0.0/0
6        3   219 DROP       all  --  *      *
0.0.0.0/0            0.0.0.0/0            ctstate INVALID
7       11  3249 REJECT     all  --  *      *
0.0.0.0/0            0.0.0.0/0            reject-with icmp-
host-prohibited

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
num   pkts bytes target     prot opt in     out     source
destination
1        0     0 ACCEPT     all  --  *      *
0.0.0.0/0            0.0.0.0/0            ctstate
RELATED,ESTABLISHED
2        0     0 ACCEPT     all  --  lo     *
0.0.0.0/0            0.0.0.0/0
3        0     0 FORWARD_direct  all  --  *      *
0.0.0.0/0            0.0.0.0/0
4        0     0 FORWARD_IN_ZONES_SOURCE  all  --  *      *
0.0.0.0/0            0.0.0.0/0
5        0     0 FORWARD_IN_ZONES  all  --  *      *
0.0.0.0/0            0.0.0.0/0
6        0     0 FORWARD_OUT_ZONES_SOURCE  all  --  *
*       0.0.0.0/0            0.0.0.0/0
7        0     0 FORWARD_OUT_ZONES  all  --  *      *
0.0.0.0/0            0.0.0.0/0
```

```
8        0     0 DROP       all  --  *      *
0.0.0.0/0            0.0.0.0/0            ctstate INVALID
9        0     0 REJECT     all  --  *      *
0.0.0.0/0            0.0.0.0/0            reject-with icmp-
host-prohibited

Chain OUTPUT (policy ACCEPT 46787 packets, 6203K bytes)
num   pkts bytes target     prot opt in     out     source
destination
1     285K   31M OUTPUT_direct  all  --  *      *
0.0.0.0/0            0.0.0.0/0

Chain FORWARD_IN_ZONES (1 references)
num   pkts bytes target     prot opt in     out     source
destination
1        0     0 FWDI_FedoraWorkstation  all  --  wlp6s0 *
0.0.0.0/0            0.0.0.0/0           [goto]
2        0     0 FWDI_FedoraWorkstation  all  --  +      *
0.0.0.0/0            0.0.0.0/0           [goto]

Chain FORWARD_IN_ZONES_SOURCE (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FORWARD_OUT_ZONES (1 references)
num   pkts bytes target     prot opt in     out     source
destination
1        0     0 FWDO_FedoraWorkstation  all  --  *
wlp6s0  0.0.0.0/0            0.0.0.0/0           [goto]
2        0     0 FWDO_FedoraWorkstation  all  --  *      +
0.0.0.0/0            0.0.0.0/0           [goto]

Chain FORWARD_OUT_ZONES_SOURCE (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FORWARD_direct (1 references)
num   pkts bytes target     prot opt in     out     source
destination
```

```
Chain FWDI_FedoraWorkstation (2 references)
num   pkts bytes target     prot opt in     out     source
destination
1        0     0 FWDI_FedoraWorkstation_log  all  --  *
*       0.0.0.0/0            0.0.0.0/0
2        0     0 FWDI_FedoraWorkstation_deny  all  --  *
*       0.0.0.0/0            0.0.0.0/0
3        0     0 FWDI_FedoraWorkstation_allow  all  --  *
*       0.0.0.0/0            0.0.0.0/0
4        0     0 ACCEPT     icmp --  *      *
0.0.0.0/0            0.0.0.0/0

Chain FWDI_FedoraWorkstation_allow (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FWDI_FedoraWorkstation_deny (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FWDI_FedoraWorkstation_log (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FWDO_FedoraWorkstation (2 references)
num   pkts bytes target     prot opt in     out     source
destination
1        0     0 FWDO_FedoraWorkstation_log  all  --  *
*       0.0.0.0/0            0.0.0.0/0
2        0     0 FWDO_FedoraWorkstation_deny  all  --  *
*       0.0.0.0/0            0.0.0.0/0
3        0     0 FWDO_FedoraWorkstation_allow  all  --  *
*       0.0.0.0/0            0.0.0.0/0

Chain FWDO_FedoraWorkstation_allow (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain FWDO_FedoraWorkstation_deny (1 references)
```

```
num   pkts bytes target     prot opt in     out     source
destination

Chain FWDO_FedoraWorkstation_log (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain INPUT_ZONES (1 references)
num   pkts bytes target     prot opt in     out     source
destination
1      623 85864 IN_FedoraWorkstation  all  --  wlp6s0 *
0.0.0.0/0            0.0.0.0/0           [goto]
2        0     0 IN_FedoraWorkstation  all  --  +      *
0.0.0.0/0            0.0.0.0/0           [goto]

Chain INPUT_ZONES_SOURCE (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain INPUT_direct (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain IN_FedoraWorkstation (2 references)
num   pkts bytes target     prot opt in     out     source
destination
1     2891  394K IN_FedoraWorkstation_log  all  --  *
*       0.0.0.0/0            0.0.0.0/0
2     2891  394K IN_FedoraWorkstation_deny  all  --  *
*       0.0.0.0/0            0.0.0.0/0
3     2891  394K IN_FedoraWorkstation_allow  all  --  *
*       0.0.0.0/0            0.0.0.0/0
4        0     0 ACCEPT     icmp --  *      *
0.0.0.0/0            0.0.0.0/0

Chain IN_FedoraWorkstation_allow (1 references)
num   pkts bytes target     prot opt in     out     source
destination
```

```
1        0     0 ACCEPT     tcp  --  *      *
0.0.0.0/0            0.0.0.0/0           tcp dpt:22
ctstate NEW
2       34  2940 ACCEPT     udp  --  *      *
0.0.0.0/0            0.0.0.0/0           udp dpt:137
ctstate NEW
3        5  1085 ACCEPT     udp  --  *      *
0.0.0.0/0            0.0.0.0/0           udp dpt:138
ctstate NEW
4      182 21771 ACCEPT     udp  --  *      *
0.0.0.0/0            224.0.0.251         udp dpt:5353
ctstate NEW
5     2653  364K ACCEPT     udp  --  *      *
0.0.0.0/0            0.0.0.0/0           udp
dpts:1025:65535 ctstate NEW
6        3   345 ACCEPT     tcp  --  *      *
0.0.0.0/0            0.0.0.0/0           tcp
dpts:1025:65535 ctstate NEW

Chain IN_FedoraWorkstation_deny (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain IN_FedoraWorkstation_log (1 references)
num   pkts bytes target     prot opt in     out     source
destination

Chain OUTPUT_direct (1 references)
num   pkts bytes target     prot opt in     out     source
destination
```

##Example to Accept incoming connections over port ##8080(TCP)

```
[protonegative@fedora ~]$  sudo iptables -I INPUT 7 -p tcp
--dport 8080 -m state --state NEW -j ACCEPT
```

##Example to replace to rule

```
[protonegative@fedora ~]$ sudo iptables -R INPUT 9 -m limit
--limit 3/min -j LOG --log-prefix "iptables_INPUT_denied: "
--log-level 7
```

##Example to delete a rule

```
[protonegative@fedora ~]$ sudo iptables -D INPUT 7
```

==========end

5. iwconfig: it is similar to ifconfig but is specific to wireless adapters.

Example Usage:

```
iwconfig <flags> <interface> <mode> <state>
```

Terminal==========

##View Details of wireless extensions

```
[protonegative@fedora ~]$ iwconfig
wlp6s0    IEEE 802.11  ESSID:"connect"
          Mode:Managed  Frequency:2.412 GHz  Access Point:
4A:FC:B6:76:4D:E2
          Bit Rate=72.2 Mb/s   Tx-Power=20 dBm
          Retry short limit:7   RTS thr:off   Fragment
thr:off
          Power Management:on
          Link Quality=55/70  Signal level=-55 dBm
          Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid
frag:0
          Tx excessive retries:5  Invalid misc:699   Missed
beacon:0

enp7s0    no wireless extensions.

lo        no wireless extensions.
```

##To change the mode of the wireless interface

```
[protonegative@fedora ~]$ iwconfig wlp6s0 mode monitor
```

==========end

Result: Understood the usage of certain network managing commands

---

eof
