13 Linux Network Configuration and Troubleshooting Commands

Computers are connected in a network to exchange information or resources each other. Two or more computer connected through network media called computer network. There are number of network devices or media are involved to form computer network. Computer loaded with Linux Operating System can also be a part of network whether it is small or large network by its multitasking and multiuser natures. Maintaining of system and network up and running is a task of System / Network Administrator's job. In this article we are going to review frequently used network configuration and troubleshoot commands in Linux.

1. ifconfig

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.

```
# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:28:FD:4C
inet addr:192.168.50.2  Bcast:192.168.50.255  Mask:255.255.255.0
inet6 addr: fe80::20c:29ff:fe28:fd4c/64 Scope:Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:6093 errors:0 dropped:0 overruns:0 frame:0
TX packets:4824 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:6125302 (5.8 MiB)  TX bytes:536966 (524.3 KiB)
Interrupt:18 Base address:0x2000
lo        Link encap:Local Loopback
inet addr:127.0.0.1  Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
```

```
UP LOOPBACK RUNNING  MTU:16436  Metric:1
RX packets:8 errors:0 dropped:0 overruns:0 frame:0
TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:480 (480.0 b)  TX bytes:480 (480.0 b)
```

ifconfig with interface (eth0) command only shows specific interface details like IP Address, MAC Address etc. with -a options will display all available interface details if it is disable also.

```
# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:0C:29:28:FD:4C
inet addr:192.168.50.2  Bcast:192.168.50.255  Mask:255.255.255.0
inet6 addr: fe80::20c:29ff:fe28:fd4c/64 Scope:Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:6119 errors:0 dropped:0 overruns:0 frame:0
TX packets:4841 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:6127464 (5.8 MiB)  TX bytes:539648 (527.0 KiB)
Interrupt:18 Base address:0x2000
```

Assigning IP Address and Gateway

Assigning an IP Address and Gateway to interface on the fly. The setting will be removed in case of system reboot.

```
# ifconfig eth0 192.168.50.5 netmask 255.255.255.0
```

Enable or Disable Specific Interface

To enable or disable specific Interface, we use example command as follows.

Enable eth0

```
# ifup eth0
```

Disable eth0

```
# ifdown eth0
```

Setting MTU Size

By default MTU size is 1500. We can set required MTU size with below command. Replace XXXX with size.

```
# ifconfig eth0 mtu XXXX
```

Set Interface in Promiscuous mode

Network interface only received packets belongs to that particular NIC. If you put interface in promiscuous mode it will received all the packets. This is very useful to capture packets and analyze later. For this you may require superuser access.

```
# ifconfig eth0 - promisc
```

2. PING Command

PING (Packet INternet Groper) command is the best way to test connectivity between two nodes. Whether it is Local Area Network (LAN) or Wide Area Network (WAN). Ping use ICMP (Internet Control Message Protocol) to communicate to other devices. You can ping host name of ip address using below command.

```
# ping 4.2.2.2
PING 4.2.2.2 (4.2.2.2) 56(84) bytes of data.
64 bytes from 4.2.2.2: icmp_seq=1 ttl=44 time=203 ms
64 bytes from 4.2.2.2: icmp_seq=2 ttl=44 time=201 ms
64 bytes from 4.2.2.2: icmp_seq=3 ttl=44 time=201 ms
OR
# ping www.tecmint.com
PING tecmint.com (50.116.66.136) 56(84) bytes of data.
64 bytes from 50.116.66.136: icmp_seq=1 ttl=47 time=284 ms
64 bytes from 50.116.66.136: icmp_seq=2 ttl=47 time=287 ms
64 bytes from 50.116.66.136: icmp_seq=3 ttl=47 time=285 ms
```

In Linux ping command keep executing until you interrupt. Ping with -c option exit after N number of request (success or error respond).

```
# ping -c 5 www.tecmint.com
```

```
PING tecmint.com (50.116.66.136) 56(84) bytes of data.
64 bytes from 50.116.66.136: icmp_seq=1 ttl=47 time=285 ms
64 bytes from 50.116.66.136: icmp_seq=2 ttl=47 time=285 ms
64 bytes from 50.116.66.136: icmp_seq=3 ttl=47 time=285 ms
64 bytes from 50.116.66.136: icmp_seq=4 ttl=47 time=285 ms
64 bytes from 50.116.66.136: icmp_seq=5 ttl=47 time=285 ms
--- tecmint.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4295ms
rtt min/avg/max/mdev = 285.062/285.324/285.406/0.599 ms
```

3. TRACEROUTE Command

Traceroute is a network troubleshooting utility which shows number of hops taken to reach destination also determine packets traveling path. Below we are tracing route to global DNS server IP Address and able to reach destination also shows path of that packet is traveling.

```
# traceroute 4.2.2.2
traceroute to 4.2.2.2 (4.2.2.2), 30 hops max, 60 byte packets
1  192.168.50.1 (192.168.50.1)  0.217 ms  0.624 ms  0.133 ms
2  227.18.106.27.mysipl.com (27.106.18.227)  2.343 ms  1.910 ms  1.799
ms
3   221-231-119-111.mysipl.com (111.119.231.221)   4.334 ms   4.001 ms
5.619 ms
4  10.0.0.5 (10.0.0.5)  5.386 ms  6.490 ms  6.224 ms
5   gi0-0-0.dgw1.bom2.pacific.net.in (203.123.129.25)   7.798 ms   7.614
ms  7.378 ms
6   115.113.165.49.static-mumbai.vsnl.net.in (115.113.165.49)   10.852
ms  5.389 ms  4.322 ms
7    ix-0-100.tcore1.MLV-Mumbai.as6453.net  (180.87.38.5)    5.836  ms
5.590 ms  5.503 ms
8   if-9-5.tcore1.WYN-Marseille.as6453.net (80.231.217.17)   216.909 ms
198.864 ms  201.737 ms
9   if-2-2.tcore2.WYN-Marseille.as6453.net (80.231.217.2)   203.305 ms
203.141 ms  202.888 ms
10    if-5-2.tcore1.WV6-Madrid.as6453.net  (80.231.200.6)    200.552  ms
202.463 ms  202.222 ms
```

```
11  if-8-2.tcore2.SV8-Highbridge.as6453.net (80.231.91.26)  205.446 ms
215.885 ms  202.867 ms
12  if-2-2.tcore1.SV8-Highbridge.as6453.net (80.231.139.2)  202.675 ms
201.540 ms  203.972 ms
13   if-6-2.tcore1.NJY-Newark.as6453.net  (80.231.138.18)   203.732  ms
203.496 ms  202.951 ms
14    if-2-2.tcore2.NJY-Newark.as6453.net  (66.198.70.2)    203.858  ms
203.373 ms  203.208 ms
15     66.198.111.26  (66.198.111.26)     201.093   ms   63.243.128.25
(63.243.128.25)  206.597 ms 66.198.111.26 (66.198.111.26)  204.178 ms
16  ae9.edge1.NewYork.Level3.net (4.68.62.185)  205.960 ms  205.740 ms
205.487 ms
17     vlan51.ebr1.NewYork2.Level3.net   (4.69.138.222)     203.867   ms
vlan52.ebr2.NewYork2.Level3.net     (4.69.138.254)         202.850    ms
vlan51.ebr1.NewYork2.Level3.net (4.69.138.222)  202.351 ms
18  ae-6-6.ebr2.NewYork1.Level3.net (4.69.141.21)  201.771 ms  201.185
ms  201.120 ms
19    ae-81-81.csw3.NewYork1.Level3.net   (4.69.134.74)     202.407   ms
201.479 ms ae-92-92.csw4.NewYork1.Level3.net (4.69.148.46)  208.145 ms
20   ae-2-70.edge2.NewYork1.Level3.net (4.69.155.80)  200.572 ms ae-4-
90.edge2.NewYork1.Level3.net   (4.69.155.208)      200.402   ms   ae-1-
60.edge2.NewYork1.Level3.net (4.69.155.16)  203.573 ms
21  b.resolvers.Level3.net (4.2.2.2)  199.725 ms  199.190 ms  202.488
ms
```

4. NETSTAT Command

Netstat (Network Statistic) command display connection info, routing table information etc. To displays routing table information use option as -r.

```
# netstat -r
Kernel IP routing table
Destination      Gateway          Genmask          Flags    MSS Window
irtt Iface
192.168.50.0     *                255.255.255.0    U          0  0
0 eth0
link-local       *                255.255.0.0      U          0  0
0 eth0
```

```
default         192.168.50.1    0.0.0.0         UG        0 0
0 eth0
```

For more examples of Netstat Command, please read our earlier article on 20 Netstat Command Examples in Linux.

5. DIG Command

Dig (domain information groper) query DNS related information like A Record, CNAME, MX Record etc. This command mainly use to troubleshoot DNS related query.

```
# dig www.tecmint.com; <<>> DiG 9.8.2rc1-RedHat-9.8.2-0.10.rc1.el6
<<>> www.tecmint.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<
```

For more examples of Dig Command, please read the article on 10 Linux Dig Commands to Query DNS.

6. NSLOOKUP Command

Nslookup command also use to find out DNS related query. The following examples shows A Record (IP Address) of tecmint.com.

```
# nslookup www.tecmint.com
Server:         4.2.2.2
Address:        4.2.2.2#53
Non-authoritative answer:
www.tecmint.com canonical name = tecmint.com.
Name:   tecmint.com
Address: 50.116.66.136
```

For more NSLOOKUP Command, read the article on 8 Linux Nslookup Command Examples.

7. ROUTE Command

Route command also shows and manipulate ip routing table. To see default routing table in Linux, type the following command.

```
# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref
Use Iface
192.168.50.0    *               255.255.255.0   U     0        0
0 eth0
link-local      *               255.255.0.0     U     1002     0
0 eth0
default         192.168.50.1    0.0.0.0         UG    0        0
0 eth0
```

Adding, deleting routes and default Gateway with following commands.

Route Adding

```
# route add -net 10.10.10.0/24 gw 192.168.0.1
```

Route Deleting

```
# route del -net 10.10.10.0/24 gw 192.168.0.1
```

Adding default Gateway

```
# route add default gw 192.168.0.1
```

8. HOST Command

Host command to find name to IP or IP to name in IPv4 orIPv6 and also query DNS records.

```
# host www.google.com
www.google.com has address 173.194.38.180
www.google.com has address 173.194.38.176
www.google.com has address 173.194.38.177
www.google.com has address 173.194.38.178
www.google.com has address 173.194.38.179
www.google.com has IPv6 address 2404:6800:4003:802::1014
```

Using -t option we can find out DNS Resource Records like CNAME, NS, MX, SOA etc.

```
# host -t CNAME www.redhat.com
www.redhat.com is an alias for wildcard.redhat.com.edgekey.net.
```

9. ARP Command

ARP (Address Resolution Protocol) is useful to view / add the contents of the kernel's ARP tables. To see default table use the command as.

```
# arp -e
Address                  HWtype  HWaddress           Flags Mask
Iface
192.168.50.1             ether   00:50:56:c0:00:08   C
eth0
```

10. ETHTOOL Command

Ethtool is a replacement of mii-tool. It is to view, setting speed and duplex of your Network Interface Card (NIC). You can set duplex permanently in /etc/sysconfig/network-scripts/ifcfg-eth0 with ETHTOOL_OPTS variable.

```
# ethtool eth0
Settings for eth0:
Current message level: 0x00000007 (7)
Link detected: yes
```

11. IWCONFIG Command

Iwconfig command in Linux is use to configure a wireless network interface. You can see and set the basic Wi-Fi details like SSID channel and encryption. You can refer man page of iwconfig to know more.

```
# iwconfig [interface]
```

12. HOSTNAME Command

Hostname is to identify in a network. Execute hostname command to see the hostname of your box. You can set hostname permanently in /etc/sysconfig/network. Need to reboot box once set a proper hostname.

```
# hostname
tecmint.com
```

13. GUI tool system-config-network

Type system-config-network in command prompt to configure network setting and you will get nice Graphical User Interface (GUI) which may also use to configure IP Address,Gateway,DNS etc. as shown below image.

```
# system-config-network
```

Linux GUI Network Configuration Tool