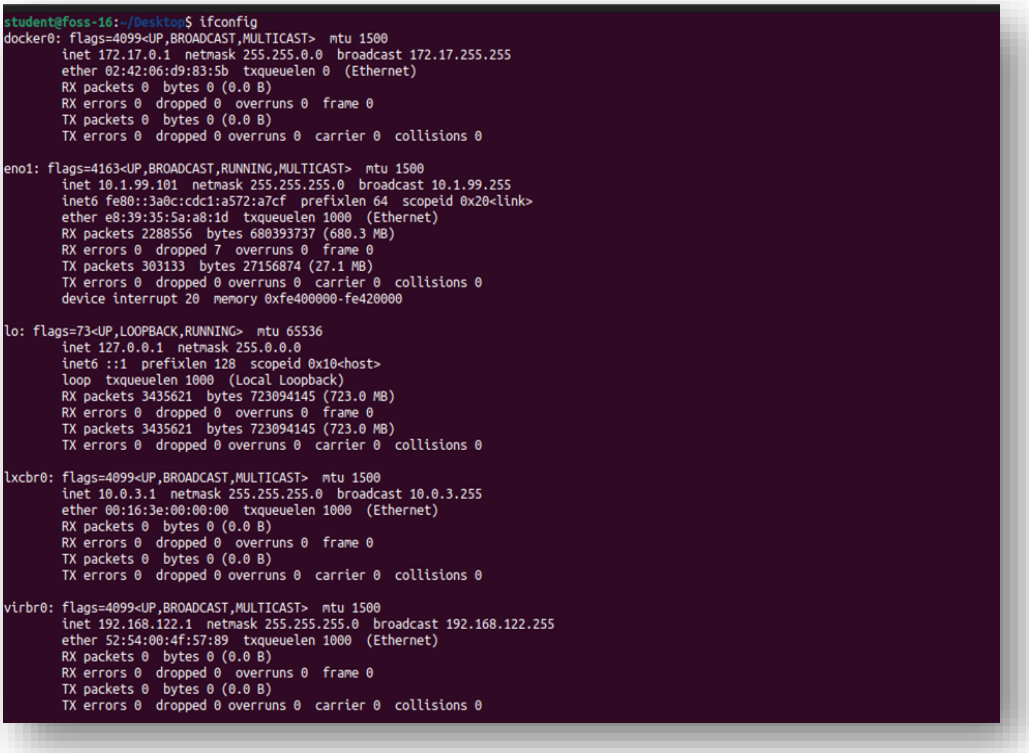
Computer Networks-Laboratory

Study of Linux Networking Commands

❖ **ifconfig :**

ifconfig stands for "interface configuration." It is used to view and change the configuration of the network interfaces on your system. This displays information about all network interfaces currently in operation.

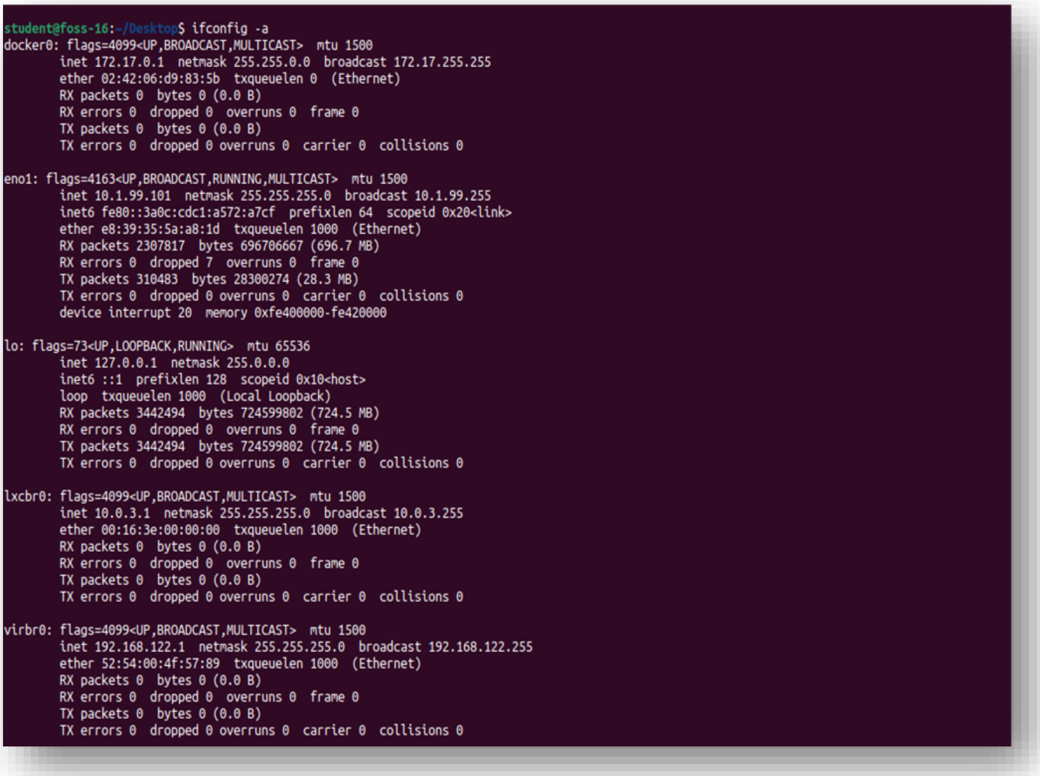


```
student@foss-16:~/Desktop$ ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:06:d9:83:5b  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.1.99.101  netmask 255.255.255.0  broadcast 10.1.99.255
        inet6 fe80::3a0c:cdc1:a572:a7cf  prefixlen 64  scopeid 0x20<link>
        ether e8:39:35:5a:a8:1d  txqueuelen 1000  (Ethernet)
        RX packets 2288556  bytes 680393737 (680.3 MB)
        RX errors 0  dropped 7  overruns 0  frame 0
        TX packets 303133  bytes 27156874 (27.1 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 20  memory 0xfe400000-fe420000

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 3435621  bytes 723094145 (723.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3435621  bytes 723094145 (723.0 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lxcbr0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 10.0.3.1  netmask 255.255.255.0  broadcast 10.0.3.255
        ether 00:16:3e:00:00:00  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

virbr0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 192.168.122.1  netmask 255.255.255.0  broadcast 192.168.122.255
        ether 52:54:00:4f:57:89  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
```

TYPES:

ifconfig -a :

1. Viewing the configuration of all interfaces:
To display the configuration of all network interfaces on the system (active as well as inactive ones), we use the -a option.

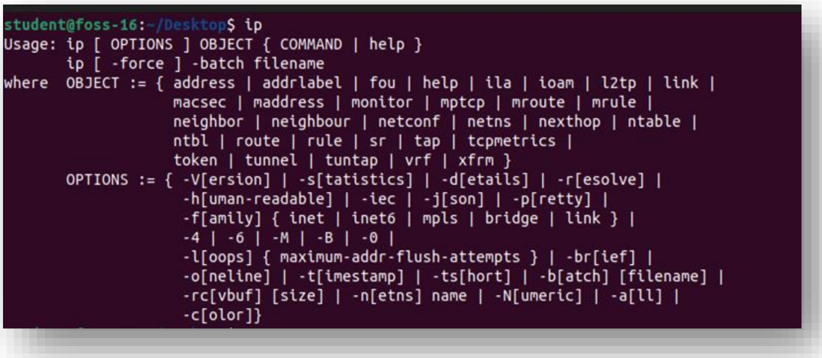


```
student@foss-16:~/Desktop$ ifconfig -a
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:06:d9:83:5b  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.1.99.101  netmask 255.255.255.0  broadcast 10.1.99.255
        inet6 fe80::3a0c:cdc1:a572:a7cf  prefixlen 64  scopeid 0x20<link>
        ether e8:39:35:5a:a8:1d  txqueuelen 1000  (Ethernet)
        RX packets 2307817  bytes 696706667 (696.7 MB)
        RX errors 0  dropped 7  overruns 0  frame 0
        TX packets 310483  bytes 28300274 (28.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 20  memory 0xfe400000-fe420000

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 3442494  bytes 724599802 (724.5 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3442494  bytes 724599802 (724.5 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lxcbr0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 10.0.3.1  netmask 255.255.255.0  broadcast 10.0.3.255
        ether 00:16:3e:00:00:00  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

virbr0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 192.168.122.1  netmask 255.255.255.0  broadcast 192.168.122.255
        ether 52:54:00:4f:57:89  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
```

2. To view the configuration of a specific interface - specific interface, specify its name as an option. **i.e** ifconfig eth0(interface_name)

3. To enable and Disable a Network Interface: a. To disable an active network interface , enter the device name followed by the down flag: **use:** ifconfig eth0 down

b. To enable an inactive network interface, use the up flag: use : ifconfig eth0 up

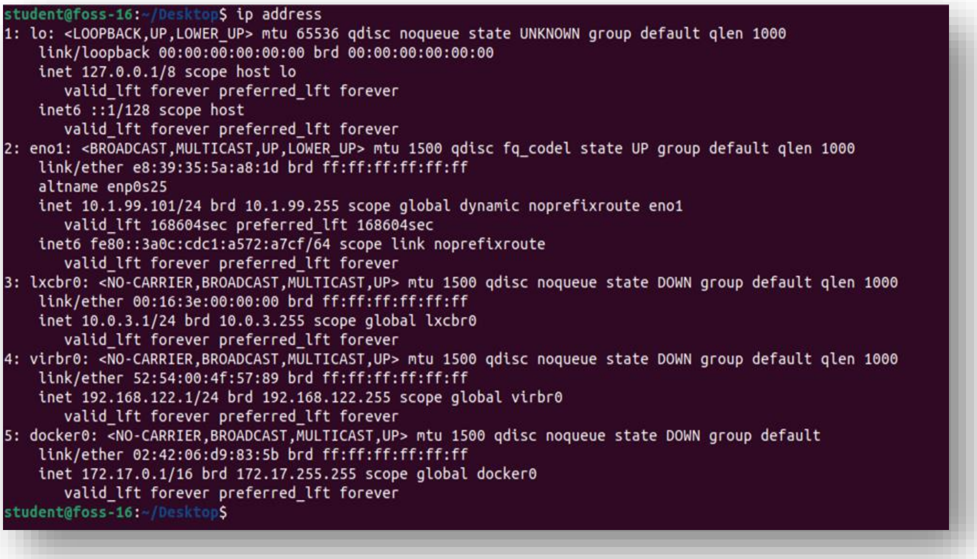


```
student@foss-16:~/Desktop$ ip
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] -batch filename
where  OBJECT := { address | addrlabel | fou | help | ila | ioam | l2tp | link |
                   macsec | maddress | monitor | mptcp | mroute | mrule |
                   neighbor | neighbour | netconf | netns | nexthop | ntable |
                   ntbl | route | rule | sr | tap | tcpmetrics |
                   token | tunnel | tuntap | vrf | xfrm }
       OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                    -h[uman-readable] | -iec | -j[son] | -p[retty] |
                    -f[amily] { inet | inet6 | mpls | bridge | link } |
                    -4 | -6 | -M | -B | -0 |
                    -l[oops] { maximum-addr-flush-attempts } | -br[ief] |
                    -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
                    -rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
                    -c[olor]}
```

❖ <u>**ip :**</u> ip command in Linux is present in the net-tools which is used for performing several network administration tasks. IP stands for Internet Protocol. This command is used to show or manipulate routing, devices, and tunnels. **Syntax:** ip [options] object { command | help }

<u>**TYPES:**</u>

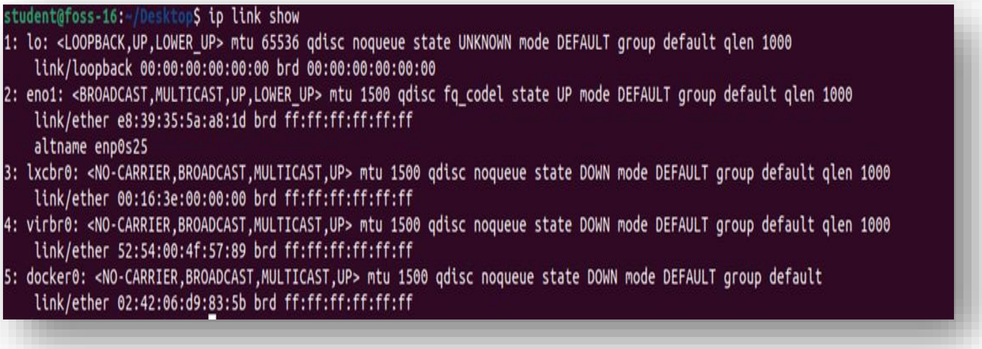
ip-address: This option is used to show all IP addresses associated on all network devices.



```
student@foss-16:~/Desktop$ ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether e8:39:35:5a:a8:1d brd ff:ff:ff:ff:ff:ff
    altname enp0s25
    inet 10.1.99.101/24 brd 10.1.99.255 scope global dynamic noprefixroute eno1
       valid_lft 168604sec preferred_lft 168604sec
    inet6 fe80::3a0c:cdc1:a572:a7cf/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 00:16:3e:00:00:00 brd ff:ff:ff:ff:ff:ff
    inet 10.0.3.1/24 brd 10.0.3.255 scope global lxcbr0
       valid_lft forever preferred_lft forever
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:4f:57:89 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:06:d9:83:5b brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
student@foss-16:~/Desktop$
```

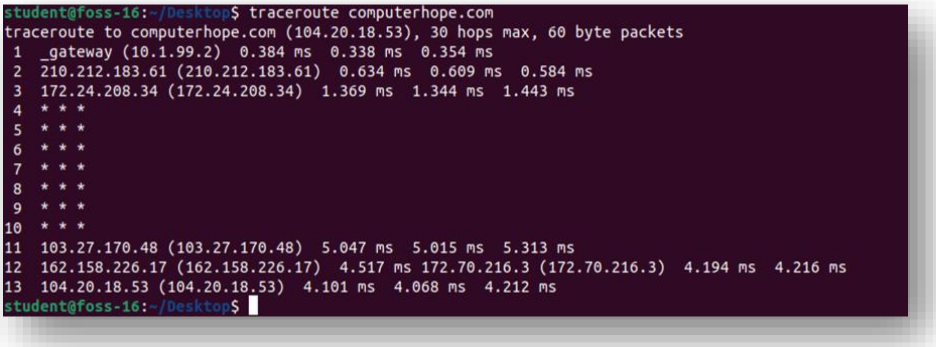
ip link: Network Device Configuration- link is a network device and the corresponding commands display and change the state of devices.

Use: ip link show [device]



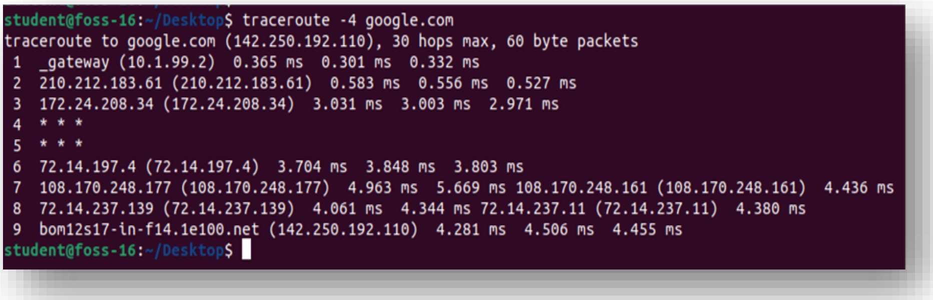
```
student@foss-16:~/Desktop$ ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether e8:39:35:5a:a8:1d brd ff:ff:ff:ff:ff:ff
    altname enp0s25
3: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 00:16:3e:00:00:00 brd ff:ff:ff:ff:ff:ff
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:4f:57:89 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:06:d9:83:5b brd ff:ff:ff:ff:ff:ff
```

<u>3. Traceroute:</u> traceroute is a network diagnostic method where a packet is sent to a destination. The traceroute software reports the location and travel time of each hop the packet makes as it travels from device to device on the intermediate network.



```
student@foss-16:~/Desktop$ traceroute computerhope.com
traceroute to computerhope.com (104.20.18.53), 30 hops max, 60 byte packets
 1  _gateway (10.1.99.2)  0.384 ms  0.338 ms  0.354 ms
 2  210.212.183.61 (210.212.183.61)  0.634 ms  0.609 ms  0.584 ms
 3  172.24.208.34 (172.24.208.34)  1.369 ms  1.344 ms  1.443 ms
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  103.27.170.48 (103.27.170.48)  5.047 ms  5.015 ms  5.313 ms
12  162.158.226.17 (162.158.226.17)  4.517 ms 172.70.216.3 (172.70.216.3)  4.194 ms  4.216 ms
13  104.20.18.53 (104.20.18.53)  4.101 ms  4.068 ms  4.212 ms
student@foss-16:~/Desktop$ 
```

Use: traceroute [options] host_Address [pathlength]



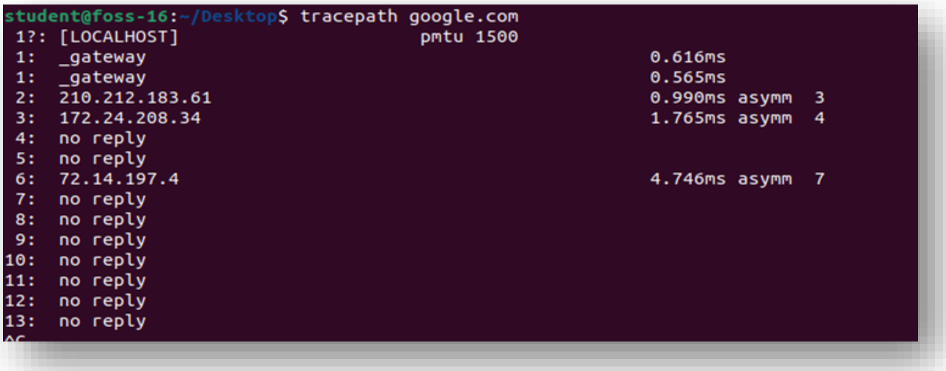
```
student@foss-16:~/Desktop$ traceroute -4 google.com
traceroute to google.com (142.250.192.110), 30 hops max, 60 byte packets
 1  _gateway (10.1.99.2)  0.365 ms  0.301 ms  0.332 ms
 2  210.212.183.61 (210.212.183.61)  0.583 ms  0.556 ms  0.527 ms
 3  172.24.208.34 (172.24.208.34)  3.031 ms  3.003 ms  2.971 ms
 4  * * *
 5  * * *
 6  72.14.197.4 (72.14.197.4)  3.704 ms  3.848 ms  3.803 ms
 7  108.170.248.177 (108.170.248.177)  4.963 ms  5.669 ms 108.170.248.161 (108.170.248.161)  4.436 ms
 8  72.14.237.139 (72.14.237.139)  4.061 ms  4.344 ms 72.14.237.11 (72.14.237.11)  4.380 ms
 9  bom12s17-in-f14.1e100.net (142.250.192.110)  4.281 ms  4.506 ms  4.455 ms
student@foss-16:~/Desktop$ 
```

Types:

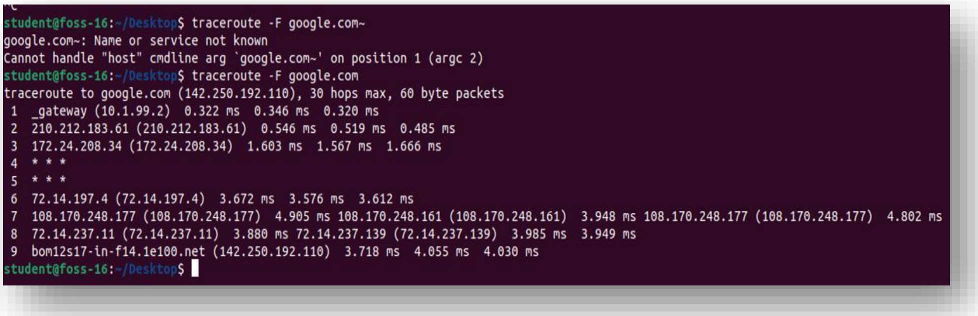
-4 Option: Use ip version 4 i.e. use Ipv4 i.e traceroute -4 google.com

❖ **<u>tracepath:</u>**

tracepath command in Linux is used to traces path to destination discovering MTU along this path. It uses UDP port or some random port. It is similar to traceroute, but it does not require superuser privileges and has no fancy options.



```
student@foss-16:~/Desktop$ tracepath google.com
 1?: [LOCALHOST]                      pmtu 1500
 1:  _gateway                                              0.616ms
 1:  _gateway                                              0.565ms
 2:  210.212.183.61                                        0.990ms asymm  3
 3:  172.24.208.34                                         1.765ms asymm  4
 4:  no reply
 5:  no reply
 6:  72.14.197.4                                           4.746ms asymm  7
 7:  no reply
 8:  no reply
 9:  no reply
10:  no reply
11:  no reply
12:  no reply
13:  no reply
```



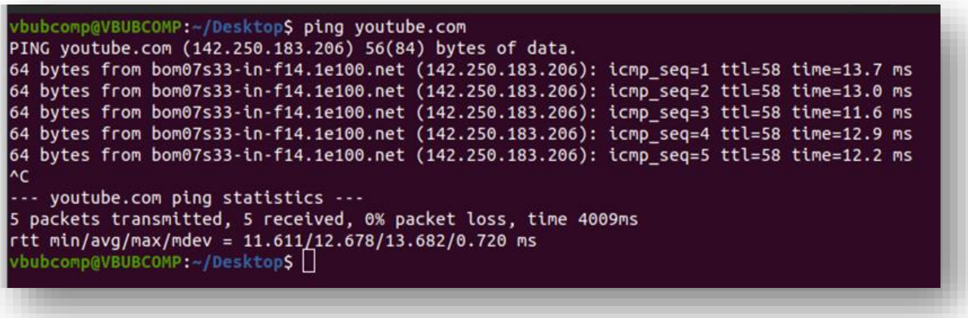
```
student@foss-16:~/Desktop$ traceroute -F google.com~
google.com~: Name or service not known
Cannot handle "host" cmdline arg `google.com~' on position 1 (argc 2)
student@foss-16:~/Desktop$ traceroute -F google.com
traceroute to google.com (142.250.192.110), 30 hops max, 60 byte packets
 1  _gateway (10.1.99.2)  0.322 ms  0.346 ms  0.320 ms
 2  210.212.183.61 (210.212.183.61)  0.546 ms  0.519 ms  0.485 ms
 3  172.24.208.34 (172.24.208.34)  1.603 ms  1.567 ms  1.666 ms
 4  * * *
 5  * * *
 6  72.14.197.4 (72.14.197.4)  3.672 ms  3.576 ms  3.612 ms
 7  108.170.248.177 (108.170.248.177)  4.905 ms 108.170.248.161 (108.170.248.161)  3.948 ms 108.170.248.177 (108.170.248.177)  4.802 ms
 8  72.14.237.11 (72.14.237.11)  3.880 ms 72.14.237.139 (72.14.237.139)  3.985 ms  3.949 ms
 9  bom12s17-in-f14.1e100.net (142.250.192.110)  3.718 ms  4.055 ms  4.030 ms
student@foss-16:~/Desktop$ 
```

Use: tracepath [-n] [-b] [-l pktlen] [-m max_hops] [-p port] destination

<u>tracepath options:</u>

-F Type: Do not fragment packet.
Use: traceroute -F google.com

- ❖ **ping:**

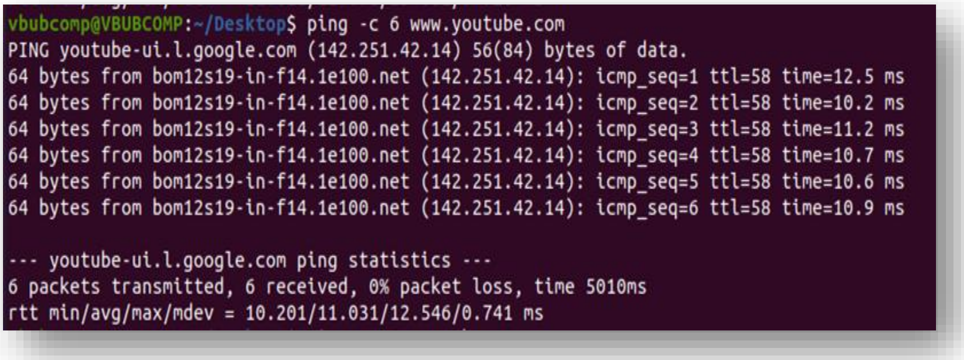


```
vbubcomp@VBUBCOMP:~/Desktop$ ping youtube.com
PING youtube.com (142.250.183.206) 56(84) bytes of data.
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=1 ttl=58 time=13.7 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=2 ttl=58 time=13.0 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=3 ttl=58 time=11.6 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=4 ttl=58 time=12.9 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=5 ttl=58 time=12.2 ms
^C
--- youtube.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4009ms
rtt min/avg/max/mdev = 11.611/12.678/13.682/0.720 ms
vbubcomp@VBUBCOMP:~/Desktop$ 
```

PING,which stands for ‘Packet Internet Groper’ is a command used for checking the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message “PING” and get a response from the server/host this time is recorded which is called latency.
Fast ping low latency means faster connection.
Ping uses ICMP(Internet Control Message Protocol) to send an ICMP echo message to the specified host if that host is available then it sends ICMP reply message.
Ping is generally measured in millisecond every modern operating system has this ping pre-installed. **Use:** ping IP address /URL

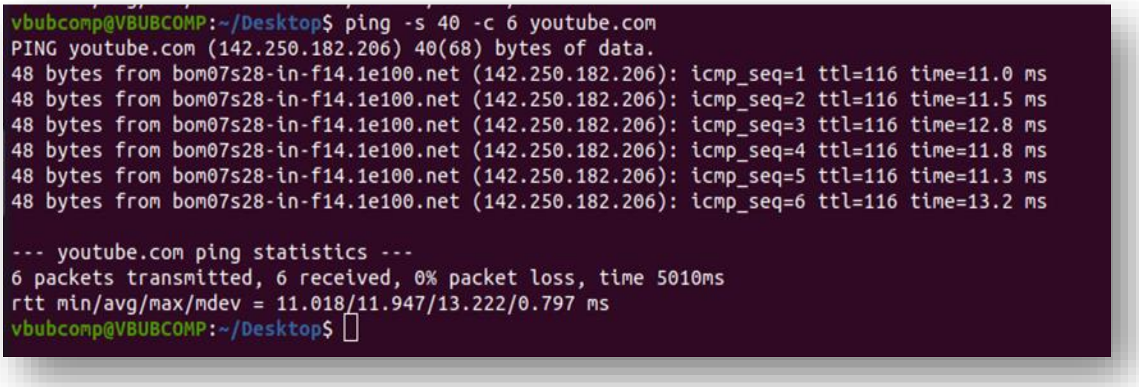
Types:

a.Controlling the number of pings:
We can efine the number of packets to send to the server/host by using -c option. use: ping -c 6 www.youtube.com



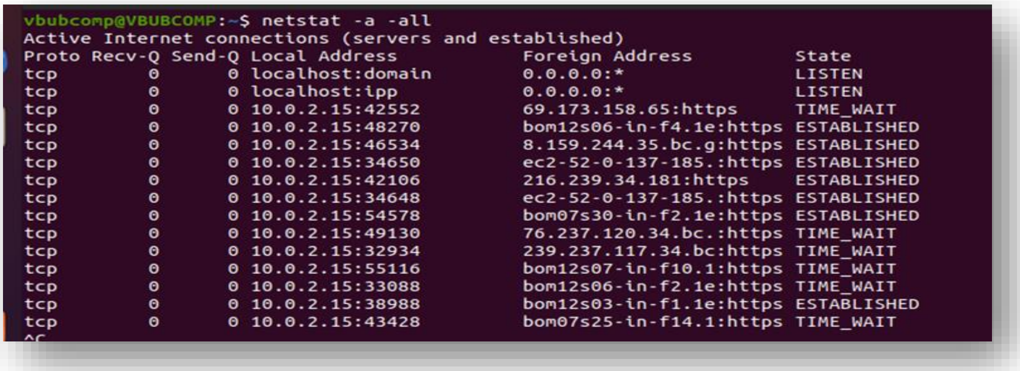
```
vbubcomp@VBUBCOMP:~/Desktop$ ping -c 6 www.youtube.com
PING youtube-ui.l.google.com (142.251.42.14) 56(84) bytes of data.
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=1 ttl=58 time=12.5 ms
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=2 ttl=58 time=10.2 ms
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=3 ttl=58 time=11.2 ms
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=4 ttl=58 time=10.7 ms
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=5 ttl=58 time=10.6 ms
64 bytes from bom12s19-in-f14.1e100.net (142.251.42.14): icmp_seq=6 ttl=58 time=10.9 ms

--- youtube-ui.l.google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5010ms
rtt min/avg/max/mdev = 10.201/11.031/12.546/0.741 ms
```

b. Controlling the size of packets send:
We can send light and heavy packet by using -s option. Use: ping -s 40 -c 6 www.youtube.com

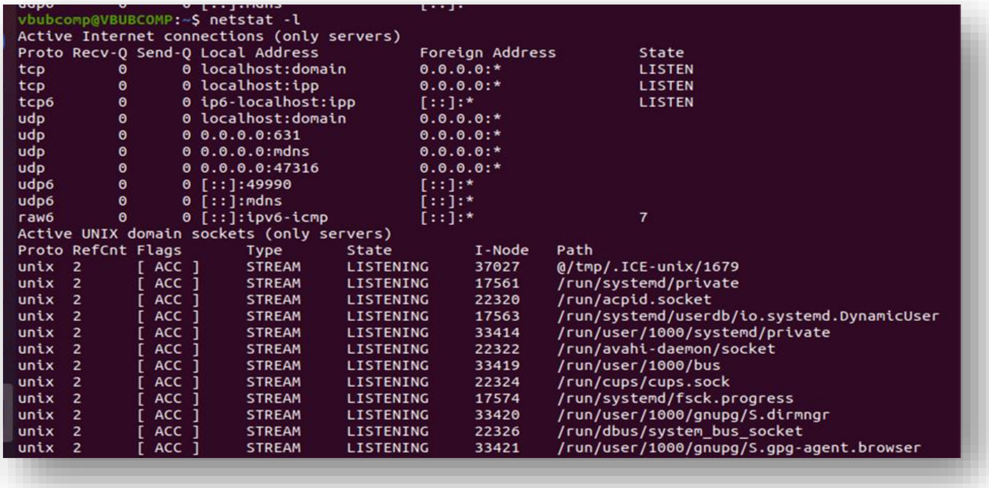


```
vbubcomp@VBUBCOMP:~/Desktop$ ping -s 40 -c 6 youtube.com
PING youtube.com (142.250.182.206) 40(68) bytes of data.
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=1 ttl=116 time=11.0 ms
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=2 ttl=116 time=11.5 ms
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=3 ttl=116 time=12.8 ms
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=4 ttl=116 time=11.8 ms
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=5 ttl=116 time=11.3 ms
48 bytes from bom07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=6 ttl=116 time=13.2 ms

--- youtube.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5010ms
rtt min/avg/max/mdev = 11.018/11.947/13.222/0.797 ms
vbubcomp@VBUBCOMP:~/Desktop$ 
```

6. netstat: Netstat command displays various network related information such as network connections, routing tables, interface statistics, masquerade connections, multicast memberships etc.
Use: netstat [type]



```
vbubcomp@VBUBCOMP:~$ netstat -a -all
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 10.0.2.15:42552         69.173.158.65:https     TIME_WAIT
tcp        0      0 10.0.2.15:48270         bom12s06-in-f4.1e:https ESTABLISHED
tcp        0      0 10.0.2.15:46534         8.159.244.35.bc.g:https ESTABLISHED
tcp        0      0 10.0.2.15:34650         ec2-52-0-137-185.:https ESTABLISHED
tcp        0      0 10.0.2.15:42106         216.239.34.181:https    ESTABLISHED
tcp        0      0 10.0.2.15:34648         ec2-52-0-137-185.:https ESTABLISHED
tcp        0      0 10.0.2.15:54578         bom07s30-in-f2.1e:https ESTABLISHED
tcp        0      0 10.0.2.15:49130         76.237.120.34.bc.:https TIME_WAIT
tcp        0      0 10.0.2.15:32934         239.237.117.34.bc:https TIME_WAIT
tcp        0      0 10.0.2.15:55116         bom12s07-in-f10.1:https TIME_WAIT
tcp        0      0 10.0.2.15:33088         bom12s06-in-f2.1e:https TIME_WAIT
tcp        0      0 10.0.2.15:38988         bom12s03-in-f1.1e:https ESTABLISHED
tcp        0      0 10.0.2.15:43428         bom07s25-in-f14.1:https TIME_WAIT
^C
```

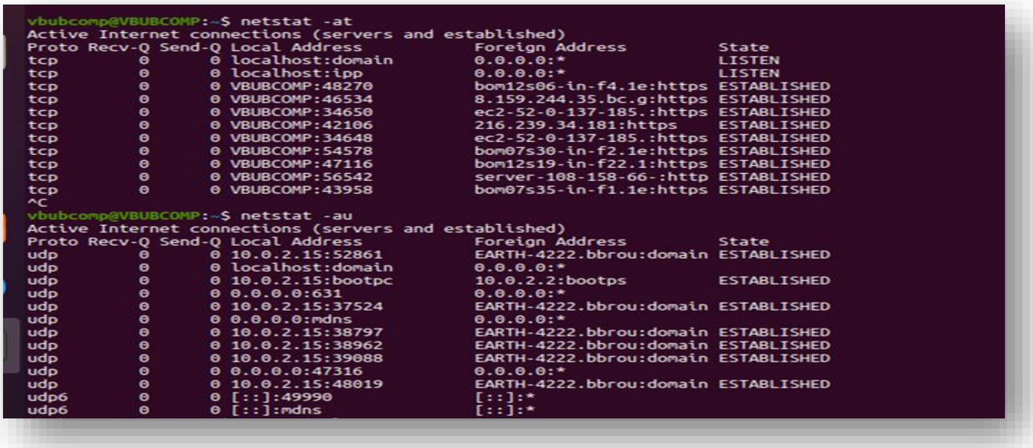


```
vbubcomp@VBUBCOMP:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 0.0.0.0:47316           0.0.0.0:*
udp6       0      0 [::]:49990              [::]:*
udp6       0      0 [::]:mdns               [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ACC ]     STREAM     LISTENING     37027    @/tmp/.ICE-unix/1679
unix  2      [ ACC ]     STREAM     LISTENING     17561    /run/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     22320    /run/acpid.socket
unix  2      [ ACC ]     STREAM     LISTENING     17563    /run/systemd/userdb/io.systemd.DynamicUser
unix  2      [ ACC ]     STREAM     LISTENING     33414    /run/user/1000/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     22322    /run/avahi-daemon/socket
unix  2      [ ACC ]     STREAM     LISTENING     33419    /run/user/1000/bus
unix  2      [ ACC ]     STREAM     LISTENING     22324    /run/cups/cups.sock
unix  2      [ ACC ]     STREAM     LISTENING     17574    /run/systemd/fsck.progress
unix  2      [ ACC ]     STREAM     LISTENING     33420    /run/user/1000/gnupg/S.dirmngr
unix  2      [ ACC ]     STREAM     LISTENING     22326    /run/dbus/system_bus_socket
unix  2      [ ACC ]     STREAM     LISTENING     33421    /run/user/1000/gnupg/S.gpg-agent.browser
```

Types:

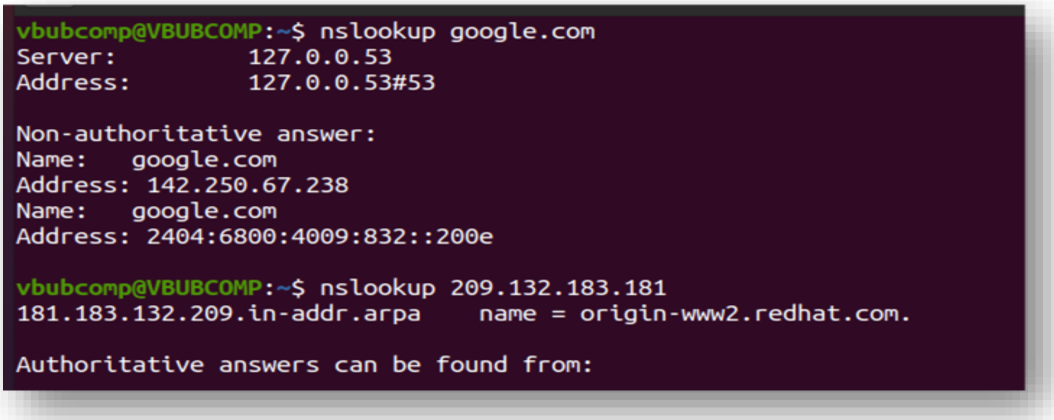
netstat -a -all : Show both listening and non-listening sockets. With the –interfaces option, show interfaces that are not up.
netstat -at : To list all tcp ports.
netstat -au : To list all udp ports.

netstat -l : To list only the listening ports.
netstat -lt : To list only the listening tcp ports.
netstat -lu : To list only the listening udp ports.
netstat -lx : To list only the listening UNIX ports.
netstat -s : To list the statistics for all ports.



```
vbubcomp@VBUBCOMP:~$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 VBUBCOMP:48270          bom12s06-in-f4.1e:https ESTABLISHED
tcp        0      0 VBUBCOMP:46534          8.159.244.35.bc.g:https ESTABLISHED
tcp        0      0 VBUBCOMP:34650          ec2-52-0-137-185.:https ESTABLISHED
tcp        0      0 VBUBCOMP:42106          216.239.34.181:https    ESTABLISHED
tcp        0      0 VBUBCOMP:34648          ec2-52-0-137-185.:https ESTABLISHED
tcp        0      0 VBUBCOMP:54578          bom07s30-in-f2.1e:https ESTABLISHED
tcp        0      0 VBUBCOMP:47116          bom12s19-in-f22.1:https ESTABLISHED
tcp        0      0 VBUBCOMP:56542          server-108-158-66-:http ESTABLISHED
tcp        0      0 VBUBCOMP:43958          bom07s35-in-f1.1e:https ESTABLISHED
^C
vbubcomp@VBUBCOMP:~$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 10.0.2.15:52861         EARTH-4222.bbrou:domain ESTABLISHED
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 10.0.2.15:bootpc        10.0.2.2:bootps         ESTABLISHED
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 10.0.2.15:37524         EARTH-4222.bbrou:domain ESTABLISHED
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 10.0.2.15:38797         EARTH-4222.bbrou:domain ESTABLISHED
udp        0      0 10.0.2.15:38962         EARTH-4222.bbrou:domain ESTABLISHED
udp        0      0 10.0.2.15:39088         EARTH-4222.bbrou:domain ESTABLISHED
udp        0      0 0.0.0.0:47316           0.0.0.0:*
udp        0      0 10.0.2.15:48019         EARTH-4222.bbrou:domain ESTABLISHED
udp6       0      0 [::]:49990              [::]:*
udp6       0      0 [::]:mdns               [::]:*
```

7. nslookup:

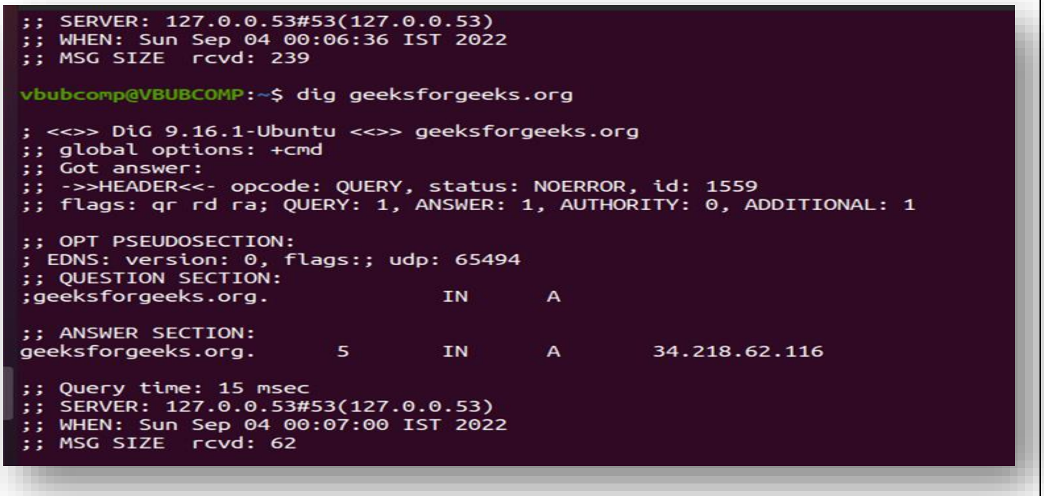


```
vbubcomp@VBUBCOMP:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.67.238
Name:   google.com
Address: 2404:6800:4009:832::200e

vbubcomp@VBUBCOMP:~$ nslookup 209.132.183.181
181.183.132.209.in-addr.arpa    name = origin-www2.redhat.com.

Authoritative answers can be found from:
```

nslookup, which stands for 'Name Server Lookup' is a useful command for getting information from the DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS-related problems.**Use:** nslookup [option]

Types:
nslookup domain_name: nslookup followed by the domain name will display the 'A Record' (IP Address) of the domain.
nslookup dip_address: reverse DNS lookup
We can do the reverse DNS look-up by providing the IP Address as an argument to nslookup.

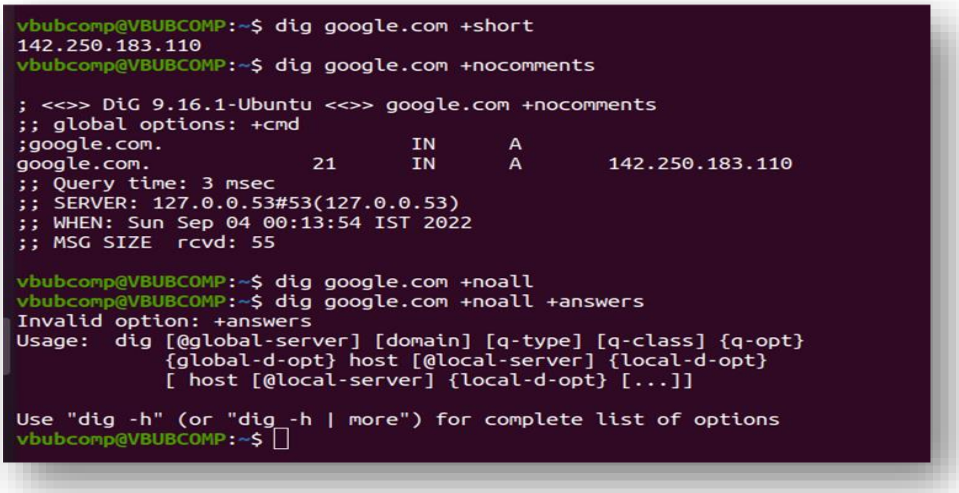
- **dig:**



```
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Sun Sep 04 00:06:36 IST 2022
;; MSG SIZE  rcvd: 239

vbubcomp@VBUBCOMP:~$ dig geeksforgeeks.org

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 1559
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;geeksforgeeks.org.             IN      A

;; ANSWER SECTION:
geeksforgeeks.org.      5       IN      A       34.218.62.116

;; Query time: 15 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Sun Sep 04 00:07:00 IST 2022
;; MSG SIZE  rcvd: 62
```

dig command stands for Domain Information Groper. It is used for retrieving information about DNS name servers. It is used by network administrators. It is used for verifying and troubleshooting DNS problems and to perform DNS lookups. **Use:** dig domain_name

Types:
To query domain "A" record with +short : dig domain_name +short
To remove comment lines : dig domain_name +nocomments
To set or clear all display flags: dig domain_name +noall
To query detailed answers: dig domain_name +noall +answer



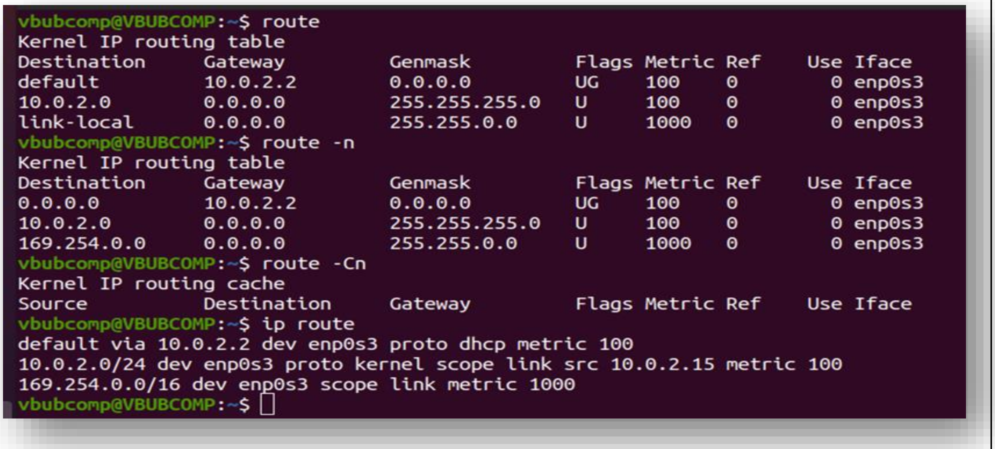
```
vbubcomp@VBUBCOMP:~$ dig google.com +short
142.250.183.110
vbubcomp@VBUBCOMP:~$ dig google.com +nocomments

; <<>> DiG 9.16.1-Ubuntu <<>> google.com +nocomments
;; global options: +cmd
;google.com.                    IN      A
google.com.             21      IN      A       142.250.183.110
;; Query time: 3 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Sun Sep 04 00:13:54 IST 2022
;; MSG SIZE  rcvd: 55

vbubcomp@VBUBCOMP:~$ dig google.com +noall
vbubcomp@VBUBCOMP:~$ dig google.com +noall +answers
Invalid option: +answers
Usage:  dig [@global-server] [domain] [q-type] [q-class] {q-opt}
            {global-d-opt} host [@local-server] {local-d-opt}
            [ host [@local-server] {local-d-opt} [...]]

Use "dig -h" (or "dig -h | more") for complete list of options
vbubcomp@VBUBCOMP:~$
```

❖ **route:**
route command in Linux is used when you want to work with the IP/kernel routing table. It is mainly used to set up static routes to specific hosts or networks via an interface. It is used for showing or update the IP/kernel routing table.

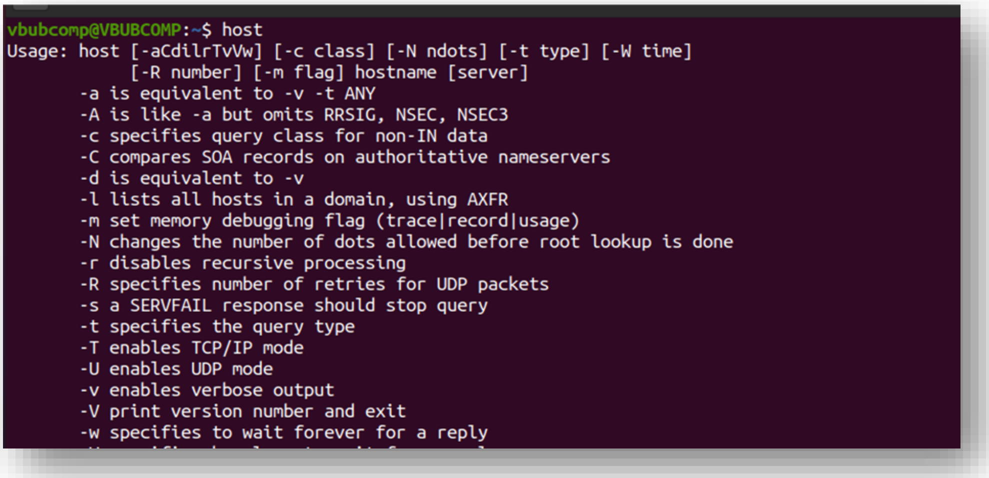
Use: route [option]

Types:

To display the IP/kernel routing table: route
To display routing table in full numeric form: route -n
To list kernel's routing cache information: route -Cn
To get details of the kernel/IP routing table using ip command: ip route



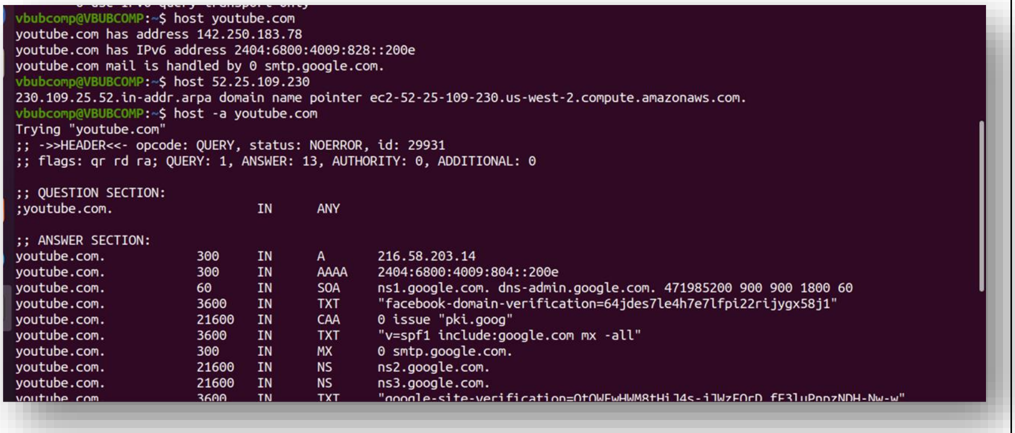
```
vbubcomp@VBUBCOMP:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
vbubcomp@VBUBCOMP:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
vbubcomp@VBUBCOMP:~$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref    Use Iface
vbubcomp@VBUBCOMP:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
vbubcomp@VBUBCOMP:~$
```



```
vbubcomp@VBUBCOMP:~$ host
Usage: host [-aCdilrTvVw] [-c class] [-N ndots] [-t type] [-W time]
            [-R number] [-m flag] hostname [server]
       -a is equivalent to -v -t ANY
       -A is like -a but omits RRSIG, NSEC, NSEC3
       -c specifies query class for non-IN data
       -C compares SOA records on authoritative nameservers
       -d is equivalent to -v
       -l lists all hosts in a domain, using AXFR
       -m set memory debugging flag (trace|record|usage)
       -N changes the number of dots allowed before root lookup is done
       -r disables recursive processing
       -R specifies number of retries for UDP packets
       -s a SERVFAIL response should stop query
       -t specifies the query type
       -T enables TCP/IP mode
       -U enables UDP mode
       -v enables verbose output
       -V print version number and exit
       -w specifies to wait forever for a reply
```

❖ **Host:** host command in Linux system is used for DNS (Domain Name System) lookup operations. This command is used to find the IP address of a particular domain name or if we want to find out the domain name of a particular IP address the host command becomes handy. We can also find more specific details of a domain by specifying the corresponding option along with the domain name.

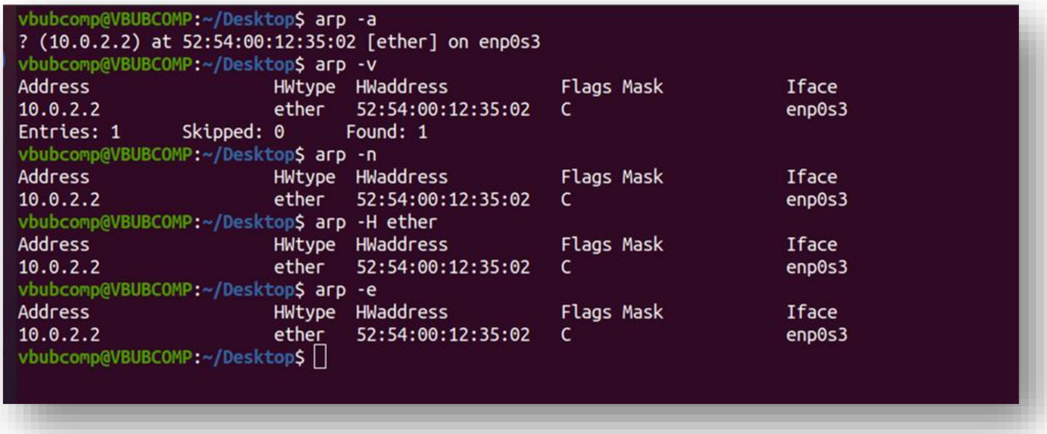
Use: host [-aCdlriTWV] [-c class] [-N ndots] [-t type] [-W time]
[-R number] [-m flag] hostname [server]



```
vbubcomp@VBUBCOMP:~$ host youtube.com
youtube.com has address 142.250.183.78
youtube.com has IPv6 address 2404:6800:4009:828::200e
youtube.com mail is handled by 0 smtp.google.com.
vbubcomp@VBUBCOMP:~$ host 52.25.109.230
230.109.25.52.in-addr.arpa domain name pointer ec2-52-25-109-230.us-west-2.compute.amazonaws.com.
vbubcomp@VBUBCOMP:~$ host -a youtube.com
Trying "youtube.com"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 29931
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;youtube.com.                   IN      ANY

;; ANSWER SECTION:
youtube.com.            300     IN      A       216.58.203.14
youtube.com.            300     IN      AAAA    2404:6800:4009:804::200e
youtube.com.            60      IN      SOA     ns1.google.com. dns-admin.google.com. 471985200 900 900 1800 60
youtube.com.            3600    IN      TXT     "facebook-domain-verification=64jdes7le4h7e7lfpi22rijygx58j1"
youtube.com.            21600   IN      CAA     0 issue "pki.goog"
youtube.com.            3600    IN      TXT     "v=spf1 include:google.com mx -all"
youtube.com.            300     IN      MX      0 smtp.google.com.
youtube.com.            21600   IN      NS      ns2.google.com.
youtube.com.            21600   IN      NS      ns3.google.com.
youtube.com.            3600    IN      TXT     "google-site-verification=OtQWFwHWM8tHiJ4s-iJWzFOrD_fE3luPnnzNDH-Nw-w"
```

Types:

host command without any option: It will print the general syntax of the command along with the various options.
host domain_name: This will print the IP address details of the specified domain.
host IP_Address:
This will display the domain details of the specified IP Address.
-a or -v: It used to specify the query type or enables the verbose output.
-t : It is used to specify the type of query.
to print txt record: host -t txt domain_name



```
vbubcomp@VBUBCOMP:~/Desktop$ arp -a
? (10.0.2.2) at 52:54:00:12:35:02 [ether] on enp0s3
vbubcomp@VBUBCOMP:~/Desktop$ arp -v
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s3
Entries: 1      Skipped: 0      Found: 1
vbubcomp@VBUBCOMP:~/Desktop$ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s3
vbubcomp@VBUBCOMP:~/Desktop$ arp -H ether
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s3
vbubcomp@VBUBCOMP:~/Desktop$ arp -e
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s3
vbubcomp@VBUBCOMP:~/Desktop$ 
```

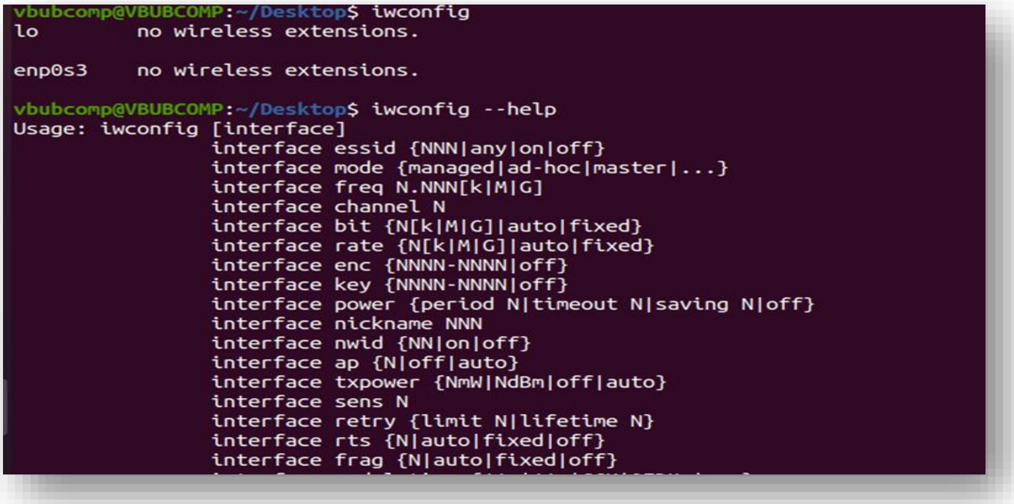
❖ **arp:**

arp stands for Address Resolution Protocol. arp command is used to manipulate the System's ARP cache. It also allows a complete dump of the ARP cache.
The primary function of this protocol is to resolve the IP address of a system to its mac address, and hence it works between level 2(Data link layer) and level 3(Network layer).
Use: arp [-v] [-i if] [-H type] -a [hostname]

arp options:

arp -a: checking arp for all
arp -v: verbose: this option shows the verbose information.
arp -n: numeric: this option shows numerical addresses instead of symbolic host, port or usernames.
arp -H type, –hw-type type, -t type: this tells arp which class of entries it should check for. Default value is ether.

12. iwconfig:

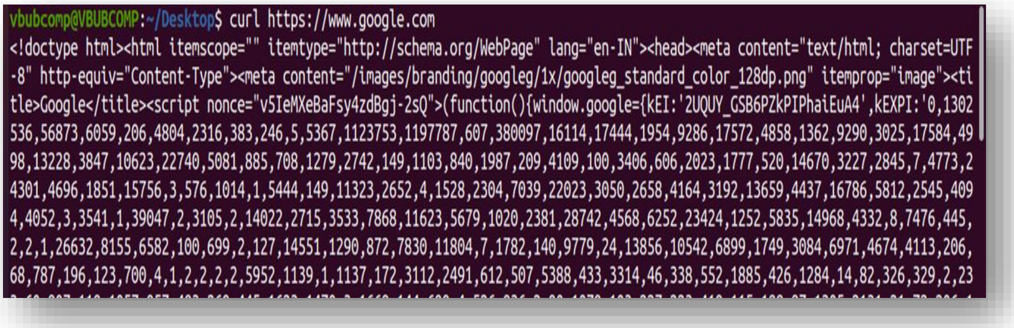


```
vbubcomp@VBUBCOMP:~/Desktop$ iwconfig
lo        no wireless extensions.

enp0s3    no wireless extensions.

vbubcomp@VBUBCOMP:~/Desktop$ iwconfig --help
Usage: iwconfig [interface]
                interface essid {NNN|any|on|off}
                interface mode {managed|ad-hoc|master|...}
                interface freq N.NNN[k|M|G]
                interface channel N
                interface bit {N[k|M|G]|auto|fixed}
                interface rate {N[k|M|G]|auto|fixed}
                interface enc {NNNN-NNNN|off}
                interface key {NNNN-NNNN|off}
                interface power {period N|timeout N|saving N|off}
                interface nickname NNN
                interface nwid {NN|on|off}
                interface ap {N|off|auto}
                interface txpower {NmW|NdBm|off|auto}
                interface sens N
                interface retry {limit N|lifetime N}
                interface rts {N|auto|fixed|off}
                interface frag {N|auto|fixed|off}
```

iwconfig command in Linux is like ifconfig command, in the sense it works with kernel-resident network interface but it is dedicated to wireless networking interfaces only. It is used to set the parameters of the network interface that are particular to the wireless operation like SSID, frequency etc.**Use:** iwconfig [interface] [options]

Types:

--help: Displays help regarding iwconfig command, such as the different modes in the options.**Use:** iwconfig --help
nwid: This option sets the network ID, you may disable or enable the Network ID.
Use: iwconfig [Interface] nwid on/off
nick: This option sets the nickname or the station name.
Use: iwconfig [Interface] nickname "My New Node"
essid: Set the ESSID.
Use: iwconfig [Interface] essid "Network name"



```
vbubcomp@VBUBCOMP:~/Desktop$ curl https://www.google.com
<!doctype html><html itemscope="" itemtype="http://schema.org/WebPage" lang="en-IN"><head><meta content="text/html; charset=UTF
-8" http-equiv="Content-Type"><meta content="/images/branding/googleg/1x/googleg_standard_color_128dp.png" itemprop="image"><ti
tle>Google</title><script nonce="v5IeMXeBaFsy4zdBgj-2sQ">(function(){window.google={kEI:'2UQUY_GSB6PZkPIPhaiEuA4',kEXPI:'0,1302
536,56873,6059,206,4804,2316,383,246,5,5367,1123753,1197787,607,380097,16114,17444,1954,9286,17572,4858,1362,9290,3025,17584,49
98,13228,3847,10623,22740,5081,885,708,1279,2742,149,1103,840,1987,209,4109,100,3406,606,2023,1777,520,14670,3227,2845,7,4773,2
4301,4696,1851,15756,3,576,1014,1,5444,149,11323,2652,4,1528,2304,7039,22023,3050,2658,4164,3192,13659,4437,16786,5812,2545,409
4,4052,3,3541,1,39047,2,3105,2,14022,2715,3533,7868,11623,5679,1020,2381,28742,4568,6252,23424,1252,5835,14968,4332,8,7476,445,
2,2,1,26632,8155,6582,100,699,2,127,14551,1290,872,7830,11804,7,1782,140,9779,24,13856,10542,6899,1749,3084,6971,4674,4113,206,
68,787,196,123,700,4,1,2,2,2,2,5952,1139,1,1137,172,3112,2491,612,507,5388,433,3314,46,338,552,1885,426,1284,14,82,326,329,2,23
```

❖ curl:

curl is a command-line tool to transfer data to or from a server, using any of the supported protocols (HTTP, FTP, IMAP, POP3, SCP, SFTP, SMTP, TFTP, TELNET, LDAP, or FILE). curl is powered by Libcurl. This tool is preferred for automation since it is designed to work without user interaction. curl can transfer multiple files at once. Use: curl [options] [URL...]

Types:

URL: The most basic use of curl is typing the command followed by the URL.
Progress Meter: curl displays a progress meter during use to indicate the transfer rate, amount of data transferred, time left, etc.

-o: saves the downloaded file on the local machine with the name provided in the parameters. **Use:** curl -o [file_name] [URL...]

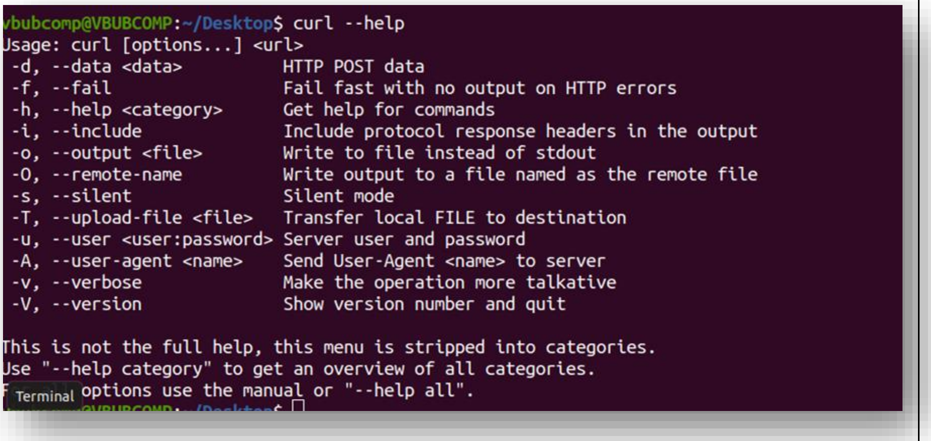
-C -: this option resumes download which has been stopped due to some reason.

–limit-rate: This option limits the upper bound of the rate of data transfer and keeps it around the given value in bytes.

use: curl --limit-rate [value] [URL]

-u: curl also provides options to download files from user authenticated FTP servers.

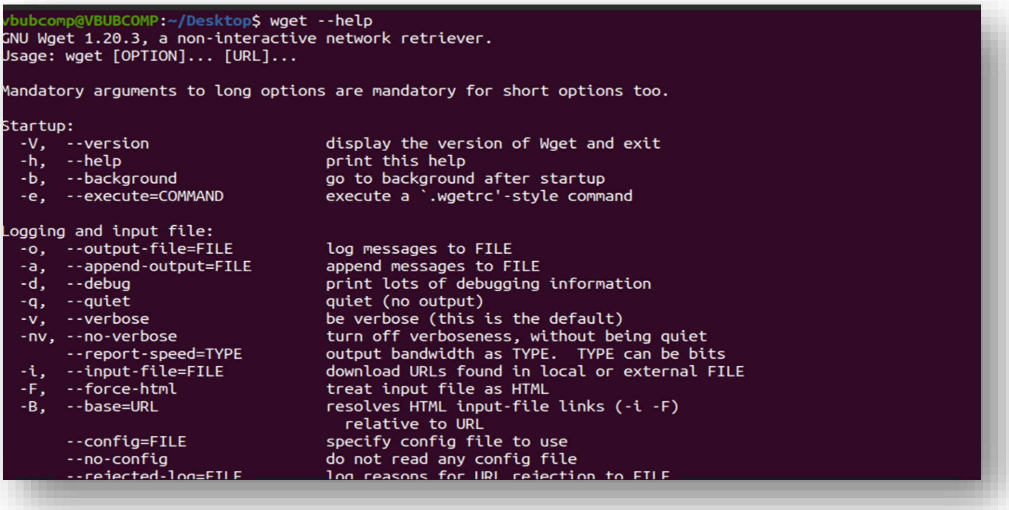
use: curl -u {username}:{password} [FTP_URL]



```
vbubcomp@VBUBCOMP:~/Desktop$ curl --help
Usage: curl [options...] <url>
 -d, --data <data>          HTTP POST data
 -f, --fail                 Fail fast with no output on HTTP errors
 -h, --help <category>      Get help for commands
 -i, --include              Include protocol response headers in the output
 -o, --output <file>        Write to file instead of stdout
 -O, --remote-name          Write output to a file named as the remote file
 -s, --silent               Silent mode
 -T, --upload-file <file>   Transfer local FILE to destination
 -u, --user <user:password> Server user and password
 -A, --user-agent <name>    Send User-Agent <name> to server
 -v, --verbose              Make the operation more talkative
 -V, --version              Show version number and quit

This is not the full help, this menu is stripped into categories.
Use "--help category" to get an overview of all categories.
F         options use the manual or "--help all".
```

❖ **wget:**

Wget is the non-interactive network downloader which is used to download files from the server even when the user has not logged on to the system and it can work in the background without hindering the current process. Use: wget [option] [URL]



```
vbubcomp@VBUBCOMP:~/Desktop$ wget --help
GNU Wget 1.20.3, a non-interactive network retriever.
Usage: wget [OPTION]... [URL]...

Mandatory arguments to long options are mandatory for short options too.

Startup:
  -V,  --version                   display the version of Wget and exit
  -h,  --help                      print this help
  -b,  --background                go to background after startup
  -e,  --execute=COMMAND           execute a `.wgetrc'-style command

Logging and input file:
  -o,  --output-file=FILE          log messages to FILE
  -a,  --append-output=FILE        append messages to FILE
  -d,  --debug                     print lots of debugging information
  -q,  --quiet                     quiet (no output)
  -v,  --verbose                   be verbose (this is the default)
  -nv, --no-verbose                turn off verboseness, without being quiet
       --report-speed=TYPE         output bandwidth as TYPE.  TYPE can be bits
  -i,  --input-file=FILE           download URLs found in local or external FILE
  -F,  --force-html                treat input file as HTML
  -B,  --base=URL                  resolves HTML input-file links (-i -F)
                                     relative to URL
       --config=FILE               specify config file to use
       --no-config                 do not read any config file
       --rejected-log=FILE         log reasons for URL rejection to FILE
```

Types:

V, --version: Display the version of wget, and exit.

-h, --help: Print a help message describing all the wget's command-line options, and exit.

-b, --background: Go to background immediately after startup.

-o logfile: This option is used to direct all the messages generated by the system to the logfile specified by the option.

-e command, --execute command: Execute command as if it were a part of the file.

-a: This option is used to append the output messages to the current output log file without overwriting the file as in -o option.

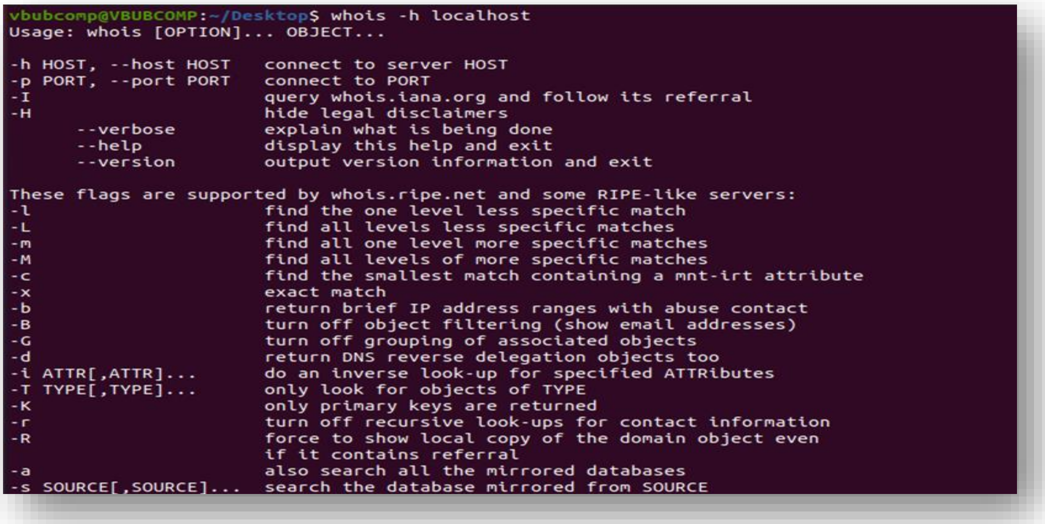
-i: This option is used to read URLs from file.

❖ telnet:

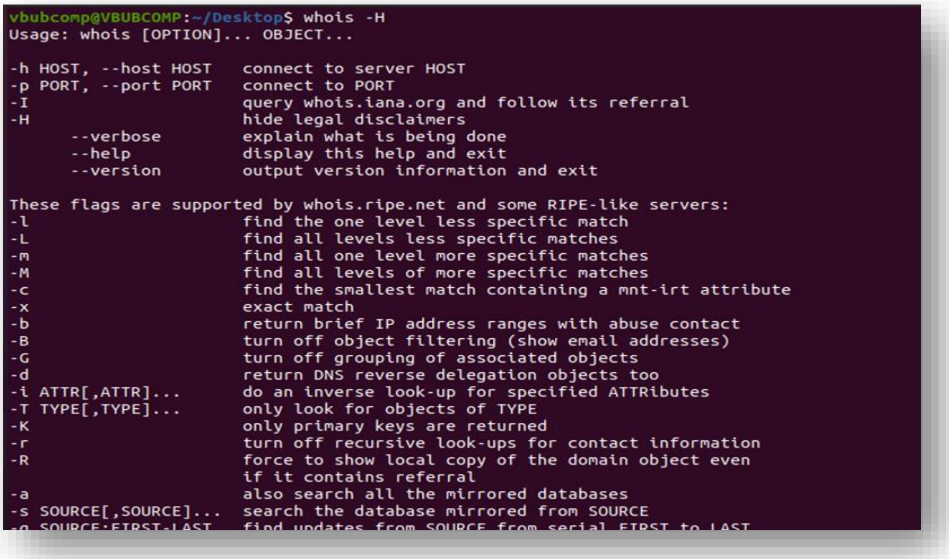
The telnet command is used to create a remote connection with a system over a TCP/IP network. It allows us to administrate other systems by the terminal. We can run a program to conduct administration.
It uses a TELNET protocol. Use: telnet hostname/IP address
To create a connection between two systems by telnet command is a simple process, execute the telnet command followed by the hostname. Use: telnet localhost

❖ whois:

whois searches for an object in a WHOIS database. WHOIS is a query and response protocol that is widely used for querying databases that store the registered users of an Internet resource, such as a domain name or an IP address block, but is also used for a wider range of other information. Use: whois [-h HOST] [-p PORT] [-aCFHlLMmrRSVx] [-g SOURCE:FIRST-LAST] [-i ATTR] [-S SOURCE] [-T TYPE] object



```
vbubcomp@VBUBCOMP:~/Desktop$ whois -h localhost
Usage: whois [OPTION]... OBJECT...

-h HOST, --host HOST   connect to server HOST
-p PORT, --port PORT   connect to PORT
-I                     query whois.iana.org and follow its referral
-H                     hide legal disclaimers
      --verbose        explain what is being done
      --help           display this help and exit
      --version        output version information and exit

These flags are supported by whois.ripe.net and some RIPE-like servers:
-l                     find the one level less specific match
-L                     find all levels less specific matches
-m                     find all one level more specific matches
-M                     find all levels of more specific matches
-c                     find the smallest match containing a mnt-irt attribute
-x                     exact match
-b                     return brief IP address ranges with abuse contact
-B                     turn off object filtering (show email addresses)
-G                     turn off grouping of associated objects
-d                     return DNS reverse delegation objects too
-i ATTR[,ATTR]...      do an inverse look-up for specified ATTRibutes
-T TYPE[,TYPE]...      only look for objects of TYPE
-K                     only primary keys are returned
-r                     turn off recursive look-up for contact information
-R                     force to show local copy of the domain object even
                       if it contains referral
-a                     also search all the mirrored databases
-s SOURCE[,SOURCE]...  search the database mirrored from SOURCE
```



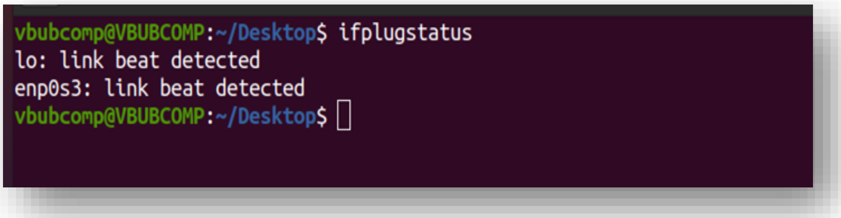
```
vbubcomp@VBUBCOMP:~/Desktop$ whois -H
Usage: whois [OPTION]... OBJECT...

-h HOST, --host HOST   connect to server HOST
-p PORT, --port PORT   connect to PORT
-I                     query whois.iana.org and follow its referral
-H                     hide legal disclaimers
      --verbose        explain what is being done
      --help           display this help and exit
      --version        output version information and exit

These flags are supported by whois.ripe.net and some RIPE-like servers:
-l                     find the one level less specific match
-L                     find all levels less specific matches
-m                     find all one level more specific matches
-M                     find all levels of more specific matches
-c                     find the smallest match containing a mnt-irt attribute
-x                     exact match
-b                     return brief IP address ranges with abuse contact
-B                     turn off object filtering (show email addresses)
-G                     turn off grouping of associated objects
-d                     return DNS reverse delegation objects too
-i ATTR[,ATTR]...      do an inverse look-up for specified ATTRibutes
-T TYPE[,TYPE]...      only look for objects of TYPE
-K                     only primary keys are returned
-r                     turn off recursive look-ups for contact information
-R                     force to show local copy of the domain object even
                       if it contains referral
-a                     also search all the mirrored databases
-s SOURCE[,SOURCE]...  search the database mirrored from SOURCE
-g SOURCE:FIRST-LAST   find updates from SOURCE from serial FIRST to LAST
```

Types:

-h host: Connect to WHOIS database host HOST.
-H: Suppress the display of legal disclaimers.
-p port: When connecting, connect to network port PORT.
--verbose: Operate verbosely.
--help: Display a help message, and exit.

- **ifplugstatus:**

A link beat detection tool.This command tells us whether a cable is plugged into our network interface or not.
Use: ifplugstatus [options] [interface]

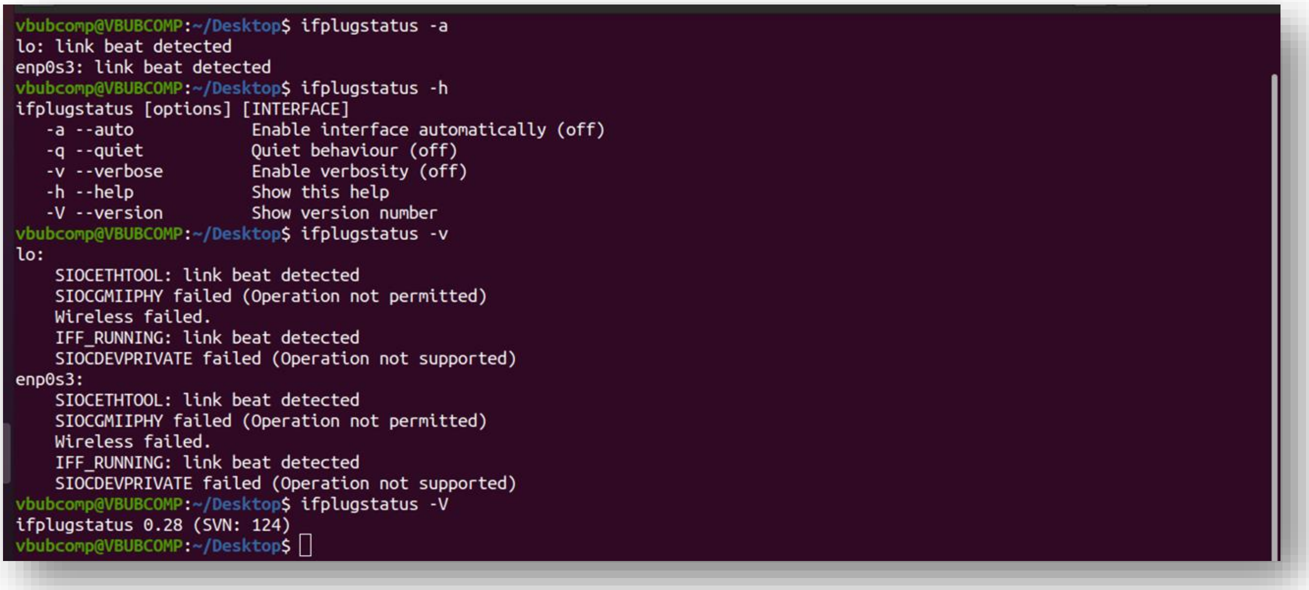


```
vbubcomp@VBUBCOMP:~/Desktop$ ifplugstatus
lo: link beat detected
enp0s3: link beat detected
vbubcomp@VBUBCOMP:~/Desktop$ 
```

Types:

You may specify an ethernet device on the command line. Otherwise ifplugstatus will check all available network interfaces.

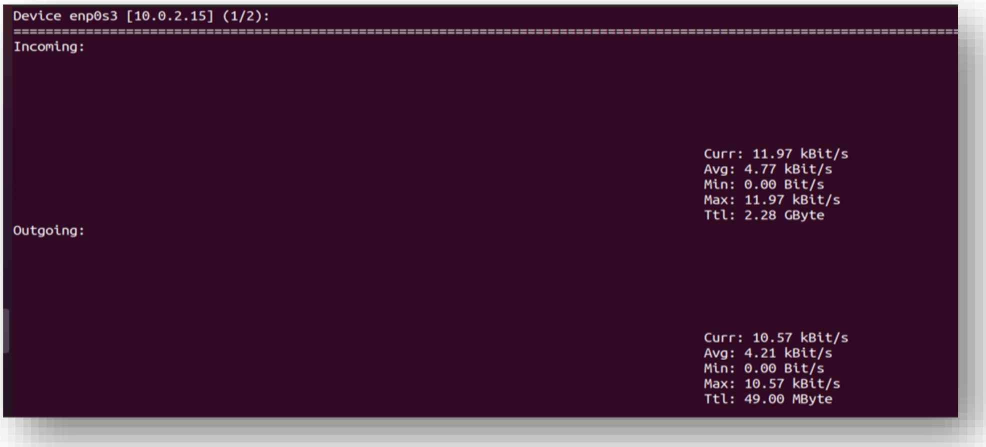
-a | --auto: enable interface automatically before querying (default: off)
-h | --help: show help
-q | --quiet: decrease verbosity by one. If the verbosity is < 0, no text will be shown, only the return value is relevant; if the verbosity is = 0, a terse status will be shown; If the verbosity is > 0, detailed information about the used API is returned. (By default the verbosity is 0)
-v | --verbose: increase verbosity by one. See option -q.
-V | --version: show version



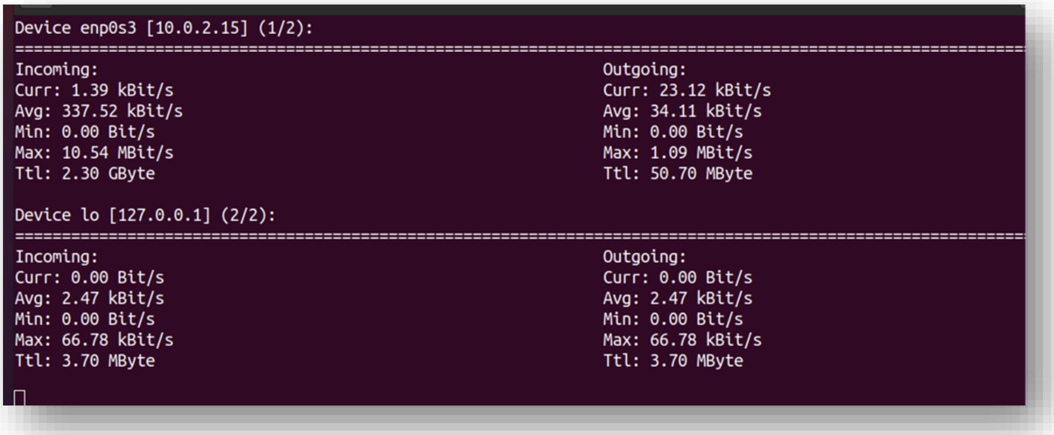
```
vbubcomp@VBUBCOMP:~/Desktop$ ifplugstatus -a
lo: link beat detected
enp0s3: link beat detected
vbubcomp@VBUBCOMP:~/Desktop$ ifplugstatus -h
ifplugstatus [options] [INTERFACE]
   -a --auto           Enable interface automatically (off)
   -q --quiet          Quiet behaviour (off)
   -v --verbose        Enable verbosity (off)
   -h --help           Show this help
   -V --version        Show version number
vbubcomp@VBUBCOMP:~/Desktop$ ifplugstatus -v
lo:
    SIOCETHTOOL: link beat detected
    SIOCGMIIPHY failed (Operation not permitted)
    Wireless failed.
    IFF_RUNNING: link beat detected
    SIOCDEVPRIVATE failed (Operation not supported)
enp0s3:
    SIOCETHTOOL: link beat detected
    SIOCGMIIPHY failed (Operation not permitted)
    Wireless failed.
    IFF_RUNNING: link beat detected
    SIOCDEVPRIVATE failed (Operation not supported)
vbubcomp@VBUBCOMP:~/Desktop$ ifplugstatus -V
ifplugstatus 0.28 (SVN: 124)
vbubcomp@VBUBCOMP:~/Desktop$ 
```

- **<u>nload:</u>**

nload is a command-line tool to keep an eye on network traffic and bandwidth usage in real time. It helps you to monitor incoming and outgoing traffic using graphs and provides additional information such as the total amount of transferred data and min/max network usage. **<u>Use</u>** : nload or nload eth0



```
Device enp0s3 [10.0.2.15] (1/2):
==========================================================================================================
Incoming:




                                                                                   Curr: 11.97 kBit/s
                                                                                   Avg: 4.77 kBit/s
                                                                                   Min: 0.00 Bit/s
                                                                                   Max: 11.97 kBit/s
                                                                                   Ttl: 2.28 GByte
Outgoing:




                                                                                   Curr: 10.57 kBit/s
                                                                                   Avg: 4.21 kBit/s
                                                                                   Min: 0.00 Bit/s
                                                                                   Max: 10.57 kBit/s
                                                                                   Ttl: 49.00 MByte
```



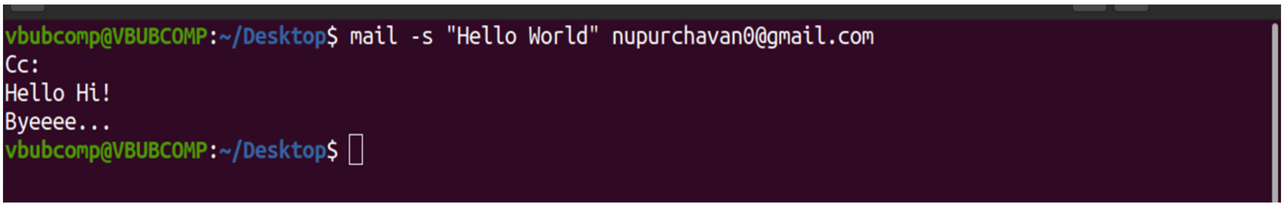
```
Device enp0s3 [10.0.2.15] (1/2):
==============================================================================================
Incoming:                                              Outgoing:
Curr: 1.39 kBit/s                                      Curr: 23.12 kBit/s
Avg: 337.52 kBit/s                                     Avg: 34.11 kBit/s
Min: 0.00 Bit/s                                        Min: 0.00 Bit/s
Max: 10.54 MBit/s                                      Max: 1.09 MBit/s
Ttl: 2.30 GByte                                        Ttl: 50.70 MByte

Device lo [127.0.0.1] (2/2):
==============================================================================================
Incoming:                                              Outgoing:
Curr: 0.00 Bit/s                                       Curr: 0.00 Bit/s
Avg: 2.47 kBit/s                                       Avg: 2.47 kBit/s
Min: 0.00 Bit/s                                        Min: 0.00 Bit/s
Max: 66.78 kBit/s                                      Max: 66.78 kBit/s
Ttl: 3.70 MByte                                        Ttl: 3.70 MByte
```

<u>Types:</u>

nload -m: to display multiple devices at a time; do not show the traffic graphs.
nload -a: to set the length in seconds of the time window for average calculation (default is 300).
nload -t: interval flag sets the refresh interval of the display in milliseconds (default value is 500).

- **<u>mail:</u>**

Linux mail command is a command-line utility that allows us to send emails from the command line. It will be quite useful to send emails from the command line if we want to generate emails programmatically from shell scripts or web applications. The mail command can be used directly by the terminal as well as the Shell script. Use: mail -s "Subject" <recipient address>



```
vbubcomp@VBUBCOMP:~/Desktop$ mail -s "Hello World" nupurchavan0@gmail.com
Cc:
Hello Hi!
Byeeee...
vbubcomp@VBUBCOMP:~/Desktop$ 
```

Specify CC and BCC: We can also attach a bcc and cc address within a command. To attach a bcc and cc address, use the -b and -c options, respectively.
to add a bcc address: mail -s "Hello World" <recipient address> -b userto< bcc address>
to add a cc address: mail -s "Hello World" <recipient address> -c userto< cc address>
both cc and bcc addresses in a single command:
mail -s "Hello World" <recipient address> -b userto< bcc address> -c userto<cc address>
adding multiple recipients: mail -s "Hello World" <recipient address1>,<recipient address2>
specify the sender name and address:
$ echo "Message body" | mail -s "Subject" -aFrom:Sender_name\<Sender mail address\> recipient address
adding an attachment:
echo "Message body" | mail -s "Subject" -r "<recipient address>" -a /path/to/file <sender address>