

SSN College of Engineering, Kalavakkam

Department of Computer Science and Engineering

V Semester - CSE 'B'

CS8581 NETWORKS LABORATORY

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Exercise 1: Network Commands

1. Command : tcpdump

Syntax : tcpdump -option

Description : Tcpdump dumps traffic on a network and prints out a description of the contents of packets on a network interface that match the boolean expression.

- **tcpdump -D** : Print the list of the network interfaces available on the system and on which tcpdump can capture packets.

```
msml0@MSMLs-MacBook-Pro ~ % tcpdump -D
1.en0 [Up, Running]
2.p2p0 [Up, Running]
3.awdl0 [Up, Running]
4.llw0 [Up, Running]
5.utun0 [Up, Running]
6.utun1 [Up, Running]
7.en3 [Up, Running]
8.lo0 [Up, Running, Loopback]
9.bridge0 [Up, Running]
10.en1 [Up, Running]
11.en2 [Up, Running]
12.gif0 [none]
13.stf0 [none]
14.ap1 [none]
```

- sudo tcpdump -i en0 : If the **-D** flag is supported, an interface number as printed by that flag can be used as the interface argument.

```
msml@MSMLs-MacBook-Pro ~ % sudo tcpdump -i en0
Password:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on en0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:48:58.519811 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 358
14:48:58.519821 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 237
14:48:58.519822 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 242
14:48:58.520291 IP 192.168.29.41.52376 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801: UDP, length 71
14:48:58.521188 IP6 2405:201:e00b:a80a:c91:7144:1cec:f00f.52021 > reliance.reliance.domain: 8115+ PTR? 175.121.206.15.in-addr.arpa. (45)
14:48:58.532041 IP 192.168.29.41.63923 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801: UDP, length 15
14:48:58.548439 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 216
14:48:58.548448 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 216
14:48:58.548450 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 264
14:48:58.551008 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.63923: UDP, length 15
14:48:58.568737 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 285
14:48:58.568743 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 135
14:48:58.568744 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 155
14:48:58.588426 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 302
14:48:58.588435 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 275
14:48:58.588437 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 277
14:48:58.600736 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 302
14:48:58.600744 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 280
14:48:58.600745 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 274
14:48:58.601224 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.63923: UDP, length 15
14:48:58.621019 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 282
14:48:58.621028 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 305
14:48:58.621030 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 145
14:48:58.621349 IP 192.168.29.41.49474 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.https: Flags [.], seq 3555287559:3555287930, ack 2577807314, win 2048, options [nop,nop,TS val 838028618 ecr 1895417987], length 371
14:48:58.651719 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.63923: UDP, length 15
14:48:58.662449 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 263
14:48:58.662460 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 397
14:48:58.662463 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 390
14:48:58.662465 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.https > 192.168.29.41.49474: Flags [.], ack 371, win 16, options [nop,no p,TS val 1895418593 ecr 838028618], length 0
14:48:58.662801 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.https > 192.168.29.41.49474: Flags [.], seq 1:39, ack 371, win 16, options [nop,nop,TS val 1895418593 ecr 838028618], length 0
14:48:58.662882 IP 192.168.29.41.49474 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.https: Flags [.], ack 39, win 2047, options [nop,nop,TS val 838028659 ecr 1895418594], length 0
14:48:58.662882 IP 192.168.29.41.49474 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.https: Flags [.], ack 39, win 2047, options [nop,nop,TS val 838028659 ecr 1895418594], length 0
```

- sudo tcpdump -i en0 -c 6 : Exit after receiving or displaying count packets.

```
msml@MSMLs-MacBook-Pro ~ % sudo tcpdump -i en0 -c 6
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on en0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:49:45.226433 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 110
14:49:45.226446 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 107
14:49:45.226448 IP ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801 > 192.168.29.41.52376: UDP, length 110
14:49:45.238976 IP 192.168.29.41.63923 > ec2-15-206-121-175.ap-south-1.compute.amazonaws.com.8801: UDP, length 15
14:49:45.245565 IP6 2403:300:a41:600::4.https > 2405:201:e00b:a80a:c91:7144:1cec:f00f.50051: Flags [.], seq 2734108829:2734109132, ack 2862321
506, win 926, options [nop,nop,TS val 1567217668 ecr 838074809], length 303
14:49:45.245706 IP6 2405:201:e00b:a80a:c91:7144:1cec:f00f.50051 > 2403:300:a41:600::4.https: Flags [.], ack 303, win 2043, options [nop,nop,TS
val 838074955 ecr 1567217668], length 0
6 packets captured
71 packets received by filter
0 packets dropped by kernel
```

2. Command : netstat

Syntax :`netstat [-option]`

Description : show network status The **netstat** command symbolically displays the contents of various network-related data structures.

- `netstat`

```
|msml@MSMLs-MacBook-Pro ~ % netstat
Active Internet connections
Proto Recv-Q Send-Q Local Address          Foreign Address      (state)
tcp6    0      0 2405:201:e00b:a8.50051 2403:300:a41:600.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50050 2405:200:1608:17.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50049 g2600-140f-0003-.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50042 de111s04-in-x0e..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50041 maa03s28-in-x0e..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50040 maa05s12-in-x03..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50039 de103s15-in-x03..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50035 maa05s02-in-x01..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50034 maa03s22-in-x02..https ESTABLISHED
tcp4    0      0 192.168.29.41.50033 151.101.1.69.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50032 de111s05-in-x01..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50031 2404:6800:4003:c.https ESTABLISHED
tcp4    0      0 192.168.29.41.50030 151.101.65.69.https ESTABLISHED
tcp4    0      0 192.168.29.41.50029 kix05s07-in-f162.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50028 maa03s22-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50027 maa03s22-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50026 2620:116:800e:21.https ESTABLISHED
tcp4    0      0 192.168.29.41.50023 104.16.25.34.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50022 de103s14-in-x0e..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50021 maa03s22-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50020 2a04:fa87:ffff::https ESTABLISHED
tcp4    0      0 192.168.29.41.50019 151.101.65.69.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50018 maa03s22-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50017 maa03s22-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50016 de103s15-in-x02..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50014 maa03s23-in-x04..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50013 maa03s23-in-x04..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50009 maa05s05-in-x08..https ESTABLISHED
tcp4    0      0 192.168.29.41.50007 137.102.96.34.bc.https ESTABLISHED
tcp4    0      0 192.168.29.41.50006 ec2-3-7-12-166.a.https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.50000 sa-in-xbd.1e100..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49999 de111s05-in-x0a..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49997 maa03s23-in-x0e..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49992 de103s16-in-x0a..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49985 maa05s01-in-x0a..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49980 maa05s13-in-x05..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49978 de111s04-in-x0e..https ESTABLISHED
tcp6    0      0 2405:201:e00b:a8.49966 2404:6800:4003:c.https ESTABLISHED
tcp4    31     0 192.168.29.41.49949 ec2-3-235-73-94..https CLOSE_WAIT
```

- netstat -a : With the default display, show the state of all sockets;

```
msml@MSMLs-MacBook-Pro ~ % netstat -a
Active Internet connections (including servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         (state)
tcp6   0      0      2405:201:e0b:a8.50051  2403:300:a41:600.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50050  2405:200:1608:17.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50049  g2600-140f-0003-.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50042  del11s04-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50041  maa03s28-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50040  maa05s12-in-x03..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50039  del03s15-in-x03..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50035  maa05s02-in-x01..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50034  maa03s22-in-x02..https ESTABLISHED
tcp4   0      0      192.168.29.41.50033  151.101.1.69.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50032  del11s05-in-x01..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50031  2404:6800:4003:c.https ESTABLISHED
tcp4   0      0      192.168.29.41.50030  151.101.65.69.https ESTABLISHED
tcp4   0      0      192.168.29.41.50029  kix05s07-in-f162.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50028  maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50027  maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50026  2620:116:800e:21.https ESTABLISHED
tcp4   0      0      192.168.29.41.50023  104.16.25.34.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50022  del03s14-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50021  maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50020  2a04:fa87:ffffe::.https ESTABLISHED
tcp4   0      0      192.168.29.41.50019  151.101.65.69.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50018  maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50017  maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50016  del03s15-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50014  maa03s23-in-x04..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50013  maa03s23-in-x04..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50009  maa05s05-in-x08..https ESTABLISHED
tcp4   0      0      192.168.29.41.50007  137.102.96.34.bc.https ESTABLISHED
tcp4   0      0      192.168.29.41.50006  ec2-3-7-12-166.a.https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.50000  sa-in-xbd.1e100..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49999  del11s05-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49997  maa03s23-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49992  del03s16-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49985  maa05s01-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49980  maa05s13-in-x05..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49978  del11s04-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e0b:a8.49966  2404:6800:4003:c.https ESTABLISHED
tcp4   31     0      192.168.29.41.49949  ec2-3-235-73-94..https CLOSE_WAIT
tcp4   31     0      192.168.29.41.49948  ec2-3-80-20-177..https CLOSE_WAIT
```

- netstat -s : Show per-protocol statistics

```
msml@MSMLs-MacBook-Pro ~ % netstat -s
tcp:
  0 packet sent
    0 data packet (0 byte)
    0 data packet (0 byte) retransmitted
    0 resend initiated by MTU discovery
    0 ack-only packet (0 delayed)
    0 URG only packet
    0 window probe packet
    0 window update packet
    0 control packet
    0 data packet sent after flow control
    0 challenge ACK sent due to unexpected SYN
    0 challenge ACK sent due to unexpected RST
    0 checksummed in software
      0 segment (0 byte) over IPv4
      0 segment (0 byte) over IPv6
  0 packet received
    0 ack (for 0 byte)
    0 duplicate ack
    0 ack for unsent data
    0 packet (0 byte) received in-sequence
    0 completely duplicate packet (0 byte)
    0 old duplicate packet
    0 received packet dropped due to low memory
    0 packet with some dup. data (0 byte duped)
    0 out-of-order packet (0 byte)
    0 packet (0 byte) of data after window
    0 window probe
    0 window update packet
    0 packet recovered after loss
    0 packet received after close
    0 bad reset
    0 discarded for bad checksum
    0 checksummed in software
      0 segment (0 byte) over IPv4
      0 segment (0 byte) over IPv6
    0 discarded for bad header offset field
    0 discarded because packet too short
  0 connection request
```

- netstat -at : Shows all TCP connections' statistics

```
msml@MSMLs-MacBook-Pro ~ % netstat -at
Active Internet connections (including servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         (state)
tcp6   0      0      2405:201:e00:a8.50054 maa05s01-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50053 maa05s10-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50052 maa03s26-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50051 2403:300:a41:600..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50049 g2600-140f-0003..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50042 del11s04-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50041 maa03s28-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50040 maa05s12-in-x03..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.50039 del03s15-in-x03..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50035 maa05s02-in-x01..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50034 maa03s22-in-x02..https ESTABLISHED
tcp4   0      0      192.168.29.41.50033 151.101.1.69..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.50032 del11s05-in-x01..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50031 2404:6800:4003:c..https ESTABLISHED
tcp4   0      0      192.168.29.41.50030 151.101.65.69..https ESTABLISHED
tcp4   0      0      192.168.29.41.50029 kix05s07-in-f162..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50028 maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50027 maa03s22-in-x02..https ESTABLISHED
tcp4   0      0      192.168.29.41.50023 104.16.25.34..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50022 del03s14-in-x0e..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.50021 maa03s22-in-x02..https ESTABLISHED
tcp4   0      0      192.168.29.41.50019 151.101.65.69..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50018 maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50017 maa03s22-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50016 del03s15-in-x02..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.50014 maa03s23-in-x04..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50013 maa03s23-in-x04..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.50009 maa05s05-in-x08..https ESTABLISHED
tcp4   0      0      192.168.29.41.50007 137.102.96.34.bc..https ESTABLISHED
tcp4   0      0      192.168.29.41.50006 ec2-3-7-12-166.a..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.50000 sa-in-xbd.1e100..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.49999 del11s05-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.49992 del03s16-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e00:b:a8.49985 maa05s01-in-x0a..https ESTABLISHED
tcp6   0      0      2405:201:e00:a8.49980 maa05s13-in-x05..https ESTABLISHED
```

- netstat -au : Shows all UDP connections' statistics

```
msml@MSMLs-MacBook-Pro ~ % netstat -au
Active LOCAL (UNIX) domain sockets
Address      Type    Recv-Q Send-Q      Inode      Conn      Refs      Nextref Addr
f4e0eb70c86c9e19 stream    0      0      0 f4e0eb70c86cb9c9 0      0 /var/run/mDNSResponder
f4e0eb70c86ccb9c9 stream    0      0      0 f4e0eb70c86c9e19 0      0
f4e0eb70c86cb4c1 stream    0      0      0 f4e0eb70c86cc529 0      0 /var/run/mDNSResponder
f4e0eb70c86cc529 stream    0      0      0 f4e0eb70c86cb4c1 0      0
f4e0eb70c86c9969 stream    0      0      0 f4e0eb70c86c9fa9 0      0 /var/run/mDNSResponder
f4e0eb70c86c9fa9 stream    0      0      0 f4e0eb70c86c9969 0      0
f4e0eb70c86c9af9 stream    0      0      0 f4e0eb70c86cc5f1 0      0 /var/run/mDNSResponder
f4e0eb70c86cc5f1 stream    0      0      0 f4e0eb70c86c9af9 0      0
f4e0eb70c86c9c89 stream    0      0      0 f4e0eb70c86cb1a1 0      0 /var/run/mDNSResponder
f4e0eb70c86cb1a1 stream    0      0      0 f4e0eb70c86c9c89 0      0
f4e0eb70c86cc079 stream    0      0      0 f4e0eb70c86cb589 0      0 /var/run/mDNSResponder
f4e0eb70c86cb589 stream    0      0      0 f4e0eb70c86cc079 0      0
f4e0eb70c86cac29 stream    0      0      0 f4e0eb70c86ca5e9 0      0 /var/run/mDNSResponder
f4e0eb70c86ca5e9 stream    0      0      0 f4e0eb70c86cac29 0      0
f4e0eb70c86cbfb1 stream    0      0      0 f4e0eb70c86ca201 0      0 /var/run/mDNSResponder
f4e0eb70c86ca201 stream    0      0      0 f4e0eb70c86cbfb1 0      0
f4e0eb70c86cadb9 stream    0      0      0 f4e0eb70c86cb011 0      0 /var/run/mDNSResponder
f4e0eb70c86cb011 stream    0      0      0 f4e0eb70c86cadb9 0      0
f4e0eb70c86cae81 stream    0      0      0 f4e0eb70c86caf49 0      0 /var/run/mDNSResponder
f4e0eb70c86caf49 stream    0      0      0 f4e0eb70c86cae81 0      0
f4e0eb70cfc15f1 stream    0      0      0 f4e0eb70c6fc1529 0      0 /var/run/mDNSResponder
f4e0eb70cfc1529 stream    0      0      0 f4e0eb70c6fc15f1 0      0
f4e0eb70cfc1461 stream    0      0      0 f4e0eb70c6fbe711 0      0 /var/run/mDNSResponder
f4e0eb70cfcbe711 stream    0      0      0 f4e0eb70c6fc1461 0      0
f4e0eb70c6fbe8a1 stream    0      0      0 f4e0eb70c6fbe969 0      0 /var/run/mDNSResponder
f4e0eb70c6fbe969 stream    0      0      0 f4e0eb70c6fbe8a1 0      0
f4e0eb70c6fbea31 stream    0      0      0 f4e0eb70c6fbeaf9 0      0 /var/run/mDNSResponder
f4e0eb70c6fbeaf9 stream    0      0      0 f4e0eb70c6fbea31 0      0
f4e0eb70c6fbefbc1 stream    0      0      0 f4e0eb70c6fc1209 0      0 /var/run/mDNSResponder
f4e0eb70c6fc1209 stream    0      0      0 f4e0eb70c6fbefbc1 0      0
f4e0eb70c6fc1141 stream    0      0      0 f4e0eb70c6fbefc89 0      0 /var/run/mDNSResponder
f4e0eb70c6fbefc89 stream    0      0      0 f4e0eb70c6fc1141 0      0
f4e0eb70c6fc0d59 stream    0      0      0 f4e0eb70c6fbefb69 0      0 /var/run/mDNSResponder
f4e0eb70c6fc0c91 stream    0      0      0 f4e0eb70c6fbfb6b1 0      0 /var/run/mDNSResponder
f4e0eb70c6fc0bc9 stream    0      0      0 f4e0eb70c6fbfb2c9 0      0 /var/run/mDNSResponder
f4e0eb70c6fbbeee1 stream    0      0      0 f4e0eb70c6fc0b01 0      0 /var/run/mDNSResponder
```

- netstat -l : Displays statistics of various Listening connections

```
msm1@MSM5Ls-MacBook-Pro ~ % netstat -l
Active Internet connections
Proto Recv-Q Send-Q Local Address          Foreign Address        (state)
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50054 maa05s01-in-x0a.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50053 maa05s10-in-x0a.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50052 maa03s26-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50042 del11s04-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50041 maa03s28-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50040 maa05s12-in-x03.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50039 del03s15-in-x03.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50035 maa05s02-in-x01.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50034 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp4   0     0     192.168.29.41.50033      151.101.1.69.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50032 del11s05-in-x01.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50031 2404:6800:4003:c04::9c.https ESTABLISHED
tcp4   0     0     192.168.29.41.50030      151.101.65.69.https ESTABLISHED
tcp4   0     0     192.168.29.41.50029      kix0s07-in-f162.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50028 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50027 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp4   0     0     192.168.29.41.50023      104.16.25.34.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50022 del03s14-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50021 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp4   0     0     192.168.29.41.50019      151.101.65.69.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50018 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50017 maa03s22-in-x02.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50016 del03s15-in-x02.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50014 maa03s23-in-x04.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50013 maa03s23-in-x04.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50009 maa05s05-in-x08.1e100.net.https ESTABLISHED
tcp4   0     0     192.168.29.41.50007      137.102.96.34.bc.https ESTABLISHED
tcp4   0     0     192.168.29.41.50006      ec2-3-7-12-166.a.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.50000 sa-in-xbd.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49999 del11s05-in-x0a.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49997 maa03s23-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49992 del03s16-in-x0a.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49985 maa05s01-in-x0a.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49980 maa05s13-in-x05.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49978 del11s04-in-x0e.1e100.net.https ESTABLISHED
tcp6   0     0     2405:201:e00b:a80a:c91:7144:1cec:f00f.49966 2404:6800:4003:c04::bd.https ESTABLISHED
tcp4   31    0     192.168.29.41.49949      ec2-3-235-73-94.https CLOSE_WAIT
tcp4   31    0     192.168.29.41.49948      ec2-3-80-20-177.https CLOSE_WAIT
```

- `netstat -lt` : Shows all listening TCP connections' statistics

```
mssl@MSMLs-MacBook-Pro ~ % netstat -lt
Active Internet connections
Proto Recv-Q Send-Q Local Address          Foreign Address        (state)
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50054 maa05s01-in-x0a.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50053 maa05s10-in-x0a.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50052 maa03s26-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50042 dell1s04-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50041 maa03s28-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50040 maa05s12-in-x03.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50039 dell03s15-in-x03.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50035 maa05s02-in-x01.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50034 maa03s22-in-x02.1e100.net.https
tcp4   0      0      192.168.29.41.50033 151.101.1.69.https ESTABLISHED
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50032 dell1s05-in-x01.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50031 2404:6800:4003:c04:9c.https ESTABLISHED
tcp4   0      0      192.168.29.41.50030 151.101.65.69.https ESTABLISHED
tcp4   0      0      192.168.29.41.50029 kix05s07-in-f162.https ESTABLISHED
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50028 maa03s22-in-x02.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50027 maa03s22-in-x02.1e100.net.https
tcp4   0      0      192.168.29.41.50023 104.16.25.34.https ESTABLISHED
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50022 dell03s14-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50021 maa03s22-in-x02.1e100.net.https
tcp4   0      0      192.168.29.41.50019 151.101.65.69.https ESTABLISHED
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50018 maa03s22-in-x02.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50017 maa03s22-in-x02.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50016 dell03s15-in-x02.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50014 maa03s23-in-x04.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50013 maa03s23-in-x04.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50009 maa05s05-in-x08.1e100.net.https
tcp4   0      0      192.168.29.41.50007 137.102.96.34.bc.https ESTABLISHED
tcp4   0      0      192.168.29.41.50006 ec2-3-7-12-166.a.https ESTABLISHED
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.50000 sa-in-xbd.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49999 dell1s05-in-x0a.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49997 maa03s23-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49992 dell03s16-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49985 maa05s01-in-x0a.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49980 maa05s13-in-x05.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49978 dell1s04-in-x0e.1e100.net.https
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49966 2404:6800:4003:c04:bd.https ESTABLISHED
tcp4   31     0      192.168.29.41.49949 ec2-3-235-73-94.https CLOSE_WAIT
tcp4   31     0      192.168.29.41.49948 ec2-3-80-20-177.https CLOSE_WAIT
tcp6   0      0      2405:201:e00b:a80a:c91:7144:1cec:f00f.49940 dell03s13-in-x0e.1e100.net.https ESTABLISHED
```

- netstat -lu : Shows all listening UDP connections' statistics.

| Address | Type | Recv-Q | Send-Q | Inode | Conn | Refs | Nextref | Addr |
|-------------------|--------|--------|--------|-------|-------------------|------|---------|------------------------|
| f4e0eb70c86cc919 | stream | 0 | 0 | 0 | f4e0eb70c86ccbc9 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86ccbc9 | stream | 0 | 0 | 0 | f4e0eb70c86cc9e19 | 0 | 0 | |
| f4e0eb70c86cb4c1 | stream | 0 | 0 | 0 | f4e0eb70c86cc529 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86cc529 | stream | 0 | 0 | 0 | f4e0eb70c86cb4c1 | 0 | 0 | |
| f4e0eb70c86cc9969 | stream | 0 | 0 | 0 | f4e0eb70c86cc9f9 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86c9fa9 | stream | 0 | 0 | 0 | f4e0eb70c86c9f9 | 0 | 0 | |
| f4e0eb70c86cc9af9 | stream | 0 | 0 | 0 | f4e0eb70c86cc5f1 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86cc5f1 | stream | 0 | 0 | 0 | f4e0eb70c86cc9af9 | 0 | 0 | |
| f4e0eb70c86c989 | stream | 0 | 0 | 0 | f4e0eb70c86cb1a1 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86cb1a1 | stream | 0 | 0 | 0 | f4e0eb70c86cc9c89 | 0 | 0 | |
| f4e0eb70c86cc079 | stream | 0 | 0 | 0 | f4e0eb70c86cc589 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86cb589 | stream | 0 | 0 | 0 | f4e0eb70c86cc079 | 0 | 0 | |
| f4e0eb70c86cac29 | stream | 0 | 0 | 0 | f4e0eb70c86ca5e9 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86ca5e9 | stream | 0 | 0 | 0 | f4e0eb70c86cac29 | 0 | 0 | |
| f4e0eb70c86cbfb1 | stream | 0 | 0 | 0 | f4e0eb70c86ca201 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86ca201 | stream | 0 | 0 | 0 | f4e0eb70c86cbfb1 | 0 | 0 | |
| f4e0eb70c86cadb9 | stream | 0 | 0 | 0 | f4e0eb70c86cb11 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86cb11 | stream | 0 | 0 | 0 | f4e0eb70c86cadb9 | 0 | 0 | |
| f4e0eb70c86cae81 | stream | 0 | 0 | 0 | f4e0eb70c86caf49 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c86caf49 | stream | 0 | 0 | 0 | f4e0eb70c86cae81 | 0 | 0 | |
| f4e0eb70c6fc15f1 | stream | 0 | 0 | 0 | f4e0eb70c6fc1529 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fc1529 | stream | 0 | 0 | 0 | f4e0eb70c6fc15f1 | 0 | 0 | |
| f4e0eb70c6fc1461 | stream | 0 | 0 | 0 | f4e0eb70c6fc1461 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fbe711 | stream | 0 | 0 | 0 | f4e0eb70c6fbe711 | 0 | 0 | |
| f4e0eb70c6fbe8a1 | stream | 0 | 0 | 0 | f4e0eb70c6fbe969 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fbe969 | stream | 0 | 0 | 0 | f4e0eb70c6fbe8a1 | 0 | 0 | |
| f4e0eb70c6fbea31 | stream | 0 | 0 | 0 | f4e0eb70c6fbeaf9 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fbeaf9 | stream | 0 | 0 | 0 | f4e0eb70c6fbea31 | 0 | 0 | |
| f4e0eb70c6fbecb1 | stream | 0 | 0 | 0 | f4e0eb70c6fc1209 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fc1209 | stream | 0 | 0 | 0 | f4e0eb70c6fbecb1 | 0 | 0 | |
| f4e0eb70c6fc1141 | stream | 0 | 0 | 0 | f4e0eb70c6fbec89 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fbec89 | stream | 0 | 0 | 0 | f4e0eb70c6fc1141 | 0 | 0 | |
| f4e0eb70c6fc0d59 | stream | 0 | 0 | 0 | f4e0eb70c6fbf6e9 | 0 | 0 | /var/run/mDNSResponder |
| f4e0eb70c6fc0e91 | stream | 0 | 0 | 0 | f4e0eb70c6fbf6b1 | 0 | 0 | /var/run/mDNSResponder |

3. Command : ifconfig

Syntax : ifconfig [-option]

Description : Configures network interface parameters. The **ifconfig** utility is used to assign an address to a network interface and/or configure network interface parameters.

- ifconfig

| |
|--------------------------------------------------------------------------------|
| msml@MSMLs-MacBook-Pro ~ % ifconfig |
| lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384 |
| options=1203<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP> |
| inet 127.0.0.1 netmask 0xffff0000 |
| inet6 ::1 prefixlen 128 |
| inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1 |
| nd6 options=201<PERFORMNUD,DAD> |
| gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280 |
| stf0: flags=0<> mtu 1280 |
| en3: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500 |
| ether ac:de:48:00:11:22 |
| inet6 fe80::aaed:48ff%en3 prefixlen 64 scopeid 0x4 |
| nd6 options=201<PERFORMNUD,DAD> |
| media: autoselect (100baseTX <full-duplex>) |
| status: active |
| ap1: flags=8802<BROADCAST,SIMPLEX,MULTICAST> mtu 1500 |
| options=400<CHANNEL_IO> |
| ether 3e:22:fb:7c:21:07 |
| media: autoselect |
| status: inactive |
| en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500 |
| options=400<CHANNEL_IO> |
| ether 3c:22:fb:7c:21:07 |
| inet6 fe80::c0a:ee77:636b:e0b%en0 prefixlen 64 secured scopeid 0x6 |
| inet 192.168.29.41 netmask 0xffffffff broadcast 192.168.29.255 |
| inet6 2405:201::e00b:a80a:471:d18b:6b6c:511e prefixlen 64 autoconf secured |
| inet6 2405:201:e00b:a80a:c91:7144:1cec:f00f prefixlen 64 autoconf temporary |
| nd6 options=201<PERFORMNUD,DAD> |
| media: autoselect |
| status: active |
| en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500 |
| options=460<TS04,TS06,CHANNEL_IO> |
| ether 82:f8:c1:e4:34:01 |
| media: autoselect <full-duplex> |
| status: inactive |

- ifconfig -s : [not working]

```
[msml@MSMLs-MacBook-Pro ~ % ifconfig -s
ifconfig: illegal option -- s
usage: ifconfig [-C] [-L] interface address_family [address [dest_address]]
               [parameters]
ifconfig interface create
ifconfig -a [-C] [-L] [-d] [-m] [-u] [-v] [address_family]
ifconfig -l [-d] [-u] [address_family]
ifconfig [-C] [-L] [-d] [-m] [-u] [-v]
```

4. Command :nslookup

Syntax : **nslookup [-option]** [name | -] [server]

Description : **Nslookup** is a program to query Internet domain name servers.

Nslookup has two modes: interactive and non-interactive.

- nslookup www.google.com
- nslookup www.ssn.edu.in

```
[msml@MSMLs-MacBook-Pro ~ % nslookup www.google.com
Server:      2405:201:e00b:a80a::c0a8:1d01
Address:     2405:201:e00b:a80a::c0a8:1d01#53

Non-authoritative answer:
Name:   www.google.com
Address: 172.217.167.36

[msml@MSMLs-MacBook-Pro ~ % nslookup www.ssn.edu.in
Server:      2405:201:e00b:a80a::c0a8:1d01
Address:     2405:201:e00b:a80a::c0a8:1d01#53

Non-authoritative answer:
www.ssn.edu.in canonical name = webs.ssn.edu.in.
Name:   webs.ssn.edu.in
Address: 182.75.25.233
```

5. Command : traceroute

Syntax : traceroute [-option] host

Description : print the route packets take to the network host.

- traceroute www.google.com
traceroute www.ssn.edu.in

```
[msml@MSMLs-MacBook-Pro ~ % traceroute www.google.com
traceroute to www.google.com (172.217.167.36), 64 hops max, 52 byte packets
 1 reliance.reliance (192.168.29.1)  2.171 ms  1.821 ms  1.717 ms
 2 10.35.160.1 (10.35.160.1)  5.872 ms  3.760 ms  3.230 ms
 3 172.31.2.101 (172.31.2.101)  5.903 ms
    172.31.3.25 (172.31.3.25)  5.065 ms
    172.31.2.101 (172.31.2.101)  5.199 ms
 4 172.17.114.34 (172.17.114.34)  4.810 ms  3.521 ms
    172.17.114.38 (172.17.114.38)  4.533 ms
 5 * * *
 6 72.14.217.58 (72.14.217.58)  10.328 ms  6.294 ms
    74.125.48.26 (74.125.48.26)  5.478 ms
 7 108.170.253.105 (108.170.253.105)  9.670 ms
    74.125.242.146 (74.125.242.146)  7.475 ms *
 8 172.253.73.149 (172.253.73.149)  6.225 ms
    72.14.239.10 (72.14.239.10)  43.012 ms
    72.14.237.164 (72.14.237.164)  6.234 ms
 9 108.170.251.97 (108.170.251.97)  42.776 ms
    142.250.63.116 (142.250.63.116)  42.038 ms  43.401 ms
10 172.253.72.137 (172.253.72.137)  29.861 ms
    172.253.66.107 (172.253.66.107)  45.272 ms
    108.170.225.88 (108.170.225.88)  47.954 ms
11 172.253.77.14 (172.253.77.14)  52.118 ms
    72.14.233.217 (72.14.233.217)  48.093 ms
    108.170.251.113 (108.170.251.113)  42.934 ms
12 72.14.233.217 (72.14.233.217)  44.864 ms
del03s16-in-f4.1e100.net (172.217.167.36)  40.903 ms  42.086 ms
[msml@MSMLs-MacBook-Pro ~ % traceroute www.ssn.edu.in
traceroute to webs.ssn.edu.in (182.75.25.233), 64 hops max, 52 byte packets
 1 reliance.reliance (192.168.29.1)  2.293 ms  1.808 ms  1.603 ms
 2 10.35.160.1 (10.35.160.1)  4.453 ms  3.347 ms  3.052 ms
 3 172.31.2.101 (172.31.2.101)  4.852 ms
    172.31.3.25 (172.31.3.25)  4.581 ms
    172.31.2.101 (172.31.2.101)  4.716 ms
 4 172.17.114.34 (172.17.114.34)  4.205 ms  3.820 ms
    172.17.114.38 (172.17.114.38)  4.872 ms
 5 * * *
 6 * * 49.44.129.54 (49.44.129.54)  5.383 ms
 7 * * *
 8 * 49.44.129.54 (49.44.129.54)  149.466 ms *
 9 * * *
10 * * *
11 * *^C
```

6. Command: ping

Syntax : ping [-option] host

Description : sends ICMP ECHO_REQUEST packets to network hosts

- ping www.gmail.com
ping www.youtube.com

```
|msml@MSMLs-MacBook-Pro ~ % ping www.gmail.com
PING googlemail.l.google.com (216.58.221.37): 56 data bytes
64 bytes from 216.58.221.37: icmp_seq=0 ttl=114 time=42.676 ms
64 bytes from 216.58.221.37: icmp_seq=1 ttl=114 time=44.947 ms
64 bytes from 216.58.221.37: icmp_seq=2 ttl=114 time=43.212 ms
64 bytes from 216.58.221.37: icmp_seq=3 ttl=114 time=44.660 ms
64 bytes from 216.58.221.37: icmp_seq=4 ttl=114 time=42.661 ms
64 bytes from 216.58.221.37: icmp_seq=5 ttl=114 time=43.206 ms
64 bytes from 216.58.221.37: icmp_seq=6 ttl=114 time=42.611 ms
64 bytes from 216.58.221.37: icmp_seq=7 ttl=114 time=43.288 ms
64 bytes from 216.58.221.37: icmp_seq=8 ttl=114 time=51.637 ms
64 bytes from 216.58.221.37: icmp_seq=9 ttl=114 time=43.324 ms
64 bytes from 216.58.221.37: icmp_seq=10 ttl=114 time=42.612 ms
64 bytes from 216.58.221.37: icmp_seq=11 ttl=114 time=43.580 ms
64 bytes from 216.58.221.37: icmp_seq=12 ttl=114 time=43.945 ms
64 bytes from 216.58.221.37: icmp_seq=13 ttl=114 time=42.643 ms
64 bytes from 216.58.221.37: icmp_seq=14 ttl=114 time=42.800 ms
64 bytes from 216.58.221.37: icmp_seq=15 ttl=114 time=45.788 ms
^C
--- googlemail.l.google.com ping statistics ---
16 packets transmitted, 16 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 42.611/43.974/51.637/2.178 ms
|msml@MSMLs-MacBook-Pro ~ % ping www.youtube.com
PING youtube-ui.l.google.com (172.217.27.174): 56 data bytes
64 bytes from 172.217.27.174: icmp_seq=0 ttl=115 time=42.456 ms
64 bytes from 172.217.27.174: icmp_seq=1 ttl=115 time=44.028 ms
64 bytes from 172.217.27.174: icmp_seq=2 ttl=115 time=43.387 ms
64 bytes from 172.217.27.174: icmp_seq=3 ttl=115 time=43.814 ms
64 bytes from 172.217.27.174: icmp_seq=4 ttl=115 time=45.127 ms
64 bytes from 172.217.27.174: icmp_seq=5 ttl=115 time=43.694 ms
64 bytes from 172.217.27.174: icmp_seq=6 ttl=115 time=43.893 ms
64 bytes from 172.217.27.174: icmp_seq=7 ttl=115 time=44.116 ms
64 bytes from 172.217.27.174: icmp_seq=8 ttl=115 time=44.002 ms
64 bytes from 172.217.27.174: icmp_seq=9 ttl=115 time=43.575 ms
^C
--- youtube-ui.l.google.com ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 42.456/43.809/45.127/0.632 ms
|msml@MSMLs-MacBook-Pro ~ % iwconfig
zsh: command not found: iwconfig
msml@MSMLs-MacBook-Pro ~ %
```