

SSN College of Engineering, Kalavakkam  
Department of Computer Science and Engineering  
V Semester - CSE 'A'  
UCS1511 NETWORK LAB  
EXERCISE-1 : NETWORK COMMANDS

AIM:

**Learn and understand the use of commands like tcpdump, netstat, ifconfig, nslookup and traceroute, ping**

1. tcpdump

Tcpdump prints out a description of the contents of packets on a network interface that match the boolean expression

It is a command-line utility which is used to capture and inspect network traffic going to and from a system. It is most commonly used for troubleshooting network issues and security testing.

Syntax: tcpdump [options] [expression]

Options:

- D : It is used to print a list of all available network interfaces that tcpdump can collect packets from. For each interface, the command prints the interface name, a short description and an associated index(number).
- i : It is used to capture traffic on any specific interface. To invoke the command use -i option followed by the interface name or associated index.
- c : It is used to specify the number of packages to be captured.

```
root@spl19:~# tcpdump -D
1.enp3s0 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.nflog (Linux netfilter log (NFLOG) interface)
5.nfqueue (Linux netfilter queue (NFQUEUE) interface)
6.usbmon1 (USB bus number 1)
7.usbmon2 (USB bus number 2)
8.usbmon3 (USB bus number 3)
9.usbmon4 (USB bus number 4)
10.usbmon5 (USB bus number 5)
11.usbmon6 (USB bus number 6)
12.usbmon7 (USB bus number 7)
13.usbmon8 (USB bus number 8)
14.usbmon9 (USB bus number 9)
root@spl19:~#
```

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```

root@spl19:~# tcpdump -c 15
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
13:45:05.255471 IP 10.6.10.19.983 > 10.6.10.98.875: UDP, length 96
13:45:05.255756 IP 10.6.10.98.875 > 10.6.10.19.983: UDP, length 32
13:45:05.256800 IP 10.6.10.19.35438 > 10.6.10.98.sunrpc: Flags [S], seq 1382007126, win 29200, options [mss 1460,sackOK,TS val 841519 ecr 0,nop,wscale 7], length 0
13:45:05.257007 IP 10.6.10.98.sunrpc > 10.6.10.19.35438: Flags [S.], seq 3566764000, ack 1382007127, win 28960, options [mss 1460,sackOK,TS val 1027023 ecr 841519,nop,wscale 7], length 0
13:45:05.257038 IP 10.6.10.19.35438 > 10.6.10.98.sunrpc: Flags [.], ack 1, win 229, options [nop,nop,TS val 841519 ecr 1027023], length 0
13:45:05.257059 IP 10.6.10.19.35438 > 10.6.10.98.sunrpc: Flags [P.], seq 1:61, ack 1, win 229, options [nop,nop,TS val 841519 ecr 1027023], length 60
13:45:05.257175 IP 10.6.10.98.sunrpc > 10.6.10.19.35438: Flags [.], ack 61, win 227, options [nop,nop,TS val 1027023 ecr 841519], length 0
13:45:05.342334 ARP, Request who-has 10.6.4.100 tell 10.6.15.18, length 46
13:45:05.342751 IP 10.6.10.19.59056 > 10.101.1.10.domain: 33934+ PTR? 100.4.6.10.in-addr.arpa. (41)
13:45:05.343626 IP 10.101.1.10.domain > 10.6.10.19.59056: 33934 NXDomain 0/1/0 (100)
13:45:05.344913 IP 10.6.10.19.59056 > 10.101.1.10.domain: 20881+ PTR? 18.15.6.10.in-addr.arpa. (41)
13:45:05.344671 IP 10.101.1.10.domain > 10.6.10.19.59056: 20881 NXDomain 0/1/0 (100)
13:45:05.345137 IP 10.6.10.19.59056 > 10.101.1.10.domain: 18345+ PTR? 10.1.101.10.in-addr.arpa. (42)
13:45:05.345943 IP 10.101.1.10.domain > 10.6.10.19.59056: 18345 NXDomain 0/1/0 (101)
13:45:05.368638 IP 10.6.254.1 > 239.192.1.1: 10.6.254.1.46308 > 239.192.1.1.freeciv: PGM, length 0
15 packets captured
54 packets received by filter
35 packets dropped by kernel
root@spl19:~#

```

```
root@sp119:~# tcpdump -i any
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on any, link-type LINUX_SLL (Linux cooked), capture size 262144 bytes
13:51:45.183529 IP 10.6.10.19.644 > 10.6.10.98.875: UDP, length 96
13:51:45.183810 IP 10.6.10.98.875 > 10.6.10.19.644: UDP, length 32
13:51:45.184870 IP 10.6.10.19.39953 > 10.6.10.98.sunrpc: Flags [S], seq 834572091, win 29200, options [mss 1460,sackOK,TS val 941501 ecr 0,nop,wscale 7], length 0
13:51:45.185077 IP 10.6.10.98.sunrpc > 10.6.10.19.39953: Flags [S.], seq 914897903, ack 834572092, win 28960, options [mss 1460,sackOK,TS val 1127007 ecr 941501,nop,wscale 7], length 0
13:51:45.185102 IP 10.6.10.19.39953 > 10.6.10.98.sunrpc: Flags [.], ack 1, win 229, options [nop,nop,TS val 941501 ecr 1127007], length 0
13:51:45.185126 IP 10.6.10.19.39953 > 10.6.10.98.sunrpc: Flags [P.], seq 1:61, ack 1, win 229, options [nop,nop,TS val 941501 ecr 1127007], length 60
13:51:45.185266 IP 10.6.10.98.sunrpc > 10.6.10.19.39953: Flags [ACK], ack 61, win 227, options [nop,nop,TS val 1127007 ecr 941501], length 0
13:51:45.237641 IP 10.6.15.7.55255 > 224.0.0.251.mdns: 0*- [0q] 12/0/6 (Cache flush) TXT "", PTR _adb.tcp.local., PTR adb-EMULATOR30XB8X4X0._adb.tcp.local., (Cache flush) SRV Android.local.:5555 0, (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) AAAA fe80::a04b:65ff:fe49:a594, (Cache flush) AAAA fec0::a04b:65ff:fe49:a594, (Cache flush) AAAA fec0::12a:ec14:f8a9:4f9e (591)
13:51:45.237891 IP localhost.42184 > sp119.domain: 40393+ PTR? 251.0.0.224.in-addr.arpa. (42)
13:51:45.238169 IP 10.6.10.19.59956 > 10.101.1.0.domain: 60003+ PTR? 251.0.0.224.in-addr.arpa. (42)
13:51:45.238848 IP6 fe80::9dba:5c9c:fcab:2130.55256 > ff02::fb.mdnss: 0*- [0q] 12/0/6 (Cache flush) TXT "", PTR _adb.tcp.local., PTR adb-EMULATOR30XB8X4X0._adb.tcp.local., (Cache flush) SRV Android.local.:5555 0, (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) PTR Android.local., (Cache flush) AAAA fe80::a04b:65ff:fe49:a594, (Cache flush) AAAA fec0::12a:ec14:f8a9:4f9e (591)
13:51:45.238950 IP 10.101.1.0.domain > 10.6.10.19.59956: 60003 NXDomain 0/1/0 (99)
13:51:45.240895 IP localhost.41125 > sp119.domain: 21874+ PTR? 10.1.101.10.in-addr.arpa. (42)
13:51:45.240952 IP 10.6.10.19.59956 > 10.101.1.0.domain: 18139+ PTR? 10.1.101.10.in-addr.arpa. (42)
13:51:45.272148 ARP, Request who-has 10.6.4.100 tell 10.6.15.23, length 46
13:51:45.272514 IP localhost.54864 > sp119.domain: 47743+ PTR? 100.4.6.10.in-addr.arpa. (41)
13:51:45.272614 IP 10.6.10.19.59956 > 10.101.1.0.domain: 46392+ PTR? 100.4.6.10.in-addr.arpa. (41)
13:51:45.273237 IP 10.101.1.0.domain > 10.6.10.19.59956: 46392 NXDomain 0/1/0 (100)
13:51:45.273341 IP sp119.domain > localhost.54864: 47743 NXDomain 0/1/0 (100)
13:51:45.289162 IP 10.6.254.1.9999 > 10.6.255.255.9999: UDP, length 21
13:51:45.289466 IP localhost.47614 > sp119.domain: 37826+ PTR? 255.255.6.10.in-addr.arpa. (43)
13:51:45.289564 IP 10.6.10.19.59956 > 10.101.1.0.domain: 40083+ PTR? 255.255.6.10.in-addr.arpa. (43)
13:51:45.289968 IP 10.6.254.2.9999 > 10.6.255.255.9999: UDP, length 21
13:51:45.290226 IP 10.101.1.0.domain > 10.6.10.19.59956: 40083 NXDomain 0/1/0 (102)
```

```
(QM)? gml15. sftp-ssh. tcp.local. SRV (QM)? gml15. sftp-ssh. tcp.local. AAAA (QM)? gml10.local. A (QM)? gml10.local. TXT (QM)? gml10. sftp-
tcp.local. SRV (QM)? gml10. sftp-ssh. tcp.local. AAAA (QM)? gml31.local. A (QM)? gml31.local. TXT (QM)? gml31. sftp-ssh. tcp.local. SRV (Q
gml31. sftp-ssh. tcp.local. AAAA (QM)? gml30.local. (1451)
13:52:50.140253 IP 10.6.4.15.mdns > 224.0.0.251.mdns: 0 [b2&3=0x200] [62a] [0q] (1439)
13:52:50.140387 IP 10.6.4.15.mdns > 224.0.0.251.mdns: 0 [b2&3=0x200] [57a] [0q] (1400)
13:52:50.140393 IP 10.6.4.15.mdns > 224.0.0.251.mdns: 0 [14a] [0q] (447)
13:52:50.140641 IP6 fe80::6665:447c:47f0:3168.mdns > ff02::fb.mdns: 0 [54a] [12q] PTR (QM)? _webdav. tcp.local. TXT (QM)? gml15. sftp-ssh.
tcp.local. SRV (QM)? gml115. sftp-ssh. tcp.local. AAAA (QM)? gml29.local. A (QM)? gml29.local. TXT (QM)? gml29. sftp-ssh. tcp.local. SRV (QM)?
29. sftp-ssh. tcp.local. PTR (QM)? _nfs. tcp.local. PTR (QM)? _afpover tcp. tcp.local. PTR (QM)? _smb. tcp.local. PTR (QM)? _sftp-ssh. tcp.l
. PTR (QM)? _webdav. tcp.local. (1388)
13:52:50.140942 IP 10.6.4.15.mdns > 224.0.0.251.mdns: 0 [b2&3=0x200] [53a] [21q] PTR (QM)? _webdav. tcp.local. A (QM)? gml30.local. TXT (QM
l30. sftp-ssh. tcp.local. SRV (QM)? gml30. sftp-ssh. tcp.local. AAAA (QM)? Mac-mini-3.local. A (QM)? Mac-mini-3.local. TXT (QM)? macminiM-
QM-^Ys Mac mini (2). sftp-ssh. tcp.local. SRV (QM)? macminiM-BM-^QM-^Ys Mac mini (2). sftp-ssh. tcp.local. AAAA (QM)? gml115.local. A (QM)?
115.local. TXT (QM)? gml115. sftp-ssh. tcp.local. SRV (QM)? gml115. sftp-ssh. tcp.local. AAAA (QM)? gml29.local. A (QM)? gml29.local. TXT (
gml29. sftp-ssh. tcp.local. SRV (QM)? gml29. sftp-ssh. tcp.local. PTR (QM)? _nfs. tcp.local. PTR (QM)? _afpover tcp. tcp.local. PTR (QM)? _
tcp.local. PTR (QM)? _sftp-ssh. tcp.local. PTR (QM)? _webdav. tcp.local. (1447)
13:52:50.140953 IP 10.6.4.15.mdns > 224.0.0.251.mdns: 0 [14a] [0q] (366)
13:52:50.147865 ARP, Request who-has 10.6.4.100 tell 10.6.15.7, length 46
13:52:50.188136 IP 10.6.3.35.netbios-ns > 10.6.255.255.netbios-ns: UDP, length 50
13:52:50.286846 ARP, Request who-has 10.6.4.100 tell 10.6.15.27, length 46
13:52:50.327802 IP 10.6.254.2.9999 > 10.6.255.255.9999: UDP, length 21
13:52:50.328607 IP 10.6.254.1.9999 > 10.6.255.255.9999: UDP, length 21
13:52:50.357139 ARP, Request who-has 10.6.4.100 tell 10.6.15.11, length 46
13:52:50.393904 ARP, Request who-has 10.6.4.100 tell 10.6.15.9, length 46
^C
2414 packets captured
```

## 2. netstat

It is used to display network related information like network connections, interface statistics, routing tables etc.

Syntax: netstat [options]

Options:

- -a : It shows both listening and non-listening sockets.
- -s : It is used to list the statistics for all ports.
- -at : Used to list all tcp ports
- -au : Used to list all udp ports.
- -l : To list only listening ports.
- -lt : To list only listening tcp ports.
- -lu : To list only listening udp ports.

```
root@spl19:~# netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 *:618                   *:*                     LISTEN
tcp        0      0 localhost:mysql         *:*                     LISTEN
tcp        0      0 *:sunrpc                *:*                     LISTEN
tcp        0      0 spl19:domain            *:*                     LISTEN
tcp        0      0 localhost:ipp           *:*                     LISTEN
tcp        0      0 10.6.10.19:45302        maa05s18-in-f5.1e:https ESTABLISHED
tcp        20      0 10.6.10.19:36178        10.6.10.98:netbios-ssn ESTABLISHED
tcp        0      0 10.6.10.19:49816        ec2-52-88-186-20.:https ESTABLISHED
tcp        0      0 10.6.10.19:60800        maa05s10-in-f4.1e:https ESTABLISHED
tcp        0      0 10.6.10.19:49816        ec2-52-88-186-20.:https ESTABLISHED
tcp        0      0 10.6.10.19:900          10.6.10.98:876         TIME_WAIT
tcp        0      0 10.6.10.19:60800        maa05s10-in-f4.1e:https ESTABLISHED
tcp        0      0 10.6.10.19:54791        10.6.10.98:sunrpc      TIME_WAIT
tcp6       0      0 [::]:sunrpc             [::]:*                 LISTEN
tcp6       0      0 ip6-localhost:ipp      [::]:*                 LISTEN
udp        0      0 *:sunrpc                *:*                     LISTEN
udp        0      0 *:617                   *:*                     LISTEN
udp        0      0 *:618                   *:*                     LISTEN
udp        0      0 *:ipp                   *:*                     LISTEN
udp        0      0 *:37602                 *:*                     LISTEN
udp        0      0 *:915                   *:*                     LISTEN
udp        0      0 *:mdns                  *:*                     LISTEN
udp        0      0 *:46689                 *:*                     LISTEN
udp        0      0 *:59056                 *:*                     LISTEN
udp        0      0 *:34758                 *:*                     LISTEN
udp        0      0 *:35234                 *:*                     LISTEN
udp        0      0 *:60798                 *:*                     LISTEN
udp        0      0 *:40695                 *:*                     LISTEN
udp        0      0 spl19:domain            *:*                     LISTEN
udp6       0      0 [::]:sunrpc             [::]:*                 LISTEN
udp6       0      0 [::]:58078              [::]:*                 LISTEN
udp6       0      0 [::]:915                 [::]:*                 LISTEN
udp6       0      0 [::]:mdns                [::]:*                 LISTEN
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State       I-Node      Path
unix  2      [ ACC ]     STREAM    LISTENING   25276       @/tmp/.ICE-unix/2247
unix  2      [ ]       DGRAM          23929       /run/user/0/systemd/notify
unix  2      [ ACC ]     STREAM    LISTENING   23930       /run/user/0/systemd/private
unix  2      [ ACC ]     SEQPACKET LISTENING   8961        /run/udev/control
unix  2      [ ACC ]     STREAM    LISTENING   23934       /run/user/0/snapd-session-agent.socket
unix  2      [ ACC ]     STREAM    LISTENING   25101       /root/.gnupg/S.gpg-agent
unix  2      [ ACC ]     STREAM    LISTENING   23939       /run/user/0/keyring/control
unix  2      [ ACC ]     STREAM    LISTENING   24210       /run/user/0/keyring/pkcs11
unix  2      [ ACC ]     STREAM    LISTENING   24212       /run/user/0/keyring/ssh
unix  3      [ ]       DGRAM          8952        /run/systemd/notify
unix  2      [ ACC ]     STREAM    LISTENING   16908       @/tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM    LISTENING   24240       @/tmp/ibus/dbus-Vk4LmRpc
unix  2      [ ACC ]     STREAM    LISTENING   285472      @root-com.canonical.Unity.Master.Scope.fil
```

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```
root@spl19:~# netstat -s
Ip:
  145691 total packets received
  893 with invalid addresses
  0 forwarded
  0 incoming packets discarded
  144795 incoming packets delivered
  84762 requests sent out
Icmp:
  0 ICMP messages received
  0 input ICMP message failed.
  ICMP input histogram:
  0 ICMP messages sent
  0 ICMP messages failed
  ICMP output histogram:
Tcp:
  748 active connections openings
  1 passive connection openings
  12 failed connection attempts
  10 connection resets received
  6 connections established
  26472 segments received
  22334 segments send out
  151 segments retransmitted
  0 bad segments received.
  175 resets sent
Udp:
  97465 packets received
  0 packets to unknown port received.
  35 packet receive errors
  62866 packets sent
  RcvbufErrors: 35
  IgnoredMulti: 20851
Udplite:
TcpExt:
  512 TCP sockets finished time wait in fast timer
  411 delayed acks sent
  Quick ack mode was activated 46 times
  24 packets directly queued to recvmsg prequeue.
  47154 bytes directly received in process context from prequeue
  15077 packet headers predicted
  25 packets header predicted and directly queued to user
  3424 acknowledgments not containing data payload received
  2956 predicted acknowledgments
  7 times recovered from packet loss by selective acknowledgements
  23 congestion windows recovered without slow start after partial ack
  7 fast retransmits
  43 other TCP timeouts
  TCPLossProbes: 42
  TCPLossProbeRecovery: 3
  4 SACK retransmits failed
  47 DSACKs sent for old packets
  1 DSACKs sent for out of order packets
  19 DSACKs received
  39 connections reset due to unexpected data
  1 connections reset due to early user close
  10 connections aborted due to timeout
  TCPDSACKIgnoredNoUndo: 6
  TCPSackShiftFallback: 13
  TCPRecvCoalesce: 8902
  TCPFOQueue: 213
  TCPFOMerge: 1
  TCPAutoCorking: 577
  TCPSynRetrans: 63
  TCPOrigDataSent: 7590
  TCPHystartTrainDetect: 2
```

```
root@spl19:~# netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 *:618                   *:                       LISTEN
tcp        0      0 localhost:mysql         *:                       LISTEN
tcp        0      0 *:sunrpc                *:                       LISTEN
tcp        0      0 spl19:domain            *:                       LISTEN
tcp        0      0 localhost:ipp           *:                       LISTEN
tcp        0      0 10.6.10.19:59522        del03s14-in-f5.1e:https ESTABLISHED
tcp        0      0 10.6.10.19:35778        maa03s42-in-f4.1e:https ESTABLISHED
tcp        0      0 10.6.10.19:50086        ec2-54-82-195-36.:https ESTABLISHED
tcp        24      0 10.6.10.19:36178        10.6.10.98:netbios-ssn ESTABLISHED
tcp        0      0 10.6.10.19:49816        ec2-52-88-186-20.:https ESTABLISHED
tcp        0      0 10.6.10.19:38682        236.234.111.34.bc:https ESTABLISHED
tcp        24      0 10.6.10.19:36178        10.6.10.98:netbios-ssn ESTABLISHED
tcp        0      0 10.6.10.19:56603        10.6.10.98:sunrpc       TIME_WAIT
tcp        0      0 10.6.10.19:49816        ec2-52-88-186-20.:https ESTABLISHED
tcp        0      0 10.6.10.19:38682        236.234.111.34.bc:https ESTABLISHED
tcp6       0      0 [::]:sunrpc             [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
root@spl19:~#
```

```
root@spl19:~# netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 *:618                   *:                       LISTEN
tcp        0      0 localhost:mysql         *:                       LISTEN
tcp        0      0 *:sunrpc                *:                       LISTEN
tcp        0      0 spl19:domain            *:                       LISTEN
tcp        0      0 localhost:ipp           *:                       LISTEN
tcp6       0      0 [::]:sunrpc             [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
root@spl19:~#
```

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```
root@spl19:~# netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 *:618                  :::*                    LISTEN
tcp        0      0 localhost:mysql        :::*                    LISTEN
tcp        0      0 *:sunrpc               :::*                    LISTEN
tcp        0      0 spl19:domain          :::*                    LISTEN
tcp        0      0 localhost:ipp          :::*                    LISTEN
tcp6       0      0 [::]:sunrpc            [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp     [::]:*                  LISTEN
udp        0      0 *:sunrpc               :::*                    LISTEN
udp        0      0 *:617                  :::*                    LISTEN
udp        0      0 *:618                  :::*                    LISTEN
udp        0      0 *:ipp                  :::*                    LISTEN
udp        0      0 *:915                  :::*                    LISTEN
udp        0      0 *:mdns                 :::*                    LISTEN
udp        0      0 *:46689                :::*                    LISTEN
udp        0      0 *:59056                :::*                    LISTEN
udp        0      0 *:34758                :::*                    LISTEN
udp        0      0 *:55651                :::*                    LISTEN
udp        0      0 *:35234                :::*                    LISTEN
udp        0      0 *:60798                :::*                    LISTEN
udp        0      0 *:40695                :::*                    LISTEN
udp        0      0 spl19:domain          :::*                    LISTEN
udp6       0      0 [::]:sunrpc            [::]:*                  LISTEN
udp6       0      0 [::]:58078              [::]:*                  LISTEN
udp6       0      0 [::]:915                [::]:*                  LISTEN
udp6       0      0 [::]:mdns               [::]:*                  LISTEN
Active UNIX domain sockets (only servers)
Proto RefCnt Flags   Type       State       I-Node      Path
unix 2      [ ACC ] STREAM   LISTENING   25276       @/tmp/.ICE-unix/2247
unix 2      [ ACC ] STREAM   LISTENING   23930       /run/user/0/systemd/private
unix 2      [ ACC ] SEQPACKET LISTENING   8961        /run/udev/control
unix 2      [ ACC ] STREAM   LISTENING   23934       /run/user/0/snapd-session-agent.socket
unix 2      [ ACC ] STREAM   LISTENING   25101       /root/.gnupg/S.gpg-agent
unix 2      [ ACC ] STREAM   LISTENING   23939       /run/user/0/keyring/control
unix 2      [ ACC ] STREAM   LISTENING   24210       /run/user/0/keyring/pkcs11
unix 2      [ ACC ] STREAM   LISTENING   24212       /run/user/0/keyring/ssh
unix 2      [ ACC ] STREAM   LISTENING   16908       @/tmp/.X11-unix/X0
unix 2      [ ACC ] STREAM   LISTENING   24240       @/tmp/ibus/dbus-Vk4LmRpc
unix 2      [ ACC ] STREAM   LISTENING   285472      @root-com.canonical.Unity.Master.Scope.files.T35436773523121
unix 2      [ ACC ] STREAM   LISTENING   25021       @/tmp/dbus-2j7gG08RaJ
unix 2      [ ACC ] STREAM   LISTENING   362256      /tmp/OSL_PIPE_0_SingleOfficeIPC_53bc4297d6d012e1a744f3977d159334
unix 2      [ ACC ] STREAM   LISTENING   8954       /run/systemd/private
unix 2      [ ACC ] STREAM   LISTENING   8959       /run/systemd/journal/stdout
unix 2      [ ACC ] STREAM   LISTENING   8963       /run/systemd/fck.progress
unix 2      [ ACC ] STREAM   LISTENING   287965      @root-com.canonical.Unity.Scope.scopes.T3545263732276
unix 2      [ ACC ] STREAM   LISTENING   12991      /var/run/dbus/system_bus_socket
unix 2      [ ACC ] STREAM   LISTENING   12992      /run/uid/request
unix 2      [ ACC ] STREAM   LISTENING   12993      /var/run/avahi-daemon/socket
unix 2      [ ACC ] STREAM   LISTENING   12994      /var/run/cups/cups.sock
unix 2      [ ACC ] STREAM   LISTENING   12995      /run/rpcbind.sock
unix 2      [ ACC ] STREAM   LISTENING   12997      /run/snapd.socket
unix 2      [ ACC ] STREAM   LISTENING   12998      /run/snapd-snap.socket
unix 2      [ ACC ] STREAM   LISTENING   12999      /run/acpid.socket
unix 2      [ ACC ] STREAM   LISTENING   16909      /tmp/.X11-unix/X0
unix 2      [ ACC ] STREAM   LISTENING   25277      /tmp/.ICE-unix/2247
unix 2      [ ACC ] STREAM   LISTENING   285471      @root-com.canonical.Unity.Master.Scope.applications.T35436757584161
unix 2      [ ACC ] STREAM   LISTENING   16140      /var/run/mysqld/mysqld.sock
unix 2      [ ACC ] STREAM   LISTENING   287907      @root-com.canonical.Unity.Scope.files.T35437543764234
unix 2      [ ACC ] STREAM   LISTENING   287964      @root-com.canonical.Unity.Scope.applications.T35452625963924
unix 2      [ ACC ] STREAM   LISTENING   24080      @/com/ubuntu/upstart-session/0/1933
unix 2      [ ACC ] STREAM   LISTENING   25205      @/tmp/dbus-bUaY1WrGaX
root@spl19:~#
```

### 3. ifconfig

This command is used to configure the kernel-resident network interfaces. It is used at boot time to set up interfaces as necessary.

Syntax:

ifconfig [interfaces]

ifconfig interface [aftype] options | addresses

Arguments:

- With no arguments, ifconfig command displays the status of the currently active interfaces.
- With a single interface argument, it displays the status of the given interface only.
- Option '-a' displays the configuration of all the interfaces both active and inactive.
- Option '-s' displays a short list (like netstat -i)

```
root@spl19:~# ifconfig
enp3s0    Link encap:Ethernet  HWaddr c4:34:6b:52:a2:f6
          inet addr:10.6.10.19  Bcast:10.6.255.255  Mask:255.255.0.0
          inet6 addr: fe80::c634:6bff:fe52:a2f6/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:197566 errors:0 dropped:0 overruns:0 frame:0
          TX packets:67005 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:110694816 (110.6 MB)  TX bytes:28052429 (28.0 MB)
          Interrupt:18

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128  Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:23456 errors:0 dropped:0 overruns:0 frame:0
          TX packets:23456 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:1866163 (1.8 MB)  TX bytes:1866163 (1.8 MB)

root@spl19:~# ifconfig -a
enp3s0    Link encap:Ethernet  HWaddr c4:34:6b:52:a2:f6
          inet addr:10.6.10.19  Bcast:10.6.255.255  Mask:255.255.0.0
          inet6 addr: fe80::c634:6bff:fe52:a2f6/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:197995 errors:0 dropped:0 overruns:0 frame:0
          TX packets:67130 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:110753987 (110.7 MB)  TX bytes:28138380 (28.1 MB)
          Interrupt:18

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128  Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:23500 errors:0 dropped:0 overruns:0 frame:0
          TX packets:23500 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:1869331 (1.8 MB)  TX bytes:1869331 (1.8 MB)
```

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```
root@spl19:~# ifconfig lo
lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:65536  Metric:1
        RX packets:23624 errors:0 dropped:0 overruns:0 frame:0
        TX packets:23624 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1
        RX bytes:1878377 (1.8 MB)  TX bytes:1878377 (1.8 MB)

root@spl19:~# ifconfig -s
Iface  MTU Met  RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp3s0  1500 0    199165      0      0 0      67516      0      0 0 0 BMRU
lo      65536 0      23632      0      0 0      23632      0      0 0 0 LRU
root@spl19:~#
```



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#### 4. nslookup

It stands for “Name Server Lookup”. This command is useful for getting information from DNS Server. It is a network administration tool for querying the DNS to obtain domain name or IP address mapping or any other specific DNS record.

Syntax:

nslookup [option]

nslookup [Domain\_name] : Displays the IP Address of the domain name.

```
root@spl19:~# nslookup www.google.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
Name:   www.google.com
Address: 216.58.200.132

root@spl19:~# nslookup www.gmail.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
Name:   www.gmail.com
Address: 142.250.195.165

root@spl19:~# nslookup www.youtube.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
www.youtube.com canonical name = youtube-ui.l.google.com.
Name:   youtube-ui.l.google.com
Address: 142.250.183.238
Name:   youtube-ui.l.google.com
Address: 172.217.163.174
Name:   youtube-ui.l.google.com
Address: 172.217.163.206
Name:   youtube-ui.l.google.com
Address: 172.217.166.110
Name:   youtube-ui.l.google.com
Address: 216.58.200.142
Name:   youtube-ui.l.google.com
Address: 142.250.67.46
Name:   youtube-ui.l.google.com
Address: 142.250.67.78
Name:   youtube-ui.l.google.com
Address: 142.250.76.78
Name:   youtube-ui.l.google.com
Address: 142.250.77.110
Name:   youtube-ui.l.google.com
Address: 142.250.77.142
Name:   youtube-ui.l.google.com
Address: 142.250.77.174
Name:   youtube-ui.l.google.com
Address: 142.250.182.14
Name:   youtube-ui.l.google.com
Address: 142.250.182.46
Name:   youtube-ui.l.google.com
Address: 142.250.182.78
Name:   youtube-ui.l.google.com
Address: 142.250.182.110
Name:   youtube-ui.l.google.com
Address: 142.250.182.142

root@spl19:~#
```

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## 5. traceroute

This command prints the route that a packet takes to reach the host.

Syntax:

`traceroute [options] host_Address [pathlength]`

```
root@spl19:~# traceroute www.google.com
traceroute to www.google.com (216.58.200.132), 30 hops max, 60 byte packets
 1  10.6.0.1 (10.6.0.1)  3.341 ms  3.355 ms  3.457 ms
 2  10.106.0.2 (10.106.0.2)  0.324 ms  0.320 ms  0.308 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

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```
root@spl19:~# traceroute www.gmail.com
traceroute to www.gmail.com (142.250.192.197), 30 hops max, 60 byte packets
 1  10.6.0.1 (10.6.0.1)  3.923 ms  3.958 ms  4.053 ms
 2  10.106.0.2 (10.106.0.2)  0.340 ms  0.345 ms  0.331 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *

root@spl19:~# traceroute www.youtube.com
traceroute to www.youtube.com (142.250.195.206), 30 hops max, 60 byte packets
 1  10.6.0.1 (10.6.0.1)  2.879 ms  2.899 ms  2.989 ms
 2  10.106.0.2 (10.106.0.2)  0.329 ms  0.323 ms  0.308 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *

root@spl19:~#
```

## 6. ping

PING(Packet Internet Grooper) command is used to check the internet connectivity between host and server/host.

Syntax:

ping [options] DESTINATION

```
root@spl19:~# ping www.google.com
PING www.google.com (142.250.195.196) 56(84) bytes of data.
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=1 ttl=249 time=2.96 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=2 ttl=249 time=2.94 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=3 ttl=249 time=3.02 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=4 ttl=249 time=2.92 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=5 ttl=249 time=192 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=6 ttl=249 time=2.96 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=7 ttl=249 time=3.01 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=8 ttl=249 time=2.95 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=9 ttl=249 time=2.94 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=10 ttl=249 time=7.89 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=11 ttl=249 time=137 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=12 ttl=249 time=5.62 ms
c64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=13 ttl=249 time=5.34 ms
64 bytes from maa03s42-in-f4.1e100.net (142.250.195.196): icmp_seq=14 ttl=249 time=5.67 ms
^C
--- www.google.com ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13015ms
rtt min/avg/max/mdev = 2.922/27.027/192.967/57.350 ms
root@spl19:~# ping www.gmail.com
PING www.gmail.com (142.250.195.165) 56(84) bytes of data.
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=1 ttl=249 time=3.71 ms
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=2 ttl=249 time=8.18 ms
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=3 ttl=249 time=3.42 ms
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=4 ttl=249 time=3.38 ms
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=5 ttl=249 time=3.47 ms
64 bytes from maa03s41-in-f5.1e100.net (142.250.195.165): icmp_seq=6 ttl=249 time=3.42 ms
^C
--- www.gmail.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 3.381/4.267/8.186/1.756 ms
root@spl19:~# ping www.youtube.com
PING youtube-ui.l.google.com (142.250.182.142) 56(84) bytes of data.
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=1 ttl=58 time=5.55 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=2 ttl=58 time=5.51 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=3 ttl=58 time=5.54 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=4 ttl=58 time=5.45 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=5 ttl=58 time=5.51 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=6 ttl=58 time=5.52 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=7 ttl=58 time=5.50 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=8 ttl=58 time=5.54 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=9 ttl=58 time=5.49 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=10 ttl=58 time=5.51 ms
64 bytes from maa05s22-in-f14.1e100.net (142.250.182.142): icmp_seq=11 ttl=58 time=5.52 ms
^C
--- youtube-ui.l.google.com ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10016ms
rtt min/avg/max/mdev = 5.451/5.517/5.551/0.081 ms
root@spl19:~#
```

Result:

Learnt, understood and implemented the use of commands like tcpdump, netstat, ifconfig, nslookup and traceroute, ping

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Learning outcome:

Learnt the various network related commands

Learnt the various options associated with the network related commands

Learnt and implemented the network commands on the terminal.