Venesh
Commands Assignment 01_25_2017
telnet,ping,dig,ifconfig,du,df,lsof,trace,free,nc,scp,netstat

Connection: Without WIFI

enp7S0= Ethernet   lo = Localhost   wlp6s0 = Wifi

```
enp7s0    Link encap:Ethernet  HWaddr 20:47:47:dd:71:51
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:233462 errors:0 dropped:0 overruns:0 frame:0
          TX packets:126285 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:288158927 (288.1 MB)  TX bytes:12455406 (12.4 MB)

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:10979 errors:0 dropped:0 overruns:0 frame:0
          TX packets:10979 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:1058456 (1.0 MB)  TX bytes:1058456 (1.0 MB)

wlp6s0    Link encap:Ethernet  HWaddr b4:6d:83:5d:61:46
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:84190 errors:0 dropped:0 overruns:0 frame:0
          TX packets:38181 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:86911959 (86.9 MB)  TX bytes:6633572 (6.6 MB)
Connection : Ethernet and Wifi

enp7s0    Link encap:Ethernet  HWaddr 20:47:47:dd:71:51
          inet addr:192.168.0.19  Bcast:192.168.0.255
          Mask:255.255.255.0
          inet6 addr: 2605:6000:3f8c:2400:7ddb:39d3:e360:f83d/64
          Scope:Global
          inet6 addr: 2605:6000:3f8c:2400:9876:ab18:5fd1:b35c/64
          Scope:Global
          inet6 addr: fe80::70d8:5e77:46ed:706c/64 Scope:Link
          inet6 addr: 2605:6000:3f8c:2400::5/128 Scope:Global
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:234424 errors:0 dropped:0 overruns:0 frame:0
          TX packets:127480 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:288582941 (288.5 MB)  TX bytes:12619528 (12.6 MB)

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:361798 errors:0 dropped:0 overruns:0 frame:0
          TX packets:361798 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:28060327 (28.0 MB)  TX bytes:28060327 (28.0 MB)

wlp6s0    Link encap:Ethernet  HWaddr b4:6d:83:5d:61:46
          inet addr:192.168.0.34  Bcast:192.168.0.255
          Mask:255.255.255.0
          inet6 addr: fe80::7d20:49c5:fd08:6bdd/64 Scope:Link
          inet6 addr: 2605:6000:3f8c:2400:c600:51fe:f653:558a/64
          Scope:Global
          inet6 addr: 2605:6000:3f8c:2400:a1e7:405a:62a1:fed5/64
          Scope:Global
          inet6 addr: 2605:6000:3f8c:2400::e/128 Scope:Global
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:84385 errors:0 dropped:0 overruns:0 frame:0
          TX packets:38468 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:86945866 (86.9 MB)  TX bytes:6685366 (6.6 MB)
```

Connection: Only Ethernet

```
enp7s0    Link encap:Ethernet  HWaddr 20:47:47:dd:71:51
          inet addr:192.168.0.19  Bcast:192.168.0.255
          Mask:255.255.255.0
          inet6 addr: 2605:6000:3f8c:2400:7ddb:39d3:e360:f83d/64
          Scope:Global
              inet6 addr: 2605:6000:3f8c:2400:9876:ab18:5fd1:b35c/64
          Scope:Global
          inet6 addr: fe80::70d8:5e77:46ed:706c/64 Scope:Link
          inet6 addr: 2605:6000:3f8c:2400::5/128 Scope:Global
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:233512 errors:0 dropped:0 overruns:0 frame:0
          TX packets:126403 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:288170760 (288.1 MB)  TX bytes:12475016 (12.4 MB)

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:361107 errors:0 dropped:0 overruns:0 frame:0
          TX packets:361107 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:28002551 (28.0 MB)  TX bytes:28002551 (28.0 MB)

wlp6s0    Link encap:Ethernet  HWaddr b4:6d:83:5d:61:46
```

```
            UP BROADCAST MULTICAST  MTU:1500  Metric:1
            RX packets:84190 errors:0 dropped:0 overruns:0 frame:0
            TX packets:38181 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:86911959 (86.9 MB)  TX bytes:6633572 (6.6 MB)
```

```
enp7s0     Link encap:Ethernet  HWaddr 20:47:47:dd:71:51
            UP BROADCAST MULTICAST  MTU:1500  Metric:1
            RX packets:234383 errors:0 dropped:0 overruns:0 frame:0
            TX packets:127368 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:288577904 (288.5 MB)  TX bytes:12603248 (12.6 MB)

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:361738 errors:0 dropped:0 overruns:0 frame:0
            TX packets:361738 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1
            RX bytes:28054915 (28.0 MB)  TX bytes:28054915 (28.0 MB)

wlp6s0     Link encap:Ethernet  HWaddr b4:6d:83:5d:61:46
            inet addr:192.168.0.34  Bcast:192.168.0.255
            Mask:255.255.255.0
            inet6 addr: fe80::7d20:49c5:fd08:6bdd/64 Scope:Link
            inet6 addr: 2605:6000:3f8c:2400:c600:51fe:f653:558a/64
            Scope:Global
                inet6 addr: 2605:6000:3f8c:2400:a1e7:405a:62a1:fed5/64
            Scope:Global
            inet6 addr: 2605:6000:3f8c:2400::e/128 Scope:Global
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:84249 errors:0 dropped:0 overruns:0 frame:0
            TX packets:38360 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:86922661 (86.9 MB)  TX bytes:6668284 (6.6 MB)
```

Breaking Down Output

Link encap : Ethernet- It tells that the device is capable of receiving the packets from Ethernet cable.

Hwaddr = MAC Address
20:47:47:dd:71:51(ETHERNET MAC ADDRESS) b

4:6d:83:5d:61:46 (WIFI MAC addresses)

inet addr- 192.168.0.33
IP Address of my machine
Bcast : 192.168.0.255
Address of the subnet

Mask 255.255.255.0

RUNNyNG – Interface is ready to accept the data

BROADCAST- Supports the broadcast

MULTICAST- Supports the multicasting.

MTU(default value = 1500) – size of the packet receiving by interface

METRIC : 1
It is the priority setting when we have two Ethernet cards, the
lowest metric value ethernet card will be chosen to send data out.

RX Packets, TX Packets- Number of packets received and transmitted

Collisions- Value is 0. If value is more than 0, then it mean packets
are colliding.

txqueuelen- transmit queue of the device slower devices will have
less queuing value as they cannot handle high queue.

Options of ifconfig

ifconfig -a

shows all the available interfaces

//this is without wifi and Ethenet

enp7s0   Link encap:Ethernet HWaddr 20:47:47:dd:71:51
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:235329 errors:0 dropped:0 overruns:0 frame:0
          TX packets:128444 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:288727924 (288.7 MB) TX bytes:12750310 (12.7 MB)

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:362231 errors:0 dropped:0 overruns:0 frame:0
            TX packets:362231 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1
            RX bytes:28099866 (28.0 MB)  TX bytes:28099866 (28.0 MB)

wlp6s0      Link encap:Ethernet  HWaddr b4:6d:83:5d:61:46
            UP BROADCAST MULTICAST  MTU:1500  Metric:1
            RX packets:84788 errors:0 dropped:0 overruns:0 frame:0
            TX packets:38528 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:86991471 (86.9 MB)  TX bytes:6693851 (6.6 MB)
```

ifconfig eth0 up

to enable the eth0

inconfig eth0 down

to disable the eth0

Netstat

Definition: Netstat displays various networks information such as which ports are listening, established, or closed. Routing tables, ehternet wifi statistics

netstat command in Linux/Unix

sachin@cricket:~$ netstat

```
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address
State
tcp       0      0 192.168.0.34:58044     dfw25s17-in-f174.:https
ESTABLISHED
tcp       0      0 192.168.0.34:57270     dfw06s49-in-f14.1:https
ESTABLISHED
tcp       0      0 192.168.0.34:38534     ow-in-f190.1e100.:https
ESTABLISHED
tcp       0      0 192.168.0.34:58482     arn09s10-in-f3.1e:https
ESTABLISHED
tcp       0     32 192.168.0.34:42720     173.194.24.41:https
LAST_ACK
tcp       0      0 192.168.0.34:37968     dfw25s16-in-f14.1:https
ESTABLISHED
tcp6     32      0 192.168.0.34:57518     pillar03.atlassia:https
CLOSE_WAIT
```

```
tcp6       32       0 192.168.0.34:57514      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57508      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57520      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57512      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57526      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57516      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57510      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57524      pillar03.atlassia:https
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57506      pillar03.atlassia:https
CLOSE_WAIT
tcp6        1       0 localhost:58032         localhost:http-alt
CLOSE_WAIT
tcp6       32       0 192.168.0.34:57522      pillar03.atlassia:https
CLOSE_WAIT
```

Listing all the ports.
sachin@cricket:~$ netstat -a

```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address        Foreign Address
State
tcp        0       0 cricket:domain       *:*
LISTEN
tcp        0       0 localhost:ipp        *:*
LISTEN
tcp        0       0 192.168.0.19:57752   ec2-50-112-150-60:https
ESTABLISHED
tcp        0       0 192.168.0.19:44552   server-54-192-7-1:https
TIME_WAIT
tcp        0       0 192.168.0.19:40242   ec2-52-25-239-122:https
ESTABLISHED
tcp        0       0 192.168.0.19:44906   nuno.canonical.com:http
TIME_WAIT
tcp        0       0 192.168.0.19:40238   ec2-52-25-239-122:https
ESTABLISHED
tcp6       0       0 localhost:8005       [::]:*
LISTEN
tcp6       0       0 [::]:http-alt        [::]:*
LISTEN
```

```
tcp6      0      0 ip6-localhost:ipp      [::]:*
LISTEN
```

```
sachin@cricket:~$ netstat -at | more

Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address
Sta
te
tcp       0      0 cricket:domain         *:*
LIS
TEN
tcp6      0      0 localhost:8005         [::]:*
LIS
TEN
tcp6      0      0 [::]:http-alt         [::]:*
LIS
TEN
```

List all udp ports.
```
sachin@cricket:~$ netstat -au

Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address
State
udp       0      0 *:mdns                 *:*
udp       0      0 *:47600                *:*
udp       0      0 cricket:domain         *:*
udp       0      0 *:bootpc               *:*
udp       0      0 *:bootpc               *:*
udp       0      0 *:ipp                  *:*
```

List all listening sockets.
```
sachin@cricket:~$ netstat -l

Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address
State
tcp       0      0 cricket:domain         *:*
LISTEN
tcp6      0      0 localhost:8005         [::]:*
LISTEN
tcp6      0      0 [::]:http-alt         [::]:*
LISTEN
udp       0      0 *:mdns                 *:*
```

```
udp         0       0 *:47600                *:*
udp         0       0 cricket:domain         *:*
udp         0       0 *:bootpc               *:*
udp         0       0 *:bootpc               *:*
udp         0       0 *:ipp                  *:*
udp6        0       0 [::]:mdns              [::]:*
udp6        0       0 [::]:39118             [::]:*
udp6        0       0 fe80::688:dhcpv6-client [::]:*
raw6        0       0 [::]:ipv6-icmp         [::]:*              7
raw6        0       0 [::]:ipv6-icmp         [::]:*              7
```

List all the udp listening sockets.
sachin@cricket:~$ netstat -lu

Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address   Foreign Address
State
```
udp         0       0 *:mdns                 *:*
udp         0       0 *:47600                *:*
udp         0       0 cricket:domain         *:*
udp         0       0 *:bootpc               *:*
udp         0       0 *:bootpc               *:*
udp         0       0 *:ipp                  *:*
udp6        0       0 [::]:mdns              [::]:*
udp6        0       0 [::]:39118             [::]:*
udp6        0       0 fe80::688:dhcpv6-client [::]:*
```

List all the tcp listening sockets.
sachin@cricket:~$ netstat -lt

Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address   Foreign Address
State
```
tcp         0       0 cricket:domain         *:*
LISTEN
tcp6        0       0 localhost:8005         [::]:*
LISTEN
tcp6        0       0 [::]:http-alt          [::]:*
LISTEN
```


Show statistics for udp network ports.
sachin@cricket:~$ netstat -su

IcmpMsg:
    InType3: 120
    OutType3: 313
Udp:
```

```
        1698 packets received
        313 packets to unknown port received.
        0 packet receive errors
        1846 packets sent
        IgnoredMulti: 19
UdpLite:
IpExt:
        InMcastPkts: 339
        OutMcastPkts: 105
        InBcastPkts: 19
        OutBcastPkts: 10
        InOctets: 752799
        OutOctets: 492487
        InMcastOctets: 49997
        OutMcastOctets: 13787
        InBcastOctets: 2482
        OutBcastOctets: 596
        InNoECTPkts: 3237
```

Show statistics for tcp network ports.
sachin@cricket:~$ netstat -st

```
IcmpMsg:
        InType3: 120
        OutType3: 313
Tcp:
        88 active connections openings
        1 passive connection openings
        2 failed connection attempts
        3 connection resets received
        1 connections established
        25876 segments received
        15622 segments send out
        103 segments retransmited
        0 bad segments received.
        51 resets sent
UdpLite:
TcpExt:
        26 TCP sockets finished time wait in fast timer
        113 delayed acks sent
        Quick ack mode was activated 24 times
        24 packets directly queued to recvmsg prequeue.
        23680 packet headers predicted
        306 acknowledgments not containing data payload received
        216 predicted acknowledgments
        1 congestion windows recovered without slow start after partial
ack
        22 other TCP timeouts
        TCPLossProbes: 11
```

```
    24 DSACKs sent for old packets
    1 DSACKs received
    10 connections reset due to unexpected data
    3 connections reset due to early user close
    7 connections aborted due to timeout
    TCPSackShiftFallback: 1
    IPReversePathFilter: 95
    TCPRcvCoalesce: 1906
    TCPOFOQueue: 695
    TCPAutoCorking: 12
    TCPSynRetrans: 24
    TCPOrigDataSent: 1109
    TCPKeepAlive: 112
IpExt:
    InMcastPkts: 341
    OutMcastPkts: 105
    InBcastPkts: 19
    OutBcastPkts: 10
    InOctets: 754627
    OutOctets: 493840
    InMcastOctets: 50175
    OutMcastOctets: 13787
    InBcastOctets: 2482
    OutBcastOctets: 596
    InNoECTPkts: 3257
```

Show PID and Program name along with all the details.

```
sachin@cricket:~$ sudo netstat -lp

[sudo] password for sachin:
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address
State       PID/Program name
tcp        0      0 cricket:domain         *:*
LISTEN      1132/dnsmasq
tcp6       0      0 localhost:8005         [::]:*
LISTEN      1069/java
tcp6       0      0 [::]:http-alt          [::]:*
LISTEN      1069/java
udp        0      0 *:mdns                 *:*
809/avahi-daemon: r
udp        0      0 *:47600                *:*
809/avahi-daemon: r
udp        0      0 cricket:domain         *:*
1132/dnsmasq
udp        0      0 *:bootpc               *:*
3374/dhclient
```

```
udp         0      0 *:bootpc                  *:*
1032/dhclient
udp         0      0 *:ipp                     *:*
918/cups-browsed
udp6        0      0 [::]:mdns            [::]:*
809/avahi-daemon: r
udp6        0      0 [::]:39118          [::]:*
809/avahi-daemon: r
udp6        0      0 fe80::688:dhcpv6-client [::]:*
1114/dhclient
raw6        0      0 [::]:ipv6-icmp      [::]:*                    7
826/NetworkManager
raw6        0      0 [::]:ipv6-icmp      [::]:*                    7
826/NetworkManager
```

Print netstat information continuously.

sachin@cricket:~$ netstat -tc
Find non supportive address family in your system.
sachin@cricket:~$ netstat -verbose

Display kernel routing information.
sachin@cricket:~$ netstat -r

```
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window
irtt Iface
default         192.168.0.1     0.0.0.0         UG        0 0
0 enp7s0
default         192.168.0.1     0.0.0.0         UG        0 0
0 wlp6s0
link-local      *               255.255.0.0     U         0 0
0 enp7s0
192.168.0.0     *               255.255.255.0   U         0 0
0 enp7s0
192.168.0.0     *               255.255.255.0   U         0 0
0 wlp6s0
```

Find out your program running on which port.

sachin@cricket:~$ netstat -ap| grep ssh

```
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
unix  2      [ ACC ]     STREAM      LISTENING      23784     -
/run/user/1000/keyring/ssh
```

Find out what port is used by your program.

```
achin@cricket:~$ netstat -an| grep ':80'
tcp6       0       0 127.0.0.1:8005          :::*
LISTEN
tcp6       0       0 :::8080                 :::*
LISTEN
tcp6       0       0 2605:6000:3f8c:24:54480 2607:f8b0:4000:80d::443
ESTABLISHED
tcp6       0       0 2605:6000:3f8c:24:46088 2607:f8b0:4000:80c::443
ESTABLISHED
tcp6       0       0 2605:6000:3f8c:24:54478 2607:f8b0:4000:80d::443
ESTABLISHED

Show the list of network interfaces.
sachin@cricket:~$ netstat -i

Kernel Interface table
Iface   MTU Met    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP
TX-OVR Flg
enp7s0     1500 0     34365      0      0 0       20974      0
0       0 BMRU
lo         65536 0     2506      0      0 0        2506      0
0       0 LRU
wlp6s0     1500 0      527       0      0 0         226      0
0       0 BMRU

Show unix listening ports.
sachin@cricket:~$ netstat -lx

Active UNIX domain sockets (only servers)
Proto RefCnt Flags      Type        State       I-Node    Path
unix  2      [ ACC ]    STREAM      LISTENING   23109
@/tmp/.ICE-unix/1871
unix  2      [ ACC ]    STREAM      LISTENING   22731
/run/user/1000/systemd/private
unix  2      [ ACC ]    SEQPACKET   LISTENING   10649
/run/udev/control
unix  2      [ ACC ]    STREAM      LISTENING   22035
/run/user/1000/keyring/control

Display in Promiscuous mode.

sachin@cricket:~$ netstat -ac 100| grep ssh
unix  2      [ ACC ]    STREAM      LISTENING   23784
/run/user/1000/keyring/ssh
unix  2      [ ACC ]    STREAM      LISTENING   23784
/run/user/1000/keyring/ssh
unix  2      [ ACC ]    STREAM      LISTENING   23784
/run/user/1000/keyring/ssh
```

```
unix  2      [ ACC ]     STREAM     LISTENING     23784
/run/user/1000/keyring/ssh
unix  2      [ ACC ]     STREAM     LISTENING     23784
/run/user/1000/keyring/ssh
unix  2      [ ACC ]     STREAM     LISTENING     23784
/run/user/1000/keyring/ssh
```

View Multi-cast information's.
sachin@cricket:~$ netstat -g

```
IPv6/IPv4 Group Memberships
Interface       RefCnt Group
--------------- ------ --------------------
lo              1      all-systems.mcast.net
enp7s0          1      224.0.0.251
enp7s0          1      all-systems.mcast.net
wlp6s0          1      224.0.0.251
wlp6s0          1      all-systems.mcast.net
lo              1      ip6-allnodes
lo              1      ff01::1
enp7s0          1      ff02::1:ff00:5
enp7s0          1      ff02::fb
enp7s0          1      ff02::1:ff89:29c1
enp7s0          1      ff02::1:ffa8:d578
enp7s0          1      ff02::1:ffe9:c77e
enp7s0          1      ip6-allnodes
enp7s0          1      ff01::1
wlp6s0          1      ff02::fb
wlp6s0          1      ff02::1:ff00:e
wlp6s0          1      ff02::1:ff50:ed4d
wlp6s0          1      ff02::1:ff53:558a
wlp6s0          1      ff02::1:ff08:6bdd
wlp6s0          1      ip6-allnodes
wlp6s0          1      ff01::1
```

Top

what it displays

Currently running processes

cpu utilization

memory utilization

timeout

uptime

load average- below 1 means all the processes are getting the cpu when ever they want, it means they are not waiting.

Tasks- Number of tasks running, sleeping, stopped.

% cpu - % by user processes,system processes, hardware interrupts, software interrupts.

% steal time – delay in between getting actual cpu via virtual cpu

Particularly about the processes

PID – unique id of the process

PR – priority

NI-Nice value is the customizable value to increase or decrease the value of the PR.

VIRT- virtual memory used by the processes.

RES- Resident memory is nonswap physical memory.

SHR- Shared memory is the amount of process memory shared by other processes

Press after the output is displayed

c gives the complete path

r increase or decrease the PR value

1 displays the CPU information

A divides the screen

n number of tasks

l hide the load average

t hide the cpu

m hide the memory

sorting top output

shift + M

sorts by memory

shift + W

saves the top output in the toproc. Of root file

shift + P by cpu usage

top with options

sachin@cricket:~$ top -u sachin
// shows the processes of only sachin

sachin@cricket:~$ top -p 1920

1920 sachin   20   0 707012 25996 21108 S 0.0 0.3   0:00.22
indicator-k+

// information of particular PID

sachin@cricket:~$ top -H -p 1920

 scroll coordinates: y = 1/4 (tasks), x = 1/12 (fields)
   PID USER   PR NI   VIRT   RES   SHR S %CPU %MEM   TIME+
COMMAND
 1920 sachin   20   0 707012 25996 21108 S 0.0 0.3   0:00.17
indicator-k+
 1948 sachin   20   0 707012 25996 21108 S 0.0 0.3   0:00.00
dconf worker
 1949 sachin   20   0 707012 25996 21108 S 0.0 0.3   0:00.00
gmain
 1950 sachin   20   0 707012 25996 21108 S 0.0 0.3   0:00.04
gdbus
//to see all the running threads of the processes

ping

PING (Packet INternet Groper)

sachin@cricket:~$ ping google.com

PING google.com (216.58.194.142) 56(84) bytes of data.
64 bytes from dfw06s49-in-f14.1e100.net (216.58.194.142): icmp_seq=1
ttl=54 time=41.8 ms

sachin@cricket:~$ ping -i 4 google.com
// 4 indicates every 4 seconds it receives and sends a packet

sachin@cricket:~$ ping -c 1 google.com
// It wil cut the ping after 1 receive and sending

PING google.com (216.58.218.142) 56(84) bytes of data.
64 bytes from dfw25s08-in-f14.1e100.net (216.58.218.142): icmp_seq=1
ttl=54 time=23.4 ms

--- google.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 23.496/23.496/23.496/0.000 ms

sachin@cricket:~$ ping -s 100 google.com
// change the size of packet

PING google.com (216.58.194.142) 100(128) bytes of data.
72 bytes from dfw06s49-in-f14.1e100.net (216.58.194.142): icmp_seq=1
ttl=54 (truncated)

sachin@cricket:~$ ping -w 2 google.com
// pinged only for 2 seconds

dig
//command to query DNS

dig facebook.com

; <<>> DiG 9.10.3-P4-Ubuntu <<>> facebook.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 4616
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
//DNS query is answered without any error

```
;; QUESTION SECTION:
;facebook.com.                IN    A
// It reminds what you asked for A stands for the Internet address.

;; ANSWER SECTION:
facebook.com.         219  IN    A     157.240.3.35
//Here is the answer you queried for 157.240.3.35

;; Query time: 40 msec
;; SERVER: 127.0.1.1#53(127.0.1.1)
;; WHEN: Sat Jan 28 12:19:12 CST 2017
;; MSG SIZE  rcvd: 46
// Size of the MSG received , current time, query time.



MX = message exchange
sachin@cricket:~/assignments$ dig facebook.com MX +noall +answer
//MX +noall +answer indicates only the MX to displayed

; <<>> DiG 9.10.3-P4-Ubuntu <<>> facebook.com MX +noall +answer
;; global options: +cmd
facebook.com.         300  IN    MX    10 msgin.vvv.facebook.com.

TXT = text annotations
sachin@cricket:~/assignments$ dig facebook.com TXT +noall +answer

; <<>> DiG 9.10.3-P4-Ubuntu <<>> facebook.com TXT +noall +answer
;; global options: +cmd
facebook.com.         83100     IN    TXT   "v=spf1
redirect=_spf.facebook.com"

NS = name servers
sachin@cricket:~/assignments$ dig jayapachallu.com NS +noall +answer

; <<>> DiG 9.10.3-P4-Ubuntu <<>> jayapachallu.com NS +noall +answer
;; global options: +cmd
jayapachallu.com.   172800    IN    NS    ns-513.awsdns-00.net.
jayapachallu.com.   172800    IN    NS    ns-108.awsdns-13.com.
jayapachallu.com.   172800    IN    NS    ns-1399.awsdns-46.org.
jayapachallu.com.   172800    IN    NS    ns-1943.awsdns-50.co.uk.

DNS query over particular NS
sachin@cricket:~/assignments$ dig ns-513.awsdns-00.net
jayapachallu.com

; <<>> DiG 9.10.3-P4-Ubuntu <<>> ns-513.awsdns-00.net
jayapachallu.com
;; global options: +cmd
```

```
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25055
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;ns-513.awsdns-00.net.          IN    A

;; ANSWER SECTION:
ns-513.awsdns-00.net.    142452     IN   A     205.251.194.1

;; Query time: 41 msec
;; SERVER: 127.0.1.1#53(127.0.1.1)
;; WHEN: Sat Jan 28 12:41:02 CST 2017
;; MSG SIZE  rcvd: 65
```

NC
nc = netcat which reads and writes the data across the network tcp/ip protocol.

nc jayapachallu.com 80
GET / HTTP/1.0

HTTP/1.1 403 Forbidden
Date: Sun, 29 Jan 2017 04:57:20 GMT
Server: Apache/2.2.31 (Amazon)
Accept-Ranges: bytes
Content-Length: 3839
Connection: close
Content-Type: text/html; charset=UTF-8
//it brought the some data over http

Traceroute

This command displays the route of the packet travelling from the server to your system with increasing TTL value. TTL value tells the number of hops packet passed through.

sachin@cricket:~$ traceroute facebook.com
//* * * shows that our system is not capable of tracing the route because of inefficiency in the hardware.
traceroute to facebook.com (157.240.3.35), 64 hops max
  1   192.168.0.1 1.353ms 1.176ms 1.164ms
  2   * * *
  3   98.156.45.230 26.941ms 25.789ms 36.112ms
  4   98.156.43.120 16.944ms 18.198ms 6.044ms
  5   98.156.42.126 30.696ms 31.850ms 32.104ms

```
  6    66.109.1.216   30.737ms   31.530ms   23.451ms
  7    107.14.17.234  26.245ms   28.085ms   28.466ms
  8    24.27.236.17   27.812ms   22.051ms   27.074ms
  9    204.15.20.129  29.713ms   27.464ms   28.619ms
 10    173.252.67.17  29.572ms   27.766ms   37.280ms
 11    157.240.3.35   36.589ms   25.120ms   29.246ms
```

df
// shows the file system usage, like udev, etc, bin.

```
sachin@cricket:~$ df
Filesystem      1K-blocks      Used  Available Use% Mounted on
udev              4024904         0    4024904   0% /dev
tmpfs              809012      9764     799248   2% /run
/dev/sda9        43302072   7325336  33754044  18% /
tmpfs             4045044       600    4044444   1% /dev/shm
tmpfs                5120         4       5116   1% /run/lock
tmpfs             4045044         0    4045044   0% /sys/fs/cgroup
/dev/sda1          507904     33596     474308   7% /boot/efi
tmpfs              809012        64     808948   1% /run/user/1000
```

du
// displays the file space usage. Usage over files.
It gives large bulk of files.

```
sachin@cricket:~$ du
92   ./Pictures
16   ./bamboohome/logs
24   ./bamboohome
4    ./.nano
8    ./.macromedia/Flash_Player/macromedia.com/support/flashplayer/sy
s/#www.hulu.com
16   ./.macromedia/Flash_Player/macromedia.com/support/flashplayer/sy
s
20   ./.macromedia/Flash_Player/macromedia.com/support/flashplayer
24   ./.macromedia/Flash_Player/macromedia.com/support
28   ./.macromedia/Flash_Player/macromedia.com
12   ./.macromedia/Flash_Player/#SharedObjects/PRXR3SRY/www.hulu.com
16   ./.macromedia/Flash_Player/#SharedObjects/PRXR3SRY
20   ./.macromedia/Flash_Player/#SharedObjects
52   ./.macromedia/Flash_Player
56   ./.macromedia
4    ./Desktop
```

```
lsof
//shows the list of files
it displays the list of files

sachin@cricket:~$ lsof -i
//listening and established files

COMMAND  PID   USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
firefox 2654 sachin   69u  IPv6  71901      0t0  TCP
[2605:6000:3f8c:2400:2d24:dd22:f452:77aa]:58160->dfw25s08-in-
x02.1e100.net:https (ESTABLISHED)
firefox 2654 sachin   73u  IPv4  73103      0t0  TCP
192.168.0.48:47362->104.244.42.193:https (ESTABLISHED)
firefox 2654 sachin   75u  IPv4  72117      0t0  TCP
192.168.0.48:39374->72.21.91.29:http (ESTABLISHED)
firefox 2654 sachin   76u  IPv4  72118      0t0  TCP
192.168.0.48:39376->72.21.91.29:http (ESTABLISHED)

sachin@cricket:~$ lsof -i 4
//IPV4 files only
COMMAND  PID   USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
firefox 2654 sachin   71u  IPv4  74821      0t0  UDP localhost:59735-
>cricket:domain
firefox 2654 sachin   72u  IPv4  73325      0t0  UDP localhost:53364-
>cricket:domain
firefox 2654 sachin   73u  IPv4  73103      0t0  TCP
192.168.0.48:47362->104.244.42.193:https (ESTABLISHED)


Telnet

sachin@cricket:~$ telnet 35.167.76.118 80
// I am testing my port 80 of the above IP


Trying 198.105.244.228...
Connected to  35.167.76.118
Escape character is '^]'.
Get / http/ 1.1
// requested for http
HTTP/1.1 400 Bad Request
Server: nginx
Date: Sat, 28 Jan 2017 19:58:55 GMT
Content-Type: text/html
Content-Length: 166
Connection: close

<html>
<head><title>400 Bad Request</title></head>
```

```
<body bgcolor="white">
<center><h1>400 Bad Request</h1></center>
<hr><center>nginx</center>
</body>
</html>
Connection closed by foreign host.
```

Scp

scp is the the secure copy. As cp copies files from one directory to another directory. Scp copies files from one host to another remote host.

```
[ec2-user@ip-172-31-25-192 ~]$ scp ec2-user@54.203.22.52:/home/ec2-user/tmp ~/home/sachin/assignments/Assignment
The authenticity of host '54.203.22.52 (54.203.22.52)' can't be established.
ECDSA key fingerprint is
94:c7:19:cb:28:da:79:98:d8:54:17:33:fa:dc:6b:14.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '54.203.22.52' (ECDSA) to the list of known hosts.
Permission denied (publickey).
```

Free

As df and du shows the secondary memory details, free shows the primary memory details

```
sachin@cricket:/$ free -m
              total        used        free      shared  buff/cache
available

Mem:           7900        3060        2090         265        2749
4254
Swap:          8107           0        8107
//7900 is available,3060 is used,2090 is free, buffer space is 265
and cache memory is 2749.
so,
Total  free RAM = 7900 -(3060+265+2749)= 1016 is available
```