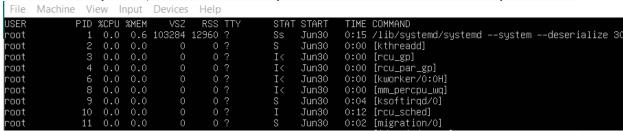
Linux exercise 10-Process management

1. Run command ps aux | less and find descriptions for column titles used in output.



- USER: the user running the process
- **PID:** the process ID
- %CPU: Percentage of CPU usage since the last screen update
- %MEM: percentage of RES memory usage since the last screen update
- VSZ: Is the Virtual Memory Size
- **RSS:** Resident Set Size and is used to show how much memory is allocated to the process
- **TTY:**The terminal.
- STAT: Shows you the current status of the process.
- **START**: Date the process started
- TIME+: total CPU time used since the process started
- COMMAND: the command, as described above
- 2. What is the default delay for top commands screen updates? Change this update time to

0.5 seconds.

Default delay: 3 seconds

```
Help for Interactive Commands – procps-ng UNKNOWN
Window 1:Def: Cumulative mode Off. System: Delay 3.0 secs; Secure mode Off.

Z,B,E,e Global: 'Z' colors; 'B' bold; 'E'/'e' summary/task memory scale
1,t,m Toggle Summary: 'l' load avg; 't' task/cpu stats; 'm' memory info
0,1,2,3,I Toggle: '0' zeros; '1/2/3' cpus or numa node views; 'I' Irix mode
f,F,X Fields: 'f'/F' add/remove/order/sort; 'X' increase fixed-width

L,&,<,> . Locate: 'L'/&' find/again; Move sort column: '<'/>
'L'>' left/right
R,H,J,C . Toggle: 'R' Sort; 'H' Threads; 'J' Num justify; 'C' Coordinates
c,i,S,j Toggle: 'C' Cond name/line; 'l' Idle; 'S' Time; 'j' Str justify
x,y . Toggle highlights: 'x' sort field; 'y' running tasks
z,b . Toggle: 'z' color/mono; 'b' bold/reverse (only if 'x' or 'y')
u,U,o,O . Filter by: 'u'/'U' effective/any user; 'o'/'O' other criteria
n,#,^O . Set: 'n'/#' max tasks displayed; Show: Ctrl+'O' other filter(s)
V,v . Toggle: 'V' forest view; 'v' hide/show forest view children

k,r Manipulate tasks: 'k' kill; 'r' renice
d or s Set update interval
W,Y Write configuration file 'W'; Inspect other output 'Y'
q Quit
(commands shown with ',' require a visible task display window)

Press 'h' or '?' for help with Windows,
Type 'q' or <Esc> to continue
```

```
Help for Interactive Commands – procps-ng UNKNOWN
Window 1:Def: Cumulative mode Off. System: Delay 0.5 secs; Secure mode Off.

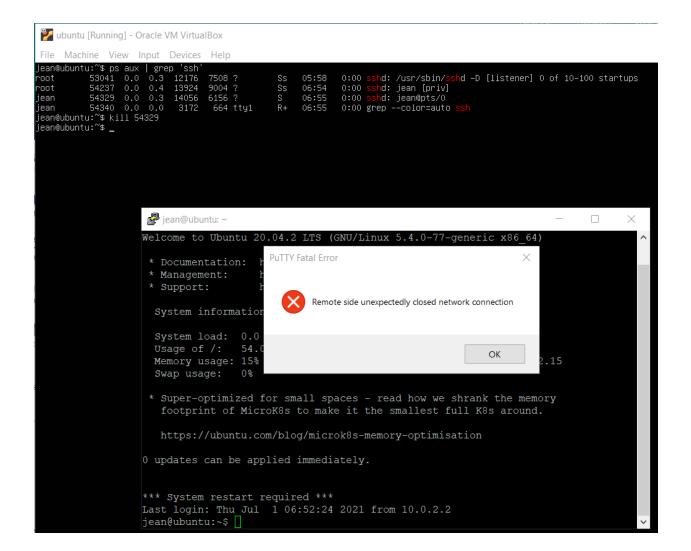
Z,B,E,e Global: 'Z' colors; 'B' bold; 'E'/'e' summary/task memory scale
1,t,m Toggle Summary: 'l' load avg; 't' task/cpu stats; 'm' memory info
0,1,2,3,I Toggle: 'O' zeros; '1/2/3' cpus or numa node views; 'I' Irix mode
f,F,X Fields: 'f'/F' add/remove/order/sort; 'X' increase fixed-width

L,&,<,> . Locate: 'L'/'&' find/again; Move sort column: '<'/'>
L,&,<,> . Locate: 'L'/'&' find/again; Move sort column: '<'/'>
K,H,J,C . Toggle: 'R' Sort; 'H' Threads; 'J' Num justify; 'C' Coordinates
c,i,S,j . Toggle: 'c' Cmd name/line; 'i' Idle; 'S' Time; 'j' Str justify
x,y . Toggle: 'c' Cmd name/line; 'i' Idle; 'S' Time; 'j' Str justify
x,y . Toggle highlights: 'x' sort field; 'y' running tasks
z,b . Toggle: 'z' color/mono; 'b' bold/reverse (only if 'x' or 'y')
u,U,o,O. Filter by: 'u'/'U' effective/any user; 'o'/'O' other criteria
n,#,^O . Set: 'n'/'#' max tasks displayed; Show: Ctrl+'O' other filter(s)
V,v . Toggle: 'V' forest view; 'v' hide/show forest view children

k,r Manipulate tasks: 'K' kill; 'r' renice
d or s Set update interval
W,Y Write configuration file 'W'; Inspect other output 'Y'
q Quit
( commands shown with '.' require a visible task display window )

Press 'h' or '?' for help with Windows,
Type 'q' or <Esc> to continue
```

3. Open another SSH connection to your Ubuntu (for example using Putty) and shutdown this connection using kill command (Tip: use PID of opened SSH connection).



4. Open another SSH connection again to your Ubuntu. Print the tree view of processes when SSH connection has been established. Now shutdown the second SSH connection and print the tree view again. How is SSH connection displayed in tree view on both cases (connection established and connection closed)?

In the first case there is a top level sshd and a pir of other sshds

In the second case there is only the top level sshd

```
jean@ubuntu:~$ pstree
            -accounts-daemon---2*[{accounts-daemon}]
systemd-
            cron
            -dbus-daemon
           -login---bash---sudo---su---bash---su---bash---pstree
-multipathd---6*[{multipathd}]
            networkd-dispat
           -polkitd-2*[{polkitd}]
-rsyslogd-3*[{rsyslogd}]
-snapd-9*[{snapd}]
-sshd-sshd-sshd-bash
            systemd——(sd-pam)
            -systemd-journal
            -systemd–logind
            -systemd-network
            systemd-resolve
            systemd–timesyn-
                                   -{systemd-timesyn}
            -systemd-udevd
            -unattended-upgr----{unattended-upgr}
            -upowerd---2*[{upowerd}]
-uuidd
jean@ubuntu:~$
```

```
jean@ubuntu:~$ ps aux | grep 'ssh'
root 53041 0.0 0.3 12176
root 54486 0.0 0.4 13924
jean 54574 0.0 0.2 14056
jean 54587 0.0 0.0 6300
jean@ubuntu:~$ kill 54574
                                                                                                                       05:58
07:03
07:03
07:04
                                                                                                                                           0:00
0:00
0:00
                                                                                                                                                                                                 nd –D [listener] O of 10–100 startups
root
root
                                                                                                                                                       sshd: jean [priv]
sshd: jean@pts/0
                                                                             9188 ?
                                                                                                                                           0:00 grep --color=auto
 ean@ubuntu:~$ pstree
gystemd——accounts-daemon——2*[{accounts-daemon}]
                    -dbus-daemon
                   —dbus—daemon
—login—bash—sudo—su—bas
—multipathd—6*[{multipathd}]
—networkd–dispat
—polkitd—2*[{polkitd}]
—rsyslogd—3*[{rsyslogd}]
—snapd—9*[{snapd}]
                                                                                                 −su──bash──pstree
                                                                                   bash-
                     -sshd
                   —sshd
—systemd—(sd-pam)
—systemd-journal
—systemd-logind
—systemd-network
—systemd-rimesyn—
—systemd-rimesyn—
                                                            -{systemd-timesyn}
                    -sýstemd-udevdĺ
                    -unattended-upgr---{unat
-upowerd---2*[{upowerd}}]
                                                             −{unattended–upgr}
```

5. Why is SSH displayed in tree view even when there is no SSH client connection open from Putty? Important: In VLE environment you will always have SSH client connection open!

I believe sshd we see after closing the connection is the main listener. It is probably there because we are using virtual machine

6. How can you shutdown SSH connection through top program?

While top is running, type "k" and give the PID of the ssh connection you want to close.