

# Linux exercise 10-Process management

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

File	Machine	View	Input	Devices	Help						
USER		PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root		1	0.0	0.6	103284	12960	?	Ss	Jun30	0:15	/lib/systemd/systemd --system --deserialize 30
root		2	0.0	0.0	0	0	?	S	Jun30	0:00	[kthreadd]
root		3	0.0	0.0	0	0	?	I<	Jun30	0:00	[rcu_gp]
root		4	0.0	0.0	0	0	?	I<	Jun30	0:00	[rcu_par_gp]
root		6	0.0	0.0	0	0	?	I<	Jun30	0:00	[kworker/0:0H]
root		8	0.0	0.0	0	0	?	I<	Jun30	0:00	[mm_percpu_wq]
root		9	0.0	0.0	0	0	?	S	Jun30	0:04	[ksoftirqd/0]
root		10	0.0	0.0	0	0	?	I	Jun30	0:12	[rcu_sched]
root		11	0.0	0.0	0	0	?	S	Jun30	0:02	[migration/0]

- **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
l,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: '<'/'>' left/right
R,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 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

```

```

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R,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
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z,b      . Toggle: 'z' color/mono; 'b' bold/reverse (only if 'x' or 'y')
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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
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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).

The screenshot shows two overlapping terminal windows from an Oracle VM VirtualBox. The top window, titled 'ubuntu [Running] - Oracle VM VirtualBox', displays the output of the command `ps aux | grep 'ssh'`. It lists several processes: `sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups`, `sshd: jean [priv]`, `sshd: jean@pts/0`, and `grep --color=auto ssh`. The bottom window, titled 'jean@ubuntu: ~', shows the output of the `cat /etc/issue` command, displaying Ubuntu 20.04.2 LTS system information. A 'PuTTY Fatal Error' dialog box is overlaid on the bottom window, with the message 'Remote side unexpectedly closed network connection' and an 'OK' button.

```
ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
jean@ubuntu:~$ ps aux | grep 'ssh'
root      53041  0.0  0.3 12176  7508 ?        Ss   05:58   0:00 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
root      54237  0.0  0.4 13924  9004 ?        Ss   06:54   0:00 sshd: jean [priv]
jean      54329  0.0  0.3 14056  6156 ?        S    06:55   0:00 sshd: jean@pts/0
jean      54340  0.0  0.0   3172   664 tty1    R+   06:55   0:00 grep --color=auto ssh
jean@ubuntu:~$ kill 54329
jean@ubuntu:~$ _
```

```
jean@ubuntu: ~
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.4.0-77-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/support

System information

System load:  0.0
Usage of /:   54.0%
Memory usage: 15%
Swap usage:  0%

 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

   https://ubuntu.com/blog/microk8s-memory-optimisation

0 updates can be applied immediately.

*** System restart required ***
Last login: Thu Jul  1 06:52:24 2021 from 10.0.2.2
jean@ubuntu:~$
```

PuTTY Fatal Error  
Remote side unexpectedly closed network connection  
OK

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 pair of other sshds

In the second case there is only the top level sshd

```

jean@ubuntu:~$ pstree
systemd─accounts-daemon─2*[{accounts-daemon}]
        └atd
        └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-udev
        └unattended-upgr─{unattended-upgr}
        └upowerd─2*[{upowerd}]
        └uuidd

jean@ubuntu:~$

```

```

jean@ubuntu:~$ ps aux | grep 'ssh'
root      53041  0.0  0.3 12176  7508 ?        Ss   05:58   0:00 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
root      54486  0.0  0.4 13924  9188 ?        Ss   07:03   0:00 sshd: jean [priv]
jean      54574  0.0  0.2 14056  5536 ?        S    07:03   0:00 sshd: jean@pts/0
jean      54587  0.0  0.0   6300   664 tty1     S+   07:04   0:00 grep --color=auto ssh
jean@ubuntu:~$ kill 54574
jean@ubuntu:~$ pstree
systemd─accounts-daemon─2*[{accounts-daemon}]
        └atd
        └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
        └systemd─(sd-pam)
        └systemd-journal
        └systemd-logind
        └systemd-network
        └systemd-resolve
        └systemd-timesyn─{systemd-timesyn}
        └systemd-udev
        └unattended-upgr─{unattended-upgr}
        └upowerd─2*[{upowerd}]

```

- 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.