

Linux Process Management Commands

This document explains useful Linux commands for monitoring and managing processes, with examples and outputs.



1. View All Processes

Command:

```
ps aux
```

- **a** → show processes for all users
- **u** → show user/owner of process
- **x** → show processes not attached to a terminal

Example Output:

```
angel@angel-VirtualBox:~$ pwd
/home/angel
angel@angel-VirtualBox:~$ ps aux
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.2	0.2	23316	14000	?	Ss	09:16	0:09	/sbin/init splash
root	2	0.0	0.0	0	0	?	S	09:16	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	S	09:16	0:00	[pool_workqueue_release]
root	4	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-rcu_gp]
root	5	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-sync_wq]
root	6	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-kvfree_rcu_reclaim]
root	7	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-slub_flushwq]
root	8	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-netns]
root	11	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/0:0H-kblockd]
root	13	0.0	0.0	0	0	?	I<	09:16	0:00	[kworker/R-mm_percpu_wq]
root	14	0.0	0.0	0	0	?	I	09:16	0:00	[rcu_tasks_kthread]
root	15	0.0	0.0	0	0	?	I	09:16	0:00	[rcu_tasks_rude_kthread]
root	16	0.0	0.0	0	0	?	I	09:16	0:00	[rcu_tasks_trace_kthread]
root	17	0.0	0.0	0	0	?	S	09:16	0:02	[ksoftirqd/0]
root	18	0.6	0.0	0	0	?	I	09:16	0:24	[rcu_preempt]
root	19	0.0	0.0	0	0	?	S	09:16	0:00	[rcu_exp_par_gp_kthread_worker/0]
root	20	0.0	0.0	0	0	?	S	09:16	0:00	[rcu_exp_gp_kthread_worker]
root	21	0.0	0.0	0	0	?	S	09:16	0:00	[migration/0]
root	22	0.0	0.0	0	0	?	S	09:16	0:00	[idle_inject/0]
root	23	0.0	0.0	0	0	?	S	09:16	0:00	[cpuhp/0]
root	24	0.0	0.0	0	0	?	S	09:16	0:00	[cpuhp/1]
root	25	0.0	0.0	0	0	?	S	09:16	0:00	[idle_inject/1]
root	26	0.0	0.0	0	0	?	S	09:16	0:00	[migration/1]
root	27	0.0	0.0	0	0	?	S	09:16	0:02	[ksoftirqd/1]
root	30	0.0	0.0	0	0	?	S	09:16	0:00	[cpuhp/2]
root	31	0.0	0.0	0	0	?	S	09:16	0:00	[idle_inject/2]
root	32	0.0	0.0	0	0	?	S	09:16	0:00	[migration/2]
root	33	0.1	0.0	0	0	?	S	09:16	0:05	[ksoftirqd/2]
root	36	0.0	0.0	0	0	?	S	09:16	0:00	[cpuhp/3]



2. Process Tree

Command:

```
pstree -p
```

Shows parent-child relationships.

Example Output:

```
systemd(1)─NetworkManager(778)
           ├──sshd(895)─sshd(1023)─bash(1024)─pstree(1101)
           ├──mysqld(2001)
           └─python3(1234)
```

```
angel@angel-VirtualBox:~$ pstree -p
systemd(1)─ModemManager(1043)─{ModemManager}(1051)
                        │   │{ModemManager}(1055)
                        │   │{ModemManager}(1060)
                        └─NetworkManager(1351)─{NetworkManager}(1352)
                                │{NetworkManager}(1353)
                                │{NetworkManager}(1354)
                        └─accounts-daemon(951)─{accounts-daemon}(1005)
                                │{accounts-daemon}(1006)
                                │{accounts-daemon}(1008)
                        └─avahi-daemon(925)─avahi-daemon(963)
                        └─colord(1750)─{colord}(1755)
                                │{colord}(1756)
                                │{colord}(1758)
                        └─cron(952)
                        └─cups-browsed(1477)─{cups-browsed}(1489)
                                │{cups-browsed}(1490)
                                │{cups-browsed}(1491)
                        └─cupsd(1174)
                        └─dbus-daemon(926)
                        └─fwupd(11241)─{fwupd}(11292)
                                │{fwupd}(11384)
                                │{fwupd}(11385)
                                │{fwupd}(11386)
                                │{fwupd}(11388)
                        └─gdm3(1599)─gdm-session-wor(2187)─gdm-wayland-ses(2445)─gnome-session-b(2458)─{gnome-session-b}(252+
                                │   │{gnome-session-b}(253+
                                │   │{gnome-session-b}(253+
                                │   │{gdm-wayland-ses}(2449)
                                │   │{gdm-wayland-ses}(2450)
                                │   │{gdm-wayland-ses}(2455)
```

3. Real-Time Monitoring

Command:

```
top
```

Displays live system resource usage.

```
angel@angel-VirtualBox:~$ top

top - 10:28:06 up 1:11, 1 user, load average: 0.22, 0.29, 0.58
Tasks: 230 total, 2 running, 228 sleeping, 0 stopped, 0 zombie
%Cpu(s): 14.4 us, 17.3 sy, 0.1 ni, 65.5 id, 0.1 wa, 0.0 hi, 2.5 si, 0.0 st
MiB Mem : 4943.9 total, 290.4 free, 2093.7 used, 2588.1 buff/cache
MiB Swap: 4096.0 total, 4096.0 free, 0.0 used, 2850.2 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR S %CPU  %MEM    TIME+  COMMAND
 2652 angel      20   0 5189908 486908 159300 S 42.4   9.6   27:14.19 gnome-shell
 13171 angel      20   0 3826388 234892 115976 R 37.7   4.6   0:01.14 gnome-character
13167 angel      20   0 1012392 51788 40396 S 18.9   1.0   0:00.57 nautilus
13173 angel      20   0 566008 49024 32336 S 16.2   1.0   0:00.49 gnome-clocks
 2380 angel      20   0 11484 6980 4452 S 8.6    0.1   0:05.77 dbus-daemon
13177 angel      20   0 498992 30220 23308 S 7.9    0.6   0:00.24 gnome-control-c
13169 angel      20   0 527024 17168 15248 S 3.0    0.3   0:00.09 gnome-calculato
 18 root        20   0 0 0 0 I 2.0    0.0   0:25.28 rcu_preempt
 3500 angel      20   0 701604 14272 11584 S 1.7    0.3   0:01.32 xdg-desktop-por
 2853 angel      20   0 388848 12152 6844 S 1.3    0.2   0:29.95 ibus-daemon
12847 root        20   0 0 0 0 I 1.3    0.0   0:01.09 kworker/u16:3-events_unbound
 267 root        19  -1 50848 17616 16336 S 1.0    0.3   0:02.22 systemd-journal
12803 angel      20   0 2876048 61880 46992 S 1.0    1.2   0:01.13 gjs
 1 root        20   0 23316 14000 9264 S 0.7    0.3   0:09.91 systemd
 988 syslog      20   0 222564 5844 4436 S 0.7    0.1   0:00.64 rsyslogd
2382 angel      20   0 316936 9952 8928 S 0.7    0.2   0:00.46 gnome-keyring-d
2556 angel      20   0 314268 7768 7128 S 0.7    0.2   0:00.34 gvfsd
3109 angel      20   0 389376 7796 6900 S 0.7    0.2   0:01.03 gvfs-afc-volume
3179 angel      20   0 236768 7292 6780 S 0.7    0.1   0:09.69 ibus-engine-sim
3526 angel      20   0 909136 41080 31096 S 0.7    0.8   0:00.99 xdg-desktop-por
10005 angel      20   0 11.4g 636020 239336 S 0.7   12.6   4:39.72 firefox
11134 angel      20   0 626024 56872 45412 S 0.7    1.1   0:06.17 gnome-terminal-
```

Example Output:

```
top - 10:20:51 up 2 days, 3:12, 2 users, load average: 0.22, 0.33, 0.45
Tasks: 197 total, 1 running, 196 sleeping, 0 stopped, 0 zombie
%Cpu(s): 12.3 us, 5.4 sy, 0.0 ni, 80.1 id, 2.2 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem : 8045632 total, 3564980 free, 1876324 used, 2604328 buff/cache

  PID  USER      PR  NI  VIRT  RES  SHR S %CPU  %MEM    TIME+  COMMAND
 1234 vibhu      20   0 274532 15632 7892 R 45.0   1.5   0:12.34 python3
 2001 mysql      20   0 450000 20988 7564 S 25.0   2.0   1:02.11 mysqld
```

👉 Press **q** to quit.

⚡ 4. Adjust Process Priority

Start process with low priority:

```
nice -n 10 sleep 300 &
```

Output:

```
[1] 13749
```

👉 Process with PID **13749** runs with nice value 10.

Change priority:

```
renice -n -5 -p 13749
```

Output:

```
13749 (process ID) old priority 10, new priority -5
```

```
angel@angel-VirtualBox:~$ nice -n 10 sleep 300 &  
[1] 13749  
angel@angel-VirtualBox:~$ sudo renice -n -5 -p 13749  
13749 (process ID) old priority 10, new priority -5  
angel@angel-VirtualBox:~$
```

5. CPU Affinity

Show which CPUs process can use:

```
taskset -cp 3050
```

Output:

```
pid 3050's current affinity list: 0-3
```

Restrict to core 1:

```
taskset -cp 1 3050
```

Output:

```
pid 3050's current affinity list: 1
```

6. I/O Scheduling Priority

```
ionice -c 3 -p 3050
```

Output:

```
successfully set pid 3050's IO scheduling class to idle
```

☞ Class 3 = only gets I/O when system is idle.
