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5724dde · 1 minute ago



170 lines (137 loc) · 5.06 KB

Linux Process Management Commands

This document explains various Linux commands to manage and monitor processes.



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

Example Output:

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME
COMMAND									
root	1	0.0	0.1	167500	1100	?	Ss	Sep25	0:05
				/sbin/init					
vibhu	1234	1.2	1.5	274532	15632	?	S1	10:15	0:12
				/usr/bin/python3	script.py				
mysql	2001	0.5	2.0	450000	20988	?	Ssl	Sep25	1:02
				/usr/sbin/mysqld					

```
vboxuser@sehajpreet:~$ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root      1  4.5  0.1 23500 14408 ?        Ss  08:52  0:03 /sbin/init splash
root      2  0.0  0.0     0    0 ?        S     08:52  0:00 [kthreadd]
root      3  0.0  0.0     0    0 ?        S     08:52  0:00 [pool_workqueue_release]
root      4  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-rcu_gp]
root      5  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-sync_wq]
root      6  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-kvfree_rcu_reclaim]
root      7  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-slab_flushwq]
root      8  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-netns]
root      9  0.0  0.0     0    0 ?        I     08:52  0:00 [kworker/0:0-events]
root     10  0.0  0.0     0    0 ?        I     08:52  0:00 [kworker/0:1-cgroup_destroy]
root     11  0.1  0.0     0    0 ?        I<  08:52  0:00 [kworker/0:0H-kblockd]
root     12  1.1  0.0     0    0 ?        I     08:52  0:01 [kworker/u16:0-loop7]
root     13  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/R-mm_percpu_wq]
root     14  0.0  0.0     0    0 ?        I     08:52  0:00 [rcu_tasks_kthread]
root     15  0.0  0.0     0    0 ?        I     08:52  0:00 [rcu_tasks_rude_kthread]
root     16  0.0  0.0     0    0 ?        I     08:52  0:00 [rcu_tasks_trace_kthread]
root     17  0.1  0.0     0    0 ?        S     08:52  0:00 [ksoftirqd/0]
root     18  1.1  0.0     0    0 ?        I     08:52  0:00 [rcu_preempt]
root     19  0.0  0.0     0    0 ?        S     08:52  0:00 [rcu_exp_par_gp_kthread_worker/0]
root     20  0.2  0.0     0    0 ?        S     08:52  0:00 [rcu_exp_gp_kthread_worker]
root     21  0.0  0.0     0    0 ?        S     08:52  0:00 [migration/0]
root     22  0.0  0.0     0    0 ?        S     08:52  0:00 [idle_inject/0]
root     23  0.0  0.0     0    0 ?        S     08:52  0:00 [cpuhp/0]
root     24  0.0  0.0     0    0 ?        S     08:52  0:00 [cpuhp/1]
root     25  0.0  0.0     0    0 ?        S     08:52  0:00 [idle_inject/1]
root     26  1.6  0.0     0    0 ?        S     08:52  0:01 [migration/1]
root     27  0.4  0.0     0    0 ?        S     08:52  0:00 [ksoftirqd/1]
root     28  0.0  0.0     0    0 ?        I     08:52  0:00 [kworker/1:0-events]
root     29  0.0  0.0     0    0 ?        I<  08:52  0:00 [kworker/1:0H-events_highpri]
root     30  0.0  0.0     0    0 ?        S     08:52  0:00 [cpuhp/2]
```

```
vboxuser@sehajpreet:~$ ps aux
vboxuser  2403  5.1  0.3 421524 29480 ?        Sl  08:53  0:02 /usr/libexec/ibus-extension-gtk3
vboxuser  2408  0.1  0.0 310424 7048 ?        Sl  08:53  0:00 /usr/libexec/ibus-portal
vboxuser  2428  0.1  0.1 416236 15020 ?        Sl  08:53  0:00 /usr/libexec/gsd-printer
vboxuser  2468  0.1  0.0 309792 6416 ?        Ssl 08:53  0:00 /usr/libexec/gvfs-mtp-volume-monitor
vboxuser  2494  0.2  0.2 546660 23928 ?        Sl  08:53  0:00 /usr/libexec/goa-daemon
vboxuser  2497  0.1  0.0 310760 6844 ?        Ssl 08:53  0:00 /usr/libexec/gvfs-ghoto2-volume-monitor
vboxuser  2507  0.0  0.0 309772 6228 ?        Ssl 08:53  0:00 /usr/libexec/gvfs-goa-volume-monitor
vboxuser  2519  0.0  0.1 389124 9040 ?        Sl  08:53  0:00 /usr/libexec/goa-identity-service
vboxuser  2527  0.0  0.0 389376 7892 ?        Ssl 08:53  0:00 /usr/libexec/gvfs-afc-volume-monitor
vboxuser  2529  0.5  0.2 890732 24124 ?        Ssl 08:53  0:00 /usr/libexec/evolution-calendar-factory
vboxuser  2535  0.6  0.8 260460 71176 ?        S     08:53  0:00 /usr/bin/Xwayland :0 -rootless -noreset -accessx -cor
vboxuser  2549  0.5  0.3 825308 29760 ?        Ssl 08:53  0:00 /usr/libexec/evolution-addressbook-factory
vboxuser  2576  0.0  0.0 230108 5552 ?        Ssl 08:53  0:00 /usr/libexec/dconf-service
vboxuser  2579  0.0  0.0 236768 6976 ?        Sl  08:53  0:00 /usr/libexec/ibus-engine-simple
vboxuser  2607  0.1  0.1 609440 8956 ?        Sl  08:53  0:00 /usr/libexec/gvfsd-trash :1.20 /org/gtk/gvfs
vboxuser  2631  0.5  0.1 39136 11676 ?        Ss  08:53  0:00 /snap/snapd-desktop-integration/315/usr/bin/snapd-des
vboxuser  2655  1.6  0.7 2941464 61536 ?        Sl  08:53  0:00 gjs /usr/share/gnome-shell/extensions/ding@rastersoft
vboxuser  2686  0.5  1.0 640840 83084 ?        Ssl 08:53  0:00 /usr/libexec/gsd-xsettings
vboxuser  2769  0.8  0.3 429620 30760 ?        Sl  08:53  0:00 /snap/snapd-desktop-integration/315/usr/bin/snapd-des
vboxuser  2787  0.2  0.3 2597064 26912 ?        Sl  08:53  0:00 /usr/bin/gjs -m /usr/share/gnome-shell/org.gnome.Scre
vboxuser  2812  0.3  0.1 701608 13916 ?        Ssl 08:53  0:00 /usr/libexec/xdg-desktop-portal
vboxuser  2821  0.2  0.3 267136 24520 ?        Sl  08:53  0:00 /usr/libexec/ibus-x11
vboxuser  2823  1.0  0.3 734596 27496 ?        SNSl 08:53  0:00 /usr/libexec/tracker-miner-fs-3
vboxuser  2824  0.4  0.5 556868 40984 ?        Ssl 08:53  0:00 /usr/libexec/xdg-desktop-portal-gnome
vboxuser  2825  0.5  1.2 1412600 101572 ?        Sl  08:53  0:00 /usr/libexec/mutter-x11-frames
vboxuser  2827  0.0  0.0 236268 6096 ?        Ssl 08:53  0:00 /usr/libexec/gvfsd-metadata
vboxuser  2879  0.4  0.3 417856 25680 ?        Ssl 08:53  0:00 /usr/libexec/xdg-desktop-portal-gtk
vboxuser  2923  3.4  0.6 698568 55636 ?        Ssl 08:53  0:01 /usr/libexec/gnome-terminal-server
vboxuser  2930  0.1  0.0 11020 4956 pts/0       Ss  08:53  0:00 bash
root     2964  0.0  0.0     0    0 ?        I     08:53  0:00 [kworker/2:3-cgroup_destroy]
vboxuser  2994  150  0.0 13616 4508 pts/0       R+  08:54  0:00 ps aux
```

2. Process Tree: pstree -p

Shows parent-child process relationships.

Example Output:

```
systemd(1)─ NetworkManager(778)
              └─ sshd(895)─ sshd(1023)─ bash(1024)─ pstree(1101)
```

```

└─mysql(2001)
└─python3(1234)

```

```
vboxuser@sehajpreet:~$ pstree -p
systemd(1) └─ModemManager(952) └─{ModemManager}(985)
              └─{ModemManager}(990)
              └─{ModemManager}(994)
NetworkManager(872) └─{NetworkManager}(981)
                      └─{NetworkManager}(983)
                      └─{NetworkManager}(987)
accounts-daemon(809) └─{accounts-daemon}(843)
                      └─{accounts-daemon}(844)
                      └─{accounts-daemon}(855)
anydesk(1148) └─{anydesk}(1212)
                └─{anydesk}(1213)
                └─{anydesk}(1214)
                └─{anydesk}(1245)
                └─{anydesk}(2871)
                └─{anydesk}(2874)
avahi-daemon(778) └─avahi-daemon(871)
colord(1516) └─{colord}(1521)
                └─{colord}(1522)
                └─{colord}(1524)
cron(818)
cups-browsed(1165) └─{cups-browsed}(1218)
                      └─{cups-browsed}(1220)
                      └─{cups-browsed}(1221)
cupsd(1135) └─dbus(1156)
dbus-daemon(779)
edje(1172) └─edje-session-wm(1876) └─adm_wmiled_ses(1966) └─gnome-session-b1706
vboxuser@sehajpreet:~$
```



3. Real-Time Monitoring: top

Displays real-time CPU/memory usage.

Example Output:

```

top - 10:40:46 up 22 min, 1 user, load average: 0.22, 0.38, 0.27
Tasks: 211 total, 1 running, 210 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.1 us, 0.3 sy, 0.0 ni, 99.5 id, 0.0 wa, 0.0 hi, 0.1 si,
0.0 st
MiB Mem : 5776.9 total, 2161.6 free, 1138.6 used, 2799.3

```

buff/cache

MiB Swap:	0.0 total,	0.0 free,	0.0 used.	4638.2 avail
Mem				

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+
COMMAND										
1992	sameerb+	20	0	4967692	411396	141592	S	3.6	7.0	0:59.64
	gnome-s+									
12065	sameerb+	20	0	553448	52396	42096	S	0.5	0.9	0:00.63
	gnome-t+									
1394	root	20	0	316824	8788	7380	S	0.3	0.1	0:00.39
	upowerd									
2568	sameerb+	20	0	2947568	67764	51612	S	0.3	1.1	0:01.47 gjs
11299	root	20	0	0	0	0	I	0.3	0.0	0:01.92
	kworker+									
12078	sameerb+	20	0	14500	5924	3748	R	0.3	0.1	0:00.06 top
1	root	20	0	23212	14144	9664	S	0.0	0.2	0:09.05
	systemd									
2	root	20	0	0	0	0	S	0.0	0.0	0:00.02
	kthreadd									
3	root	20	0	0	0	0	I	0.0	0.0	0:00.00
	pool_wo+									
4	root	20	0	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
10	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
11	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									
13	root	0	-20	0	0	0	I	0.0	0.0	0:00.00
	kworker+									

👉 Press q to quit.

```
vboxuser@sehajpreet:~$ top

top - 08:59:09 up 6 min, 1 user, load average: 0.09, 0.46, 0.32
Tasks: 211 total, 1 running, 210 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.7 us, 2.8 sy, 0.0 nt, 93.2 id, 0.0 wa, 0.0 hi, 3.3 st, 0.0 st
MiB Mem : 7941.9 total, 6049.3 free, 1143.2 used, 1023.7 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 6798.7 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
 2136 vboxuser  20   0 4767112 398712 147428 S 17.3  4.9  0:25.68 gnome-shell
    47 root      20   0      0      0 I  1.3  0.0  0:00.16 kworker/u16:1-events_power_efficient
 2923 vboxuser  20   0 699128 56276 45040 S  1.0  0.7  0:04.02 gnome-terminal-
    78 root      20   0      0      0 I  0.7  0.0  0:00.13 kworker/u16:5-ipv6_addrconf
1143 root      20   0 1254028 35584 23168 S  0.7  0.4  0:02.19 tailscaled
3067 vboxuser  20   0 14516 5828 3652 R  0.7  0.1  0:00.06 top
1558 root      20   0 316760 9008 7600 S  0.3  0.1  0:00.36 upowerd
    1 root      20   0 23500 14408 9416 S  0.0  0.2  0:03.89 systemd
    2 root      20   0      0      0 S  0.0  0.0  0:00.03 kthreadd
    3 root      20   0      0      0 S  0.0  0.0  0:00.00 pool_workqueue_release
    4 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-rcu_gp
    5 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-sync_wq
    6 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-kvfree_rcu_reclaim
    7 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-slub_flushwq
    8 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-netns
   10 root      20   0      0      0 I  0.0  0.0  0:00.07 kworker/0:1-cgroup_destroy
   11 root      0 -20      0      0 I  0.0  0.0  0:00.11 kworker/0:0H-kblockd
   13 root      0 -20      0      0 I  0.0  0.0  0:00.00 kworker/R-mm_percpu_wq
   14 root      20   0      0      0 I  0.0  0.0  0:00.00 rcu_tasks_kthread
   15 root      20   0      0      0 I  0.0  0.0  0:00.00 rcu_tasks_rude_kthread
ShowApps 3050  20   0      0      0 I  0.0  0.0  0:00.00 rcu_tasks_trace_kthread
   17 root      20   0      0      0 S  0.0  0.0  0:00.14 ksoftirqd/0
```

⚡ 4. Adjust Process Priority

- Start process with low priority:

```
nice -n 10 sleep 300 &
[1] 3050
```



- Change priority of running process:

```
renice -n -5 -p 3050
3050 (process ID) old priority 10, new priority -5
```



🔧 5. CPU Affinity: taskset

- Show affinity:

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



- Restrict to core 1 only:

```
taskset -cp 1 3050  
pid 3050's current affinity list: 1
```

📁 6. I/O Scheduling Priority: ionice

```
ionice -c 3 -p 3050  
successfully set pid 3050's IO scheduling class to idle
```

👉 Class 3 (idle) → Process only gets I/O when system is idle.

📄 7. File Descriptors: lsof

```
sleep 3347 vboxuser cwd DIR 8,2 4096 3407874 /home/vboxuser  
sleep 3347 vboxuser rtd DIR 8,2 4096 2 /  
sleep 3347 vboxuser txt REG 8,2 35336 275947 /usr/bin/sleep  
sleep 3347 vboxuser mem REG 8,2 5719296 278970 /usr/lib/locale-archi
```

🐛 8. Trace System Calls: strace

```
strace -p 3347  
strace: Process 3347 attached  
restart_syscall(<... resuming interrupted nanosleep ...>) = 0  
nanosleep({tv_sec=300, tv_nsec=0}, 0x7ffd4a60d8b0) = ?  
RESTART_RESTARTBLOCK (Interrupted by signal)
```

📡 9. Find Process Using a Port: fuser

```
sudo fuser -n tcp 8080  
8080/tcp: 4321
```



10. Per-Process Stats: pidstat

```
pidstat -p 3347 2 3
```



```
linux 6.14.0-33-generic (sehajpreet) 11/01/2025      _x86_64      (4 cpu)
```

```
09:21:21 AM  UID  PID  %usr  %system  %guest  %wait  %CPU  command
```



11. Control Groups (cgroups)

- Create new cgroup:

```
sudo cgcreate -g cpu,memory:/testgroup
```



- Limit CPU and Memory:

```
echo 50000 | sudo tee /sys/fs/cgroup/cpu/testgroup/cpu.cfs_quota_us  
echo 100M   | sudo tee /sys/fs/cgroup/memory/testgroup/memory.limit_in_bytes
```



- Add a process (PID 3050) to cgroup:

```
echo 3050 | sudo tee /sys/fs/cgroup/cpu/testgroup/cgroup.procs
```



```
vboxuser@sehajpreet:~$ nice -n 10 sleep 300 &
[2] 3347
vboxuser@sehajpreet:~$ renice -n -5 -p 3347
renice: failed to set priority for 3347 (process ID): Permission denied
vboxuser@sehajpreet:~$ taskset -cp 3347
pid 3347's current affinity list: 0-3
vboxuser@sehajpreet:~$ taskset -cp 1 3347
pid 3347's current affinity list: 0-3
pid 3347's new affinity list: 1
vboxuser@sehajpreet:~$ ionice -c 3 -p 3347
vboxuser@sehajpreet:~$ lsop -p 3347 | head -5
Command 'lsop' not found, did you mean:
  command 'lsof' from deb lsof (4.95.0-1)
  command 'lzop' from deb lzop (1.04-2build2)
  command 'slop' from deb slop (7.6-4build1)
  command 'lscp' from deb nilfs-tools (2.2.9-1)
Try: sudo apt install <deb name>
vboxuser@sehajpreet:~$ sudo apt install <deb name>
bash: syntax error near unexpected token 'newline'
[1]- Done           nice -n 10 sleep 300

vboxuser@sehajpreet:~$ lsof -p 3347 | head -5
COMMAND  PID    USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
sleep  3347  vboxuser cwd DIR    8,2      4096 1441794 /home/vboxuser
sleep  3347  vboxuser rtd DIR    8,2      4096        2 /
sleep  3347  vboxuser txt REG    8,2     35336 526705 /usr/bin/sleep
sleep  3347  vboxuser mem REG    8,2    5719296 524368 /usr/lib/locale/locale-archive
vboxuser@sehajpreet:~$ strace -p 3347
strace: attach: ptrace(PTRACE_SEIZE, 3347): Operation not permitted
vboxuser@sehajpreet:~$ sudo fuser -n tcp 8080
[2]+ Done           nice -n 10 sleep 300
vboxuser@sehajpreet:~$ pidstat -p 3347 2 3
Linux 6.14.0-33-generic (sehajpreet) 11/01/2025 _x86_64_ (4 CPU)

09:21:21 AM   UID      PID    %usr %system  %guest   %wait    %CPU    CPU  Command
vboxuser@sehajpreet:~$
```