

Linux Practice - Process and Services

Command: ps -ef | head

Observation: PID 1 is systemd, which is the parent of all user-space processes.

```
ubuntu@ip-172-31-13-238:~$ ps -ef | head
UID      PID  PPID  C STIME TTY          TIME CMD
root      1     0  0 Jan27 ?        00:00:07 /usr/lib/systemd/systemd --system --deserialize=123
root      2     0  0 Jan27 ?        00:00:00 [kthreadd]
root      3     2  0 Jan27 ?        00:00:00 [pool_workqueue_release]
root      4     2  0 Jan27 ?        00:00:00 [kworker/R-rcu_gp]
root      5     2  0 Jan27 ?        00:00:00 [kworker/R-sync_wq]
root      6     2  0 Jan27 ?        00:00:00 [kworker/R-kvfree_rcu_reclaim]
root      7     2  0 Jan27 ?        00:00:00 [kworker/R-slub_flushwq]
root      8     2  0 Jan27 ?        00:00:00 [kworker/R-netns]
root     10     2  0 Jan27 ?        00:00:00 [kworker/0:0H-events_highpri]
```

Command: top

Observation: System load average is 0.00 and CPU is 100% idle. No high CPU-consuming processes were observed.

```
ubuntu@ip-172-31-13-238:~$ top
top - 17:31:30 up 2 days, 6:08, 3 users, load average: 0.00, 0.00, 0.00
Tasks: 123 total, 1 running, 122 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.2 us, 0.0 sy, 0.0 ni, 99.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 914.2 total, 248.3 free, 428.5 used, 404.9 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used.. 485.7 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
 1 root 20 0 22732 14224 9756 S 0.0 1.5 0:07.69 systemd
 2 root 20 0 0 0 0 S 0.0 0.0 0.0 0:00.04 kthreadd
 3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 pool_workqueue_release
 4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-rcu_gp
 5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-sync_wq
 6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-kvfree_rcu_reclaim
 7 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-slub_flushwq
 8 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-netns
 10 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/0:0H-events_highpri
 13 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-mm_percpu_wq
 14 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rCU_tasks_rude_kthread
 15 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rCU_tasks_trace_kthread
 16 root 20 0 0 0 0 S 0.0 0.0 0:00.17 ksoftirqd/0
 17 root 20 0 0 0 0 I 0.0 0.0 0:03.42 rCU_sched
 18 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rCU_exp_par_gp_kthread_worker/0
 19 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rCU_exp_gp_kthread_worker
 20 root rt 0 0 0 0 S 0.0 0.0 0:00.93 migration/0
 21 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/0
 22 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
 23 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/1
 24 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/1
 25 root rt 0 0 0 0 S 0.0 0.0 0:00.85 migration/1
 26 root 20 0 0 0 0 S 0.0 0.0 0:00.17 ksoftirqd/1
 28 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/1:0H-events_highpri
 29 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtmpfs
 30 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-inet_frag_wq
 31 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kaudited
```

Command: pgrep sshd

Observation: It searches for **running processes** and returns their **PID(s)** (Process ID).

```
ubuntu@ip-172-31-13-238:~$ pgrep sshd
4406
9186
9323
9555
9691
```

Command: systemctl list-units --type=service --state=running | head

Observation: Identified active systemd services like cron, ssh, docker, and containerd running on the system.

```
ubuntu@ip-172-31-13-238:~$ systemctl list-units --type=service --state=running | head
UNIT                                     LOAD  ACTIVE SUB   DESCRIPTION
acpid.service                            loaded  active  running ACPI event daemon
chrony.service                           loaded  active  running chrony, an NTP client/server
containerd.service                      loaded  active  running container runtime
cron.service                             loaded  active  running Regular background program processing daemon
dbus.service                            loaded  active  running D-Bus System Message Bus
docker.service                          loaded  active  running Docker Application Container Engine
fwupd.service                           loaded  active  running Firmware update daemon
getty@tty1.service                      loaded  active  running Getty on tty1
irqbalance.service                     loaded  active  running irqbalance daemon
ubuntu@ip-172-31-13-238:~$ |
```

Command: systemctl status cron

Observation: cron service is enabled and running. Recent logs show hourly cron jobs executing successfully.

```
ubuntu@ip-172-31-13-238:~$ systemctl status cron
● cron.service - Regular background program processing daemon
  Loaded: loaded (/usr/lib/systemd/system/cron.service; enabled; preset: enabled)
  Active: active (running) since Tue 2026-01-27 11:22:56 UTC; 2 days ago
    Docs: man:cron(8)
   Main PID: 579 (cron)
      Tasks: 1 (limit: 1008)
     Memory: 1.4M (peak: 4.2M)
        CPU: 5.594s
       CGroup: /system.slice/cron.service
               └─579 /usr/sbin/cron -f -P

Jan 29 17:15:01 ip-172-31-13-238 CRON[9545]: pam_unix(cron:session): session closed for user root
Jan 29 17:17:01 ip-172-31-13-238 CRON[9548]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:17:01 ip-172-31-13-238 CRON[9549]: (root) CMD (cd / && run-parts --report /etc/cron.hourly)
Jan 29 17:17:01 ip-172-31-13-238 CRON[9548]: pam_unix(cron:session): session closed for user root
Jan 29 17:25:01 ip-172-31-13-238 CRON[9703]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:25:01 ip-172-31-13-238 CRON[9704]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
Jan 29 17:25:01 ip-172-31-13-238 CRON[9703]: pam_unix(cron:session): session closed for user root
Jan 29 17:35:01 ip-172-31-13-238 CRON[9716]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:35:01 ip-172-31-13-238 CRON[9717]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
Jan 29 17:35:01 ip-172-31-13-238 CRON[9716]: pam_unix(cron:session): session closed for user root
ubuntu@ip-172-31-13-238:~|
```

Command: journalctl -u cron

Observation: Cron logs show regular execution of scheduled jobs with no errors.

```
ubuntu@ip-172-31-13-238:~$ journalctl -u cron --no-pager | tail -n 10
Jan 29 17:17:01 ip-172-31-13-238 CRON[9548]: pam_unix(cron:session): session closed for user root
Jan 29 17:25:01 ip-172-31-13-238 CRON[9703]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:25:01 ip-172-31-13-238 CRON[9704]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
Jan 29 17:25:01 ip-172-31-13-238 CRON[9703]: pam_unix(cron:session): session closed for user root
Jan 29 17:35:01 ip-172-31-13-238 CRON[9716]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:35:01 ip-172-31-13-238 CRON[9717]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
Jan 29 17:35:01 ip-172-31-13-238 CRON[9716]: pam_unix(cron:session): session closed for user root
Jan 29 17:45:01 ip-172-31-13-238 CRON[9732]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Jan 29 17:45:01 ip-172-31-13-238 CRON[9733]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
Jan 29 17:45:01 ip-172-31-13-238 CRON[9732]: pam_unix(cron:session): session closed for user root
```

Command: tail -n 20 /var/log/syslog

Observation: System logs show normal cron and sysstat activity. Noticed amazon-ssm-agent errors due to missing EC2 IAM role configuration

```
ubuntu@ip-172-31-13-238:~$ tail -n 20 /var/log/syslog
2026-01-29T17:10:02.430398+00:00 ip-172-31-13-238 systemd[1]: sysstat-collect.service: Deactivated successfully.
2026-01-29T17:10:02.430691+00:00 ip-172-31-13-238 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2026-01-29T17:15:01.785676+00:00 ip-172-31-13-238 CRON[9546]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
2026-01-29T17:17:01.823372+00:00 ip-172-31-13-238 CRON[9549]: (root) CMD (cd / && run-parts --report /etc/cron.hourly)
2026-01-29T17:20:02.423577+00:00 ip-172-31-13-238 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2026-01-29T17:20:02.422083+00:00 ip-172-31-13-238 systemd[1]: sysstat-collect.service: Deactivated successfully.
2026-01-29T17:20:02.423296+00:00 ip-172-31-13-238 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2026-01-29T17:23:31.418163+00:00 ip-172-31-13-238 systemd[1]: Started session-396.scope - Session 396 of User ubuntu.
2026-01-29T17:30:01.833091+00:00 ip-172-31-13-238 CRON[9704]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
2026-01-29T17:30:02.422531+00:00 ip-172-31-13-238 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2026-01-29T17:30:02.462993+00:00 ip-172-31-13-238 systemd[1]: sysstat-collect.service: Deactivated successfully.
2026-01-29T17:30:02.463236+00:00 ip-172-31-13-238 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2026-01-29T17:32:17.235317+00:00 ip-172-31-13-238 amazon-ssm-agent.amazon-ssm-agent[592]: 2026-01-29 17:32:17.2346 WARN EC2RoleProvider Failed to connect to Systems Manager with instance profile role credentials. Err: retrieved credentials failed to report to ssm. Error: EC2RoleRequestError: no EC2 instance role found
2026-01-29T17:32:17.335588+00:00 ip-172-31-13-238 amazon-ssm-agent.amazon-ssm-agent[592]: 2026-01-29 17:32:17.2712 ERROR EC2RoleProvider Failed to connect to Systems Manager with SSM role credentials. error calling RequestManagedInstanceRoleToken: AccessDeniedException: Systems Manager's instance management role is not configured for account: 920398711465
2026-01-29T17:32:17.335690+00:00 ip-172-31-13-238 amazon-ssm-agent.amazon-ssm-agent[592]: #011status code: 400, request id: f6c3297f-45f8-471b-8fe7-2b632fb05c48
2026-01-29T17:35:01.854362+00:00 ip-172-31-13-238 CRON[9717]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
2026-01-29T17:40:02.428824+00:00 ip-172-31-13-238 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2026-01-29T17:40:02.435873+00:00 ip-172-31-13-238 systemd[1]: sysstat-collect.service: Deactivated successfully.
2026-01-29T17:40:02.436247+00:00 ip-172-31-13-238 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2026-01-29T17:45:01.867805+00:00 ip-172-31-13-238 CRON[9733]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1)
ubuntu@ip-172-31-13-238:~$
```

Command: systemctl restart cron

Observation: cron service restarted successfully and is running with a new PID.

```
ubuntu@ip-172-31-13-238:~$ sudo systemctl restart cron
ubuntu@ip-172-31-13-238:~$ sudo systemctl status cron
● cron.service - Regular background program processing daemon
   Loaded: loaded (/usr/lib/systemd/system/cron.service; enabled; preset: enabled)
   Active: active (running) since Thu 2026-01-29 17:51:00 UTC; 1s ago
     Docs: man:cron(8)
 Main PID: 9772 (cron)
   Tasks: 1 (limit: 1008)
    Memory: 352.0K (peak: 584.0K)
      CPU: 3ms
     CGroup: /system.slice/cron.service
             └─9772 /usr/sbin/cron -f -p

Jan 29 17:51:00 ip-172-31-13-238 systemd[1]: Started cron.service - Regular background program processing daemon.
Jan 29 17:51:00 ip-172-31-13-238 (cron)[9772]: cron.service: Referenced but unset environment variable evaluates to an empty string: EXTRA_OPTS
Jan 29 17:51:00 ip-172-31-13-238 cron[9772]: (CRON) INFO (pidfile fd = 3)
Jan 29 17:51:00 ip-172-31-13-238 cron[9772]: (CRON) INFO (Skipping @reboot jobs -- not system startup)
ubuntu@ip-172-31-13-238:~$ |
```