ps List processes

CONCEPTS

ps takes UNIX options (-ef, with a dash) and BSD options (aux, no dash). They differ in meaning: ps -aux is not ps aux.

Select -e -u -p -C --ppid
↓ which rows
Format -f u -o <cols>
↓ which columns
Sort --sort=-%cpu
↓ order
Filter | grep, | head

ps is a snapshot. For a live view use top; to act on a result, feed the PID to kill.

SELECT PROCESSES

ps
Your processes on this terminal

ps -e / ps -A
All processes

ps -u *<user>*
By effective user

ps -p *<pid>*[,*<pid>*]
By PID

ps -C *<name>*
By exact command name

ps --ppid *<pid>*
Children of a process

ps -t *<tty>*
By terminal

ps -U *<user>*
By real user

ps -N -u *<user>*
Negate the selection

ps -q *<pid>*
Quick lookup, no scan

ps r
Only running processes

ps x
Include processes without a tty

OUTPUT FORMATS

ps aux
BSD user-oriented, all

ps -ef
UNIX full format, all

ps -f
Full format (UID, PPID, args)

OUTPUT FORMATS (cont.)

ps -l
Long format (nice, state, size)

ps -F
Extra full (adds RSS, CPU id)

ps -j
Job format (PGID, SID)

ps -w / ps ww
Do not truncate long lines

ps --no-headers
Drop the header line

ps e
Append the environment

CUSTOM COLUMNS AND SORTING

ps -eo pid,ppid,user,%cpu,%mem,cmd
Choose your own columns

ps -o pid=,cmd= -p *<pid>*
Column without header

ps -O *<cols>*
Default columns plus extras

ps L
List all output column names

ps --sort=-%cpu
Highest CPU first

ps --sort=-rss
Largest resident memory first

ps --sort=*<key>*,-*<key>*
Multi-key sort

ps -eo pid,lstart,etime,cmd
Start time and uptime

ps -eo pid,etimes,cmd
Elapsed time in seconds

ps -eo pid,stat,wchan:20,cmd
State and kernel wait point

ps -eo pid,comm:20,args
Set a column width

TREES AND THREADS

ps -ejH
Hierarchy, indented

ps axjf
ASCII-art forest

ps -ef --forest
Forest with full format

TREES AND THREADS (cont.)

ps -eLf
Threads with LWP and NLWP

ps -T -p *<pid>*
Threads of one process

READING THE OUTPUT

STAT first letter

Code	Meaning
R	Running or runnable
S	Sleeping, interruptible
D	Uninterruptible I/O wait
T	Stopped by job control signal
t	Stopped by a debugger
Z	Zombie, awaiting parent
I	Idle kernel thread

STAT extra flags

Flag	Meaning
s	Session leader
+	In foreground group
l	Multi-threaded
<	High priority
N	Low priority (nice)
L	Pages locked in memory

Common columns

Column	Meaning
%CPU	CPU time / elapsed time
VSZ	Virtual size in KiB
RSS	Resident memory in KiB
TIME	Total CPU time used
ELAPSED	Time since start
NI / PRI	Nice value / priority

%CPU is an average over the whole life of the process, not current load. Use top for what is busy right now.

RECIPES

Find a process without matching grep

```
ps -ef | grep '[n]ginx'
# or: ps -C nginx -o pid,args
# or: pgrep -af nginx
```

Top 5 memory hogs

```
ps -eo pid,user,%mem,rss,comm --sort=-rss | head -n 6
```

Find zombies and their parents

```
ps -eo pid,ppid,stat,cmd | awk '$3 ~ /^Z/'
# kill or fix the parent (PPID), not the zombie
```

How long has it been running?

```
ps -o pid,lstart,etime,cmd -p <pid>
# then: kill -TERM <pid>
```