lsof List open files

CONCEPTS

On Unix everything is a file: regular files, directories, pipes, sockets and devices all show up. Run as root to see other users' processes.

Selectors -i -p -u -c names
↓ OR (or AND with -a)
Matching files every open file
↓ -t / -F / columns
Output table, PIDs, fields

Selection options are ORed by default, so lsof -u me -i lists both. Add -a to require all of them.

Always add -nP when scripting or debugging: it skips slow DNS and service-name lookups.

FIND BY PROCESS

lsof -p *<pid>*
Open files of a process

lsof -p *<pid1>*,*<pid2>*
Several processes

lsof -c *<prefix>*
Processes by command-name prefix

lsof -d cwd -a -p *<pid>*
Working directory of a process

FIND BY USER AND FILE

lsof -u *<user>*
Files opened by a user

lsof -u ^*<user>*
Everyone except a user

lsof *<file>*
Processes holding a file open

lsof *<mountpoint>*
Processes using a filesystem

lsof +d *<dir>*
Open files directly in a dir

lsof +D *<dir>*
Open files in a dir tree

lsof -d *<fds>*
Select by descriptor (0-2, cwd, mem)

lsof -a -u *<user>* **-d ^mem**
AND selectors together

NETWORK

lsof -i
All network files

lsof -i :*<port>*
Who uses a port

lsof -i TCP:*<port>*
Restrict to TCP port

lsof -i :*<p1>*-*<p2>*
Port range

lsof -i @*<host>*
Connections to a host

lsof -iTCP -sTCP:LISTEN
Listening TCP sockets

lsof -iTCP -sTCP:ESTABLISHED
Established connections

lsof -nP -i
No DNS or port-name lookups

lsof -i -a -p *<pid>*
Network files of one process

OUTPUT CONTROL

lsof -t *<selectors>*
PIDs only, no header

lsof +L1
Unlinked (deleted) but open files

READING THE TABLE

Common FD values

FD	Meaning
cwd	Current directory
txt	Program binary
mem	Memory-mapped file or library
rtd	Root directory
3u	Descriptor 3, open read and write
4r / 5w	Read-only / write-only
DEL	Mapped file deleted

A '(deleted)' suffix on NAME means the file was removed but a process still holds it, so its disk space is not freed.

Without sudo, lsof only shows your own processes and may exit 1 with no output; that does not always mean nothing is open.