lsof Command Cheatsheet

A handy reference for the lsof command, covering basic usage, common filters, network inspection, process management, and output interpretation.

Basic Usage & Filters

Basic Listing

`lsof`	List all open files for all active processes. This can produce a very large output.
`lsof | less`	Pipe the output to `less` for easier viewing and searching.
`lsof -u <user>`	List files opened by a specific user. **Example:** `lsof -u root`
`lsof -i`	List all network connections (sockets). Includes TCP, UDP, and raw sockets.
`lsof -c <command>`	List files opened by processes running a specific command. **Example:** `lsof -c nginx`
`lsof -p <pid>`	List files opened by a specific process ID. **Example:** `lsof -p 1234`
`lsof -d <fd>`	List files opened with a specific file descriptor. **Example:** `lsof -d 1` (File descriptor 1 usually refers to standard output)
`lsof -d ^<fd>`	List files EXCEPT those with a specific file descriptor. **Example:** `lsof -d ^1` (Exclude standard output)

Network Filters

`lsof -i TCP`	List all open TCP network connections.
`lsof -i UDP`	List all open UDP network connections.
`lsof -i :<port>`	List processes listening on or connected to a specific port. **Example:** `lsof -i :80` (List processes using port 80)
`lsof -i TCP:<port>`	List TCP connections on a specific port. **Example:** `lsof -i TCP:443`
`lsof -i @<address>`	List network activity related to a specific host address. **Example:** `lsof -i @localhost`
`lsof -i @<address>:<port>`	List network activity related to a specific host and port. **Example:** `lsof -i @192.168.1.100:22`
`lsof -i :<start>-<end>`	List network activity within a port range. **Example:** `lsof -i :1024-2000`
`lsof -i -P`	Disable port number to name mapping (shows numeric ports).

Process & File System Filters

`lsof -a -u <user> -c <cmd>`	Combine options with `-a` (AND logic). List files opened by `<user>` running `<cmd>`. **Example:** `lsof -a -u www-data -c apache2`
`lsof -u ^<user>`	List files opened by everyone EXCEPT a specific user. **Example:** `lsof -u ^root`
`lsof -p ^<pid>`	List files opened by all processes EXCEPT a specific PID. **Example:** `lsof -p ^1` (Exclude `init` process)
`lsof <file>`	List processes that have a specific file open. **Example:** `lsof /var/log/syslog`
`lsof +D <directory>`	List all open files *within* a directory (and its subdirectories). **Example:** `lsof +D /tmp`
`lsof +d <directory>`	List only files opened directly *in* the specified directory (no recursion). **Example:** `lsof +d /etc`
`lsof -F n`	Output filenames only. Useful for scripting. **Example:** `lsof -F n /var/log`
`lsof -v`	Display `lsof` version information.
`lsof -l`	Include user ID numbers in the output.

Advanced Usage & Output

Output Fields Explained

`COMMAND`	The command name (often truncated).
`PID`	Process ID.
`TID`	Task ID (Thread ID) if the `-K` option is used.
`USER`	User ID or name of the process owner.
`FD`	File Descriptor number and type. **Examples:** `cwd`: current working directory `rtd`: root directory `txt`: program text (code and data) `mem`: memory-mapped file `mmap`: memory-mapped device file `<n>u`: file descriptor `<n>` opened for read/write (`u` for unknown) `<n>r`: read only `<n>w`: write only `<n>R`: raw socket `<n>t`: terminal device
`TYPE`	Type of node associated with the file. **Examples:** `REG`: regular file `DIR`: directory `CHR`: character special file `BLK`: block special file `FIFO`: FIFO special file (named pipe) `SOCK`: socket file `UNIX`: UNIX domain socket `IPv4`: IPv4 socket `IPv6`: IPv6 socket
`DEVICE`	Device numbers for the file.
`SIZE/OFF`	Size of the file or the file offset.
`NODE`	Node number of the local file system file or the inode number.
`NAME`	Name of the file, network address, etc.

Common Use Cases & Tips

`lsof /dev/sda1`	Find processes accessing a specific device.
`lsof +L`	List files that are currently linked to but have been deleted (shows `(deleted)` in output). Useful for finding processes holding onto disk space.
`lsof -i :<port> -s TCP:LISTEN`	Find processes listening on a specific TCP port. **Example:** `lsof -i :8080 -s TCP:LISTEN`
`lsof -i -T TCP`	Show TCP options. Use `-T` followed by specific options (e.g., `W` for window sizes). **Example:** `lsof -i -T W` (Show TCP window sizes)
`lsof -t -i :<port>`	Output only PIDs using a specific port. Useful for scripting (e.g., killing processes). **Example:** `kill $(lsof -t -i :3000)`
`lsof -r <seconds>`	Repeat `lsof` output every `<seconds>`. Useful for monitoring dynamic changes. **Example:** `lsof -r 5 -i :80` (Monitor port 80 every 5 seconds)
`lsof -b`	Avoid kernel blocking. `lsof` may block if the kernel file structure table is being accessed. Use this to prevent blocking, but the output might be incomplete.
`lsof -n -P`	Disable host name resolution (`-n`) and port name resolution (`-P`). Speeds up execution, especially on large systems or slow DNS. Good practice for general use unless names are required.

Troubleshooting Examples

Find which process is using a port:

```
lsof -i :8080
```

Find the `COMMAND`, `PID`, and `USER` in the output.

Find why a disk is full (deleted files):

```
lsof +L1
```

Look for large files marked `(deleted)`. Identify the `PID` and restart/kill the process holding the file handle.

Identify network connections for a specific process:

```
lsof -p <pid> -i
```

Replace `<pid>` with the actual process ID.

See all files opened by user 'daemon':

```
lsof -u daemon
```

Check if a specific file is open and by whom:

```
lsof /path/to/your/file
```

Determine which process has a lock on a file:

`lsof` can sometimes show file locks (depending on the system and lock type), often indicated by the `lck` FD type or flags in the output. While not foolproof for all lock types, it's a good starting point.

Look for output lines related to the file and check the `FD` column for lock indicators.