xargs Build commands from input

START HERE

`<cmd>` **| xargs** `<cmd2>`
Input lines become arguments

find . -print0 | xargs -0 `<cmd>`
Safe with odd file names

xargs -n 1 `<cmd>`
One argument per run

xargs -I {} `<cmd>` **{}**
Place the item yourself

xargs -P 4 -n 1 `<cmd>`
Run 4 at a time

xargs -r `<cmd>`
Skip on empty input

xargs -t `<cmd>`
Echo each command first

xargs -p `<cmd>`
Ask before each run

Producer find, grep, git ls-files → `-print0 / lines` → **xargs** split into items → `batch -n / -s` → **Command** runs once per batch → `-P parallel` → **Exit status** 0, 123, 124..127

CONCEPTS

xargs turns stdin into arguments: cmd a b c, not cmd fed through its stdin. It packs as many as fit per run.

Default splitting is on blanks and newlines, and quotes and backslashes are interpreted. Names with spaces break unless you use -0 or -d.

Without -r, GNU xargs runs the command once even on empty input (rm with no args, for example).

BASICS

`<producer>` **| xargs** `<cmd>`
Append input items to a command

xargs `<cmd> < <file>`
Read items from stdin redirect

xargs -a `<file> <cmd>`
Read items from a file
Leaves stdin free for the command itself.

echo `<a> <b>` **| xargs**
Default command is echo

xargs -n `<n> <cmd>`
At most n items per run

xargs -L `<n> <cmd>`
At most n input lines per run
Lines ending in a blank continue onto the next one.

xargs -s `<bytes> <cmd>`
Cap command line length

xargs --show-limits
Print system argument limits

SPLITTING INPUT

xargs -0 `<cmd>`
Items are NUL-separated
Disables quote, backslash and EOF processing.

SPLITTING INPUT (cont.)

xargs -d '\n' `<cmd>`
Items split on newlines only
Handles spaces and quotes in names; fails on names with newlines.

xargs -d `<char> <cmd>`
Split on any single character

xargs -E `<str> <cmd>`
Stop reading at this line
Ignored with -0 or -d.

xargs -e `<cmd>`
Disable the end-of-file string

find `<dir>` **-print0 | xargs -0** `<cmd>`
Pipe file names safely

grep -rlZ `<re> .` **| xargs -0** `<cmd>`
Pipe grep matches safely

git ls-files -z | xargs -0 `<cmd>`
Run on tracked files

PLACING ARGUMENTS

xargs -I {} `<cmd>` **{}**
Substitute each item at {}
Runs the command once per line and keeps blanks inside the item.

xargs -I % `<cmd>` **%.bak**
Choose another placeholder

xargs -I {} sh -c '`<script>` **"$1"' _ {}**
Run a small script per item
Passing the item as $1 avoids shell injection from file names.

xargs -n 1 sh -c '`<script>` **"$1"' _**
Script without a placeholder

xargs -I {} mv {} `<dir>`**/{}**
Move items into a directory

xargs sh -c '`<cmd>` **"$@"** `<extra>`**' _**
Put extra args after the items

-I implies one line per run and overrides -n. Leave it out when batching is faster.

PARALLEL AND CONTROL

xargs -P `<n> <cmd>`
Up to n runs at once

xargs -P 0 `<cmd>`
As many runs as possible

xargs -P $(nproc) -n 1 `<cmd>`
One job per CPU core

xargs --process-slot-var=`<VAR> <cmd>`
Child gets a slot number in $VAR

xargs -r `<cmd>`
Do nothing if input is empty

xargs -t `<cmd>`
Print each command to stderr

xargs -p `<cmd>`
Prompt y/n before each run

xargs -x `<cmd>`
Exit if args exceed the size limit

xargs -o `<cmd>`
Give the command a tty as stdin
Needed for vim, less and other interactive programs.

With -P, outputs of parallel runs can interleave. Write to per-item files or lock if order matters.

EXIT STATUS

xargs exit codes

Code	Meaning
0	All runs succeeded
123	Some run exited 1-125
124	A run exited 255; xargs stopped
125	A run was killed by a signal
126	Command found but not executable
127	Command not found
1	xargs itself failed

A command exiting 255 stops xargs at once; any other failure just continues with the next batch.

COMMON USES

find . -name '*.log' -print0 | xargs -0 rm
Delete found files

find . -type f -print0 | xargs -0 grep -l `<re>`
Grep many files

ls | xargs -n 1 -P 4 `<cmd>`
Fan out over names
Parsing ls breaks on odd names; prefer find -print0.

xargs -n 1 `< <file>`
One word per line

xargs `< <file>`
Join lines into one

xargs -n 2 `<cmd>`
Process items in pairs

git branch --merged | xargs -r git branch -d
Clean merged branches

docker ps -q | xargs -r docker stop
Stop all containers

cat `<urls>` **| xargs -n 1 -P 8 curl -sO**
Download in parallel

xargs -a `<file>` **-d '\n' -n 100** `<cmd>`
Batch lines of a file

RECIPES

Bulk search and replace

```
find . -name '*.py' -print0 \
  | xargs -0 -r sed -i 's/<old>/<new>/g'
```

Parallel compress

```
find . -name '*.log' -print0 \
  | xargs -0 -P 4 -n 1 gzip
```

Rename with a per-item script

```
find . -name '*.jpeg' -print0 \
  | xargs -0 -I {} sh -c 'mv "$1" "${1%.jpeg}.jpg"' _ {}
```

Dry run, then real run

```
... | xargs -t -p -n 1 <cmd>
# -p shows and asks; drop it once happy
... | xargs -0 -r -n 1 -P 4 <cmd>
```