xargs Build commands from input

START HERE

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

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

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

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

`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

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

BASICS (cont.)

`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.

`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

SPLITTING INPUT (cont.)

`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

COMMON USES (cont.)

`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>
```