xargs Build commands from input

CONCEPTS

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

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

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

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

xargs --show-limits
Print system argument limits

SPLITTING INPUT

xargs -0 <cmd>
Items are NUL-separated

xargs -d '\n' <cmd>
Items split on newlines only

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

xargs -E <str> <cmd>
Stop reading at this line

SPLITTING INPUT (cont.)

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 {}

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

xargs -I {} sh -c '<script>' "$1"' _ {}
Run a small script per item

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 -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

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

xargs < <file>
Join lines into one

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>
```