

# Subcontractors – xargs

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## xargs

```
root@frausto:~/class/shellprogramming/awk
[root@frausto awk]# ls
ans-p188.txt  datafile2  datafile5  employees  lab3.data-  lab6.data  show-gawk-built-in-vars.sh
ans-p202.txt  datafile3  datebook   employees2  lab4.data  lab6.data-  xargs.txt
datafile     datafile4  emp.data   lab3.data  lab4.data-  program.awk
[root@frausto awk]# find . -name "*~"
./lab6.data-
./lab3.data-
./lab4.data-
[root@frausto awk]# find . -name "*~" | xargs ls -l
-rw-r--r-- 1 root root 505 2013-12-02 00:31 ./lab3.data-
-rw-r--r-- 1 root root 504 2013-12-02 00:31 ./lab4.data-
-rw-r--r-- 1 root root 505 2013-12-02 00:31 ./lab6.data-
[root@frausto awk]# find . -name "*~" | xargs rm
[root@frausto awk]# find . -name "*~"
[root@frausto awk]# ls
ans-p188.txt  datafile2  datafile5  employees  lab4.data  show-gawk-built-in-vars.sh
ans-p202.txt  datafile3  datebook   employees2  lab6.data  xargs.txt
datafile     datafile4  emp.data   lab3.data  program.awk
[root@frausto awk]#
```

produce list of vi's backup files

long list 'em with xargs

remove 'em with xargs

gone

# xargs

filename too long to type

command to avoid typing it

```
[root@frausto ~]# locate datafile3
/root/class/books/quigley/quigley_unix_files/chap06/Ex_6.127-6.146/datafile3
[root@frausto awk]# locate datafile3 | cat
/root/class/books/quigley/quigley_unix_files/chap06/Ex_6.127-6.146/datafile3
[root@frausto awk]# locate datafile3 | xargs cat
tom
mary
sean
tom
mary
mary
bob
mary
alex
[root@frausto awk]# locate datafile3 | xargs cat /etc/resolv.conf
; generated by /sbin/dhclient-script
nameserver 4.2.2.2
tom
mary
sean
tom
mary
mary
bob
mary
alex
[root@frausto awk]# locate datafile3 | xargs cp .
cp: omitting directory '.'
[root@frausto awk]# locate datafile3 | xargs -I _ cp -v _ /root/class/books/quigley/quigley_unix_files/chap06/Ex_6.127-6.146/datafile3' -> './datafile3'
```

what's in the file? ...oops  
cat needs filename as argument,  
not input

xargs composes correct cat syntax by pasting  
its input onto cat's command line  
produces: cat /root/class... etc etc

produces: cat /etc/resolv.conf /root/class... etc etc

xargs composes incorrect cp syntax by pasting  
its input onto cp's command line  
produces: cp . /root/class... etc etc  
cp differs from cat, needs insertion from xargs not pasting

control argument placement with xargs' -I  
(xargs stuff goes where the special char appears, \_ in this case)

# xargs and efficiency

```
[root@frausto ~]# time echo 1 2 3 4 5 | xargs -n 1 sleep
real    0m15.029s
user    0m0.004s
sys     0m0.025s
[root@frausto awk]# time echo 1 2 3 4 5 | xargs -n 1 -P 5 sleep
real    0m5.027s
user    0m0.005s
sys     0m0.024s
```

sleeptime totals 15 sec

took 15 sec

run sleeps simultaneously

took 5 sec

- significant for compute-heavy commands
- distributes them across multi-cores
  - simultaneous execution

# xargs and efficiency

- commonly used with find to process files
- functionally equivalent
  - find . -name "\*" -exec rm {} \;
  - find . -name "\*" | xargs rm
- computationally different
  - -exec -rm creates one process per file
  - xargs rm creates one process per group of files

# xargs and efficiency

```
[root@frausto ~]# /rm=findexec-vs-rm-findxargs
file24961164 file24961600 file249620865 file249625363 file24963116 file24964829 file24967036 file24969901
file249612232 file249616167 file249620901 file249625369 file249631596 file24965145 file24967317
file249613165 file249618106 file249622198 file249627409 file249632065 file24965250 file24967433
file249613778 file249620023 file249622745 file249627448 file249632070 file249652720 file24967736
file249614545 file249620167 file249623300 file249627476 file249632404 file24965865 file24968668
file249614876 file249620622 file249623330 file249628688 file24963325 file2496703 file24968403
file249614878 file249620804 file249624279 file249630227 file2496421 file24967034 file24969537
DELETING THESE FILES WITH find's -exec
real 0m0.235s
user 0m0.059s
sys 0m0.172s
press key to continue.
file2570510057 file2570513243 file257051706 file257052312 file257052878 file2570530191 file257057182 file257059929
file2570510894 file2570513559 file257051745 file2570523254 file2570528847 file2570531397 file257059572
file2570510897 file257051393 file2570518521 file2570524231 file2570528916 file257053651 file257058382
file2570511366 file257051398 file2570518823 file2570525018 file2570529258 file257055368 file257058471
file2570511458 file2570514801 file2570520993 file2570526361 file2570529742 file257055446 file257058983
file2570512122 file2570515649 file2570522334 file2570525152 file25705301 file257056212 file257059090
file2570513082 file2570517042 file2570522550 file2570528495 file257053014 file257056817 file257059347
DELETING THESE FILES WITH xargs and rm
real 0m0.027s
user 0m0.014s
sys 0m0.014s
[root@frausto awk]#
[root@frausto awk]# cat rm-findexec-vs-rm-findxargs
#!/bin/bash
#
# -exec'ing rm within find -vs= running rm outside find using xargs
# find creates one process per file, xargs as few as it can
#
populateO
token=$RANDOM
for i in $(seq 1 $1); do touch file$token$RANDOM; done
}
populate 50; ls file$token*; sleep 1
echo "DELETING THESE FILES WITH find's -exec"
time find . -name "file$token*" -exec rm {} \;
read -p "press key to continue..." ; echo
populate 50; ls file$token*; sleep 1
echo "DELETING THESE FILES WITH xargs and rm"
time find . -name "file$token*" | xargs rm
[root@frausto awk]#
```

12 times longer to delete 50 files

# xargs

```
[root@frausto: ~]# cd /class/shellprogramming/awk
[root@frausto awk]# ls -l *stuff
-rw-r--r-- 1 root root 72 2013-12-02 00:52 new stuff
-rw-r--r-- 1 root root 72 2013-12-02 00:52 old stuff
[root@frausto awk]#
[root@frausto awk]# find . -name "*stuff" -print | xargs wc -l
wc: ./new: No such file or directory
wc: stuff: No such file or directory
wc: ./old: No such file or directory
wc: stuff: No such file or directory
0 total
[root@frausto awk]#
[root@frausto awk]# find . -name "*stuff" -print | xxd -g1
0000000: 2e 2f 6e 65 77 20 73 74 75 66 66 0a 2e 2f 6f 6c ./new stuff./o1
0000010: 64 20 73 74 75 66 66 0a                                d stuff.
[root@frausto awk]#
[root@frausto awk]# find . -name "*stuff" -print0 | xxd -g1
0000000: 2e 2f 6e 65 77 20 73 74 75 66 66 00 2e 2f 6f 6c ./new stuff./o1
0000010: 64 20 73 74 75 66 66 00                                d stuff.
[root@frausto awk]#
[root@frausto awk]# find . -name "*stuff" -print0 | xargs -0 wc -l
 3 ./new stuff
 3 ./old stuff
 6 total
[root@frausto awk]#
```

← spaces in filenames

← space and newline are delimiters to xargs

← find output-delimits with 0a

← but can use 00 instead of 0a

← and xargs can input-delimit on 00 instead of 20 (space)