



Periodic Processes

CRON – Schedule Commands (1)

❑ What we want?

- Do things at right time automatically

❑ cron daemon

- The daemon that handles periodic execution
- cron daemon reads configuration file and executes commands on time

`cron(8)`, `crontab(1)`, `crontab(5)`

CRON – Schedule Commands (2)

❑ Configuration file

- So called: crontab (cron table)
- Location of user cron configuration file
 - Every user can have at most one crontab file and this file will be named the user's login ID

System	Cron Dir
FreeBSD	/var/cron/tabs
Red Hat	/var/spool/cron
Solaris	/var/spool/cron/crontabs
SunOS	/var/spool/cron/crontabs

- Location of System Cron Configuration file
 - /etc/crontab

CRON – Schedule Commands (3)

❑ Configuration File Format

1. Ignored
 - Blank lines or leading spaces and tabs
2. Comments
 - pound-sign Lines whose first non-space character is a #
3. environment setting
 - name = value
 - Default environment variables:
 - LOGNAME, SHELL, PATH, HOME, MAILTO
4. cron command

Format:

minute hour day month weekday command

```
33 7 * * * /usr/local/bin/rsync -al --delete /home/ backup:/raid/home/
```

CRON – Schedule Commands (4)

❑ cron command format – *minute hour day month weekday command*

Field	Description	Range
minute	Minute of the hour	0 ~ 59
hour	Hour of the day	0 ~ 23
day	Day of the month	1 ~ 31
month	Month of the year	1 ~ 12
weekday	Day of the week	0 ~ 6 (0 = Sunday)

❑ Rule Matching

- * matches everything
- Single character matches exactly
- Dash(-) matches range
- Comma(,) matches any listed value
- Slash(/) matches skips of the number's value through the range.

CRON – Schedule Commands (5)

❑ crontab time format example

- | | |
|---------------|---|
| 45 10 * * 1-5 | → AM 10:45, from Mon. to Fri. |
| 10 * * * * | → On 10 minutes of each hour |
| */3 * * * * | → Every three minutes |
| 30 15 5 * * | → PM 3:30 of each 5-th day |
| 0 0 14 2 * | → On the Midnight of Valentine's day |
| 5 0-6 * * * | → On 5 minutes, from 0 to 6 o'clock. |
| 0,30 * 13 * 5 | → every half-hour on Fri. and every
half-hour on the 13-th day |

❑ crontab example

- | | |
|-----------------|--|
| 20 1 * * * | find /tmp -atime +3 -exec rm -f {} ‘;’ |
| 55 23 * * 0-3,6 | /home/wutzh/cputemp-check.sh |

CRON – Schedule Commands (6)

❑ Special strings to specify the time

string	meaning	in 5 fields format
@reboot	Run once, at startup.	N/A
@yearly	Run once a year	0 0 1 1 *
@annually	(same as @yearly)	
@monthly	Run once a month	0 0 1 * *
@weekly	Run once a week	0 0 * * 0
@daily	Run once a day	0 0 * * *
@midnight	(same as @daily)	
@hourly	Run once an hour	0 * * * *

crontab command

❑ crontab(1)

% crontab -e [-u user]

- Edit the [user's] crontab using editor

% crontab -l

- List the content of the crontab

% crontab -r

- Remove the current crontab

% crontab *filename*

- Install *filename* as your crontab

crontab management

❑ To Allow or deny user

- By default, all users can have their own crontab
- allow file
 - A list of users that may use crontab, any other not in the list can not use it
- deny file
 - Reverse meaning

❑ log

System	Allow or deny file	Log file
FreeBSD	/var/cron/{allow,deny}	By syslogd
Red Hat	/etc/cron.{allow,deny}	/var/log/cron
Solaris	/etc/cron.d/cron.{allow,deny}	/var/cron/log
SunOS	/var/spool/cron/cron.{allow,deny}	By syslogd

System crontab: /etc/crontab

❑ System crontab

- /etc/crontab

```
SHELL=/bin/sh
PATH=/etc:/bin:/sbin:/usr/bin:/usr/sbin
HOME=/var/log
#minute hour mday month wday who command
*/5 * * * * root /usr/libexec/atrun
*/11 * * * * operator /usr/libexec/save-entropy
0 * * * * root newsyslog
1 3 * * * root periodic daily
15 4 * * 6 root periodic weekly
30 5 1 * * root periodic monthly
1,31 0-5 * * * root adjkerntz -a
```

periodic utility

□ periodic utility

- Run periodic system function under /etc/periodic

```
sabsd [/home/wutzh] -wutzh- ls -ld /etc/periodic/*
drwxr-xr-x  2 root  wheel  1024 Sep 26 21:43 /etc/periodic/daily
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/monthly
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/security
drwxr-xr-x  2 root  wheel   512 Sep 27 03:49 /etc/periodic/weekly
```

```
sabsd [/home/wutzh] -wutzh- ls /etc/periodic/daily
100.clean-disks          200.backup-passwd      405.status-ata-raid    430.status-rwho
110.clean-tmps           210.backup-aliases     406.status-gmirror     440.status-mailq
120.clean-preserve       300.calendar           407.status-graid3      450.status-security
130.clean-msgs           310.accounting         408.status-gstripe     470.status-named
140.clean-rwho           330.news               409.status-gconcat     500.queuerun
150.clean-hoststat       400.status-disks       420.status-network     999.local
```

- /etc/periodic.conf
- /etc/defaults/periodic.conf
- /usr/local/etc/periodic

```
derek[/usr/local/etc/periodic/security] -wutzh- ls -al
total 8
drwxr-xr-x  2 root  wheel   512 Jan  7  2009 ./
drwxr-xr-x  4 root  wheel   512 Apr  7  2010 ../
-r-xr-xr-x  1 root  wheel  2286 Jan  7  2009 410.portaudit*
```

at command

❑ at command

- executes commands at a specified time

at [-q queue] [-f file] [-mldbv] time

or at [-q queue] [-f file] [-mldbv] -t [[CC]YY]MMDDhhmm[.SS]

❑ at management

- atq, atrm
- /var/at/at.{allow,deny}

at(1), atrun(8)