Linux Systems Administrator

Nathan Warner

Northern Illinois
University

Computer Science
Northern Illinois University
United States

Contents

Shell Job control

1.0.1 Terminology

- Process is a program in execution
  - process is reated every time you run a command
  - each process has a unique process id
  - processes are removed from the system when the command finishes its execution
- Job is a unit of work
  - Consists of the commands specified in a single command line
  - A single job may involve several processes, each consisitng of an executable program

1.0.2 Job contral Terminology

- **Foreground job:**
  - A job that has our immediate attention
  - user has to wait for job to complete
- **Background job:**
  - a job that the user does not wait for
  - it runs independently of user interaction
- **Unix shells allow users to:**
  - Make jobs execute in the background
  - move jobs from foreground to background
  - determine their status, and terminate them

1.0.3 Background jobs

- How do we deiced which jobs to place in the background?
  - jobs that are run non-interactively
  - jobs that do not require user input

To execute a command in the background, we put & after it

1.0.4 Managing jobs

- **Display jobs**
  - Command ”jobs” lists your active jobs
  - each job has job number
  - job number with ”%” is used to refer to job
- **Send job to background:** bg
- **Move job to foreground:** fg

1.0.5 Signaling jobs

- **Command to send signal to job:** kill
  - Example: kill -HUP 12324
  - Example: kill -INT %1

1.0.6 Ending jobs

- **To stop a job:**
  - kill -STOP
  - resume via ”bg” or ”fg” command
- **To terminate a job:**
  - kill
  - kill -INT
  - kill -9
- Once a job finishes it will display exit status

1.0.7 Scheduling utils

- **crontab**
  - Run a job based on a schedule
  - Job is executed on a periodic basis
- **at**
  - run a job some time in the future
- **batch**
  - run a job when system load is low

1.0.8 Crontab

- Crontab is based on control file
- crontab file has 6 columns

```
minute    hour    day    month    weekday    command
```

- **Meaning:**
  1. Minute 0-59
  2. Hour 0-23
  3. Day 1-31
  4. Month 1-12
  5. Weekday 1-7 (1=mon, 2=tue,..., 7=sun)
  6. Command Any unix command

Note:-

"*" means any value

1.0.9 Example crotab file

```
0   8  *  *  1 echo Happy Monday Morning
30 14  *  *  1 echo Meeting at 3pm
0  17  *  *  5 $HOME/bin/cleanup.sh
```

1.0.10 Crontab command

Options:

- -e to edit the control file
- -l to list the control file
- -r to remove the control file

For superuser:

- -u to edit another user's control file

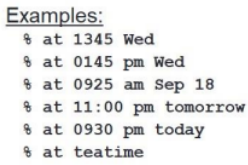
1.0.11 One time execution: at

- Utility to run command(s) at a later time
  - Must specify on the command the time and date on which your command to be executed
  - No need to be logged in when the commands are scheduled to run
  - Any output from command is sent via email

1.0.12 At command syntax

```
1 at timeDate
2     > command
3     > <EOT>
```

1.0.13 at examples



1.0.14 at utils

- atq lists users's scheduled jobs atrm removes specified job from at queue

1.0.15 Batch command

- **batch:** Schedules job to be performed while system load is *low*

1.0.16 Batch command syntax

```
batch command
```

Linux System Administration

- User management
  - adduser, sudo
- software management
  - apt-get, synaptic
- file system management
  - fdisk, mkfs, mount, fsck

2.1 User Configuration

- User info is stored in file /etc/passwd
  - userid, user name, group, home directory, shell
  - passwords are stored in separate file: /etc/shadow
- Group info is stored in file /etc/group
  - group id, group name
  - additional group members
- To find out group info, use: groups user-id

2.2 Steps to create a new user

1. add info to /etc/passwd
2. add info to /etc/shadow
3. add info to /etc/group
4. create home directory
5. add default content to home directory
6. set password

2.2.1 Common debian utils

- adduser, deluser
- addgroup, delgroup

2.3 Sudo

- Execute commands as super user ”root”
  - Will be prompted for password
- /etc/sudoers
  - list designated users/groups
    - group ”sudo”
- lists allowed commands
  - root can do anything

2.3.1 sudo -s

Runs new shell with super user privileges

2.4 Software management

- applications are bundled into package file
  - tar
    - original (tape) archive format
  - rpm
    - Redhat package manager format, download and intall via: **yum**
  - deb
    - Debian package format, download and install via: apt-get

2.4.1 Deb pacakge management

- Basic utils
  - dpkg - package manager
  - apt-get - package handling util
- User friendly interfaces
  - aptitude - command line frontend
  - synaptic - GUI frontend
- Software manager
  - Unifed web-based application store

2.4.2 apt-get config

- /etc/apt/sources.list - contains locations of packages

2.4.3 apt-get sub-commands

- update
  - re-sync pacakge listing
- install
  - Install packages
- upgrade
  - Update packages
- remove, purge
  - remove packages (delete config files)
- dist-upgrade
  - Update system
- clean
  - Empty local cache of downloaded packages

2.5 File system commands

- df - displays make up of logical file system
- fdisk - prepare partitions on physical medium
- mkfs
  - Create file system on physical device
  - select file system type, ex: ext4
- mount
  - add additional physical into logical file system
  - undone via: umount
  - made permanent with entry into /etc/fstab

2.6 Steps to enable new hard drive

- Find device name: **fdisk -l**
- Edit partition table: **fdisk /dev/sdb**
  - Create partition /dev/sdb1
- create file system: **mkfs -t ext4 /dev/sdb1**
- mount file system
  - mkdir /mnt/extra
  - mount /dev/sdb1 /mnt/extra
- see file systems: **df**