

TOPIC 09A

USERS AND GROUPS

USER AND GROUP ADMINISTRATION PROCESSES

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Managing users

From: Learning Ubuntu Server

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User Accounts

- User accounts help keep files and roles separate from others
- Humans using the system should have accounts, and services should, too

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00:11 / 04:28

1x



Linux Users and the /etc/passwd file

- Every user has a **username** and a **uid** (user ID)
- Usernames and uids are stored in **/etc/passwd**.
- Eg of /etc/passwd entry. Explanation of fields can also be found in “man 5 passwd”

madonna:x:504:504:Music User:/home/madonna:/bin/bash

The diagram illustrates the fields of a /etc/passwd entry. The entry string is "madonna:x:504:504:Music User:/home/madonna:/bin/bash". Arrows point from labels below to the corresponding fields in the string:

- username points to "madonna"
- ex-password field points to "x"
- uid points to "504"
- primary group id points to "504"
- user description points to "Music User"
- home directory points to "/home/madonna"
- login shell points to "/bin/bash"

Linux Users and the `/etc/passwd` file

- ❑ Local users' encrypted passwords used to be stored in **`/etc/passwd`** (long ago). However, because `/etc/passwd` is world readable, everyone can have access to the encrypted passwords. Brute forced or dictionary attacks ❑ simple.
- ❑ So now, users' encrypted passwords are stored in **`/etc/shadow`**. This file is readable only by the root user.
- ❑ Users change their password with the **`passwd`** command.
- ❑ Root can reset users' passwords with the **`passwd`** command.

Types of Users

- There are 3 classes of Linux users:
- Normal users
 - real people who use the Linux system.
 - usually have `/bin/bash` as the login shell and a home directory within `/home`.
 - usually can only create files in their home directories and in temporary directories like `/tmp` and `/var/tmp`.
 - uids equal or greater than 500 in RHEL.

Types of Users

- The root user
 - uid of 0.
 - also known as superuser, has permission to do everything.
 - has /root as the home directory.
- System users
 - run specific processes required for the Linux system to function.
 - usually do not have login shells. Home directories are usually system directories.
 - uids ranging from 1 to 499

What are the three types of users shown by running top command?

```
jipx@ubuntu-jipx: ~  
File Edit View Search Terminal Help  
top - 07:00:12 up 6:03, 1 user, load average: 0.21, 0.16, 0.11  
Tasks: 265 total, 1 running, 195 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 4.1 us, 2.4 sy, 0.0 ni, 93.5 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st  
KiB Mem : 2017260 total, 359536 free, 1379376 used, 278348 buff/cache  
KiB Swap: 2097148 total, 1934076 free, 163072 used. 460296 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
2382	jipx	20	0	854844	13480	7876	S	0.0	0.7	0:00.11	deja-dup-m+
2687	jipx	20	0	21412	4708	3096	S	0.0	0.2	0:00.24	bash
3126	root	20	0	0	0	0	I	0.0	0.0	0:27.35	kworker/0:0
3792	jipx	20	0	196076	5564	4960	S	0.0	0.3	0:00.03	gvfsd-meta+
4735	mysql	20	0	1155192	166932	4652	S	0.0	8.3	0:13.74	mysqld
5136	root	20	0	0	0	0	I	0.0	0.0	0:00.87	kworker/u2+
5722	www-data	20	0	826256	4532	3124	S	0.0	0.2	0:00.00	apache2
5723	www-data	20	0	826256	4532	3124	S	0.0	0.2	0:00.00	apache2
5788	root	20	0	99284	7072	5836	S	0.0	0.4	0:00.04	cupsd
5792	root	20	0	303652	9764	8324	S	0.0	0.5	0:00.03	cups-brows+
5982	root	20	0	0	0	0	I	0.0	0.0	0:00.11	kworker/u2+
5984	root	20	0	0	0	0	I	0.0	0.0	0:00.81	kworker/0:1
7112	jipx	20	0	21412	4556	3012	S	0.0	0.2	0:00.03	bash
7153	root	20	0	0	0	0	I	0.0	0.0	0:00.01	kworker/u2+

Examining User Information

- The **id** command displays user and group information. (**whoami** command reports only current username)
- The **who**, **users** and **w** commands report users with active sessions.
- The **finger**¹ command report when users were last logged into the system and other information.
 - Use of **.plan** file

¹ Need to install “finger client” package

User Administration

- The **useradd** command adds new users.
 - The contents of **/etc/skel** will be copied into the user's home directory.
- The **usermod** command modifies users.
- The **userdel** command deletes users.
- The **chage** command changes password expiry info.

Common useradd options

- Commonly used (see man page for details)
- c** add a comment for the user (Full User Name)
- g** <GID/groupname> sets the primary group of the user
- G** group1, group2... sets the secondary groups of the user
- p** <encrypted password> set password for the user (The command mkpasswd can be used to generate encrypted passwords)
- e** <YYYY-MM-DD> set expiry date for the account

Common usermod options

- For a complete list, see the man pages
- Common usermod options
 - d** change the home directory for the user
 - u *UID*** change the UID of the user
 - G *group1, group2...*** sets the secondary groups of the user (any existing secondary groups are replaced)
 - aG *group1, group2...*** sets the secondary groups of the user (without replacing any existing secondary groups)

Common userdel options

- For a complete list, see the man pages
- Common userdel options
 - r** removes the home directory for the user too

How To List All User Accounts On Ubuntu 16.04 / 18.04

`less /etc/passwd`

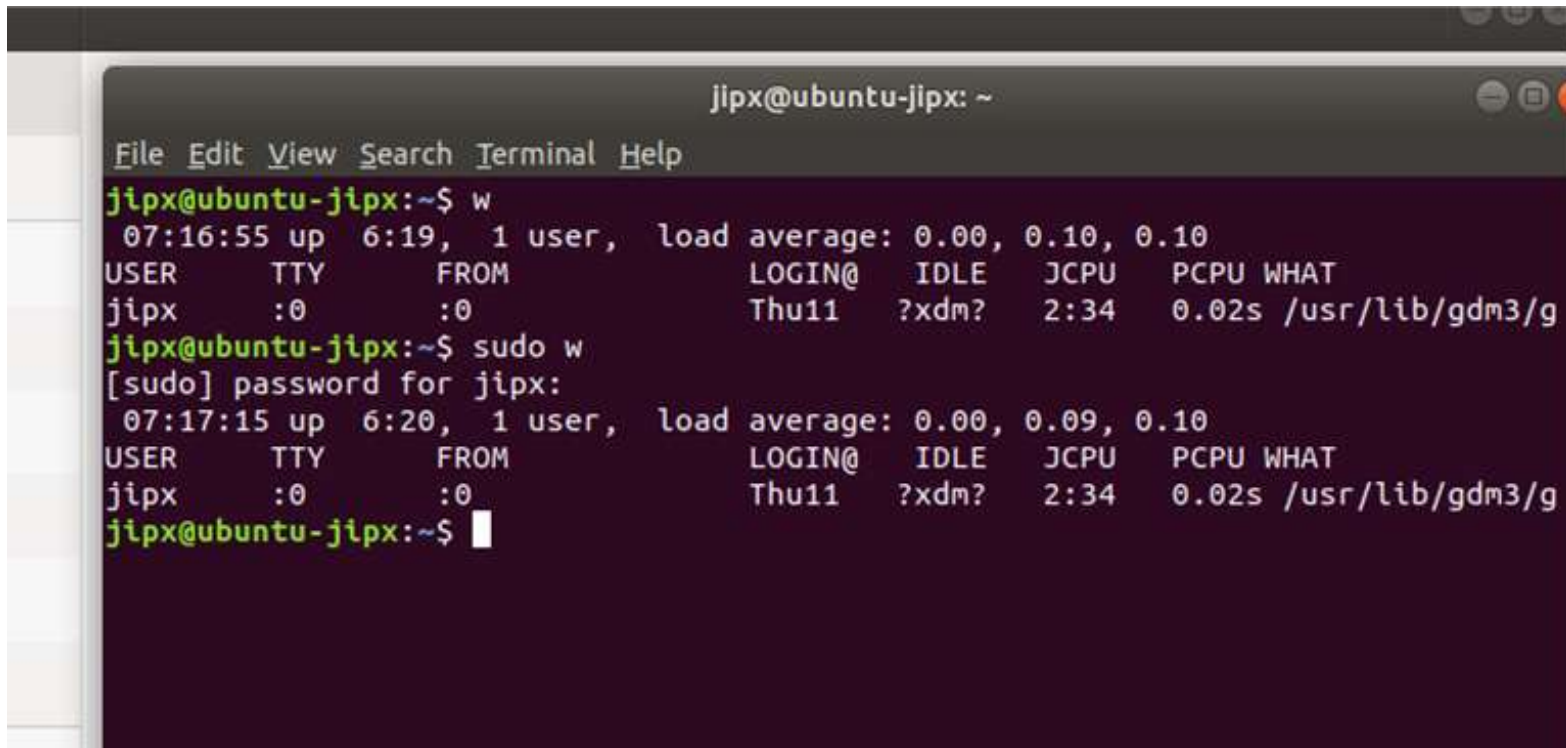
A terminal window showing the output of the 'less /etc/passwd' command. The terminal displays several lines of user account information in a standard passwd file format (username:password:UID:GID:full_name:home_directory:login_shell). The line for the 'jipx' user is highlighted in white. Other visible users include 'landscape', 'pollinate', 'rtkit', and 'usbmux'.

```
landscape:x:108:112:::/var/lib/landscape:/usr/sbin/landscape
pollinate:x:109:1::/var/cache/pollinate:/bin/false
jipx:x:1000:1000:jipx:/home/jipx:/bin/bash
rtkit:x:110:114:RealtimeKit,,,:/proc:/usr/sbin/rtkit-daemon
usbmux:x:111:46:usbmux daemon:/var/lib/usbmux:/usr/sbin/usbmuxd
```

User name	password	UID	GID	Full Name	Home Directory	Login Shell	
jipx	x	1000	1000	jipx	/home/jipx	/bin/bash	

Show Active users

who or w command

A terminal window titled 'jipx@ubuntu-jipx: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the output of the 'w' command, followed by 'sudo w', and then the output of 'sudo w' after a password prompt. The output of both commands is identical, showing system uptime, load averages, and a table of active users.

```
jipx@ubuntu-jipx:~$ w
07:16:55 up 6:19, 1 user, load average: 0.00, 0.10, 0.10
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
jipx      :0        :0              Thu11    ?xdm?  2:34   0.02s  /usr/lib/gdm3/g

jipx@ubuntu-jipx:~$ sudo w
[sudo] password for jipx:
07:17:15 up 6:20, 1 user, load average: 0.00, 0.09, 0.10
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
jipx      :0        :0              Thu11    ?xdm?  2:34   0.02s  /usr/lib/gdm3/g

jipx@ubuntu-jipx:~$
```

Linux Groups and the /etc/group file

- Every user is a member of one **primary group**.
- Users can also be a member of zero or many **secondary groups**.
- Eg of /etc/group entry. Explanation of fields can also be found in “man 5 group”

```
music:x:205:john,peter,lucy,susan
```

↑
groupname

↑
group password (“x” means
no password has been set)

↑
gid

↑
secondary
group members

Linux Groups and the /etc/group file

- Group memberships are usually used to determine who has access to what files. Every file has a user owner and a group owner.
- The user who created the file becomes the user owner of that file. The primary group of the user becomes the group owner of that file.
- The user's primary group is defined in /etc/passwd. In RHEL, the user's primary group has the same name as the username known as **private group**.
- Extra group memberships can be added known as secondary group.

Group Administration

- The **groupadd** command creates new groups.
- The **groupmod** command modifies groups.
- The **groupdel** command deletes groups.
- The **newgrp** command allows a user to switch primary group during the current session
- Note: To add or remove members from a group, use the **usermod -G** or **usermod -aG** command.

Questions

- Can you set the password for user john as “john” ?
- When user Jen, UID=510 is created, can we change Jen’s UID to 888 ?
- Can 2 users (e.g Steven & ChenYi) have the same UID ? (see the man page for useradd)

Delegating with sudo

- Sometimes the root user wants to delegate administrative tasks to a normal user.
- For example, the root user want a co-worker to help him shutdown the server at the end of the day.
- The `/etc/sudoers` specifies users who have special privileges
- The **visudo** command is used to edit the `/etc/sudoers` file
- See **man sudoers** for details

Example: Install PHP

Installing PHP

PHP 7.2 which is the default PHP version in Ubuntu 18.04 is fully supported and recommended for WordPress.

To install PHP and all required PHP extensions run the following command:

```
sudo apt install php7.2 php7.2-cli php7.2-mysql php7.2-json php7.2-opcache php7.2-mbstring php7.2-xml php7.2-gd php7.2-curl
```

Restart apache so the newly installed PHP extensions are loaded:

```
sudo systemctl restart apache2
```

Process and Resource Management

- All processes compete for resources (memory, CPU, disk, etc.)
- The system balances resource usage for processes
- We can view and modify resource usage

top command

The screenshot shows the Lynda.com website interface. At the top, the Lynda.com logo and navigation links are visible. The main header area displays the course title "Process and resource management" and a subtitle "From Managing Ubuntu Server". Below this, there is a sidebar with a search bar and a list of video lessons. The main content area shows a video player with a list of video lessons on the right side. The video player is currently showing a video titled "Process and resource management" with a duration of 1:00:34. The video player controls are visible at the bottom, showing the video is at 00:34 / 00:00.

Course Title: Process and resource management

From: Managing Ubuntu Server

Video Lessons:

- 1. Introduction to Process and Resource Management
- 2. Process and Resource Management
- 3. Configuring and Managing the System
- 4. Configuring Networking with NetworkManager
- 5. Configuring and Managing the System
- 6. Service Management
- 7. Managing Users
- 8. Configuring for Users

You can press 'q' to quit exit the window. The process list shows all the processes with various process specific details in separate columns.

PID: It is the task's unique process id.

USER: It is the effective user name of the task's owner.

PR: It is the priority of the task.

NI: The nice value of the task. A negative nice value means higher priority, whereas a positive nice value means lower priority. Zero in this field simply means priority will not be adjusted in determining a task's dispatchability.

VIRT: It is the total amount of virtual memory used by the task.

RES: It is the Resident size, the non-swapped physical memory a task has used.

SHR: It means the Shared Mem size (kb), the amount of shared memory used by a task.

%CPU: It shows the CPU usage. The task's share of the elapsed CPU time since the last screen update, expressed as a percentage of total CPU time.

%MEM: It shows the Memory usage, a task's currently used share of available physical memory.

TIME+: CPU Time, the same as 'TIME', but reflecting more granularity through hundredths of a second.

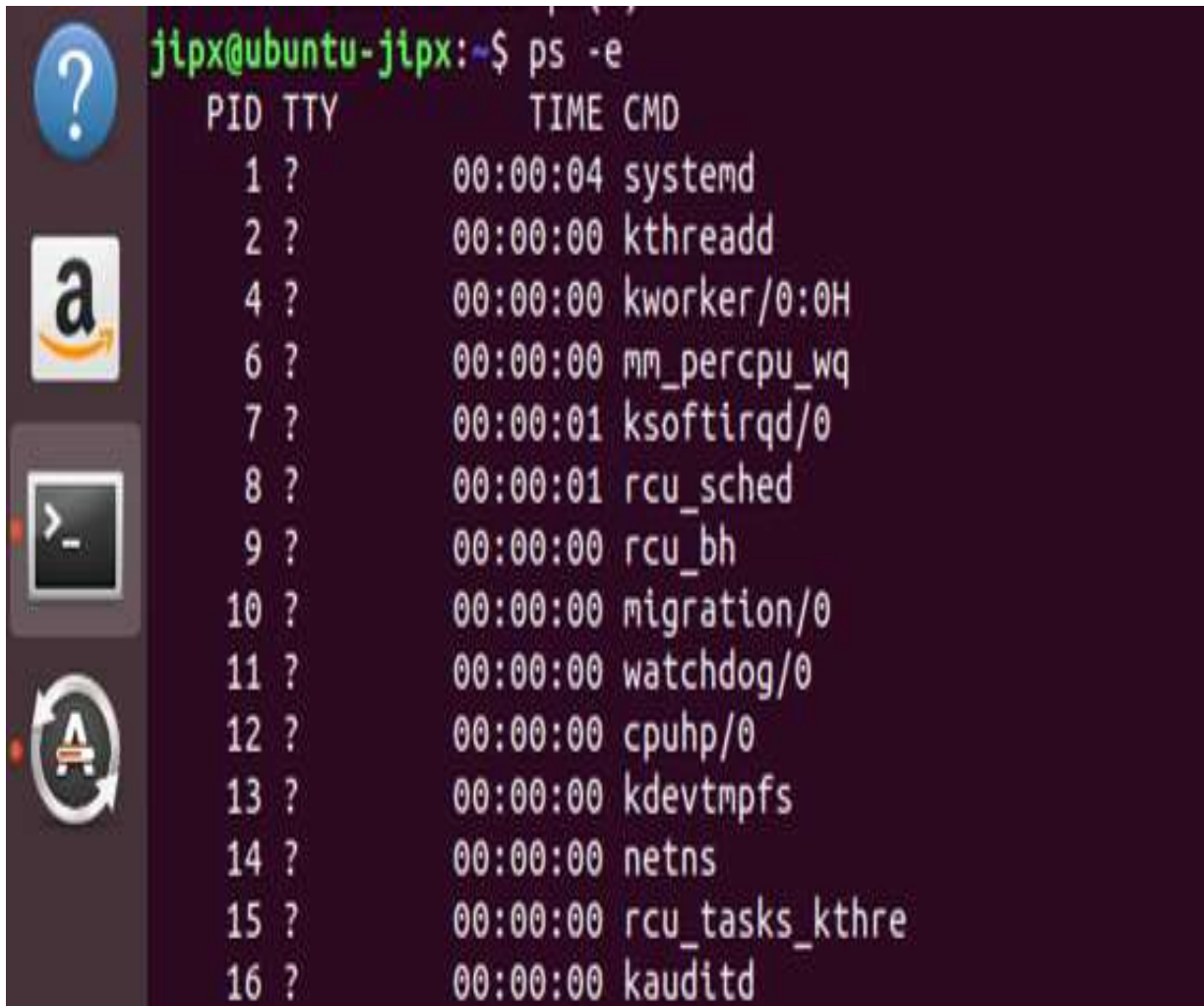
COMMAND: Display the command line used to start a task or the name of the associated program.

top command

```
jlp@ubuntu-jlp: ~  
File Edit View Search Terminal Help  
top - 07:00:12 up 6:03, 1 user, load average: 0.21, 0.16, 0.11  
Tasks: 265 total, 1 running, 195 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 4.1 us, 2.4 sy, 0.0 ni, 93.5 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st  
KiB Mem : 2017260 total, 359536 free, 1379376 used, 278348 buff/cache  
KiB Swap: 2097148 total, 1934076 free, 163072 used. 460296 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
2382	jlp	20	0	854844	13480	7876	S	0.0	0.7	0:00.11	deja-dup-m+
2687	jlp	20	0	21412	4708	3096	S	0.0	0.2	0:00.24	bash
3126	root	20	0	0	0	0	I	0.0	0.0	0:27.35	kworker/0:0
3792	jlp	20	0	196076	5564	4960	S	0.0	0.3	0:00.03	gvfsd-meta+
4735	mysql	20	0	1155192	166932	4652	S	0.0	8.3	0:13.74	mysqld
5136	root	20	0	0	0	0	I	0.0	0.0	0:00.87	kworker/u2+
5722	www-data	20	0	826256	4532	3124	S	0.0	0.2	0:00.00	apache2
5723	www-data	20	0	826256	4532	3124	S	0.0	0.2	0:00.00	apache2
5788	root	20	0	99284	7072	5836	S	0.0	0.4	0:00.04	cupsd
5792	root	20	0	303652	9764	8324	S	0.0	0.5	0:00.03	cups-brows+
5982	root	20	0	0	0	0	I	0.0	0.0	0:00.11	kworker/u2+
5984	root	20	0	0	0	0	I	0.0	0.0	0:00.81	kworker/0:1
7112	jlp	20	0	21412	4556	3012	S	0.0	0.2	0:00.03	bash
7153	root	20	0	0	0	0	I	0.0	0.0	0:00.01	kworker/u2+

ps -e | grep bash



```
jipx@ubuntu-jipx:~$ ps -e
```

PID	TTY	TIME	CMD
1	?	00:00:04	systemd
2	?	00:00:00	kthreadd
4	?	00:00:00	kworker/0:0H
6	?	00:00:00	mm_percpu_wq
7	?	00:00:01	ksoftirqd/0
8	?	00:00:01	rcu_sched
9	?	00:00:00	rcu_bh
10	?	00:00:00	migration/0
11	?	00:00:00	watchdog/0
12	?	00:00:00	cpuhp/0
13	?	00:00:00	kdevtmpfs
14	?	00:00:00	netns
15	?	00:00:00	rcu_tasks_kthre
16	?	00:00:00	kauditd



Starting and Stopping Services

```
sudo systemctl start application.service  
sudo systemctl stop application.service
```

Restarting and Reloading

```
sudo systemctl restart application.service  
sudo systemctl reload application.service  
sudo systemctl reload-or-restart application.service
```

Enabling and Disabling Services

```
sudo systemctl enable application.service  
sudo systemctl disable application.service
```

Checking the Status of Services

```
systemctl status application.service
```

Summary

- ❑ Linux Users and the /etc/passwd file
- ❑ Three types of users
 - normal, root and system
- ❑ How to examine User Information
- ❑ Linux Groups and the /etc/group file
 - Primary, secondary, private group
- ❑ How to add, modify and delete users and groups
- ❑ Delegating with sudo

Extra (not tested)

- System Administration
Authentication Advanced Password

[root@localhost ~]# grep student /etc/shadow
student:\$1\$9bU08pTn\$.F7dq.N1DiHTmmhawciEs0:15452:0:99999:7:::

[root@localhost ~]# openssl passwd -1 -salt 9bU08pTn student
\$1\$9bU08pTn\$.F7dq.N1DiHTmmhawciEs0

Diagram illustrating the password hashing process:

- Hashing Algo**: \$1 (MD5)
- salt**: 9bU08pTn
- hash**: \$.F7dq.N1DiHTmmhawciEs0
- password**: student

The resulting password hash is: \$1\$9bU08pTn\$.F7dq.N1DiHTmmhawciEs0

More info check out **man 3 crypt**