

SOFTSERVE PYTHON DEVELOPER INTERNSHIP

REPORT ON LINUX OPERATING SYSTEM

Report Number 2

“ACCESS RIGHTS, PRIVILEGES AND USER TYPES IN LINUX”

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Goal: to get knowledge with access right in Linux OS, as well as privileges. Learn how to change the owner of files permissions and directories. Learn the basic mechanism of user management.

- 1) Analyze the structure of the /etc/passwd and /etc/group file, what fields are present in it, what users exist on the system? Specify several pseudo-users, how to define them?

```
root@CsnKhali:/home# cat /etc/passwd
root:x:0:0:root:/bin:/usr/sbin/nologin
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin)/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
libuuid:x:100:101::/var/lib/libuuid:
syslog:x:101:104::/home/syslog:/bin/false
messagebus:x:102:105::/var/run/dbus:/bin/false
sshd:x:103:65534::/var/run/sshd:/usr/sbin/nologin
student:x:1000:1000:Student KhAI,,:/home/student:/bin/bash
root@CsnKhali:/home#
```

Fig 1.1 file structure of /etc/passwd

```

audio:x:29:
dip:x:30:student
www-data:x:33:
backup:x:34:
operator:x:37:
list:x:38:
irc:x:39:
src:x:40:
gnats:x:41:
shadow:x:42:
utmp:x:43:
video:x:44:
sasl:x:45:
plugdev:x:46:student
staff:x:50:
games:x:60:
users:x:100:
nogroup:x:65534:
libuuid:x:101:
netdev:x:102:
crontab:x:103:
syslog:x:104:
messagebus:x:105:
fuse:x:106:
mlocate:x:107:
ssh:x:108:
student:x:1000:
lpadmin:x:109:student
sambashare:x:110:student
root@CsnKhai:/home#

```

Fig 1.2 File structure of /etc/group

Present fields

- Username
- pswd (password)
- uid (unique identifier of the user within the system)
- gid (unique identifier of the user within the group)
- uid comment (comment, extended user description)
- directory (user's home directory)
- shell (user's command interpreter)

Current users

- student;
- root;

Pseudo-users

- daemon :used by system service processes;
- bin : Gives ownership of executables command;

- adm :own registration files;
- nobody : used by many services;
- sshd : used by the secure shell server;

2) What are the uid ranges? What is UID? How to define it?

uid ranges from 0 to 65535

UID (Unique Identifier).

It is defined as a unique number assigned by Linux to each user on the system.

3) What is GID? How to define it?

GID (Group Identifier): A unique identifier of the user with a group in the system.

4)) How to determine belonging of user to the specific group?

We can view content of /etc/group file and identifier the username then viewing the number assigned to it by looking at the third field of /etc/group with is the GID

```
root@CsnKhai:/dev# grep root /etc/group
root:x:0:
root@CsnKhai:/dev# grep student /etc/group
adm:x:4:syslog,student
cdrom:x:24:student
sudo:x:27:student
dip:x:30:student
plugdev:x:46:student
student:x:1000:
```

Fig 1.3 /etc/group content filtered with student and root

As we can see in Fig 1.3 root belongs to group (0) and student to group (1000).

5) What are the commands for adding a user to the system? What are the basic parameters required to create a user?

The command use to add user in the system is useradd and the basic parameter usernames see Fig 1.4.

```
root@CsnKhai:/dev# useradd karatsuba
root@CsnKhai:/dev# _
```

Fig 1.4 adding user karatsuba in the system

6) How do I change the name (account name) of an existing user?

We change the name of an existing account using usermod command

```
root@CsnKhai:/dev# usermod -l idourah christ
root@CsnKhai:/dev# _
```

Fig 1.5 changing username Christ by Idourah

7) What is skell_dir? What is its structure?

skel_dir - contains files which must be copied to the new user's home directory.

```
root@CsnKhai:/home# ls -al /etc/skel
total 20
drwxr-xr-x  2 root root 4096 Sep 15  2015 .
drwxr-xr-x 83 root root 4096 Feb 19 08:14 ..
-rw-r--r--  1 root root  220 Apr  9  2014 .bash_logout
-rw-r--r--  1 root root 3637 Apr  9  2014 .bashrc
-rw-r--r--  1 root root  675 Apr  9  2014 .profile
root@CsnKhai:/home# _
```

Fig 1.6 structure of /etc/skel

8) How to remove a user from the system (including his mailbox)?

```
root@CsnKhai:/home# userdel -r idourah
userdel: idourah mail spool (/var/mail/idourah) not found
root@CsnKhai:/home#
```

9) What commands and keys should be used to lock and unlock a user account?

```
root@CsnKhai:/home# passwd -l karatsuba
passwd: password expiry information changed.
root@CsnKhai:/home# passwd -u karatsuba
passwd: password expiry information changed.
root@CsnKhai:/home# _
```

10) How to remove a user's password and provide him with a password-free login for subsequent password change?

```
root@CsnKhai:/home# passwd -d kids
passwd: password expiry information changed.
root@CsnKhai:/home# _
```

11) Display the extended format of information about the directory, tell about the information columns displayed on the terminal

```

root@CsnKhai:/home/student# ls -al
total 92
drwxr-xr-x 5 student student 4096 Feb 19 04:02 .
drwxr-xr-x 4 root root 4096 Feb 19 08:34 ..
drwxr-xr-x 2 root root 4096 Feb 16 21:29 algorithms
drwxr-xr-x 2 root root 4096 Feb 16 08:31 bash-file
-rw----- 1 student student 320 Feb 19 08:46 .bash_history
-rw-r--r-- 1 student student 220 Sep 15 2015 .bash_logout
-rw-r--r-- 1 student student 3637 Sep 15 2015 .bashrc
drwx----- 2 student student 4096 Sep 15 2015 .cache
-rw-r--r-- 1 root root 0 Feb 16 20:35 class1
-rw-r--r-- 1 root root 11513 Feb 19 04:02 device-listing
-rw-rw-r-- 1 student student 4205 Feb 17 18:07 help
-rw-r--r-- 1 root root 17 Feb 16 20:17 homework1
-rw-r--r-- 1 root root 12 Feb 16 20:14 output
-rw-r--r-- 1 student student 675 Sep 15 2015 .profile
-rw-rw-r-- 1 student student 9181 Feb 17 18:24 screen
-rw-rw-r-- 1 student student 9181 Feb 17 18:38 tee
-rw-r--r-- 1 root root 58 Feb 17 17:34 text

```

File type

- - regular file;
- d directory

Permission

- w : writing permission
- r : reading permission
- x : use

Linux process

File owner

- root
- student

The group that own the file

12) What access rights exist and for whom (i. e., describe the main roles)?

Briefly describe the acronym for access rights

- a. Read access or (r): the owner, group member of the member who owns the file and an outsider can only read the recourse (file, directory)
- b. Write access or (w) : the owner, group member of the owner and an outsider can write within the file or directory
- c. Right to use (x): the owner, group member of the owner and outsider can use the file or directory.

To whom

- u : the owner
- g : the group
- o : others (outsider)

13) What is the sequence of defining the relationship between the file and the user?

If the UID of the file is the same as the UID of the process, the is the owner of the file

If the GID of the file matches the GID of any group the user belongs to , he is a member of the group to which the file belongs.

If neither the UID nor the GID of a file overlaps with the UID of the process and the list of groups that the user running it belongs to, that user is an outsider.

14) What commands are used to change the owner of a file (directory), as well as the mode of access to the file? Give examples, demonstrate on the terminal.

```
root@CsnKhai:/home# ls -l
total 12
drwxr-xr-x 2 root    root    4096 Feb 19 09:49 developer-dir
drwxr-xr-x 6 student student 4096 Feb 19 10:03 student
drwxr-xr-x 2 root    root    4096 Feb 16 23:51 test
root@CsnKhai:/home# chown idourah-dev developer-dir/
root@CsnKhai:/home# ls -l
total 12
drwxr-xr-x 2 idourah-dev root    4096 Feb 19 09:49 developer-dir
drwxr-xr-x 6 student    student 4096 Feb 19 10:03 student
drwxr-xr-x 2 root       root    4096 Feb 16 23:51 test
root@CsnKhai:/home#
```

Fig 1.11 changing owner of developer-dir to idourah-dev

```
student@CsnKhai:~/data$ ls -l
total 4
-rw-rw-r-- 1 student student 23 Feb 19 11:11 sensible-data
student@CsnKhai:~/data$ chmod o+x sensible-data
student@CsnKhai:~/data$ ls -l
total 4
-rw-rw-r-x 1 student student 23 Feb 19 11:11 sensible-data
student@CsnKhai:~/data$
```

15) What is an example of octal representation of access rights? Describe the umask command

```

student@CsnKhai:~/data/office$ ls -l
total 0
-rw-r--r-- 1 student student 0 Feb 19 11:42 kharkov
student@CsnKhai:~/data/office$ chmod 030 kharkov
student@CsnKhai:~/data/office$ ls -l
total 0
-----wx--- 1 student student 0 Feb 19 11:42 kharkov
student@CsnKhai:~/data/office$ _

```

Umask command: when creat a new file with touch for example by default the file has default right. Umask allows to change this default right.

```

student@CsnKhai:~/data$ umask 022
student@CsnKhai:~/data$ ls
sensible-data
student@CsnKhai:~/data$ touch text1
student@CsnKhai:~/data$ ls
sensible-data text1
student@CsnKhai:~/data$ ls -l
total 4
-rw-rw-r-x 1 student student 23 Feb 19 11:11 sensible-data
-rw-r--r-- 1 student student 0 Feb 19 11:19 text1
student@CsnKhai:~/data$ umask 666
student@CsnKhai:~/data$ touch text2
student@CsnKhai:~/data$ ls -l
total 4
-rw-rw-r-x 1 student student 23 Feb 19 11:11 sensible-data
-rw-r--r-- 1 student student 0 Feb 19 11:19 text1
----- 1 student student 0 Feb 19 11:20 text2
student@CsnKhai:~/data$ _

```

- 16) Give definitions of sticky bits and mechanism of identifier substitution.
Give an example of files and directories with these attributes.

When the Sticky bit is set on file or directory only the owner can rename of remove it, but others user can only access it.

```

student@CsnKhai:~/data/office/shared-folder$ ls -l
total 8
drwxr-xr-t 2 student student 4096 Feb 19 12:00 data
-rw-r--r-T 1 student student 0 Feb 19 12:01 data-sha5
drwxr-xr-x 2 student student 4096 Feb 19 12:00 sensible-data
student@CsnKhai:~/data/office/shared-folder$ _

```


17) What file attributes should be present in the command script?

Script file should have a x attribute (chmod +x).