File permissions in Linux

Project description

Authorization is the concept of granting access to specific resources in a system. It's important because without authorization any user could access and modify all files belonging to other users or system files. This would certainly be a security risk.

In Linux, file and directory permissions are used to specify who has access to specific files and directories. You'll explore file and directory permissions and change the ownership of a file and a directory to limit who can access them.

Check file and directory details

The file structure of the /home/researcher2/projects directory and the permissions of the files and subdirectory it contains.In the /home/researcher2/projects directory, there are five files with the following names and permissions:

- project_k.txt
  - User = read, write,
  - Group = read, write
  - Other = read, write
- project_m.txt
  - User = read, write
  - Group = read
  - Other = none
- project_r.txt
  - User= read, write
  - Group = read, write
  - Other = read
- project_t.txt
  - User = read, write
  - Group = read, write
  - Other = read
- .project_x.txt
  - User = read, write
  - Group = write
  - Other = none

There is also one subdirectory inside the projects directory named drafts. The permissions on drafts are:

- User = read, write, execute
- Group = execute
- Other = none

Describe the permissions string

Permissions strings are 10 characters long we the first giving information about it being a directory of a file by having d or - respectively
The next 9 characters are divided into 3 parts each part representing information about the permissions granted. Each part contains r which represents read , w which represents write and x which represents execution. The first set gives information about users then groups and then other users. Each letter missing from the permissions indicate the permissions are not given to that particular entity.

Change file permissions

Chmod command helps us in changing the permissions of the file .
The syntax of chmod: chmod <changes in permissions > <file/directory name>
Changes are indicated by +,-,= which add , remove and overwrite permissions respectively
Eg chmod u+x,g-wx,o=r file.txt
Gives user the ability to execute
Removes group permission to write and execute
Overwrite other user permission to read only for the file “file.txt”

```
researcher2@e1f34403bb2d:~$ pwd
/home/researcher2
researcher2@e1f34403bb2d:~$ ls
projects
researcher2@e1f34403bb2d:~$ cd projects
researcher2@e1f34403bb2d:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 03:07 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 04:22 ..
-rw--w---- 1 researcher2 research_team   46 Feb 25 03:07 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$ chmod u+x,g-w,o=r project_k.txt
researcher2@e1f34403bb2d:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rwxr--r-- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$
```

Change file permissions on a hidden file

Command ls list all files
-la list all files(hidden included) with their permissions.
Chmod u-w,g-w .project_x.txt to remove write permissions from user and group

```
researcher2@e1f34403bb2d:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 03:07 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 04:22 ..
-rw--w---- 1 researcher2 research_team   46 Feb 25 03:07 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rwxr--r-- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$ chmod u-w,g-w .project_x.txt
researcher2@e1f34403bb2d:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 03:07 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 25 04:22 ..
-r-------- 1 researcher2 research_team   46 Feb 25 03:07 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rwxr--r-- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$
```

Change directory permissions

```
drwx--x--- 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rwxr--r-- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$ chmod g-x drafts
researcher2@e1f34403bb2d:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Feb 25 03:07 drafts
-rwxr--r-- 1 researcher2 research_team   46 Feb 25 03:07 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 25 03:07 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 25 03:07 project_t.txt
researcher2@e1f34403bb2d:~/projects$
```

Summary

- Examine file and directory permissions
- Change permissions on hidden files
- Change permissions on files
- Change permissions on directories.