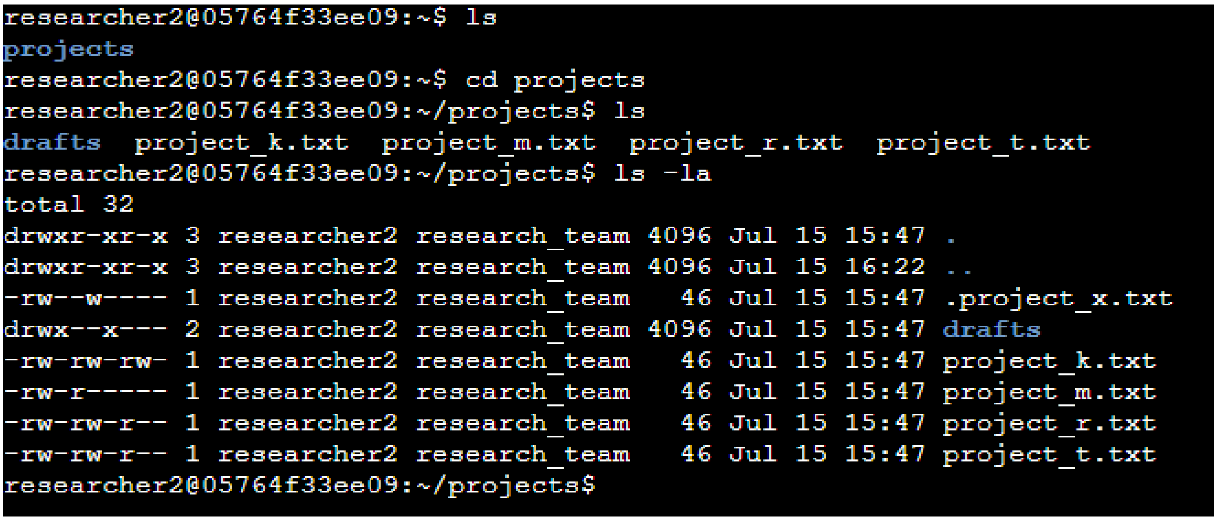
File permissions in Linux

Project description

I am a security professional at a large organization and I was tasked to examine existing permissions on the file system. I will change the permissions for files in the “projects” directory.

Check file and directory details



```
researcher2@05764f33ee09:~$ ls
projects
researcher2@05764f33ee09:~$ cd projects
researcher2@05764f33ee09:~/projects$ ls
drafts  project_k.txt  project_m.txt  project_r.txt  project_t.txt
researcher2@05764f33ee09:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 15:47 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 16:22 ..
-rw--w---- 1 researcher2 research_team   46 Jul 15 15:47 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 15 15:47 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul 15 15:47 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul 15 15:47 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_t.txt
researcher2@05764f33ee09:~/projects$
```

Firstly, using *ls* command I checked for the directory files. Then *using cd projects* I entered into projects directory. With the help of *ls -la* I displayed all the files and directories in *projects* directory with their permissions. I found out that there are four normal projects and one hidden project called *.project_x.txt*. There is also one directory *drafts*.

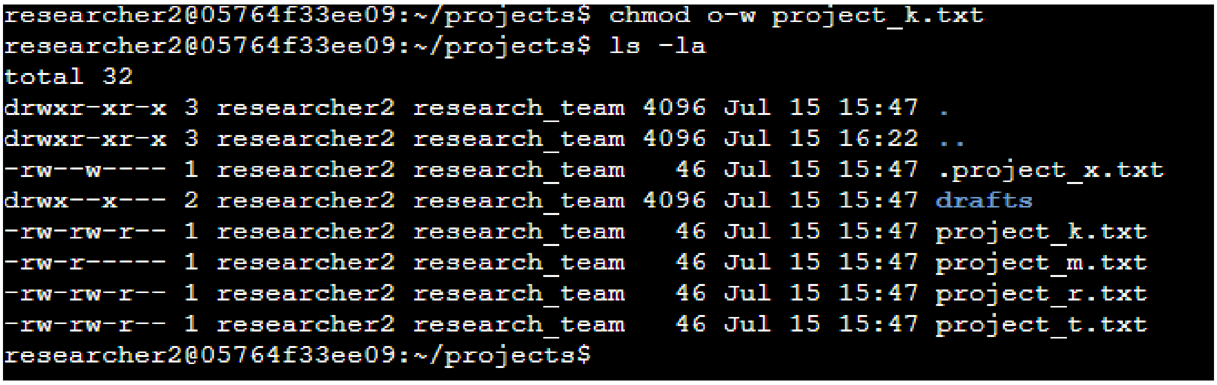
Describe the permissions string

The 10-character string tells us what permissions every group has. The first character tells us if this is a file or directory. If there is a *d* it’s a directory and if there is a *hyphen* it’s a normal file. The characters 2-4 shows us a permissions that are user’s permissions. The characters 5-7 tells us the permissions for the group and characters 8-10 help us determine what permission the others have.

There are 3 types of permission:

- r - read permission – allows reading a content of file or directory
- w - write permission – allows changing the content of a file or directory
- x – execute permission – allows executing of a file. For directory it allows to enter the directory and to access any of its files

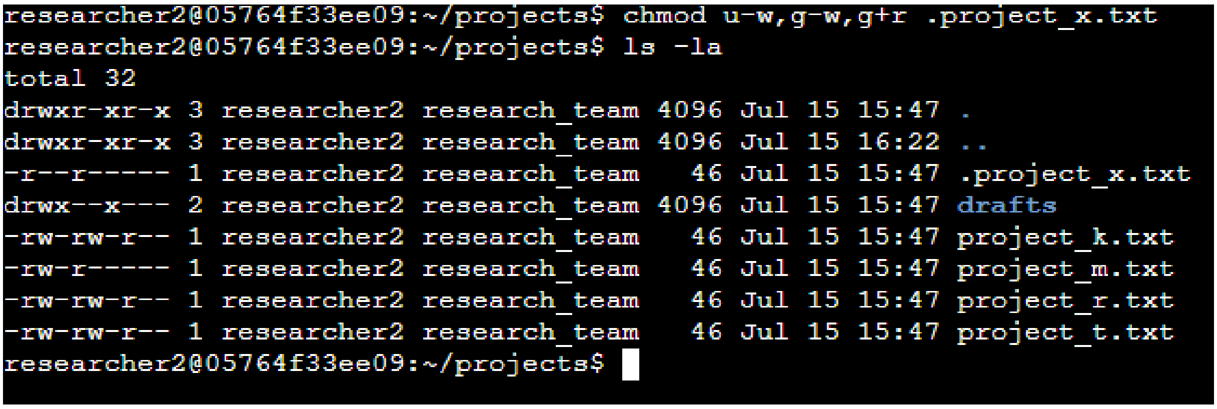
Change file permissions



```
researcher2@05764f33ee09:~/projects$ chmod o-w project_k.txt
researcher2@05764f33ee09:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 15:47 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 16:22 ..
-rw--w---- 1 researcher2 research_team   46 Jul 15 15:47 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 15 15:47 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul 15 15:47 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_t.txt
researcher2@05764f33ee09:~/projects$
```

The organization does not allow other to have write access to any files. To achieve that I checked the files and found out that that only file “project_k.txt” has the write permission for the other. So with the help of command *chmod o-w project_k.txt* I removed the write permission for the other. Using *ls -la* I displayed the changed permissions and we can see that permission is removed.

Change file permissions on a hidden file



```
researcher2@05764f33ee09:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@05764f33ee09:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 15:47 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 16:22 ..
-r--r----- 1 researcher2 research_team   46 Jul 15 15:47 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 15 15:47 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul 15 15:47 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_t.txt
researcher2@05764f33ee09:~/projects$ 
```

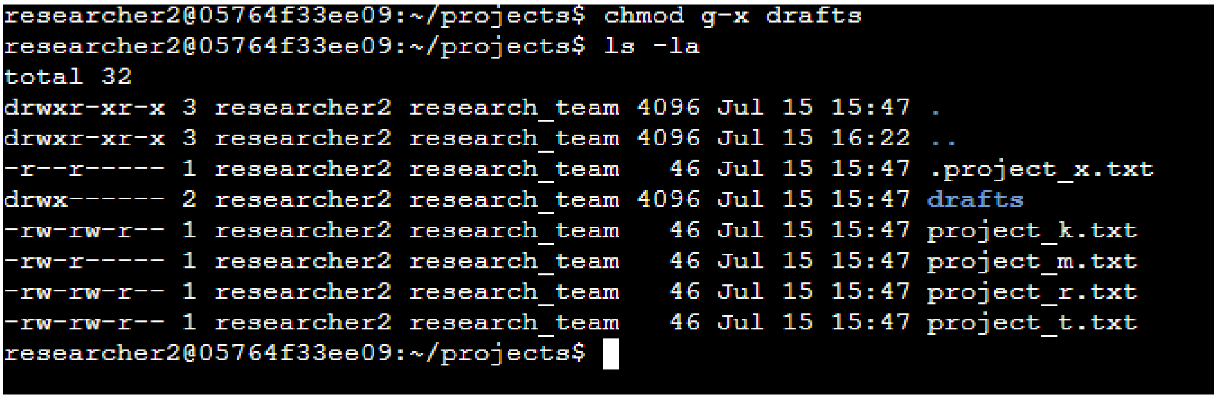
The research team has archived *.project_x.txt*, which is why it’s a hidden file. This file should not have write permissions for anyone, but the user and group should be able to read the file. I found out that users had permission for writing and reading. Group had a permission for writing. I had to remove writing permission for both users and group and add a read permission for the group.

I achieved that with command *chmod u-w, g-w, g+r .projects_x.txt.*

Change directory permissions

The files and directories in the projects directory belong to the *researcher2* user. Only *researcher2* should be allowed to access the *drafts* directory and its contents.

Here’s a following code I used to achieve this.



```
researcher2@05764f33ee09:~/projects$ chmod g-x drafts
researcher2@05764f33ee09:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 15:47 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 15 16:22 ..
-r--r----- 1 researcher2 research_team   46 Jul 15 15:47 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Jul 15 15:47 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul 15 15:47 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 15 15:47 project_t.txt
researcher2@05764f33ee09:~/projects$ 
```

With the help of command *chmod g-x drafts* I removed permission for the group and completed my goal to make a *researcher2* an only user to access this file.

Summary

I completed multiple tasks to match the level of authorization my organization set for both files and directories. I mainly used *chmod* command to change the permissions of file or directory and *ls -la* to control the progression of this process.