File permissions in Linux

Project description

The research team at my organization needs to update the file permissions for certain files and directories within the projects directory. The permissions do not currently reflect the level of authorization that should be given. Checking and updating these permissions will help keep their system secure. To complete this task, I performed the following tasks:

Check file and directory details

```
researcher2@5a5c73ca4995:~$ ls
projects
researcher2@5a5c73ca4995:~$ cd projects
researcher2@5a5c73ca4995:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 28 15:06 .
drwxr-xr-x 3 researcher2 research_team 4096 May 28 15:31 ..
-rw--w---- 1 researcher2 research_team   46 May 28 15:06 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 28 15:06 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 28 15:06 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 28 15:06 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 28 15:06 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 28 15:06 project_t.txt
```

Here I used “ls” to list the files and directories, then move to the project directory with the command “cd”, and then use the “ls” command to list the files and directories inside the directory “projects” followed by the commando “-la”. “-l” is a command used to list them with permissions, number of links, name of the owner, group, file size, time stamp and name of the file or directory, while “-a” also lists the hidden ones. Here I used both commands together by typing “-la”

Here we can see the permissions of 5 files:
.project_x.txt:
- User permissions: Read and write
- Group permissions: Write
- Other permissions: None

project_k.txt
- User permissions: Read and write
- Group permissions: Read and write
- Other permissions: Read and write

project_m.txt

User permissions: Read and write
Group permissions: Read
Other permissions: None

project_r.txt

User permissions: Read and write
Group permissions: Read and write
Other permissions: Read

project_t.txt

User permissions: Read and write
Group permissions: Read and write
Other permissions: Read

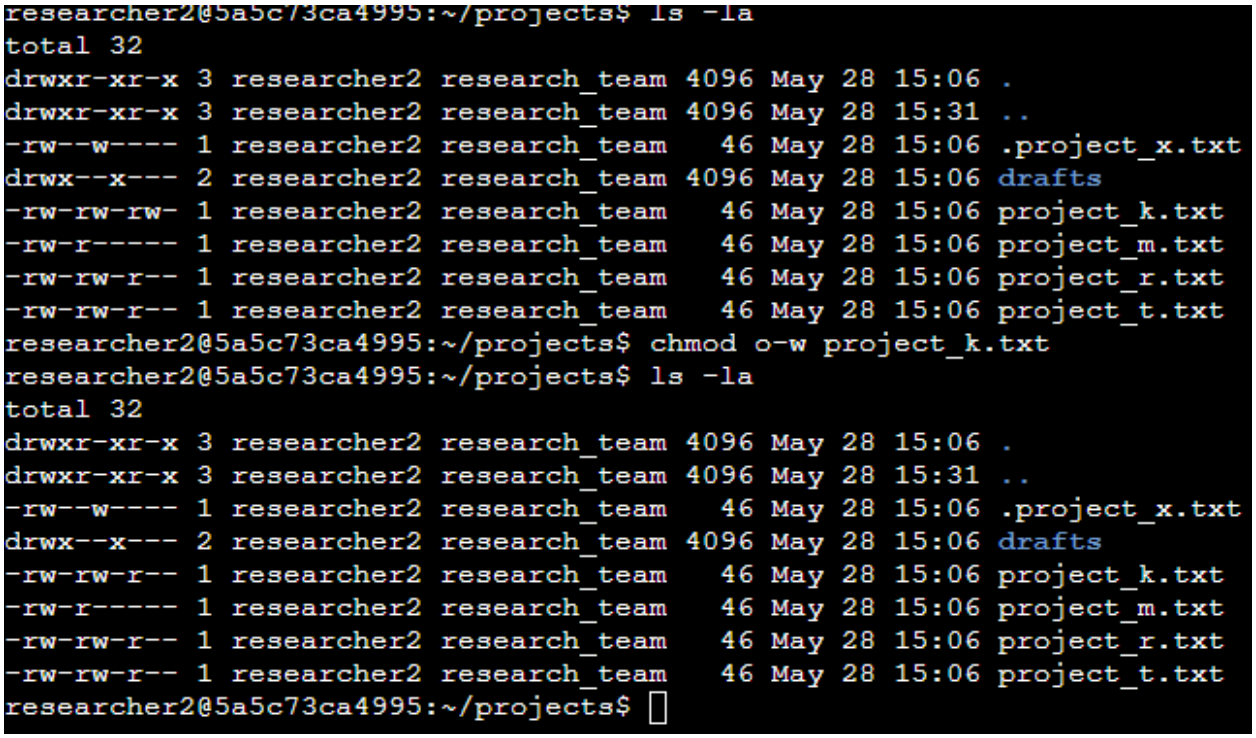
Describe the permissions string

To explain this in further detail, the permissions string is made up of 10 characters:

- **First**: describes if it´s a file or directory, “d” for directories and “-” for files.
- **Second to the fourth**: it indicates the read (r), write (w), and execute (x)permissions for the user. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted to the user.
- **Fifth to the seventh**: it indicates the read (r), write (w), and execute (x)permissions for the group. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted for the group.
- **Eighth to the tenth**: it indicates the read (r), write (w), and execute (x)permissions for the other. This owner type consists of all other users on the system apart from the user and the group. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted for the other.

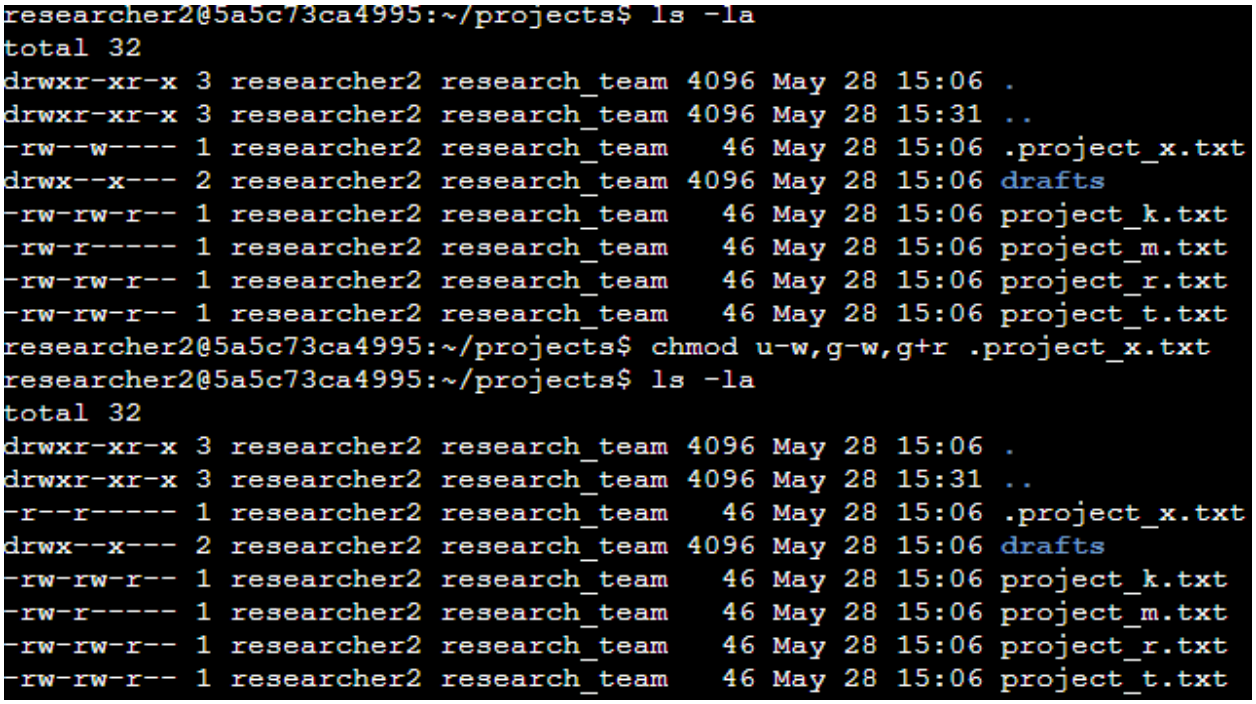
For example, the file permissions for project_m.txt are -rw-r-----. Since the first character is a hyphen (-), this indicates that project_m.txt is a file, not a directory. The second and fifth characters are r, which indicates that user and group have read permissions. The third character is w, which indicates that only the user has write permission. No one has execute permissions for project_m.txt.

Change file permissions



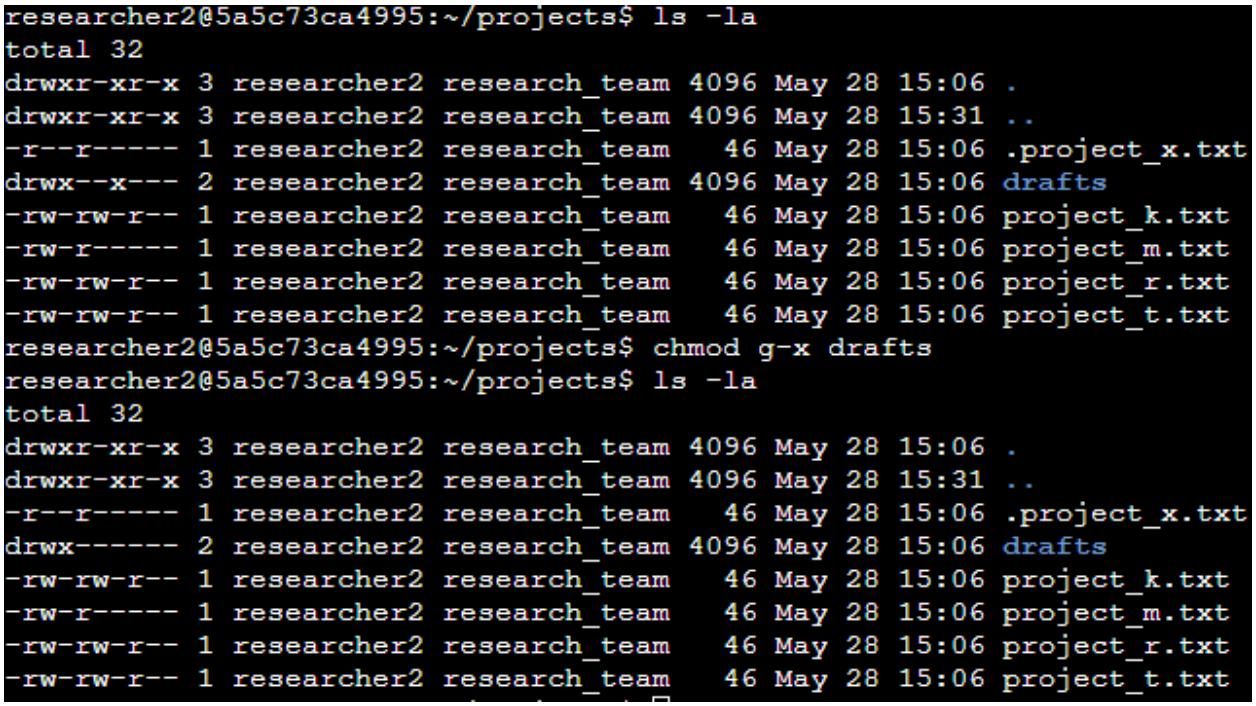
As the organization doesn't allow “other” to have write permissions in any file, we removed it’s permissions by using the command “chmod”. The syntax of this command goes like this:
After writing “chmod” you specify which type of owner you want to give or take permissions from(in this case we use “o” for “other”), followed by a mathematical operator, “-” for removing and “+” for giving permissions. Then the permission we want to modify(in this case “w” for the “write” permission) and last the name of the file that we are modifying.
We then use the command “ls -la” to check that it has successfully been changed.

Change file permissions on a hidden file



The organization asked us to take all “write” permissions from the hidden file “.project_x.txt” but “user” and “group” should be able to read it, we can say it’s a hidden file because its name starts with a period(.). We then proceeded to change permissions as we explained in the last example, removing write permissions from “user” and “group”(“other” doesn’t have write permissions).

Change directory permissions



In this case the organization asked to only leave execute permissions from the drafts directory to the owner of the directory. We proceed to remove the permissions for “group” to execute that directory, and list everything to check that now it's correctly modified.

Summary

I changed multiple permissions to match the level of authorization my organization wanted for files and directories in the projects directory. The first step in this was using ls -la to check the permissions for the directory. This informed my decisions in the following steps. I then used the chmod command multiple times to change the permissions on files and directories.