File permissions in Linux

Project description

The research team in my organization needs to update file permissions for certain files and directories for certain users in the projects directory. The permissions that are available are not updated according to the level that is needed, affecting the security of these files and directories. Checking and updating the permissions would secure the system. To complete these tasks, I performed the following steps

Check file and directory details.

The following code is how I check the file file and directory details

```
researcher2@8c23adb69a60:~$ cd projects
researcher2@8c23adb69a60:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:38 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:54 ..
-rw--w---- 1 researcher2 research_team   46 Nov 27 03:38 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 27 03:38 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 27 03:38 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 27 03:38 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_t.txt
researcher2@8c23adb69a60:~/projects$
```

The first line in the screenshot displays the command I entered to navigate to the project subdirectory. The second line is the command I entered to output all the content of the project. By using the ls command together with -la, I am able to display all the hidden and not hidden content in project. The output of my command indicates that there is one directory named drafts, one hidden file named .project_x.txt, and five other project files. The 10-character string in the first column represents the permissions set on each file or directory.

Describe the permissions string

- The 1st character in the 10-character strings can be either (d) or (-) to indicate the type. The (d) stands for directory, the (-) stands for file

- The 2nd to 4th character : The character can be (r) for read, (w) for write, and (x) for execute permissions for the user. If (-) is instead used, means the user is not granted permission.
- The 5th to 7th character : The character can be (r) for read, (w) for write, and (x) for execute permissions for the group. If (-) is instead used, means the group is not granted permission.
- The 8th to 10th character : The character can be (r) for read, (w) for write, and (x) for execute permissions for the other . If (-) is instead used, means the other is not granted permission.

For example, the project_m.txt file permissions are -rw-r—-- . The absence of (d) in the first character indicates that this is a file, not a directory. For 2nd to 4th string, the user only has read (r) and write (w) permissions. For 5th to 7th strings, the group only has read (r) permission. For the other, no permission is granted.

Change file permissions

The organization does not allow other to have write access to any files. So to achieve this, these are the steps taken. From the previous screenshot, only the project_k.txt has write permission for other. So the command I input is according to this screenshot (chmod o-w project_k.txt)

```
researcher2@8c23adb69a60:~/projects$ chmod o-w project_k.txt
researcher2@8c23adb69a60:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:38 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:54 ..
-rw--w---- 1 researcher2 research_team   46 Nov 27 03:38 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 27 03:38 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 27 03:38 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_t.txt
researcher2@8c23adb69a60:~/projects$
```

To recheck the modified permission, I use the command ls -la to view the updates. Note that for the file project_k.txt, the other no longer has write permission.

Change file permissions on a hidden file

The research team at my organization recently archived .project_x.txt. They do not want anyone to have write access to this project, but the user and group should have read access. The following code demonstrates how I used Linux commands to change the permissions:

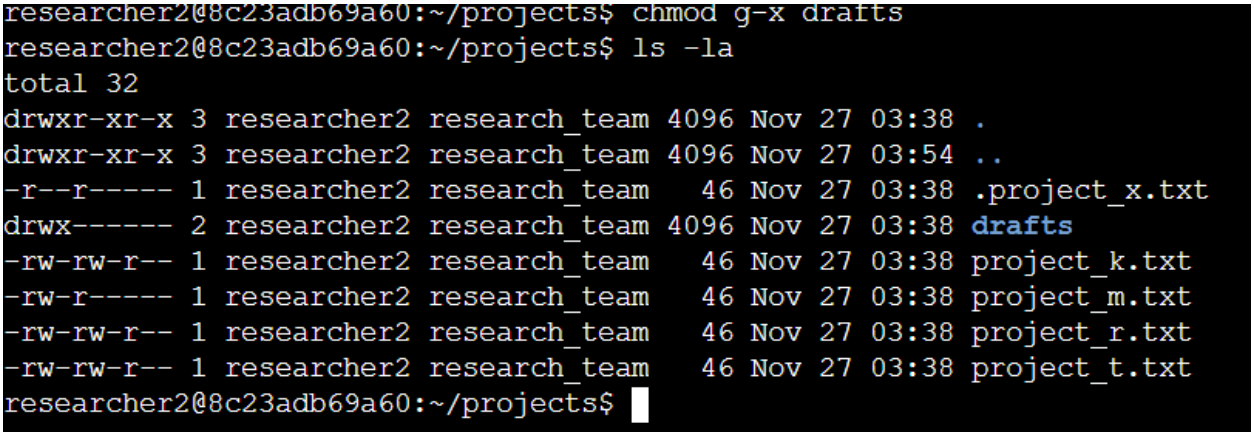
```
researcher2@8c23adb69a60:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@8c23adb69a60:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:38 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 27 03:54 ..
-r--r----- 1 researcher2 research_team   46 Nov 27 03:38 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 27 03:38 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 27 03:38 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 27 03:38 project_t.txt
researcher2@8c23adb69a60:~/projects$
```

To remove permission for (w) in user and group, I use u-w and g-w. To add permission read to the group, I use g+r. By rechecking and viewing the updated permissions using ls -la, I can the that it is modified correctly.

Change directory permissions

My organization only wants the researcher2 user to have access to the drafts directory and its contents. This means that no one other than researcher2 should have execute permissions.

These are the steps taken to execute the task :



The first two lines of the screenshot display the commands I entered, and the other lines display the output of the second command. I previously determined that the group had execute permissions, so I used the chmod command to remove them.

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. I then used the chmod command multiple times to change the permissions on files and directories.