

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

In the /home/researcher2/projects directory, there are five files with the following names and permissions:

```
researcher2@f36b0b691ac7:~$ pwd
/home/researcher2
researcher2@f36b0b691ac7:~$ ls
projects
researcher2@f36b0b691ac7:~$ cd projects
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 10 07:47 ..
-rw--w---- 1 researcher2 research_team  46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$
```

Describe the permissions string

`ls -la` command is used to display the permission details of the directories and files including hidden ones. Let's take a look at `project_k.txt` file in project directory, it has the following 10 character permission string: `-rw-rw-rw-`

It describes that it is a regular file by indicating hyphen in the first character in the string. Next 2nd, 3rd and 4th characters indicate that the user has permission only to read(**r**) and write(**w**) but no access to execute(**-**). The group and other also have the same permissions as the user that they can only read(**r**) and write(**w**) but do not have access to execute, which can be observed in the following characters from 5th to 10th.

Change file permissions

The organization does not allow other to have write access to any files. Based on the permissions established before, identified which file needs to have its permissions modified. Used Linux commands to modify these permissions.

```
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 10 07:47 ..
-rw--w---- 1 researcher2 research_team  46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$ chmod o-x .
researcher2@f36b0b691ac7:~/projects$ chmod o-x ..
researcher2@f36b0b691ac7:~/projects$ chmod o-w project_k.txt
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:47 ..
-rw--w---- 1 researcher2 research_team  46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$
```

Implemented `chmod` command to modify the permissions as per the organization's terms. As we can see before there were few permissions given to other, regarding hidden files and `project_k.txt` which were against the terms and later modified using `chmod` command. Finally, used the `ls -la` command to display the desired output that the permissions are modified and displayed the updated permissions that the owners have.

Change file permissions on a hidden file

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. So implemented a Linux command to assign `.project_x.txt` the appropriate authorization.

```
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:47 ..
-rw--w---- 1 researcher2 research_team   46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:47 ..
-r--r----- 1 researcher2 research_team   46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$
```

As we can see before that the user and the group had write access to `.project_x.txt`, but to give the required and appropriate permissions, implemented `chmod u-w,g-w,g+r .project_x.txt` command to remove the write access to the user and the group and to give read access to the group. As the user already has the permission to read so that it has not been modified. To display the achieved output, implemented the `ls -la` command to show the details of the changed permissions.

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. Used a Linux command to modified the permissions accordingly.

```
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:47 ..
-r--r----- 1 researcher2 research_team  46 Apr 10 07:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$ chmod g-x drafts
researcher2@f36b0b691ac7:~/projects$ ls -la
total 32
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:11 .
drwxr-xr-- 3 researcher2 research_team 4096 Apr 10 07:47 ..
-r--r----- 1 researcher2 research_team  46 Apr 10 07:11 .project_x.txt
drwx----- 2 researcher2 research_team 4096 Apr 10 07:11 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 10 07:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 10 07:11 project_t.txt
researcher2@f36b0b691ac7:~/projects$
```

Before it can be observed that the group has the access to execute **drafts** directory. But in the given scenario only the user should be allowed to access **drafts** directory and its contents. So, I implemented the **chmod g-x drafts** command to remove the execute access to the group to give the appropriate permissions. To display the achieved output, implemented the **ls -la** command to show the details of the modified access permissions.

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.