

File permissions in Linux

Project description

In this project, I used Linux commands to manage file permissions in `/home/researcher2/projects` directory. The goal was to verify proper user authorization and update permissions to maintain system security. I made sure all the authorized users have appropriate access and removed any unnecessary users.

Check file and directory details

I used the following command to check the file and directory permissions.

```
researcher2@fd394c85248e:~$ ls -la /home/researcher2/projects
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 17:57 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 18:28 ..
-rw--w---- 1 researcher2 research_team  46 Apr 19 17:57 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 19 17:57 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Apr 19 17:57 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 19 17:57 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_t.txt
researcher2@fd394c85248e:~$
```

The first line of the screenshot displays the `ls -la` command that I used to display all the following file contents including the hidden one. The output of my command shows that there is only one hidden file named `.project_x.txt` and a directory named `drafts`.

Describe the permissions string

There are 10 character permission strings used in Linux to determine who is authorized to access what part of the directory.

- 1st character : The 1st character is (d) to state a directory file however, hyphen (-) is used as the 1st character if it is just a regular file.
- 2-4th character : These 3 characters indicate the read (r), write (w) and execute (x) permissions for the user. If the user does not have one of the permissions then, it is indicated with a hyphen (-).
- 5-7th character : The 3 characters indicate read (r), write (w) and execute (x) permissions for the group. However, if the group is not permitted with one or any of the permissions it is indicated with a hyphen (-).

- 8-10th character: The last 3 characters indicate read (r), write (w) and execute (x) permissions for others and if they are not permitted with one or any of the permissions it is indicated with a hyphen (-).

For example, for `project_r.txt`, `-rw-rw-r--`, indicates that it is a file not a directory because of the 1st character being (-). The 2-4th characters indicate that the user only has read (r) and write (w) permissions and not execute permission as it is stated by (-) and not (x). Similarly, the group also only has read (r) and write (w) permissions with others only having 1 permission i.e. read (r).

Change file permissions

My organization stated that they did not want other to have write access to any of their files. I identified that other directories and files do not have write access to other except for the file `project_k.txt` so, I used the following command to remove write access for other.

```
researcher2@fd394c85248e:~/projects$ chmod o-w project_k.txt
researcher2@fd394c85248e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 17:57 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 18:28 ..
-rw--w---- 1 researcher2 research_team  46 Apr 19 17:57 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 19 17:57 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 19 17:57 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_t.txt
researcher2@fd394c85248e:~/projects$
```

The first line of the code states that I changed the file permission using `chmod o-w` to remove write permission for other. Then, I used the `ls -la` command to show the changes that have been made.

Change file permissions on a hidden file

The research team at my organization archived the folder named `.project_x.txt` and they did not want anyone to have write and execute permission to the file. However, they did want the user and group to have read permission. So, I used the `chmod` command to change permissions.

```
researcher2@fd394c85248e:~/projects$ chmod g-w,u-w,g+r .project_x.txt
researcher2@fd394c85248e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 17:57 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 18:28 ..
-r--r----- 1 researcher2 research_team  46 Apr 19 17:57 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Apr 19 17:57 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 19 17:57 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_t.txt
researcher2@fd394c85248e:~/projects$
```

At first, I identified the hidden file with (.) in front of the file name i.e. `.project_k.txt`. Originally the file had write access to the user and the group and did not have the read access for the group so, I first used (g-w) and (u-w) to remove write permission for the group and the user respectively then, lastly wrote (g+r) to add reading access for the group.

Change directory permissions

My organization only wanted the `researcher2` users to have access to the `drafts` directory and its contents (no one should be able to execute it other than the user) however, initially the group also had access to execute the file.

So, I used the `chmod (g-x)` command to change the file permission to remove the group to have execute permission; however, the user already had the read permission so, I did not have to change any command.

```
researcher2@fd394c85248e:~/projects$ chmod g-x drafts
researcher2@fd394c85248e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 17:57 .
drwxr-xr-x 3 researcher2 research_team 4096 Apr 19 18:28 ..
-r--r----- 1 researcher2 research_team  46 Apr 19 17:57 .project_x.txt
drwx----- 2 researcher2 research_team 4096 Apr 19 17:57 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Apr 19 17:57 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Apr 19 17:57 project_t.txt
researcher2@fd394c85248e:~/projects$
```

Summary

I changed permissions for multiple files and directories listed in the `projects` directory to match the level of authorization my organization wanted. First, I used the `ls -la` command to view permissions to the files and directories, then I used the `chmod` command to change permissions on each as mentioned.