File permissions in Linux

Project description

[In this lab, I practiced examining and managing Linux file permissions using Bash commands. I checked the existing permissions on files within a directory, identified any incorrect or insecure settings, and modified those permissions to ensure proper user authorization. I also removed unauthorized access from a specific directory to strengthen security. Throughout the process, I used Linux command-line tools and documented the commands I ran. Below is a record of what I accomplished]

Check file and directory details

[In this task, I explored the permissions of the `projects` directory and the files it contained.]

```
researcher2@69238beaa0b5:~$ cd projects
researcher2@69238beaa0b5:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Dec  2 18:33 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec  2 18:33 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 18:33 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 18:33 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 18:33 project_t.txt
researcher2@69238beaa0b5:~/projects$ 
```

Using the ls -l command we checked the permissions for the files and directory in the **projects** directory

Describing a permissions string for a file or a directory

[The permissions string consists of 10 characters.

The first character shows the file type: **d** means it's a directory, and **-** means it's a regular file.
The next three characters show the **user's** permissions: **r** for read, **w** for write, and **x** for execute. A **-** means the user doesn't have that permission.
The following three characters show the **group's** permissions, using the same **r**, **w**, **x**, and **-** meanings.
The last three characters show the permissions for **others** (everyone else on the system), again using **r**, **w**, **x**, or **-** to show what they can or can't do.]

Change file permissions

[Due to the organization's policy not to allow **others** to have write access to any file, we need to change the permissions for the file project_k.txt]

```
drwx--x--- 2 researcher2 research_team 4096 Dec  2 19:10 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec  2 19:10 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 19:10 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_t.txt
researcher2@ccf93f407c17:~/projects$ chmod o-w project_k.txt
researcher2@ccf93f407c17:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Dec  2 19:10 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 19:10 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_t.txt
researcher2@ccf93f407c17:~/projects$ 
```

We used the chmod command to take away the (w) write privileges for **other** users

Change file permissions on a hidden file

[We also get tasked to check the file permissions on any hidden files as hidden files should not have write permissions for anyone, so we use the ls -al command to discover hidden files]

```
researcher2@ccf93f407c17:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 19:10 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 20:02 ..
-rw--w---- 1 researcher2 research_team   46 Dec  2 19:10 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 19:10 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 19:10 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_t.txt
researcher2@ccf93f407c17:~/projects$ 
```

As you can see the hidden file .project_x.txt has (w) write permissions for both users and groups. Lets change this so that it can only be read by users.

```
researcher2@ccf93f407c17:~/projects$ chmod u-w,g-w .project_x.txt
researcher2@ccf93f407c17:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 19:10 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 20:02 ..
-r-------- 1 researcher2 research_team   46 Dec  2 19:10 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 19:10 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 19:10 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_t.txt
researcher2@ccf93f407c17:~/projects$ 
```

As you can see .project_x.txt only has read permissions for the users.

Changing directory permissions

[With the directory drafts, we have been told that only the researcher2 user should be able to access this directory, so let's alter the permissions on this directory.]

```
researcher2@ccf93f407c17:~/projects$ chmod g-x drafts
researcher2@ccf93f407c17:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Dec  2 19:10 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 19:10 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 19:10 project_t.txt
researcher2@ccf93f407c17:~/projects$
```

We have taken the access privileges away from the group so that only the user researcher2 has access to this directory.

Summary

[In this project, I reviewed and managed Linux file and directory permissions using Bash commands. I began by checking the permissions of the *projects* directory and its contents with `ls -l`, and I interpreted permission strings to understand access levels for users, groups, and others. I then corrected insecure permissions by using `chmod` to remove write access from certain files, including a hidden file that needed stricter restrictions. Finally, I adjusted the permissions on the *drafts* directory to ensure that only the intended user, *researcher2*, could access it. Throughout the lab, I followed organizational security policies and documented the commands I used.]