File permissions in Linux

Project description

In this project, I worked on updating file and directory permissions in Linux using command-line tools. The goal was to make sure access levels matched the organization's security needs. By checking current permissions and adjusting them with the chmod command, I was able to control who can read, write, or execute specific files and directories.

Check file and directory details

To start, I used the `ls -l` command to list the files and directories in the `projects` directory. This command shows details like file type, owner, group, and permission settings. This gave me a clear view of the existing access structure for all items in the directory.

```
researcher2@ae6ebacaacab:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jul 12 23:26 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul 12 23:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul 12 23:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_t.txt
researcher2@ae6ebacaacab:~/projects$
```

Describe the permissions string

Each file or directory has a 10-character string that shows its permissions. Here's how it's structured:

- 1st character: File type (d for directory, - for file)

- 2nd–4th characters: Permissions for the user (read r, write w, execute x)

- 5th–7th characters: Permissions for the group

- 8th–10th characters: Permissions for others (everyone else)

For example, -rw-rw-r-- means:

- It's a file (not a directory)

- User and group can read and write

- Others can only read

Change file permissions

To make the system more secure, I removed write permissions for **others** on `project_k.txt` and group read permissions on `project_m.txt` t I used the `chmod` command to do this, followed by `ls -l` to verify that the permissions were updated.

```
researcher2@ae6ebacaacab:~/projects$ chmod o-w project_k.txt
researcher2@ae6ebacaacab:~/projects$ chmod g-r project_m.txt
researcher2@ae6ebacaacab:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jul 12 23:26 drafts
-rw-rw---- 1 researcher2 research_team   46 Jul 12 23:26 project_k.txt
-rw------- 1 researcher2 research_team   46 Jul 12 23:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_t.txt
```

Change file permissions on a hidden file

The hidden file `.project_x.txt` needed to be archived, so no one should be able to write to it. First I used the ls -la command to view hidden files in the projects directory. Then I removed write permissions from both the user and group, and made sure the group could still read it. I used `chmod u-w`, `g-w`, and `g+r` to apply these changes.

```
researcher2@ae6ebacaacab:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@ae6ebacaacab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 12 23:26 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 13 00:17 ..
-r--r----- 1 researcher2 research_team   46 Jul 12 23:26 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 12 23:26 drafts
-rw-rw---- 1 researcher2 research_team   46 Jul 12 23:26 project_k.txt
-rw------- 1 researcher2 research_team   46 Jul 12 23:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_t.txt
```

Change directory permissions

Only the `researcher2` user should have access to the `drafts` directory. I removed execute permissions from the group using `chmod g-x`. This prevents others from accessing or listing the contents of that directory unless they are the owner.

```
researcher2@ae6ebacaacab:~/projects$ chmod g-x drafts
researcher2@ae6ebacaacab:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Jul 12 23:26 drafts
-rw-rw---- 1 researcher2 research_team   46 Jul 12 23:26 project_k.txt
-rw------- 1 researcher2 research_team   46 Jul 12 23:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul 12 23:26 project_t.txt
```

Summary

This project involved checking and updating file and directory permissions in Linux using commands like `ls -la` and `chmod`. I made sure access control was set correctly based on what the organization needed, restricting who can read, write, or execute each item. These changes help protect sensitive files and limit access to only authorized users.