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 existing permissions did not align with the required authorization levels, creating potential security risks. To resolve this, I examined current permissions, adjusted them using Linux commands, and ensured only authorized users had the appropriate access. This process strengthened the system's security while demonstrating practical Linux file management skills.

Check file and directory details

```
researcher2@f5f4a1ee012f:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  6 15:01 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  6 16:10 ..
-rw--w---- 1 researcher2 research_team   46 Nov  6 15:01 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$
```

The first line I entered is the command I used to list all files and directory details including hidden files. The output shows a directory called drafts, a hidden file named `.project_x.txt`, four other project files, and the permissions to each directory and file. We know `.project_x.txt` is a hidden file due to the `.` in front of the name as that represents a hidden file.

Describe the permissions string

A 10-character string shows who can access a file and what they can do with it. Each character has a specific meaning:

- **1st character:** Indicates the file type. A `d` means it's a directory, and a `-` means it's a regular file.
- **2nd–4th characters:** Show the user's permissions. `r` is read, `w` is write, and `x` is execute. A `-` in any position means that permission is **not** granted to the user.
- **5th–7th characters:** Show the group's permissions in the same order: read (`r`), write (`w`), execute (`x`). A `-` means that permission is not granted to the group.

- **8th–10th characters:** Show permissions for all other users (everyone else on the system). Again, `r` is read, `w` is write, `x` is execute, and `-` means the permission is not granted.

In short, this string gives a snapshot of who can access the file and what actions they're allowed to take.

Change file permissions

```
researcher2@f5f4a1ee012f:~/projects$ chmod o-w project_k.txt
researcher2@f5f4a1ee012f:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$ chmod g-r project_m.txt
researcher2@f5f4a1ee012f:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$
```

The first command I entered here changes the owner permissions of `project_k.txt`. The output of the command removed the ability to write to the file. After this, I used `ls -la` to review the updates I made.

The second command was to change the group permissions of the file `project_m.txt`. The output of the command resulted in the removal of the read permission. After this, I used `ls -la` to review the updates I made.

Change file permissions on a hidden file

```
researcher2@f5f4a1ee012f:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@f5f4a1ee012f:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  6 15:01 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  6 16:10 ..
-r--r----- 1 researcher2 research_team   46 Nov  6 15:01 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$
```

The command I entered here was to change the access capabilities of the user, group, and owner for the `.project_x.txt` file. The output of `u-w` removed the users permission to write. The output of `g-w` removed the group's permission to write. The output of `g+r` added the group's ability to read. After this, I used `ls -la` to review the updates I made.

Change directory permissions

```
researcher2@f5f4a1ee012f:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$ chmod g-x drafts
researcher2@f5f4a1ee012f:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Nov  6 15:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov  6 15:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  6 15:01 project_t.txt
researcher2@f5f4a1ee012f:~/projects$
```

The first line I entered is the command I used to list all files and directory details not including hidden files. The second command changed the access permissions to the directory `drafts`. The output of `g-x` removed the execute permission of the group. After this, I used `ls -l` to review the updates I made.

Summary

I updated the permissions on several files and directories in the projects folder to align with the organization's required access levels. I started by running `ls -la` to review the current permissions, which helped guide my next steps. After assessing the existing settings, I applied the `chmod` command several times to adjust the permissions as needed.