File permissions in Linux

Project description

I will be examining and updating the research team's permissions for files and directories in the projects directory. I will be updating authorizations to match what should be given.

Check file and directory details

```
researcher2@63c7bca87596:~$ ls
projects
researcher2@63c7bca87596:~$ cd projects
researcher2@63c7bca87596:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 10:31 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 11:48 ..
-rw--w---- 1 researcher2 research_team   46 Aug 22 10:31 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 22 10:31 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 22 10:31 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 22 10:31 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 10:31 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 10:31 project_t.txt
researcher2@63c7bca87596:~/projects$
```

This shows how I used Linux commands to find the current file and directory permissions. I first used ls to list the contents of the started directory. Next, I used cd to change directories to projects. Lastly, I used the -la option of ls to list permissions on all the contents in projects, including hidden files.

Describe the permissions string

The permissions string is a 10-character string is used to determine who has access and what permissions they have on files and directories. The characters and what they mean are as follows:

- 1st character: Shows the file type. A d is for a directory, and – for a regular file.
- 2nd-4th characters: The next three characters show the read, write, and execute (or rwx respectively) for the user. If one the characters are a – instead, then the user hasn't been granted permissions to access.
- 5th-7th characters: The next three characters show the read, write, and execute (or rwx respectively) for the group that the user belongs to. If one the characters are a – instead, then the user hasn't been granted permissions to access.

- 8th-10th characters: The next three characters show the read, write, and execute (or rwx respectively) for all other users. If one the characters are a – instead, then the user hasn't been granted permissions to access.

As an example, for project_r.txt, the permissions are -rw-rw-r--. Since the first character is -, we can determine it's a file. Next, we see characters 2-4 and 5-7 are both rw-, we know the both the user and group have read and write permissions. Lastly, since characters 8-10 are r--, all other users on have read permission.

Change file permissions

```
researcher2@63c7bca87596:~/projects$ chmod o-w project_k.txt
researcher2@63c7bca87596:~/projects$ chmod g-r project_m.txt
researcher2@63c7bca87596:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 10:31 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 11:48 ..
-rw--w---- 1 researcher2 research_team   46 Aug 22 10:31 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 22 10:31 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 10:31 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 22 10:31 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 10:31 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 10:31 project_t.txt
researcher2@63c7bca87596:~/projects$
```

It was determined that other users don't need write permissions on any file, so based on the previous screenshot project_k.txt needs that permission removed. That was accomplish via the chmod command. The command chmod o-w project_k.txt has two arguments. The first o-w removes the write permission for the other users category. The second argument of project_k.txt is the file that is having its permissions edited.

Lastly, project_m.txt is a restricted file that only the user should have permission on. Thus we used chmod g-r project_m.txt to remove the read access that the group had. Then, I used ls -la to confirm changes.

Change file permissions on a hidden file

```
researcher2@77eacea58f49:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 12:41 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 13:05 ..
-rw--w---- 1 researcher2 research_team   46 Aug 22 12:41 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 22 12:41 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 22 12:41 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_t.txt
researcher2@77eacea58f49:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@77eacea58f49:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 12:41 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 13:05 ..
-r--r----- 1 researcher2 research_team   46 Aug 22 12:41 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 22 12:41 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 22 12:41 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_t.txt
researcher2@77eacea58f49:~/projects$
```

The hidden file .project_x.txt should on be readable by the user and group and shouldn't be writeable by anyone. You can tell the file is hidden because it starts with a ".". I used `chmod u-w,g-w,g+r .project_x.txt` to remove both the write permissions from both user and the group while granting read permissions to the group. I then used ls -la to confirm changes.

Change directory permissions

```
researcher2@77eacea58f49:~/projects$ chmod g-x drafts
researcher2@77eacea58f49:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 12:41 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 22 13:05 ..
-r--r----- 1 researcher2 research_team   46 Aug 22 12:41 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug 22 12:41 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 22 12:41 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 22 12:41 project_t.txt
researcher2@77eacea58f49:~/projects$
```

The drafts directory should only be accessible by the user(researcher2). Using `chmod g-x drafts` I removed the execute permissions from the group. I used `ls -la` to verify changes.

Summary

I changed multiple permissions to match the authorization level that the company wants for the projects directory. Using ls -la to check the permissions, then I used multiple chmod commands to change the permissions.