File permissions in Linux

Project description

You are a security professional at a large organization. You mainly work with their research team. Part of your job is to ensure users on this team are authorized with the appropriate permissions. This helps keep the system secure.

Your task is to examine existing permissions on the file system. You'll need to determine if the permissions match the authorization that should be given. If they do not match, you'll need to modify the permissions to authorize the appropriate users and remove any unauthorized access.

Check file and directory details:

I navigated to the projects directory where I then used the ls -la command to look for hidden files or directories.

```
researcher2@67cf2db55863:~$ cd projects
researcher2@67cf2db55863:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 30 17:40 .
drwxr-xr-x 3 researcher2 research_team 4096 May 30 18:09 ..
-rw--w---- 1 researcher2 research_team   46 May 30 17:40 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$
```

The first line of the screenshot displays the command I entered, and the other lines display the output. The code lists all contents of the projects directory. I used the ls command with the -la option to display a detailed listing of the file contents that also returned hidden files. The output of my command indicates that there is one directory named drafts, one hidden file named .project_x.txt, and five other project files. The 10-character string in the first column represents the permissions set on each file or directory.

Describe the permissions string:

The 10-character string can be deconstructed to determine who is authorized to access the file and their specific permissions. The characters and what they represent are as follows:

1st character: This character is either a d or hyphen (-) and indicates the file type. If it's a d, it's a directory. If it's a hyphen (-), it's a regular file.

2nd-4th characters: These characters indicate the read (r), write (w), and execute (x)

permissions for the user. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted to the user.

5th-7th characters: These characters indicate the read (r), write (w), and execute (x) permissions for the group. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted for the group.

8th-10th characters: These characters indicate the read (r), write (w), and execute (x) permissions for other. This owner type consists of all other users on the system apart from the user and the group. When one of these characters is a hyphen (-) instead, that indicates that this permission is not granted for other.

For example, the file permissions for project_t.txt are -rw-rw-r--. Since the first character is a hyphen (-), this indicates that project_t.txt is a file, not a directory. The second, fifth, and eighth characters are all r, which indicates that user, group, and other all have read permissions. The third and sixth characters are w, which indicates that only the user and group have write permissions. No one has execute permissions for project_t.txt.

Change file permissions:

I used the following command to change the permission of file project_k.txt to remove other from being able to write in that file. chmod o-w project_k.txt

```
researcher2@67cf2db55863:~/projects$ chmod o-w project_k.txt
researcher2@67cf2db55863:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$
```

Then I used chmod g-r project_m.txt to remove permission from the group on project m.

```
researcher2@67cf2db55863:~/projects$ chmod g-r  project_m.txt
researcher2@67cf2db55863:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw------- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$
```

Change file permissions on a hidden file:

I was asked to change the permissions of file .project_x.txt so that both the user and the group can read, but not write to the file.

```
researcher2@67cf2db55863:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 30 17:40 .
drwxr-xr-x 3 researcher2 research_team 4096 May 30 18:09 ..
-rw--w---- 1 researcher2 research_team   46 May 30 17:40 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw------- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$ chmod  g=r .project_x.txt
researcher2@67cf2db55863:~/projects$ chmod u=r .project_x.txt
researcher2@67cf2db55863:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 30 17:40 .
drwxr-xr-x 3 researcher2 research_team 4096 May 30 18:09 ..
-r--r----- 1 researcher2 research_team   46 May 30 17:40 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw------- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$
```

Change directory permissions:

Lastly, I was asked to remove the execute permission for the group from the drafts directory. I used the following command chmod g-x drafts.

```
researcher2@67cf2db55863:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 30 17:40 .
drwxr-xr-x 3 researcher2 research_team 4096 May 30 18:09 ..
-r--r----- 1 researcher2 research_team   46 May 30 17:40 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw------- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$ chmod g-x drafts
researcher2@67cf2db55863:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 May 30 17:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_k.txt
-rw------- 1 researcher2 research_team   46 May 30 17:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 30 17:40 project_t.txt
researcher2@67cf2db55863:~/projects$
```

Summary

I did the following;

- examine file and directory permissions,
- change permissions on files, and
- change permissions on directories.

I changed multiple permissions to match the level of authorization my organization wanted for files and directories in the projects directory. The first step in this was using ls -la to check the permissions for the directory. This informed my decisions in the following steps. I then used the chmod command multiple times to change the permissions on files and directories.