File permissions in Linux

Project description

It was presented as a scenario where I worked as a security professional at a large organization, mainly with their research team. Part of the job is to ensure users on this team are authorized with the appropriate permissions. This helps keep the system secure.
My task is to examine existing permissions on the file system, determine if the permissions match the authorization that should be given, modify the permissions to authorize the appropriate users and remove any unauthorized access.

Check file and directory details

In this task, the goal was to explore the permissions of the projects directory and the files it contains. The lab starts with /home/researcher2 as the current working directory.
I run the following commands for more details:

```
researcher2@112dbaac814f:~$ ls
projects
researcher2@112dbaac814f:~$ cd projects
researcher2@112dbaac814f:~/projects$ ls
drafts  project_k.txt  project_m.txt  project_r.txt  project_t.txt
researcher2@112dbaac814f:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jul  6 22:44 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul  6 22:44 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul  6 22:44 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  6 22:44 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  6 22:44 project_t.txt
researcher2@112dbaac814f:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul  6 22:44 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul  6 23:53 ..
-rw--w---- 1 researcher2 research_team   46 Jul  6 22:44 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul  6 22:44 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul  6 22:44 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul  6 22:44 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  6 22:44 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  6 22:44 project_t.txt
researcher2@112dbaac814f:~/projects$
```

I used the ls command with the -la option to display a detailed listing of the file contents that also returned hidden files.

Describe the permissions string

The 10-character string begins each entry and indicates how the permissions on the file are set.
The 1st character indicates the file type. The d indicates it's a directory. When this character is a hyphen (-), it's a regular file.

- The 2nd-4th 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.
- The 5th-7th 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.
- The 8th-10th characters indicate the read (r), write (w), and execute (x) permissions for the owner type of 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.

Change file permissions

In this task, the goal was to determine whether any files have incorrect permissions and then change the permissions as needed. This action will remove unauthorized access and strengthen security on the system.
None of the files should allow the other users to write to files.
I run the following commands to remove the writing permissions for others on the project_k, file and the read and write permissions for groups on project_m.txt:

```
chmod o-w project_k.txt
chmod g-r-w project_m.txt
```

The `chmod` command changes the permissions on files and directories.

Change file permissions on a hidden file

The file .project_x.txt is a hidden file that has been archived and should not be written to by anyone. (The user and group should still be able to read this file.)
It was run the following command to achieve the request:

```
chmod u-w,g+r-w .project_x.txt
```

Change directory permissions

In this task, the goal was to change the permissions of a directory. First, I checked the group permissions of the /home/researcher2/projects/drafts directory and then modified the permissions as required.
Only the researcher2 user should be allowed to access the drafts directory and its contents. (This means that only researcher2 should have execute privileges.)
For this was used the following command:
`chmod g-x drafts`

Summary

I changed multiple permissions for files and directories. 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.