File permissions in Linux

Project description

In this scenario, I am a security professional at a large organization and mainly work with their research team.To ensure users on this team are authorized with the appropriate permissions by examining existing permissions on the file system, modifying the permissions to authorize the appropriate users, and removing any unauthorized access in Linux to help keep the system secure.

Check file and directory details

Check the permissions set for files and subdirectories in the **`projects`** directory. Make sure you display all permissions, including hidden files.

I used `ls -la projects` to display all file and subdirectories in the projects directory.

```
researcher2@6490b536bed7:~$ ls
projects
researcher2@6490b536bed7:~$ ls -la projects
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:26 .
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:49 ..
-rw--w---- 1 researcher2 research_team   46 May 22 18:26 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 22 18:26 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 22 18:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_t.txt
researcher2@6490b536bed7:~$
```

Describe the permissions string

For the file `project_k.txt`, the user has read and write permissions, the group has read and write permissions, and other have read and write permissions. The r stands for read and the w stands for write. The hyphen at the beginning shows it is a file, not a directory. The hyphen after the w's show that the execute permission is not granted.

```
-rw-rw-rw- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
```

Change file permissions

Other write access was removed for the file `project_k.txt` by using `chmod` to change permissions, then `o-w` to remove the the write access from other.

```
researcher2@6490b536bed7:~$ cd projects
researcher2@6490b536bed7:~/projects$ chmod o-w project_k.txt
researcher2@6490b536bed7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:26 .
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:49 ..
-rw--w---- 1 researcher2 research_team   46 May 22 18:26 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 22 18:26 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 22 18:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_t.txt
researcher2@6490b536bed7:~/projects$
```

Change file permissions on a hidden file

This hidden file, shown through `ls -la`, should not have write permissions for anyone, but the user and group should be able to read the file, so using `chmod` to change permissions, the user lost write permissions, the group lost write permissions, and the group was given read permissions.

```
researcher2@6490b536bed7:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@6490b536bed7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:26 .
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:49 ..
-r--r----- 1 researcher2 research_team   46 May 22 18:26 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 22 18:26 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 22 18:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_t.txt
researcher2@6490b536bed7:~/projects$
```

Change directory permissions

The files and directories in the projects directory belong to the **`researcher2`** user. Only **`researcher2`** should be allowed to access the **`drafts`** directory and its contents.

Using `ls -la` to display the permissions of all files and directories, including hidden ones, you could see the group had execute permission to the drafts directory. Using `chmod` to change permissions, I removed the execute permission from the group.
I then used `ls -la` to confirm permissions were correct.

```
researcher2@6490b536bed7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:26 .
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:49 ..
-r--r----- 1 researcher2 research_team   46 May 22 18:26 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 22 18:26 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 22 18:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_t.txt
researcher2@6490b536bed7:~/projects$ chmod g-x drafts
researcher2@6490b536bed7:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:26 .
drwxr-xr-x 3 researcher2 research_team 4096 May 22 18:49 ..
-r--r----- 1 researcher2 research_team   46 May 22 18:26 .project_x.txt
drwx------ 2 researcher2 research_team 4096 May 22 18:26 drafts
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 22 18:26 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 22 18:26 project_t.txt
researcher2@6490b536bed7:~/projects$
```

Summary

After examining the permissions for the research team, changes were made to access by using linux commands `chmod` and `ls -la` to confirm permissions had changed. Using the principle of least privilege helps reduce security risks to the file system.