Linux commands for managing file permissions

Scenario

You are a security professional in a large organization. You work primarily with your research team. Part of your job is to make sure that the users on this team have the right permissions. This helps keep the system secure.

You must examine and manage the permissions on the files in the `/home/researcher2/projects` directory for the `researcher2` user.

The `researcher2` user is part of the `research_team` group.

You must check the permissions for all files in the directory, including any hidden files, to make sure that permissions align with the authorization that should be given. When it doesn't, you must change the permissions.

Project description

The research team in my organization needs to update file permissions for certain files and directories within the `projects` directory. Currently, the permissions do not reflect the required authorization level. Reviewing and updating these permissions will help maintain system security. To complete this task, I performed the following actions

Check file and directory details

I used Linux commands to explore the permissions of the `projects` directory and the files it contains.

1. First, I used the `pwd` command to check my current directory. Then, I used the `ls` command to view the files and directories available. Finally, I navigated to the `projects` directory using the `cd` command.

```
researcher2@ab2c1ada4ee1:~$ pwd
/home/researcher2
researcher2@ab2c1ada4ee1:~$ ls
projects
researcher2@ab2c1ada4ee1:~$ cd projects
```

2. I used the `ls -l` command to list the contents and check the permissions of the `projects` directory.

```
researcher2@ab2c1ada4ee1:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
```

3. I used the `ls -la` command to list the contents, including hidden files, and to check the permissions of the `projects` directory.

```
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
```

Change file permissions

The organization determined that 'other' user type should not have write access to any of its files. To comply with this, I reviewed the file permissions I had obtained and identified that I needed to remove the write permission for 'other' users on the `project_k.txt` file.

```
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
```

1. I changed the permissions of the `project_k.txt` file, removing write permissions for the 'other' type using the `chmod` command.Then, I used `ls -la` to review the updates I had made.

```
researcher2@ab2c1ada4ee1:~/projects$ chmod o-w project_k.txt
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
```

2. It was noticed that the `project_m.txt` file is a restricted file and should not be readable or writable by the group or others; only the user should have these permissions. I listed the contents and permissions of the current directory to check if the group had read or write permissions on the file with `ls -la` command.

```
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
```

3. I used the `chmod` command to change the permissions of the `project_m.txt` file so that the group no longer has read or write permissions and used `ls -la` to

review the updates I had made.

```
researcher2@ab2c1ada4ee1:~/projects$ chmod g-r project_m.txt
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
researcher2@ab2c1ada4ee1:~/projects$
```

Change file permissions on a hidden file

Recently, the research team in my organization archived `project_x.txt`. They do not want anyone to have write access to this file, but the user and the group should have read access.

1. I used the `chmod` command to change the permissions of the `project_x.txt` file so that both the user and the group have read access, but no write access.

```
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-rw--w---- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
researcher2@ab2c1ada4ee1:~/projects$ chmod ug-w .project_x.txt
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-r-------- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
researcher2@ab2c1ada4ee1:~/projects$ chmod g+r .project_x.txt
researcher2@ab2c1ada4ee1:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 16:00 ..
-r--r----- 1 researcher2 research_team   46 Aug 14 15:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 14 15:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 14 15:13 project_t.txt
researcher2@ab2c1ada4ee1:~/projects$
```

I knew that `.project_x.txt` is a hidden file because it starts with a dot (.). In this example, I removed the write permissions for both the user and the group and added read permissions for the group. I removed the write permissions for the user using `u-w`, then removed the write permissions for the group with `g-w`, and finally added read permissions for the group using `g+r`.

Change directory permissions

My organization requires that only the user `researcher2` has access to the `drafts` directory and its contents. This means that no one else should have execute permissions for the directory.

1. I accessed the `drafts` directory using the `cd` command, and then checked the permissions of the `drafts` directory using the `ls -la` command.

```
researcher2@ab2c1ada4ee1:~/projects$ cd drafts
researcher2@ab2c1ada4ee1:~/projects/drafts$ ls -la
total 8
drwx--x--- 2 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 ..
researcher2@ab2c1ada4ee1:~/projects/drafts$
```

2. I removed the execute permission for the group from the `drafts` directory using the `chmod` command with `g-x` to ensure that only the user `researcher2` has access.

```
researcher2@ab2c1ada4ee1:~/projects/drafts$ chmod g-x .
researcher2@ab2c1ada4ee1:~/projects/drafts$ ls -la
total 8
drwx------ 2 researcher2 research_team 4096 Aug 14 15:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 14 15:13 ..
researcher2@ab2c1ada4ee1:~/projects/drafts$
```

Summary

I adjusted various permissions to match the authorization level that my organization required for files and directories in the `projects` directory. The first step was to use `ls -la` to check the permissions for the directory. I based my decisions for the subsequent steps on this information. Then, I used the `chmod` command several times to modify the permissions on files and directories