File permissions in Linux

Project description

For this project, I am a security professional for a large organization with a research team. I am tasked with examining the permissions of files and directories in the `projects` directory for the user `researcher2`. If any permissions are configured incorrectly, I need to modify them to ensure users have the appropriate authorization.

Check file and directory details

Using the command `ls -la` displays the permissions for all files and directories (including hidden files and directories) in the current working directory, which in this case is `/home/researcher2/projects`.

```
researcher2@66ba1513a108:~$ pwd
/home/researcher2
researcher2@66ba1513a108:~$ ls
projects
researcher2@66ba1513a108:~$ cd projects
researcher2@66ba1513a108:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 18:45 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 19:48 ..
-rw--w---- 1 researcher2 research_team   46 Sep 13 18:45 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Sep 13 18:45 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Sep 13 18:45 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Sep 13 18:45 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_t.txt
researcher2@66ba1513a108:~/projects$
```

Describe the permissions string

The first ten characters in each line of the output above is the 10-character string that indicates the permissions for the corresponding file or directory. For example, the sixth line of the output shows the permissions for `project_k.txt`. The first character is a hyphen, which indicates that the string describes the permissions for a file. The next three characters indicate the permissions for the owner type user. Those three characters are `rw-` which indicate that the user has read and write access, but not execute access. The fifth to seventh characters indicate the permissions for the owner type group. They also have permission to read and write to the

file, but not to execute the file, as indicated by `rw-`. The last three characters indicate the permissions for the owner type other. They have the same permissions as the user and group.

Change file permissions

It is the organization's policy that others should not have write access for any files. The only file in which others have write permissions enabled is `project_k.txt`. In order to change the permissions of that file, I used the command `chmod o-w project_k.txt`. In the first argument, `o` indicates that we are changing permissions for the owner type other; the minus (`-`) indicates we are taking away access; and the `w` indicates we are changing the write permission. The second argument indicates which file's permissions are being modified–in this case, `project_k.txt`.

```
researcher2@66ba1513a108:~/projects$ chmod o-w project_k.txt
researcher2@66ba1513a108:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 18:45 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 19:48 ..
-rw--w---- 1 researcher2 research_team   46 Sep 13 18:45 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Sep 13 18:45 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Sep 13 18:45 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_t.txt
researcher2@66ba1513a108:~/projects$
```

Using the `ls -la` command shows that the ninth character in the 10-character string for `project_k.txt` has changed from a `w` to a hyphen (`-`).

Change file permissions on a hidden file

The `.project_x.txt` file has been archived by the research team. Nobody should have write access to the file, but the user and group should have read access. Currently, the user has read and write permissions enabled and the group only has write access. I used `chmod u=r,g=r .project_x.txt` to update the permissions. In the first argument, `u=r` indicates that we are setting the user permissions to read only, and `g=r` indicates that we are setting the group permissions to read only. Using the equal sign (`=`) sets the permissions exactly as specified and overwrites the previous permissions. The second argument indicates that we are changing permissions for the hidden file `.project_x.txt`.

```
researcher2@66ba1513a108:~/projects$ chmod u=r,g=r .project_x.txt
researcher2@66ba1513a108:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 18:45 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 19:48 ..
-r--r----- 1 researcher2 research_team   46 Sep 13 18:45 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Sep 13 18:45 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Sep 13 18:45 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_t.txt
researcher2@66ba1513a108:~/projects$
```

Change directory permissions

The files and directories in `projects` belong to `researcher2` and they are the only user that should have access to the `drafts` subdirectory. Currently, the group has execute permissions for drafts. I used the command `chmod g-x drafts`. The argument `g-x` removes execute permissions from the group. The `drafts` directory is specified in the second argument.

```
researcher2@66ba1513a108:~/projects$ chmod g-x drafts
researcher2@66ba1513a108:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 18:45 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 13 19:48 ..
-r--r----- 1 researcher2 research_team   46 Sep 13 18:45 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Sep 13 18:45 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Sep 13 18:45 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Sep 13 18:45 project_t.txt
researcher2@66ba1513a108:~/projects$
```

Summary

I checked the current permissions of the files and directories in the `projects` directory and updated the permissions to meet the organization's guideline of appropriate authorization levels. I made sure users outside the `research_team` group did not have write access to any files or directories in `projects`, changed the user and group permissions to read only for the archived `.project_x.txt` file, and updated the `drafts` permissions so that only the user has access.

In this lab, I learned the use and power of the `ls -l` option and the `chmod` command for managing file permissions.