

File permissions in Linux

Project Description

I'm a security professional at a large organization. I mainly work with their research team. Part of my 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. I'll need to determine if the permissions match the authorization that should be given. If they do not match, I'll need to modify the permissions to authorize the appropriate users and remove any unauthorized access.

Check file and directory details

I'll be using the command: `ls -la` to display the file structure of the `/home/researcher2/projects` directory and the permissions of the files and subdirectory it contains including hidden files.

```
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-rw--w--- 1 researcher2 research_team  46 Dec  2 15:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

The first line of the screenshot displays the command I entered, and the other lines display the output. Based on that, I can tell that there's one directory named `drafts`, one hidden file named `.project_x.txt`, and five other project files.

Describe the permissions string

Let's examine the output:

`.project_k.txt` The User in this file has read, write permissions, Group has read, write permissions, and Other has read, write permissions. Either the user, group, or other have execute permissions.

`project_m.txt` The User has read, write permissions, the Group has only read permissions, and Other do not have access to this file.

`project_r.txt` In this file the User has read, write permissions, Group has read, write permissions as well, but Other has only read permissions.

`project_t.txt` The User has read, write permissions, Group has read, write permissions, and Other has only read permissions.

`.project_x.txt` The User in this hidden file has read, write permissions, the Group has execute permissions, and Other does not have access to this file at all.

`drafts` In this subdirectory, the User has read, write, and execute permissions, the Group has only execute permissions, and Other has none.

Change file permissions

The organization I work for does not allow Other to have write access permissions to any files. I have noticed that `project_k.txt` file does have write permissions and that needs to be changed.

```
researcher2@5d738f0f927b:~/projects$ chmod o-w project_k.txt
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-rw--w--- 1 researcher2 research_team  46 Dec  2 15:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

Notice that I typed command: `chmod o-w project_k.txt` to block Other from having write access to file `project_k.txt`. Then, I checked the update by entering the command `ls -la` which outputs the changes made. After this, Other no longer has write permissions to file `project_k.txt`, only read permissions.

Change file permissions on a hidden file

The research team has archived `.project_x.txt`, which is why it's a hidden file. This file should not have write permissions for anyone, but the user and group should be able to read the file.

```
researcher2@3213bbc1d047:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@3213bbc1d047:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 20 15:36 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 20 15:36 ..
-r--r----- 1 researcher2 research_team  46 Dec 20 15:36 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec 20 15:36 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Dec 20 15:36 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Dec 20 15:36 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec 20 15:36 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec 20 15:36 project_t.txt
researcher2@3213bbc1d047:~/projects$
```

By typing command: `chmod u-w,g-w,g+r .project_x.txt` as shown in the first line of the image would make the change of permissions, and by typing in: `ls -la` as displayed in the second line of the image, I can see now that the hidden file only allows read access to User and Group.

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. However, the `research_team` Group has execute permissions that should be eliminated.

To fix this, I'll be using command: `chmod g-x drafts`

```
researcher2@5d738f0f927b:~/projects$ chmod g-x drafts
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-r--r----- 1 researcher2 research_team  46 Dec  2 15:27 .project_x.txt
drwx----- 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

As displayed in the image above I entered command: `ls -la` to make sure changes were made. Finally, I can see now that the `drafts` directory has read, write, and execute permissions to the `researcher2` user only.

Summary

I changed multiple permissions to comply with standards, confidentiality, availability, and integrity within my organization's file system, and to secure and prevent unauthorized access to the organization's confidential data.

As previously mentioned I used command `chmod` to manage file permissions and command `ls -la` to make sure changes were made. Therefore, ensure that only authorized users have access to specific files and directories.