Changing File Permissions in Linux

Project description

In-order to protect the confidentiality and integrity of our work, the research team at my organisation has decided to maintain the file permissions on a *need-to-know* basis. I have been tasked to examine existing permissions on the file system and update them so that only appropriate users have access to appropriate files. This is the documentation of how I completed this task.

Check file and directory details

In-order to examine the existing permissions, I have used the `ls -la` command. This command lists all the permissions on all the files/sub-directories, including the hidden files.

```
researcher2@b548bee18d4f:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 06:51 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 07:27 ..
-rw--w---- 1 researcher2 research_team   46 Aug 24 06:51 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 24 06:51 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 24 06:51 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 24 06:51 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 06:51 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 06:51 project_t.txt
```

Describe the permissions string

The `ls -la` command returns file permissions and in-order to identify the permissions of specific file/folder the 10-character string shown below should be examined.

`drwxr-xr-x`

- The **1st character** indicates the file type, `d` indicates that it is a directory and (`-`) indicates that it is a file.
- From **2nd to 4th,** characters indicate the read (`r`), write (`w`), and execute (`x`) permissions of the **USER**. If one of the characters is (`-`) , it indicates that this permission is not granted to the user.
- From **5th to 7th**, characters indicate the read (`r`), write (`w`), and execute (`x`) permissions of the **GROUP**. If one of the characters is (`-`) , it indicates that this permission is not granted to any member of the group.

- From **8th to 10th,** characters indicate the read (`r`), write (`w`), and execute (`x`) permissions of the **OTHER users outside the group**. If one of the characters is (`-`) , it indicates that this permission is not granted to any other users.

Change file permissions

Research work is highly confidential, therefore, the organisation determined that none of the files should allow the other users to write to files.
From the `ls -la` command entered before, I identified that permission for **other users** to write into `project_k.txt` is set to true and this access must be removed.

In-order to remove this I use the `chmod` command. This command allows you to change permissions of file or subdirectory. The first argument indicates what permissions should be changed, and the second argument specifies the file or directory.
As evident in the screenshot below, that I first used `chmod` command to remove write permissions granted to other users for the `project_k.txt` file and then when `ls -la` command was used again it showed the changes made.

```
researcher2@b548bee18d4f:~/projects$ chmod o-w project_k.txt
researcher2@b548bee18d4f:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 06:51 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 07:27 ..
-rw--w---- 1 researcher2 research_team   46 Aug 24 06:51 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 24 06:51 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 06:51 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 24 06:51 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 06:51 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 06:51 project_t.txt
researcher2@b548bee18d4f:~/projects$
```

Change file permissions on a hidden file

The research team archived the `.project_x.txt` file and determined that no one should now have access to write into the file.
Therefore, I used the following command to change the permissions.

```
researcher2@f32038b3518e:~/projects$ chmod u-w,g-r,g+r .project_x.txt
researcher2@f32038b3518e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 07:14 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 08:40 ..
-r--rw---- 1 researcher2 research_team   46 Aug 24 07:14 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 24 07:14 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 24 07:14 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_t.txt
researcher2@f32038b3518e:~/projects$
```

Again I used the `chmod` command, to remove the user and the group's writing access to this file and gave the group members access to read the file.

Change directory permissions

My organisation determined that only **researcher2** user should have access to the **drafts** directory and its contents and no other user should be able to access its contents. Therefore, I used the `chmod` command again to remove the execute access that other members of **research_team** had on this sub-directory.

```
researcher2@f32038b3518e:~/projects$ chmod g-x drafts
researcher2@f32038b3518e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 07:14 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 24 08:40 ..
-r--rw---- 1 researcher2 research_team   46 Aug 24 07:14 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug 24 07:14 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 24 07:14 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 24 07:14 project_t.txt
researcher2@f32038b3518e:~/projects$
```

Summary

I have changed the permissions on multiple files and folders to to maintain the file permissions on a *need-to-know* basis. However, this will need to be updated on regular basis because of many reasons and some of them are:
- New researchers can join the team.
- Some can leave the team
- Researchers might work on new projects.
- Researchers might archive some existing projects.