

# File permissions in Linux

## Project description

The research team at my organization needs to update the file permissions for certain files and directories within the **projects** directory. The permissions do not currently reflect the level of authorization that should be given. Checking and updating these permissions will help keep their system secure. To complete this task, I performed the following tasks:

## Check file and directory details

The following code demonstrates how I used Linux commands to determine the existing permissions set for a specific directory in the file system.

```
researcher2@35c4e30d840a:~$ pwd
/home/researcher2
researcher2@35c4e30d840a:~$ ls
projects
researcher2@35c4e30d840a:~$ cd projects/
researcher2@35c4e30d840a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:05 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:23 ..
-rw--w---- 1 researcher2 research_team  46 Jul 10 00:05 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 10 00:05 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Jul 10 00:05 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jul 10 00:05 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_t.txt
researcher2@35c4e30d840a:~/projects$
```

The first line of the screenshot displays the command I entered, and the other lines display the output. The code lists all contents of the **projects** directory. I used the **ls** command with the **-la** option to display a detailed listing of the file contents that also returned hidden files. The output of my command indicates that there is one directory named **drafts**, one hidden file named **.project\_x.txt**, and five other project files. The 10 character string in the first column represents the permissions set on each file or directory.

The file permissions for **project\_t.txt** are **-rw-rw-r--**. Since the first character is a hyphen (-), this indicates that **project\_t.txt** is a file, not a directory. The second, fifth, and eighth characters are all **r**, which indicates that user, group, and other all have read permissions. The third and sixth characters are **w**, which indicates that only the user and group have write permissions. No one has execute permissions for **project\_t.txt**.

## Change file permissions

The organization determined that other shouldn't have write access to any of their files. To comply with this, I referred to the file permissions that I previously returned. I determined **project\_k.txt** must have the write access removed for other.

The following code demonstrates how I used Linux commands to do this:

```
researcher2@35c4e30d840a:~/projects$ chmod o-w project_k.txt
researcher2@35c4e30d840a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:05 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:23 ..
-rw--w---- 1 researcher2 research_team  46 Jul 10 00:05 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 10 00:05 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jul 10 00:05 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_t.txt
researcher2@35c4e30d840a:~/projects$
```

The first two lines of the screenshot display the commands I entered, and the other lines display the output of the second command. The `chmod` command changes the permissions on files and directories. The first argument indicates what permissions should be changed, and the second argument specifies the file or directory. In this example, I removed write permissions from other for the **project\_k.txt** file. After this, I used `ls -la` to review the updates I made.

## Change file permissions on a hidden file

The research team at my organization recently archived **project\_x.txt**. They do not want anyone to have write access to this project, but the user and group should have read access.

The following code demonstrates how I used Linux commands to change the permissions:

```
researcher2@35c4e30d840a:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@35c4e30d840a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:05 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul 10 00:23 ..
-r--r----- 1 researcher2 research_team  46 Jul 10 00:05 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul 10 00:05 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jul 10 00:05 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jul 10 00:05 project_t.txt
researcher2@35c4e30d840a:~/projects$
```

The first two lines of the screenshot display the commands I entered, and the other lines display the output of the second command. I know **.project\_x.txt** is a hidden file because it starts with a period (.). In this example, I removed write permissions from the user and group, and added read permissions to the group. I removed write permissions from the user with **u-w**. Then, I removed write permissions from the group with **g-w**, and added read permissions to the group with **g+r**.

## Change directory permissions

My organization only wants the **researcher2** user to have access to the **drafts** directory and its contents. This means that no one other than **researcher2** should have execute permissions.

The following code demonstrates how I used Linux commands to change the permissions:

```
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$
```

The first two lines of the screenshot display the commands I entered, and the other lines display the output of the second command. I previously determined that the group had execute permissions, so I used the **chmod** command to remove them. The **researcher2** user already had execute permissions, so they did not need to be added.

