

# 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:

Command `chmod` was used to modify/update file and directory permissions. Command `ls -la` was used to view permissions of all files and directories including hidden files.

## Check file and directory details

Viewing permissions of the `projects` directory:

```
researcher2@3c151f5d847e:~$ ls -l projects
total 20
drwx--x--- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-rw- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r--  1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r--  1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~$
```

## Describe the permissions string

For file `project_m.txt` the permissions are as follows:

- rw -r - - - -

User- read, write

Group- read only

Other- zero permissions

10 character interpretation:

1st character: d =directory

2nd to 4th characters: read/write/execute for user permissions

5rd to 7th characters: read/write/execute for group permissions

8th to 10th characters: read/write/execute for other permissions

r = read  
w = write  
hyphen (-) = no permission

## Change file permissions

The organization does not allow other users to have write access to any files. One file- `project_k.txt` has write permissions for other users. The image below shows the write permission was removed from the mentioned file.

```
researcher2@3c151f5d847e:~/projects$ cd ~/projects
researcher2@3c151f5d847e:~/projects$ chmod o-w project_k.txt
researcher2@3c151f5d847e:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~/projects$
```

## 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. The image below shows the permissions for `.project_x.txt` and permissions modified to read only for user and group.

```
researcher2@3c151f5d847e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:34 .
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:57 ..
-rw--w---- 1 researcher2 research_team  46 May 19 15:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~/projects$ chmod u-w,g+r-w .project_x.txt
researcher2@3c151f5d847e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:34 .
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:57 ..
-r--r----- 1 researcher2 research_team  46 May 19 15:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~/projects$
```

## 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. The image below shows the draft directory's permissions were modified so the user has access; group and other permissions were removed.

```
researcher2@3c151f5d847e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:34 .
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:57 ..
-r--r----- 1 researcher2 research_team  46 May 19 15:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~/projects$
researcher2@3c151f5d847e:~/projects$ chmod g-rwx,o-rwx drafts
researcher2@3c151f5d847e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:34 .
drwxr-xr-x 3 researcher2 research_team 4096 May 19 15:57 ..
-r--r----- 1 researcher2 research_team  46 May 19 15:34 .project_x.txt
drwx----- 2 researcher2 research_team 4096 May 19 15:34 drafts
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_k.txt
-rw-r----- 1 researcher2 research_team  46 May 19 15:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 May 19 15:34 project_t.txt
researcher2@3c151f5d847e:~/projects$
```

## Summary

I changed multiple permissions to match the level of authorization my organization wanted for files and directories in the `projects` directory. The first step in this was using `ls -la` to check the permissions for the directory. I then used the `chmod` command multiple times to change the permissions on files and the directory `drafts`.