

# File permissions in Linux

## Project description

Updating the permissions of files and directories within the ~/projects/ director.

## Check file and directory details

```
researcher2@580f01750983:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 17 22:42 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 17 23:41 ..
-rw--w--- 1 researcher2 research_team  46 Nov 17 22:42 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 17 22:42 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Nov 17 22:42 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Nov 17 22:42 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Nov 17 22:42 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Nov 17 22:42 project_t.txt
researcher2@580f01750983:~/projects$
```

## Describe the permissions string

```
-rw--w--- 1 researcher2 research_team  46 Nov 17 22:42 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 17 22:42 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Nov 17 22:42 project_k.txt
```

For the drafts line, the d is indicating that it is a directory. The rwx indicates that the user (researcher2) has read, write, and execute permissions. The --w indicates that the group (research\_team) has execute permission only. The following --- indicates that others have no permissions over the directory.

## Change file permissions

```
-rw-r----- 1 researcher2 research_team  46 Nov 17 22:42 project_m.txt
```

Project\_m.txt should not be readable for the group, so to remove that permission the following command is used:

```
researcher2@580f01750983:~/projects$ chmod g-r project_m.txt
researcher2@580f01750983:~/projects$
```

Which removes read permission for the group:

```
-rw-rw-rw- 1 researcher2 research_team  46 Nov 17 22:42 project_k.txt
-rw----- 1 researcher2 research_team  46 Nov 17 22:42 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Nov 17 22:42 project_r.txt
```

## Change file permissions on a hidden file

Changing permissions on a hidden file is just as easy:

```
-rw--w---- 1 researcher2 research_team 46 Nov 17 22:42 .project_x.txt
```

As you can see the hidden file '.project\_x.txt' gives read and write permissions to the user, and write permissions to the group. We need to remove write permission for both user and group, and at the same time allow both read permission. This can be accomplished with the following command:

```
researcher2@580f01750983:~/projects$ chmod ug=r .project_x.txt
```

This updates the permissions for both user and group to read only.

```
-r--r----- 1 researcher2 research_team 46 Nov 17 22:42 .project_x.txt
```

## Change directory permissions

Lastly, we need to remove execute permissions for the group for the drafts directory.

```
drwxr-xr-x 3 researcher2 research_team 4096 Nov 17 22:42 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 17 23:41 ..
-r--r----- 1 researcher2 research_team 46 Nov 17 22:42 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 17 22:42 drafts
-rw-rw-r-- 1 researcher2 research_team 46 Nov 17 22:42 project_k.txt
-rw----- 1 researcher2 research_team 46 Nov 17 22:42 project_m.txt
```

Doing so is accomplished with the command:

```
researcher2@580f01750983:~/projects$ chmod g-x drafts/
```

This updates the group permissions for the drafts directory to:

```
drwx----- 2 researcher2 research_team 4096 Nov 17 22:42 drafts
```

As you can see, the user has read, write, and execute permissions, and the execute permission for the group has been removed.

## Summary

The permission switches for the chmod command are very self explanatory, by specifying u (user), g (group), o (other) and using +/- to add or remove permission followed by which permission you wish to add or remove, r (read), w (write), and x (execute). It is a very easy and important command to know. A shortcut can be had using the = switch, by entering 'chmod u=r filename.txt' I'm saying that I want users to only have read access for the filename.txt file.