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

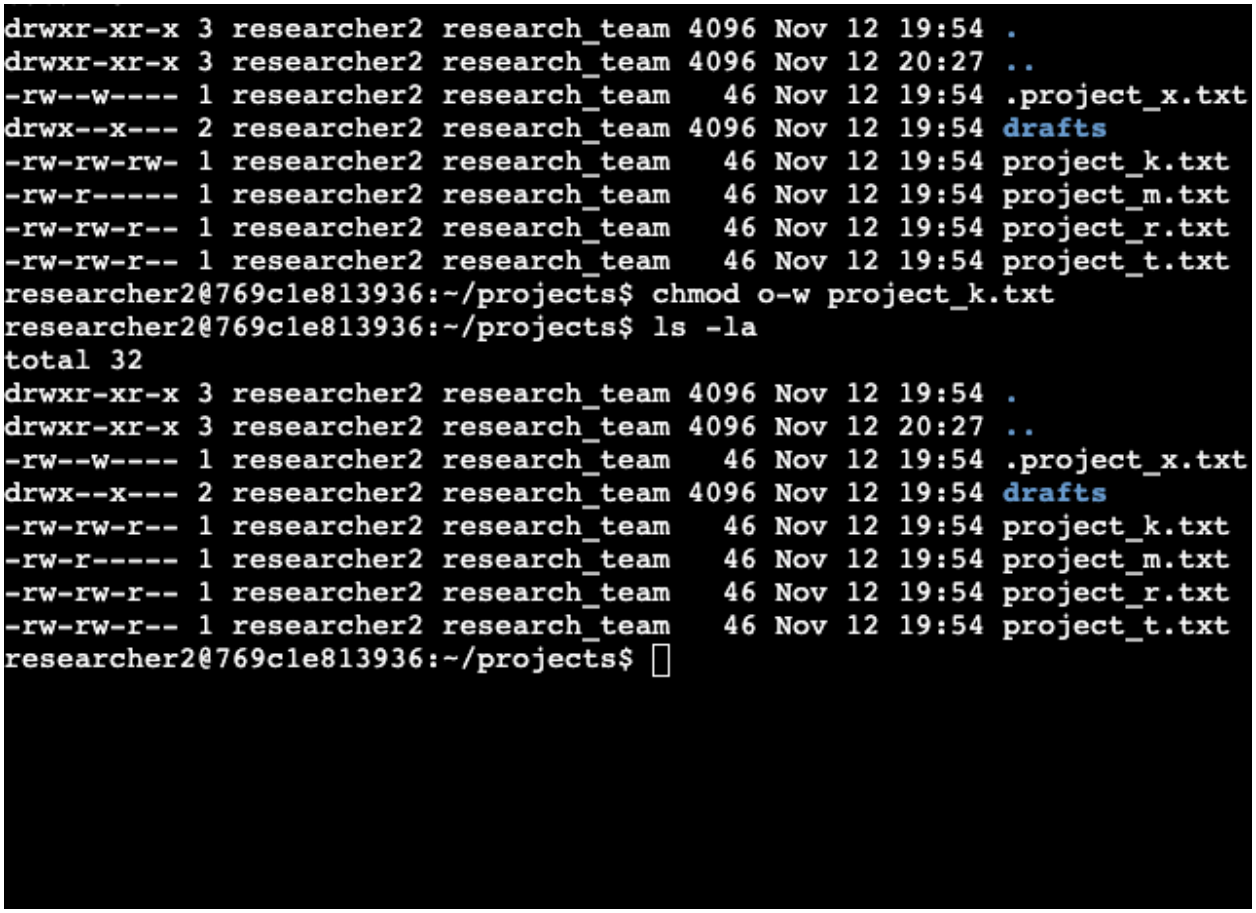
```
researcher2@3db55b996561:~$ pwd
/home/researcher2
researcher2@3db55b996561:~$ cd projects
researcher2@3db55b996561:~/projects$ ls -l
total 20er2@3db55b996561:~$ cd project
drwx--x--- 2 researcher2 research_team 4096 Nov 12 00:48 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 12 00:48 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 12 00:48 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_t.txt
researcher2@3db55b996561:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 00:48 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 01:04 ..
-rw--w---- 1 researcher2 research_team   46 Nov 12 00:48 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 12 00:48 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 12 00:48 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 12 00:48 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_t.txt
researcher2@3db55b996561:~/projects$ ls-l
-bash: ls-l: command not found
researcher2@3db55b996561:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov 12 00:48 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 12 00:48 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 12 00:48 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_t.txt
researcher2@3db55b996561:~/projects$ chmod o-w project_k.txt
researcher2@3db55b996561:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov 12 00:48 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 12 00:48 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 00:48 project_t.txt
researcher2@3db55b996561:~/projects$ chmod g-r project_m.txt
researcher2@3db55b996561:~/projects$ ls-la
-bash: ls-la: command not found
researcher2@3db55b996561:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 00:48 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 01:04 ..
-rw--w---- 1 researcher2 research_team   46 Nov 12 00:48 .project_x.txt
```

Describe the permissions string

The 10-character string can be deconstructed to determine who is authorized to access the file and their specific permissions. The characters and what they represent are as follows:

- **1st character**: This character is either a d or hyphen (-) and indicates the file type. If it's a d, it's a directory. If it's a hyphen (-), it's a regular file.
- **2nd-4th characters**: These characters indicate the read (r), write (w), and execute (x) permissions for the user. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted to the user.
- **5th-7th characters:** These characters indicate the read (r), write (w), and execute (x) permissions for the group. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted for the group.
- **8th-10th characters:** These characters indicate the read (r), write (w), and execute (x) permissions for other. This owner type consists of all other users on the system apart from the user and the group. When one of these characters is a hyphen (-) instead, that indicates that this permission is not granted for other.

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.

- `project_k.txt`

- User = read, write,
- Group = read, write
- Other = read, write(I removed the “W”)

Change file permissions on a hidden file

```
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 19:54 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 20:27 ..
-rw--w---- 1 researcher2 research_team   46 Nov 12 19:54 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 12 19:54 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov 12 19:54 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_t.txt
researcher2@769c1e813936:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@769c1e813936:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 19:54 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 20:27 ..
-r--r----- 1 researcher2 research_team   46 Nov 12 19:54 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 12 19:54 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov 12 19:54 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 19:54 project_t.txt
researcher2@769c1e813936:~/projects$
```

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:
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

```
drwx--x--- 2 researcher2 research_team 4096 Nov 12 20:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 12 20:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_t.txt
researcher2@c7fc7c19fdbb:~/projects$ chmod g-r project_m.txt
researcher2@c7fc7c19fdbb:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@c7fc7c19fdbb:~/projects$ chmod g-x drafts
researcher2@c7fc7c19fdbb:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 20:40 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 12 21:28 ..
-r--r----- 1 researcher2 research_team   46 Nov 12 20:40 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Nov 12 20:40 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_k.txt
-rw------- 1 researcher2 research_team   46 Nov 12 20:40 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 12 20:40 project_t.txt
researcher2@c7fc7c19fdbb:~/projects$
```

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:
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

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. This informed my decisions in the following steps. I then used the `chmod` command multiple times to change the permissions on files and directories.