File permissions in Linux

Project description

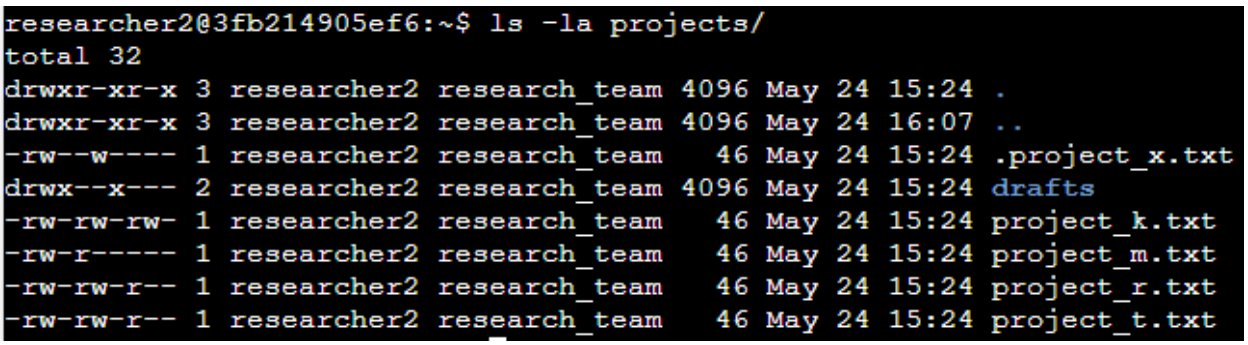
In this project, I used Linux commands to inspect and manage file and directory permissions. This allowed me to verify that the users in a research team had the appropriate access rights. I applied key Linux permission commands to identify misconfigurations and corrected them to align with organizational security policies.

Check file and directory details

To check file and directory permissions, I used the following command:

```
ls -la projects/
```

This command lists all files (including hidden ones) in the `projects` directory in long format. It shows permissions, ownership (user and group), file size, and timestamps. Here's an example output:



Describe the permissions string

Let's take the permissions string for `project_k.txt` as an example:

-rw-rw-rw-

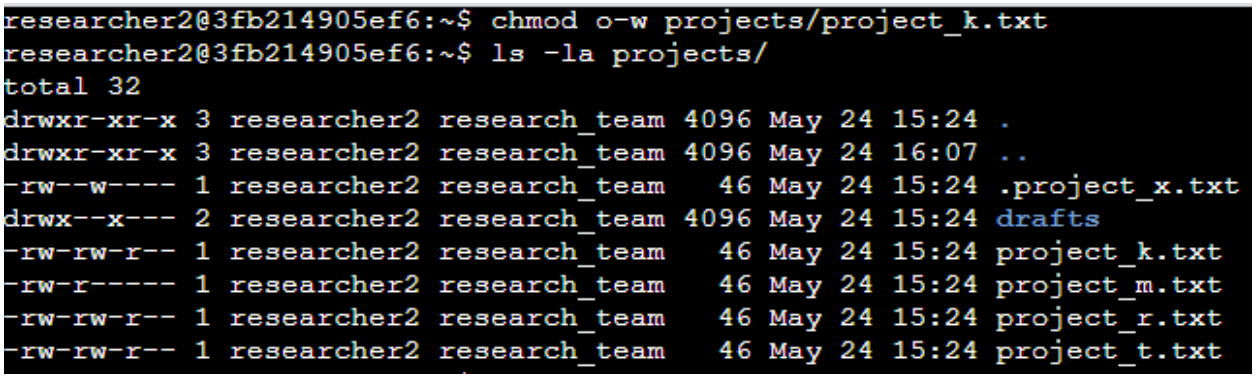
This string has 10 characters:

- `-` (1st): indicates it's a regular file (could also be `d` for directory or `l` for symlink).
- `rw-` (2nd–4th): the **owner** (`researcher2`) has **read and write** permission.
- `rw-` (5th–7th): the **group** has **read and write** permission.
- `rw-` (8th–10th): **others** have **read and write** access.

Change file permissions

The organization does not allow **write access for others**. The file `project_k.txt` has `-rw-rw-rw-`, which violates this policy. To remove write access from others, I used:

```
chmod o-w projects/project_k.txt
```



Change file permissions on a hidden file

The file `.project_x.txt` is a hidden file used for archival purposes. It must be **read-only** for the group and others, while the owner can read it too. To set this, I used:

```
chmod u-w,g+r,g-w,o+r projects/.project_x.txt
```

```
researcher2@0fb636dceccc:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:44 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:19 ..
-rw--w---- 1 researcher2 research_team   46 May 24 15:44 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 24 15:44 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:44 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:44 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:44 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:44 project_t.txt
researcher2@0fb636dceccc:~$ chmod u-w,g+r,g-w,o+r projects/.project_x.txt
researcher2@0fb636dceccc:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:44 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:19 ..
-r--r--r-- 1 researcher2 research_team   46 May 24 15:44 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 24 15:44 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:44 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:44 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:44 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:44 project_t.txt
```

Another way of doing it, its:

```
chmod 444 projects/.project_x.txt
```

```
researcher2@d207e5b4589d:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:52 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:23 ..
-rw--w---- 1 researcher2 research_team   46 May 24 15:52 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 24 15:52 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:52 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:52 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_t.txt
researcher2@d207e5b4589d:~$ chmod 444 projects/.projects_x.txt
chmod: cannot access 'projects/.projects_x.txt': No such file or directory
researcher2@d207e5b4589d:~$ chmod 444 projects/.project_x.txt
researcher2@d207e5b4589d:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:52 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:23 ..
-r--r--r-- 1 researcher2 research_team   46 May 24 15:52 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 24 15:52 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:52 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:52 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_t.txt
```

Change directory permissions

Only `researcher2` should be able to access the `drafts/` directory. To restrict access to the owner only, I used

```
chmod g-x projects/drafts
```

```
researcher2@d207e5b4589d:~$ chmod g-x projects/drafts
researcher2@d207e5b4589d:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:52 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:23 ..
-r--r--r-- 1 researcher2 research_team   46 May 24 15:52 .project_x.txt
drwx------ 2 researcher2 research_team 4096 May 24 15:52 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:52 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:52 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_t.txt
```

Another way of this, it's using:

```
chmod 700 projects/drafts
```

```
researcher2@d207e5b4589d:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:52 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:23 ..
-r--r--r-- 1 researcher2 research_team   46 May 24 15:52 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 May 24 15:52 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:52 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:52 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_t.txt
researcher2@d207e5b4589d:~$ chmod 700  projects/drafts
researcher2@d207e5b4589d:~$ ls -la projects/
total 32
drwxr-xr-x 3 researcher2 research_team 4096 May 24 15:52 .
drwxr-xr-x 3 researcher2 research_team 4096 May 24 16:23 ..
-r--r--r-- 1 researcher2 research_team   46 May 24 15:52 .project_x.txt
drwx------ 2 researcher2 research_team 4096 May 24 15:52 drafts
-rw-rw-rw- 1 researcher2 research_team   46 May 24 15:52 project_k.txt
-rw-r----- 1 researcher2 research_team   46 May 24 15:52 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 May 24 15:52 project_t.txt
```

Summary

In this activity, I used Linux commands to examine and manage file and directory permissions within a simulated organizational environment. I inspected existing permissions using `ls -la`, interpreted permission strings, and used `chmod` to remove unauthorized access. I ensured hidden files and sensitive directories were properly secured according to company policy. These skills are essential for maintaining the integrity and confidentiality of files in a Linux-based system.