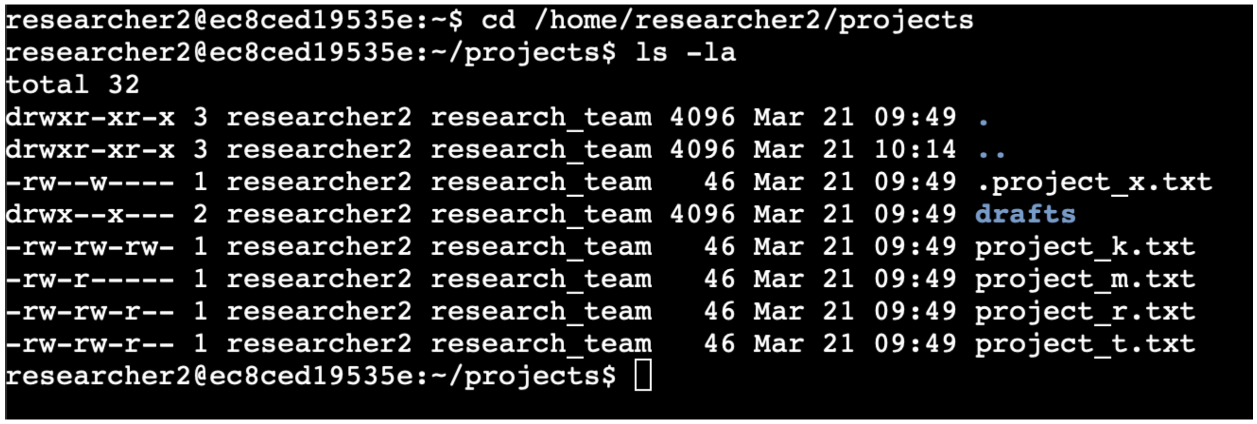
File permissions in Linux

Project description

In this project, we use Linux commands to inspect and modify file and directory permissions to ensure proper authorization and security. By analyzing permissions and making necessary changes, we control access to files and directories, preventing unauthorized modifications.

Check file and directory details

To inspect file and directory permissions, we navigate to the target directory and list its contents using:

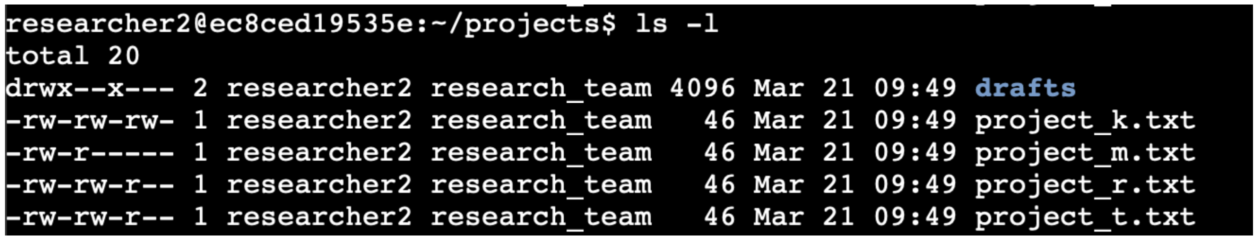


```
researcher2@ec8ced19535e:~$ cd /home/researcher2/projects
researcher2@ec8ced19535e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 21 09:49 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 21 10:14 ..
-rw--w---- 1 researcher2 research_team   46 Mar 21 09:49 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Mar 21 09:49 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Mar 21 09:49 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Mar 21 09:49 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 21 09:49 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 21 09:49 project_t.txt
researcher2@ec8ced19535e:~/projects$ 
```

This command displays all files, including hidden ones, with their permissions, ownership, and other details.

Describe the permissions string

Each file or directory has a permissions string, such as:



```
researcher2@ec8ced19535e:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Mar 21 09:49 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Mar 21 09:49 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Mar 21 09:49 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 21 09:49 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 21 09:49 project_t.txt
```

Breaking it down:

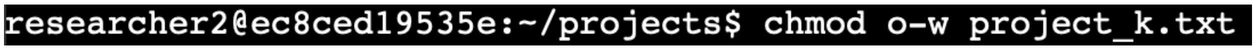
- The first character: `d` (directory) or `-` (file).
- The next three (`rwx`): User (owner) permissions.
- The following three (`r-x`): Group permissions.
- The last three (`r--`): Others (everyone else) permissions.
- The owner and group follow, showing who controls access.

Change file permissions

We must remove unauthorized access by modifying file permissions.

Example 1: Restricting write access for others

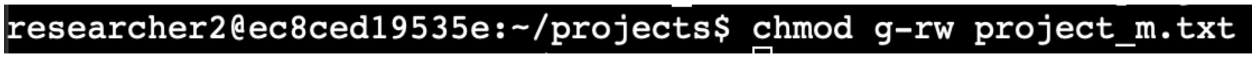
The file `project_k.txt` initially had `rw-rw-rw-` permissions, allowing all users to modify it. We fix this with:



```
researcher2@ec8ced19535e:~/projects$ chmod o-w project_k.txt
```

Example 2: Restricting group access to a sensitive file

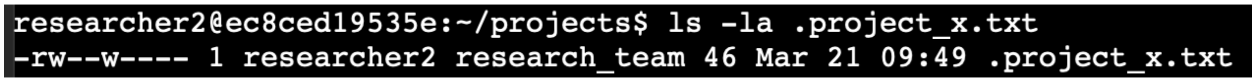
The file `project_m.txt` should only be accessible to the owner. If the group has read (`r`) or write (`w`) access, we remove it:



```
researcher2@ec8ced19535e:~/projects$ chmod g-rw project_m.txt
```

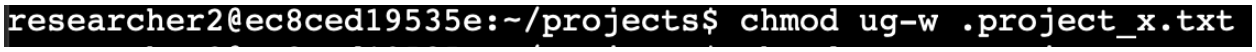
Change file permissions on a hidden file

Hidden files (starting with `.`) may have incorrect permissions. We locate and inspect `.project_x.txt`:



```
researcher2@ec8ced19535e:~/projects$ ls -la .project_x.txt
-rw--w---- 1 researcher2 research_team 46 Mar 21 09:49 .project_x.txt
```

If the user and group have write permissions, we remove them:

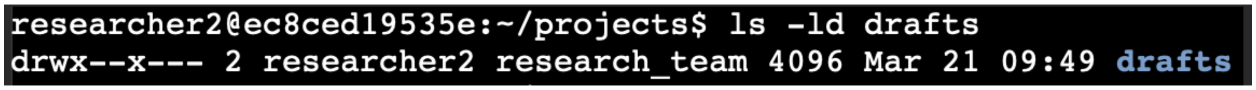


```
researcher2@ec8ced19535e:~/projects$ chmod ug-w .project_x.txt
```

Now, only read access is allowed for the user and group

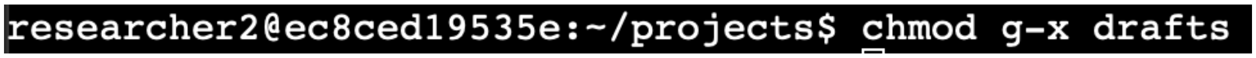
Change directory permissions

The `drafts` directory should only be accessible by `researcher2`. We verify its permissions:



```
researcher2@ec8ced19535e:~/projects$ ls -ld drafts
drwx--x--- 2 researcher2 research_team 4096 Mar 21 09:49 drafts
```

If the group has execute (`x`) access, we restrict it:



```
researcher2@ec8ced19535e:~/projects$ chmod g-x drafts
```

Summary

In this project, file and directory permissions were examined using `ls -la`. The structure of permission strings was analyzed, and adjustments were made to prevent unauthorized access. File permissions were modified to enhance security, including restricting write access for hidden files. Additionally, directory permissions were secured by removing execute permissions for the group.

This hands-on experience enhances the ability to manage file security in Linux environments.