File permissions in Linux

Project description

Implemented and managed file and directory permissions in Linux to control access and enhance system security, ensuring appropriate authorization for sensitive information.

Check file and directory details

Explored and analyzed the permissions of files and directories within the projects directory, ensuring proper access control for files belonging to the researcher2 user.

```
researcher2@a0a90f2e8967:~/projects$ pwd
/home/researcher2/projects
researcher2@a0a90f2e8967:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Feb 23 08:42 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 08:42 project_k.txt
-rw------- 1 researcher2 research_team   46 Feb 23 08:42 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 08:42 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 08:42 project_t.txt
researcher2@a0a90f2e8967:~/projects$
```

Describe the permissions string

Explored and understood the 10-character string that represents file permissions: the first character indicates file type (e.g., 'd' for directory, '-' for regular file), followed by three sets of characters representing read (r), write (w), and execute (x) permissions for the user, group, and others. Hyphens (-) indicate missing permissions

```
drwx------
-rw-rw-r--
-rw-------
-rw-rw-r--
-rw-rw-r--
```

Change file permissions

Reviewed and modified file permissions to enhance security. Removed write permissions for 'other' users on files like project_k.txt using `chmod o-w`. Restricted group permissions on

project_m.txt to prevent unauthorized access, ensuring only the user has read and write permissions

```
total 20
drwx--x--- 2 researcher2 research_team 4096 Feb 23 10:09 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Feb 23 10:09 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 23 10:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_t.txt
researcher2@bdbe32baa276:~/projects$ chmod o-w project_k.txtchmod o-w p

researcher2@bdbe32baa276:~/projects$ chmod o-w project_k.txt
researcher2@bdbe32baa276:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Feb 23 10:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 23 10:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_t.txt
```

Change file permissions on a hidden file

Reviewed and updated the permissions of the hidden file .project_x.txt to ensure that both the user and group could read the file but not write to it, strengthening system security by removing unauthorized write access.

```
researcher2@bdbe32baa276:~/projects$ ls -a
.   ..   .project_x.txt   drafts   project_k.txt   project_m.txt   project_r.t
  project_t.txt
researcher2@bdbe32baa276:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Feb 23 10:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 23 10:24 ..
-rw--w---- 1 researcher2 research_team   46 Feb 23 10:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Feb 23 10:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 23 10:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_t.txt
researcher2@bdbe32baa276:~/projects$ chmod u-w,g-w,g+r .projects_x.txt
chmod: cannot access '.projects_x.txt': No such file or directory
researcher2@bdbe32baa276:~/projects$ chmod u-w,g-w .project_x.txt
researcher2@bdbe32baa276:~/projects$ chmod g+r .project_x.txt
researcher2@bdbe32baa276:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Feb 23 10:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 23 10:24 ..
-r--r----- 1 researcher2 research_team   46 Feb 23 10:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Feb 23 10:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Feb 23 10:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Feb 23 10:09 project_t.txt
```

Change directory permissions

Checked and modified the permissions of the /home/researcher2/projects/drafts directory to ensure only the researcher2 user has access, granting execute privileges exclusively to the user and restricting group and other access for enhanced security.

```
researcher2@bdbe32baa276:~/projects$ ls -l /home/researcher2/projects/dra
ts
total 0
researcher2@bdbe32baa276:~/projects$ ls -la /home/researcher2/projects/dr
fts
total 8
drwx--x--- 2 researcher2 research_team 4096 Feb 23 10:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Feb 23 10:09 ..
researcher2@bdbe32baa276:~/projects$ chmod g-x researcher2
chmod: cannot access 'researcher2': No such file or directory
researcher2@bdbe32baa276:~/projects$ 
```

Summary

Implemented and managed file and directory permissions on a Linux system to enhance security. Reviewed and modified file permissions, ensuring proper access control for users, groups, and others. Specifically, I:

- Restricted write access for 'other' users on files like project_k.txt and ensured sensitive files such as project_m.txt were only accessible by the user.
- Managed hidden file permissions for .project_x.txt to allow read-only access for the user and group, removing unauthorized write access.
- Changed directory permissions to limit access to the /home/researcher2/projects/drafts directory, ensuring only the researcher2 user had execute privileges, thereby strengthening system security.