File permissions in Linux

Project description

In this project, I examined and updated Linux file and directory permissions for the research team. I ensured that only authorized users could read or modify files, and that sensitive directories were restricted to the owner. This was done by checking current permissions, interpreting permission strings, and modifying them using chmod commands.

❖ Check file and directory details

🞣 Command used:

ls -la /home/researcher2/projects

🞣 Explanation:
- ls lists directory contents
- -l shows details (permissions, owner, group, size, date)
- -a includes hidden files (names starting with .)

🞣 Output:

```
researcher2@b683f98c4fbf:~$ ls -la /home/researcher2/projects
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 13 15:46 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 13 16:12 ..
-rw--w---- 1 researcher2 research_team   46 Aug 13 15:46 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 13 15:46 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 13 15:46 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 13 15:46 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 13 15:46 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 13 15:46 project_t.txt
researcher2@b683f98c4fbf:~$
```

❖ Describe the permissions string

Example string:

-rw-rw-rw-

Meaning:
- '-' : regular file
- 'rw-' : owner can read and write
- 'rw-' : group can read and write
- 'rw-' : others can read and write

This allows all users to modify the file, which violates the organization's policy.

❖ Change file permissions

File: project_k.txt

➕ Before change:

ls -l /home/researcher2/projects/project_k.txt

```
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ls -l /home/researcher2/projects/project_k.txt
-rw-rw-rw- 1 researcher2 research_team 46 Aug 13 15:46 /home/researcher2/projects/pro
ject_k.txt
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$
```

➕ Command used:

chmod o-w /home/researcher2/projects/project_k.txt

➕ After change:

ls -l /home/researcher2/projects/project_k.txt

```
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ chmod o-w /home/researcher2/projects/project_k.txt
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ls -l /home/researcher2/projects/project_k.txt
-rw-rw-r-- 1 researcher2 research_team 46 Aug 13 15:46 /home/researcher2/projects/pro
ject_k.txt
```

➕ Explanation:
Removed write permission from "others" to comply with policy.

❖ Change file permissions on a hidden file

File: .project_x.txt

➕ Before change:

ls -l /home/researcher2/projects/.project_x.txt

```
researcher2@b683f98c4fbf:~$ ls -l /home/researcher2/projects/.project_x.txt
-rw--w---- 1 researcher2 research_team 46 Aug 13 15:46 /home/researcher2/projects/.pr
oject_x.txt
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$
```

➕ Command used:

chmod 440 /home/researcher2/projects/.project_x.txt

➕ After change:

ls -l /home/researcher2/projects/.project_x.txt

```
researcher2@b683f98c4fbf:~$ chmod 440 /home/researcher2/projects/.project_x.txt
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ls -l /home/researcher2/projects/.project_x.txt
-r--r----- 1 researcher2 research_team 46 Aug 13 15:46 /home/researcher2/projects/.pr
oject_x.txt
researcher2@b683f98c4fbf:~$
```

➕ Explanation:
Set read-only permission for owner and group, no access for others.

❖ Change directory permissions

Directory: drafts

➕ Before change:

ls -ld /home/researcher2/projects/drafts

```
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ls -ld /home/researcher2/projects/drafts
drwx--x--- 2 researcher2 research_team 4096 Aug 13 15:46 /home/researcher2/projects/d
rafts
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ▯
```

➕ Command used:

chmod g-x /home/researcher2/projects/drafts

➕ After change:

ls -ld /home/researcher2/projects/drafts

```
researcher2@b683f98c4fbf:~$ ls -ld /home/researcher2/projects/drafts
drwx--x--- 2 researcher2 research_team 4096 Aug 13 15:46 /home/researcher2/projects/d
rafts
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ chmod g-x /home/researcher2/projects/drafts
researcher2@b683f98c4fbf:~$
researcher2@b683f98c4fbf:~$ ls -ld /home/researcher2/projects/drafts
drwx------ 2 researcher2 research_team 4096 Aug 13 15:46 /home/researcher2/projects/d
rafts
researcher2@b683f98c4fbf:~$
```

➕ Explanation:
Removed execute permission for the group so only the owner can access.

Summary

I inspected the permissions of files and directories in /home/researcher2/projects using ls -la, identified unauthorized write and execute permissions, and corrected them with chmod. I removed write access for others on project_k.txt, secured the hidden file .project_x.txt to read-only for user

and group, and restricted the drafts directory so only the owner could access it. These changes strengthen security and prevent unauthorized access or modification of research files.