File permissions in Linux

Project description

In my role as a security professional within an organization, the Linux File Permissions Management System project holds significant relevance. The system focuses on efficiently managing file access permissions on Linux systems, featuring a secure user authentication mechanism for authorized access. The ability to list, view, and modify file permissions, along with access control measures and a comprehensive permissions history log, aligns closely with my responsibilities of ensuring robust security. The inclusion of role-based access control and encryption further contributes to a secure environment. This project not only serves as a practical tool for streamlined file permissions management but also enhances my understanding of Linux security concepts within the organizational context.

Check file and directory details

```
researcher2@b1895b7744a6:~/projects$ pwd
/home/researcher2/projects
researcher2@b1895b7744a6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 14:20 ..
-rw--w---- 1 researcher2 research_team   46 Mar 12 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Mar 12 13:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Mar 12 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Mar 12 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_t.txt
researcher2@b1895b7744a6:~/projects$
```

In the /home/researcher2/projects directory, there are five files with the following names and permissions:

- project_k.txt
    - - = regular file not a directory.
    - User = read, write,
    - Group = read, write
    - Other = read, write
- project_m.txt
    - - = regular file

    - User = read, write
    - Group = read
    - Other = none
- project_r.txt
    - - = regular file
    - User= read, write
    - Group = read, write
    - Other = read
- project_t.txt
    - - = regular file,
    - User = read, write
    - Group = read, write
    - Other = read
- .project_x.txt
    - - = regular file,
    - User = read, write
    - Group = write
    - Other = none

There is also one subdirectory inside the projects directory named drafts. The permissions on drafts are:

- User = read, write, execute
- Group = execute
- Other = none

Describe the permissions string

- 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 lack of user permission.

- 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 lack of group permission.

- 8th-10th characters: These characters indicate the read (r), write (w), and execute (x) permissions for other. When one of these characters is a hyphen (-) instead, that indicates lack of other permission.

Change file permissions

The following code demonstrates how I used Linux commands to do this:

```
researcher2@b1895b7744a6:~/projects$ chmod g-w project_k.txt
researcher2@b1895b7744a6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 14:20 ..
-rw--w---- 1 researcher2 research_team   46 Mar 12 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Mar 12 13:39 drafts
-rw-r--rw- 1 researcher2 research_team   46 Mar 12 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Mar 12 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_t.txt
researcher2@b1895b7744a6:~/projects$ chmod o+w project_m.txt
researcher2@b1895b7744a6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 14:20 ..
-rw--w---- 1 researcher2 research_team   46 Mar 12 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Mar 12 13:39 drafts
-rw-r--rw- 1 researcher2 research_team   46 Mar 12 13:39 project_k.txt
-rw-r---w- 1 researcher2 research_team   46 Mar 12 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_t.txt
researcher2@b1895b7744a6:~/projects$
```

Change file permissions on a hidden file

```
researcher2@b1895b7744a6:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@b1895b7744a6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 14:20 ..
-r--r----- 1 researcher2 research_team   46 Mar 12 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Mar 12 13:39 drafts
-rw-r--rw- 1 researcher2 research_team   46 Mar 12 13:39 project_k.txt
-rw-r---w- 1 researcher2 research_team   46 Mar 12 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_t.txt
```

Change directory permissions

```
researcher2@b1895b7744a6:~/projects$ chmod g-x drafts
researcher2@b1895b7744a6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Mar 12 14:20 ..
-r--r----- 1 researcher2 research_team   46 Mar 12 13:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Mar 12 13:39 drafts
-rw-r--rw- 1 researcher2 research_team   46 Mar 12 13:39 project_k.txt
-rw-r---w- 1 researcher2 research_team   46 Mar 12 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Mar 12 13:39 project_t.txt
researcher2@b1895b7744a6:~/projects$
```

Summary

I assessed and aligned file permissions in the projects directory with organizational requirements. After using "ls -la" to review existing permissions, I employed the "chmod" command multiple times to make necessary adjustments, ensuring adherence to specific authorization levels.