File permissions in Linux

Project description

We will examine existing permissions on the file system. We will check if the permissions match the authorization that should be given. If they do not match, we'll modify the permissions to authorize the appropriate users and remove any unauthorized access.

Check file and directory details

We can see in the above image that we are currently working in the '/home/researcher2/projects' directory. There are 4 files and 1 directory available in the projects directory. We can also see the strings describing each files and directories permission details.

Describe the permissions string

In the above image we can see individual directories and files permissions indicated through a 10-character string. We will review one of the strings and others can be interpreted in the same way.
Let's consider the string indicating permissions for the file project_k.txt
"-rw-rw-rw-" : The first character of the string (-) represents that it is a file('d' for directory). 2nd to 4th characters represent permissions granted to the user, 'r' for read permissions, 'w' for write permissions and since the user doesn't have execute('x') permissions a hyphen(-) is used instead. In the same way characters 5th to 7th represent permissions granted to group owners. In this scenario the group owner is 'research_team'. Lastly, characters 8th to 10th represent permissions granted to other owners.

The current file permissions in projects directory are as follows:

- project_k.txt
  - User = read, write,
  - Group = read, write
  - Other = read, write
- project_m.txt
  - User = read, write
  - Group = read
  - Other = none
- project_r.txt
  - User= read, write
  - Group = read, write
  - Other = read
- project_t.txt
  - User = read, write
  - Group = read, write
  - Other = read
- Drafts directory
  - User = read, write, execute
  - Group = execute
  - Other = none

Change file permissions

```
drwx--x--- 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$ chmod o-w project_k.txt
researcher2@412c5c7ac4f9:~/projects$ chmod g-r project_m.txt
researcher2@412c5c7ac4f9:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$
```

We have successfully changed the access permissions for project_k.txt and project_m.txt files.

Change file permissions on a hidden file

```
researcher2@412c5c7ac4f9:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 28 11:01 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 28 11:12 ..
-rw--w---- 1 researcher2 research_team   46 Aug 28 11:01 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$
```

We can see that there is a hidden file present in the projects directory named '.project_x.txt'.
We will change the permissions to this file to make it more protected.

```
researcher2@412c5c7ac4f9:~/projects$ chmod u-w,g+r-w .project_x.txt
researcher2@412c5c7ac4f9:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 28 11:01 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 28 11:12 ..
-r--r----- 1 researcher2 research_team   46 Aug 28 11:01 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$
```

We have successfully changed the hidden file's permissions.

Change directory permissions

```
researcher2@412c5c7ac4f9:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$ chmod g-x drafts
researcher2@412c5c7ac4f9:~/projects$ ls -l
total 20
drwx------ 2 researcher2 research_team 4096 Aug 28 11:01 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 28 11:01 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 28 11:01 project_t.txt
researcher2@412c5c7ac4f9:~/projects$
```

We have successfully changed the directory permissions.

Summary

Current file and directory permissions are as follows:

- project_k.txt
- User = read, write,
- Group = read, write
- Other = read
- project_m.txt
- User = read, write
- Group = none
- Other = none
- project_r.txt
- User= read, write
- Group = read, write
- Other = read
- project_t.txt
- User = read, write
- Group = read, write
- Other = read
- .project_x.txt
- User = read
- Group = read

○ Other = none
● Drafts directory
○ User = read, write, execute
○ Group = none
○ Other = none