File permissions in Linux

Project description

The research team army organisation needs to update the permissions for certain files and directory in the projects directory. The current permissions does not reflect the level of authorisation that should be given in the company. In order to keep the system secure, checking and updating the permission is required. Hence, to complete this task, I performed the following actions:

Check file and directory details

The following code demonstrate how I used Linux commands to determine the existing permission set for a specific directory in the file system, which is this case is the projects directory.

```
researcher2@5b7c9633ee32:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:46 ..
-rw--w---- 1 researcher2 research_team   46 Nov  5 03:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov  5 03:34 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov  5 03:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  5 03:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_t.txt
```

The first line fo the screenshot displays the command i entered and the lines after that displays the output of the common. The code list all contents of the projects directory including hidden files. I used the `ls` command with the `-la` option to display a detailed listing of the file contents including the hidden files. The output from my command indicates that there is one directory named `drafts`, one hidden file named `.project_x.txt` and five other project files. The first 10-character string in the first column represents the permission set on each file and directory, the second column represents the current user researcher2 and the third column represents the group which is the research_team.

Describe the permissions string

The 10-character string can be deconstructed to determine who is authorized to access the file and their specific permissions. The characters and what they represent are as follows:

- 1st Character: This character can either be a d or hyphen (`-`) which indicates the file type. The d is directory and a hyphen (-) is a regular file.
- 2nd - 4th Characters: These characters indicates the read (`r`) , write (`w`), execute (`x`) permission for user. When one of these character is a hyphen (`-`) , it means that this permission is not granted to the user.
- 5th - 7th Characters: These characters indicates the read (`r`) , write (`w`), execute (`x`) permission for group. When one of these character is a hyphen (`-`) , it means that this permission is not granted to the group.
- 8th - 10th Characters: These characters indicates the read (`r`) , write (`w`), execute (`x`) permission for other. When one of these character is a hyphen (`-`) , it means that this permission is not granted to the other.

```
-rw-rw-rw- 1 researcher2 research_team   46 Nov  5 03:34 project_k.txt
```

For example `project_k.txt` has the permission `-rw-rw-r–`. The first character is a hyphen (`-`) which indicates this is a file and has a read and write permission for user, group and others. The first Character `-` indicates that this is a file. Then the 2nd - 4th character, The 5th till 7th character and 8th till the 10th character is written as `rw-` which indiciates user, group and other all have read and write permission but not execute permission.

Change file permissions

```
researcher2@5b7c9633ee32:~/projects$ chmod o-w project_k.txt
```

```
researcher2@5b7c9633ee32:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:46 ..
-rw--w---- 1 researcher2 research_team   46 Nov  5 03:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov  5 03:34 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  5 03:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_t.txt
```

The company policy indicates that other should not have any write permission for any files. I determined that `project_k.txt` has write permission for others. Hence, I need removed the write permission for other on `project_k.txt`. Using the command `chmod o-w project_k.txt` , I removed the permission to write file for users. The chmod command changes the permission on the files and directories. The first argument indicates what permission should be changed the second argument specifies the file or directory to change. Then I use la `-la` to review the updates I made, ensuring it is correctly configured.

Change file permissions on a hidden file

The research team at my organisation recently archived `project_x.txt`. They do not want anyone to have write access to this project however user and group should have read access.

The following code demonstrate how I used Linux commands to update the permissions:

```
researcher2@5b7c9633ee32:~/projects$ chmod u=r,g=r .project_x.txt
```

```
researcher2@5b7c9633ee32:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:46 ..
-r--r----- 1 researcher2 research_team   46 Nov  5 03:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov  5 03:34 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  5 03:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_t.txt
```

The first screenshot indicates the command I entered to change the file permission and the second screenshot displays the output after the change. In order to achieve this, I used the command `chmod u=r,g=r .project_x.txt` where `u=r` indicates to change user permission to read only and `g=r` to change group permission to read only.

Change directory permissions

My organization only requires researcher2 user to have access to the drafts directory and its contents. This means that no one other than researcher2 should execute permissions.

The following screenshot demonstrates how i changed the permission for this folder:

```
researcher2@5b7c9633ee32:~/projects$ chmod g-x drafts
```

```
researcher2@5b7c9633ee32:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov  5 03:46 ..
-r--r----- 1 researcher2 research_team   46 Nov  5 03:34 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Nov  5 03:34 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov  5 03:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov  5 03:34 project_t.txt
```

The first screenshot indicates the command used to change the permission of the folder drafts. The second screenshot displays the output of the files and directory after the change. From previous screenshots, we determined that user has read, write and execute access while group

has execute access for the folder drafts. Hence I using the command `chmod g-x drafts` i have removed the execute access for group leaving on users to have access to the folder.

Summary

To conclude, I changed multiple permission to match the level of authorization indicated by my organization for the files and directories in the projects directory. Using the command ls `-la` I was able to determined the current file and directory permission. Based on that, I used the `chmod` command multiple times to change the permission of the files and directories.