File permissions in Linux

Project description

I will use the Linux Bash shell to update file permissions for my organization to accurately reflect the level of authorization that should be give. By updating permissions within the projects directory, I will be able to help ensure a secure system through the principle of least-privilege.

Check file and directory details

First, we must view all of the permissions for the files in the projects directory. We do this by first navigating to the project directory by entering `cd projects.` Next, we type in `ls -la` so that we may see the permissions on all of the files, including the hidden ones. The output is as follows:

```
researcher2@21d46e547d92:~$ cd projects
researcher2@21d46e547d92:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 22 01:20 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 22 01:44 ..
-rw--w---- 1 researcher2 research_team   46 Nov 22 01:20 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 22 01:20 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 22 01:20 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 22 01:20 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 22 01:20 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 22 01:20 project_t.txt
researcher2@21d46e547d92:~/projects$
```

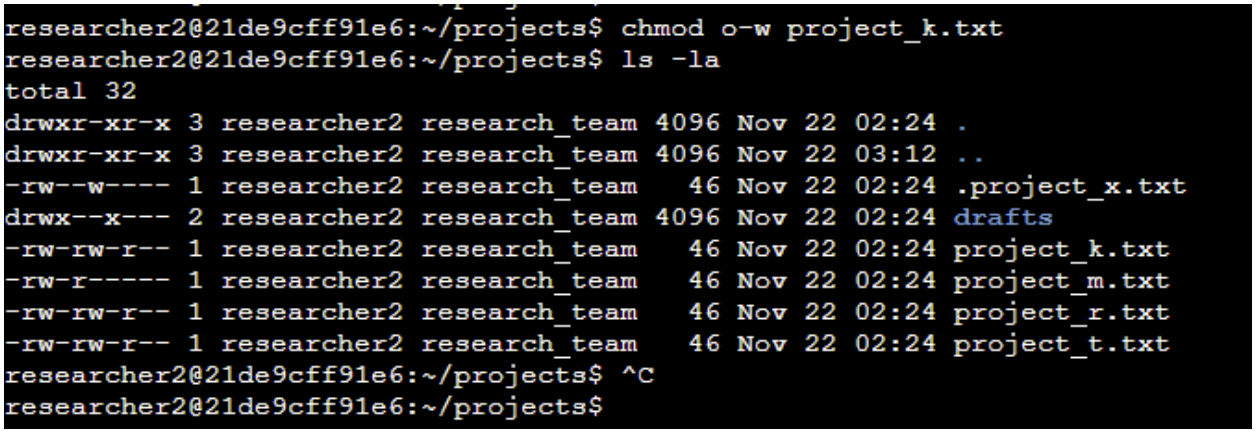
Describe the permissions string

We will take an indepth look into the permissions of one of the items in order to understand the permissions string more thoroughly. Let's take a look at the drafts directory. We see that on the left side we have a 10 character string. The first character indicates that it is a directory, marked by "d" rather than a "-". The next 3 characters indicate the user permissions, then the group permissions, then the other permissions. We see that the user has the most permissions; read, write, execute. The group has only execute permissions, marked by "x". Finally, the other category has no permissions and thus can not read, write, or execute to the directory.

Change file permissions

This organization does not allow others to have write access to any files, so we must change the permissions of the files and directories to accurately reflect this.
From the screenshot above, we see that `project_k.txt` has write permissions for other when it shouldn't, so we will input `chmod o-w project_k.txt` to remove them.

As we can see, the file no longer contains write permissions for the other group:



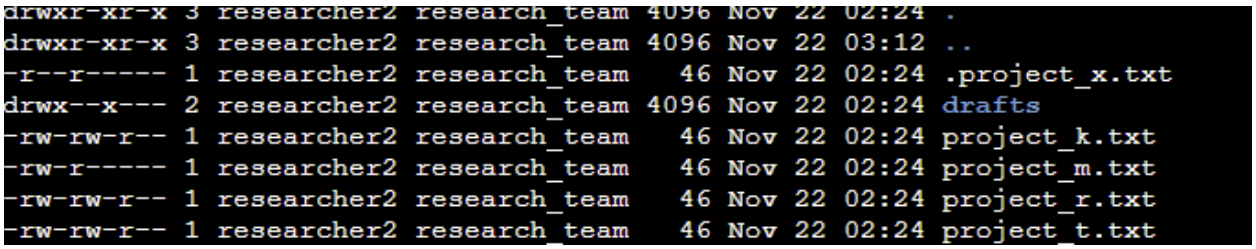
Change file permissions on a hidden file

In order to display a hidden file, we can use the command `ls` followed by option `-a` or combine it with `-l` to display the permissions on all files, including those hidden. The resulting command is `ls -la.`

`project_x.txt` is a hidden file that has been archived. It shouldn't have write permissions for anyone but the user and group should be able to read the file.

To fix this, we will input `chmod u=r,g=r.project_x.txt` Chmod changes the mode, u=r assigns the user read only permissions and g=r assigns the group read only permissions.

As we can see below, this file now only has read permissions for user and group:



Change directory permissions

The user, researcher2, is the only person who should have access to the drafts directory and its contents, so we will input `chmod u=rwx,g-rwx,o-rwx drafts` so that we may assign read write and execute permissions for the user and take away all permissions to the group and other category.

The corresponding output is this when we print it out :

```
researcher2@21de9cff91e6:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 22 02:24 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 22 03:12 ..
-r--r----- 1 researcher2 research_team   46 Nov 22 02:24 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Nov 22 02:24 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Nov 22 02:24 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 22 02:24 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 22 02:24 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 22 02:24 project_t.txt
researcher2@21de9cff91e6:~/projects$
```

Summary

In conclusion, we have secured this organization's project directory by changing the permission. We have covered how to display and modify the permissions hidden files, how to modify permissions via chmod, including with the assignment option "=" and through adding or subtracting permissions with "-" or "+".