File permissions in Linux

Project description

One of the teams at my organization needs to update the file permissions to the principle of least privilege. We can view all permissions for the project directory and its files, and change those permissions as required of us using linux commands because they don't currently reflect the team's wishes.

Check file and directory details

```
researcher2@e386fa48c7de:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:44 ..
-rw--w---- 1 researcher2 research_team   46 Oct 20 16:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Oct 20 16:13 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Oct 20 16:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Oct 20 16:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_t.txt
researcher2@e386fa48c7de:~/projects$
```

The command used above is the **ls** command (which lists files and directories below our current directory in the tree) with options to show permissions "**l**" and show hidden files "**a**" at the same time. The ten characters at the front of each file indicate the read, write, and execute permissions for 3 groups of linux users on the system: user, group, and other. There are six project files including one hidden file and a directory called drafts.

Describe the permissions string

The permissions string for project_k.txt is "-rw-rw-rw-". The first character shows whether it's a file (-) or directory (d). The next three characters tell us the read, write, and execute permissions for the user. In this case it's (rw-) which means the user has read and write permissions but not execute permissions. The next three characters are the permissions for the group, which multiple linux users can belong to. Here it is also (rw-) meaning the group has the same permissions as the user. The last three characters are the permissions for other, which are all linux owners that aren't the user and the group. Again the permissions are (rw-) which are read and write but no execute permissions. Read permissions allow viewing the file,

write permissions allow writing to a file and making new files, and execute permissions allow the execution of .exe files.

Change file permissions

The change needed for the organization is to remove write permissions from the 'other' owner type. The file project_k.txt has write permissions for other owner type and must be changed.

```
researcher2@e386fa48c7de:~/projects$ chmod o-w project_k.txt
researcher2@e386fa48c7de:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:44 ..
-rw--w---- 1 researcher2 research_team   46 Oct 20 16:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Oct 20 16:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Oct 20 16:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_t.txt
researcher2@e386fa48c7de:~/projects$
```

The first line is the command that actually changes the permissions, and every other line refreshes the view of file and directory permissions to see the change take effect. The command **chmod** does the work and the first argument is (o-w) which is interpreted as remove (-) write permissions (w) from other owner type (o), or as a full argument (o-w).

Change file permissions on a hidden file

The research team has indicated project_x.txt has been archived which is why it's hidden. The only permissions it should have are for the user and group to read the file. The current permissions must be changed using chmod.

```
researcher2@e386fa48c7de:~/projects$ chmod u-w,g-w+r .project_x.txt
researcher2@e386fa48c7de:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:44 ..
-r--r----- 1 researcher2 research_team   46 Oct 20 16:13 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Oct 20 16:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Oct 20 16:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_t.txt
researcher2@e386fa48c7de:~/projects$
```

The command used is the same as above but with a different first argument. This time we are changing both the user and group permissions at the same time, each in different ways. The user is changed to remove write permissions (u-w), and the group has read permissions added, and write permissions taken away (g-w+r). Then I used ls -la to show the changes.

Change directory permissions

The research team wants to make sure only the user (researcher2) can access the drafts folder. The only change required is removing execute permissions from the group. Here is the command:

```
researcher2@e386fa48c7de:~/projects$ chmod g-x drafts
researcher2@e386fa48c7de:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:13 .
drwxr-xr-x 3 researcher2 research_team 4096 Oct 20 16:44 ..
-r--r----- 1 researcher2 research_team   46 Oct 20 16:13 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Oct 20 16:13 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Oct 20 16:13 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Oct 20 16:13 project_t.txt
researcher2@e386fa48c7de:~/projects$
```

The command is the same as before, chmod and in this case it's used to remove (-) execute permissions (x) from the group (g), or (g-x). This is done for the drafts directory so only the user researcher2 has access to it.

Summary

The organization's goal was to fix all permissions relating to its files and directories. This means adhering to the principle of least privilege and changing the permissions on a few files and one directory. This was done with the chmod and ls -la to verify the changes. The first change was to remove write permissions from the other owner type. The second change was to remove write permissions from the user and remove it from the group while adding read permissions to the group. This was all done to the hidden project file. The last change was to ensure the directory “drafts” was only accessible from the user, researcher2.