File permissions in Linux

Project description

The file permissions need to be updated for my organisation for files in the *projects* directory. At the moment the file permissions do not provide adequate security against unauthorised access. Checking these file permissions will help maintain system security.

This process was completed as follows:

Check file and directory details

```
researcher2@1f3f000f47f4:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 14:36 ..
-rw--w---- 1 researcher2 research_team   46 Jun 20 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 20 13:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jun 20 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 20 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_t.txt
researcher2@1f3f000f47f4:~/projects$
```

Above is a screenshot of the process to check the current permissions of all of the files in the *projects* directory. After typing the command “ls -la“, the permissions of all files in the projects directory are returned (including hidden files). The permissions are displayed in the format of a 10 character string. In the projects directory, we can see that there are 4 visible files as well as a subdirectory named drafts.

Describe the permissions string

Let’s take a closer look at the 10 character string.

- Character 1: Specifies the file type. Can be a directory (d) or a file (-).
- Characters 2-4: Permissions for the user. Character 2 is for read access (r), character 3 is for write access (w), and character 4 is for execute access (x).
- Characters 5-7: Permissions for the group. Character 5 is for read access (r), character 6 is for write access (w), and character 7 is for execute access (x).
- Characters 8-10: Permissions for other. Character 8 is for read access (r), character 9 is for write access (w), and character 10 is for execute access (x).
- No permission is indicated by a hyphen (-) in place of the specific access character.

As an example, let's look at the project_m.txt permissions string from the screenshot above. The permissions string for this file is '-rw-r----'.

- Following the scheme outlined above, we know that project_m.txt is a file.
- The user has read and write permissions but no execute permissions.
- The group only has read permissions.
- Other has no permissions for project_m.txt.

Change file permissions

It was decided by the organisation that other should not have write access to any files in the projects directory.

```
researcher2@1f3f000f47f4:~/projects$ chmod o-w *.txt
researcher2@1f3f000f47f4:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 14:36 ..
-rw--w---- 1 researcher2 research_team   46 Jun 20 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 20 13:39 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 20 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_t.txt
researcher2@1f3f000f47f4:~/projects$
```

To change the permissions of all files in the directory, I used the chmod command to remove write access from other for all files in /projects. The first line in the screenshot above is the command I used. I then viewed the permissions for the files in the projects directory and it was confirmed that other do not have write access for any files.

Change file permissions on a hidden file

The research team has recently archived .project_x.txt, which is why it's a hidden file. Hidden files are preceded by a full stop character (.). They do not want anyone to have write permissions, but the user and group should have read access.

```
researcher2@1f3f000f47f4:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@1f3f000f47f4:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 14:36 ..
-r--r----- 1 researcher2 research_team   46 Jun 20 13:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 20 13:39 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 20 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_t.txt
researcher2@1f3f000f47f4:~/projects$
```

To comply with their request, I modified the permissions by executing the command on the first line of the screenshot above. The arguments passed to the chmod command are outlined below.

- u-w : removes write access from the user
- g-w : removes write access from the group
- g+r : adds read access for the group

Change directory permissions

The organisation wants only researcher2 user to have access to the drafts subdirectory.

```
researcher2@1f3f000f47f4:~/projects$ chmod g-x drafts/
researcher2@1f3f000f47f4:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 13:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 20 14:36 ..
-r--r----- 1 researcher2 research_team   46 Jun 20 13:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Jun 20 13:39 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 20 13:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 20 13:39 project_t.txt
researcher2@1f3f000f47f4:~/projects$
```

To change this, I needed to remove execute access from the group. This is done on the first line above. The researcher2 user already had execute permissions for drafts so I did not need to add any extra permissions for them.

Summary

I successfully changed the file permissions for all of the files in the projects directory to comply with the requests of the research team and the level of authorisation wanted by the organisation. The process was completed through the process of checking the permissions using the ‘ls -la’ command and subsequently changing them as required using the ‘chmod’ command.