File permissions in Linux

Project description:

The research team at my organization needs to change the file permissions for some files and folders in the projects directory. The current permissions aren't set correctly for the required access levels. By checking and updating these permissions, we can help secure the system. To do this, I took the following steps:

Check file and directory details

The following code shows how I used Linux commands to check the current permissions for a specific directory in the file system.

```
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-rw--w---- 1 researcher2 research_team   46 Dec  2 15:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

The first line is the command I entered, and the next lines are the output. I used the `ls -la` command to list everything in the projects directory, including hidden files. The output shows one folder called drafts, one hidden file named `.project_x.txt`, and five other project files. The first column shows the permissions (10 character string) for each file or folder.

Describe the permissions string

The 10-character string shows who can access the file and what permissions they have. Here's what each part means:

- 1st character: This is either a "d" or a hyphen (-). A "d" means it's a directory, and a hyphen means it's a regular file.
- 2nd-4th characters: These show the read (r), write (w), and execute (x) permissions for the user. If there's a hyphen (-), that permission is not granted to the user.

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- 5th-7th characters: These show the read (*r*), write (*w*), and execute (*x*) permissions for the group. A hyphen (-) means that permission is not granted for the group.
- 8th-10th characters: These show the read (*r*), write (*w*), and execute (*x*) permissions for others. This includes all other users on the system. A hyphen (-) means that permission is not granted for others.

Change file permissions

The organization decided that others shouldn't have write access to any files. To follow this rule, I checked the file permissions I had earlier. I found that `project_k.txt` needed its write access removed for others. The code below shows how I used Linux commands to do this:

```
researcher2@5d738f0f927b:~/projects$ chmod o-w project_k.txt
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-rw--w---- 1 researcher2 research_team   46 Dec  2 15:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

The first two lines of the screenshot show the commands I typed, and the following lines show the output of the second command. The `chmod` command changes file and directory permissions. The first part tells which permissions to change, and the second part specifies the file or directory. In this case, I removed write permissions for others on the `project_k.txt` file. After that, I used `ls -la` to check the updates I made.

Change file permissions on a hidden file

The code below shows how I used Linux commands to change the permissions:

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```
researcher2@3213bbc1d047:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@3213bbc1d047:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 20 15:36 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 20 15:36 ..
-r--r----- 1 researcher2 research_team   46 Dec 20 15:36 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec 20 15:36 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec 20 15:36 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec 20 15:36 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 20 15:36 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 20 15:36 project_t.txt
researcher2@3213bbc1d047:~/projects$
```

The first two lines of the screenshot show the commands I typed, and the following lines show the output of the second command. I know `.project_x.txt` is a hidden file because it starts with a period (`.`). In this case, I removed write permissions for the user and added read permissions for the group. I took away write permissions from the user with `u-w`, then removed write permissions from the group with `g-w`, and added read permissions for the group with `g+r`.

Change directory permissions

My organization wants only the user `researcher2` to have access to the drafts directory and its contents. This means no one else should have execute permissions.
The code below shows how I used Linux commands to change the permissions. The first two lines of the screenshot show the commands I typed, and the following lines show the output of the second command. I found that the group had execute permissions, so I used the `chmod` command to remove them. The `researcher2` user already had execute permissions, so I didn't need to add those.

```
researcher2@5d738f0f927b:~/projects$ chmod g-x drafts
researcher2@5d738f0f927b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec  2 15:27 ..
-r--r----- 1 researcher2 research_team   46 Dec  2 15:27 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Dec  2 15:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec  2 15:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec  2 15:27 project_t.txt
researcher2@5d738f0f927b:~/projects$
```

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Summary

I changed several permissions to match what my organization wanted for the files and directories in the projects directory. The first step was using `ls -la` to check the permissions for the directory, which helped me make decisions in the next steps. Then, I used the `chmod` command several times to change the permissions on the files and directories.