

File permissions in Linux

Project description

This project is to demonstrate knowledge and skills towards examining and managing file permissions. Linux commands within the Bash shell will be used to accomplish this project.

Scenario background: As a security analyst, setting appropriate access permissions is critical to protecting sensitive information and maintaining the overall security of a system.

Check file and directory details

In this task, you must explore the permissions of the `projects` directory and the files it contains. The lab starts with `/home/researcher2` as the current working directory. This is because you're changing permissions for files and directories belonging to the `researcher2` user.

The permissions of the files in the `projects` directory are as follows:

Navigate to `projects` directory= `cd projects`

Check file and directory permissions= `ls -l`

```
researcher2@8bb6a462c5ab:~$ ls
projects
researcher2@8bb6a462c5ab:~$ cd projects
researcher2@8bb6a462c5ab:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$
```

Describe the permissions string

A directory with full permissions for all owner types would be `drwxrwxrwx`:

- The 1st character indicates the file type. The d indicates it's a directory. When this character is a hyphen (-), it's a regular file.
- The 2nd-4th characters indicate the read (r), write (w), and execute (x) permissions for the user. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted to the user.
- The 5th-7th characters indicate the read (r), write (w), and execute (x) permissions for the group. When one of these characters is a hyphen (-) instead, it indicates that this permission is not granted for the group.
- The 8th-10th characters indicate the read (r), write (w), and execute (x) permissions for the owner type of other. This owner type consists of all other users on the system apart from the user and the group. When one of these characters is a hyphen (-) instead, that indicates that this permission is not granted for other.

The second block of text in the expanded directory listing is the user who owns the file. The third block of text is the group owner of the file.

Change file permissions

Check whether any files in the `projects` directory have write permissions for the owner type of other:

Check permissions of files and directories= `ls -l`

Check permissions of files and directories to include hidden files= `ls -la`

```

researcher2@8bb6a462c5ab:~/projects$ ls
drafts      project_m.txt  project_t.txt
project_k.txt  project_r.txt
researcher2@8bb6a462c5ab:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 14:49 ..
-rw--w---- 1 researcher2 research_team  46 Jun  7 13:59 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$ █

```

Change permission on the file `project_k.txt` so that the owner type of other doesn't have write permissions= `chmod o-w project_k.txt`

```

researcher2@8bb6a462c5ab:~/projects$ chmod o-w project_k.txt
researcher2@8bb6a462c5ab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 14:49 ..
-rw--w---- 1 researcher2 research_team  46 Jun  7 13:59 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$ █

```

Change file permissions on a hidden file

The file `.project_x.txt` is a hidden file that has been archived and should not be written to by anyone. (The user and group should still be able to read this file.)

```
researcher2@8bb6a462c5ab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 14:49 ..
-rw--w---- 1 researcher2 research_team  46 Jun  7 13:59 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$
```

Change the permissions of the file `.project_x.txt` so that both the user and the group can read, but not write to, the file= `chmod u-w, g-w .project_x.txt`

```
researcher2@8bb6a462c5ab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 14:49 ..
-r--r----- 1 researcher2 research_team  46 Jun  7 13:59 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$
```

Change directory permissions

Change the permissions of a directory. First, you'll check the group permissions of the `/home/researcher2/projects/drafts` directory and then modify the permissions as required.

Navigate to the `drafts` directory=`cd drafts`

List permissions for the drafts directory= `ls -la`

```
researcher2@8bb6a462c5ab:~/projects$ ls
drafts project_k.txt project_m.txt project_r.txt project_t.txt
researcher2@8bb6a462c5ab:~/projects$ cd drafts
researcher2@8bb6a462c5ab:~/projects/drafts$ ls -la
total 8
drwx--x--- 2 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 ..
researcher2@8bb6a462c5ab:~/projects/drafts$
```

Only the `researcher2` user should be allowed to access the `drafts` directory and its contents. (This means that only `researcher2` should have execute privileges.)

Remove the execute permission for the group from the `drafts` directory= `chmod g-x drafts`

```
researcher2@8bb6a462c5ab:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 13:59 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun  7 14:49 ..
-r--r----- 1 researcher2 research_team   46 Jun  7 13:59 .project_x.txt
drwx----- 2 researcher2 research_team 4096 Jun  7 13:59 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun  7 13:59 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun  7 13:59 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun  7 13:59 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun  7 13:59 project_t.txt
researcher2@8bb6a462c5ab:~/projects$
```

Summary

In this activity I checked the file and directory details for all files within the `project` directory using the `ls -l` and `ls -la` commands. I then changed permissions on the file `project_k.txt` so that the owner type of other doesn't have write permissions using the command `chmod o-w project_k.txt`. Finally, I changed the permissions for the directory `drafts` using the command `chmod g-x drafts`.