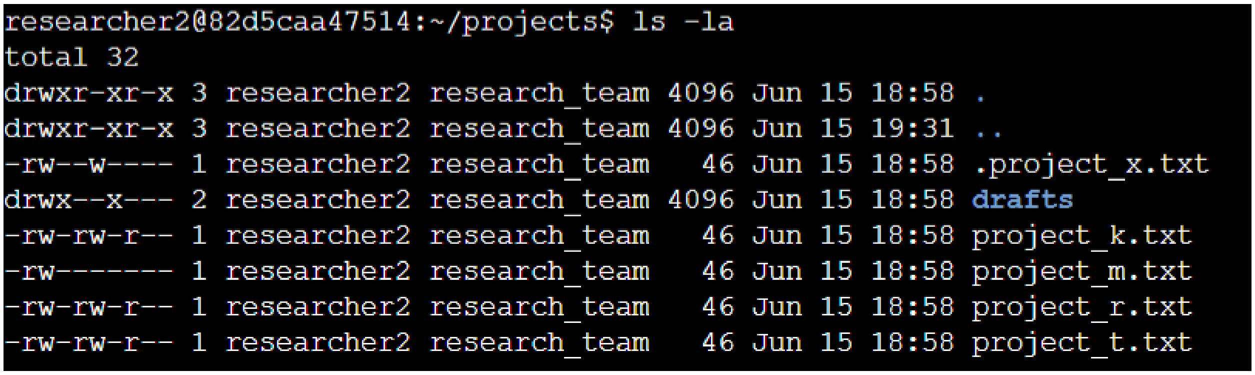
File permissions in Linux

Project description

The research team at my organization needs to update the file permissions for specific files and directories within the projects directory. The current permissions do not accurately reflect the appropriate level of authorization required. Verifying and updating these permissions will enhance system security. To address this, I carried out the following tasks:

Check file and directory details



```
researcher2@82d5caa47514:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 18:58 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 19:31 ..
-rw--w---- 1 researcher2 research_team   46 Jun 15 18:58 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 15 18:58 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_k.txt
-rw------- 1 researcher2 research_team   46 Jun 15 18:58 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_t.txt
```

The first line of the screenshot shows the command I entered, while the other lines display the output. The command lists all contents of the projects directory. I used the `ls -la` command to provide a detailed listing of the file contents, including hidden files. The output of my command indicates that there is one directory named `drafts`, one hidden file named `.project_x.txt`, and five other project files. The 10-character string in the first column represents the permissions set for each file or directory.

Describe the permissions string

The 10-character string can be deconstructed to determine who is authorized to access the file and their specific permissions. The characters and what they represent are as follows:

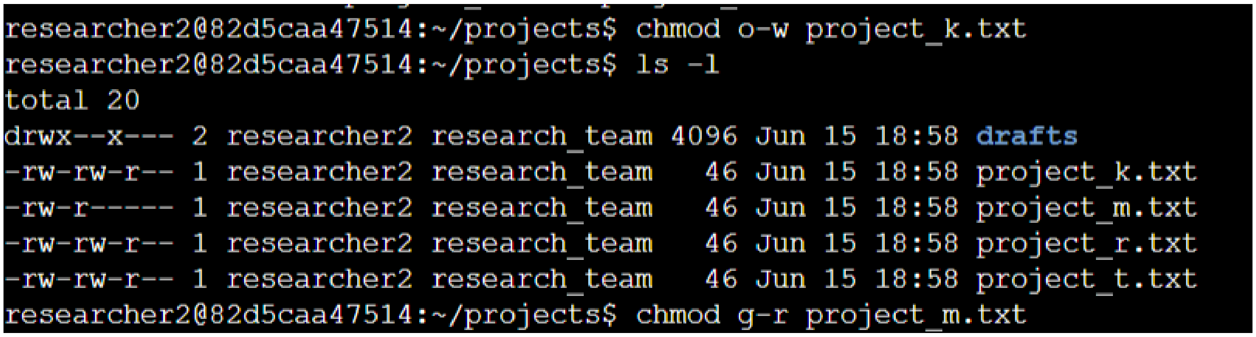
1st character: This character is either a d or hyphen (-) and indicates the file type. If it's a d, it's a directory. If it's a hyphen (-), it's a regular file.

2nd-4th characters: These 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.

5th-7th characters: These 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.

8th-10th characters: These characters indicate the read (r), write (w), and execute (x) permissions for others. 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, it indicates that this permission is not granted for others.

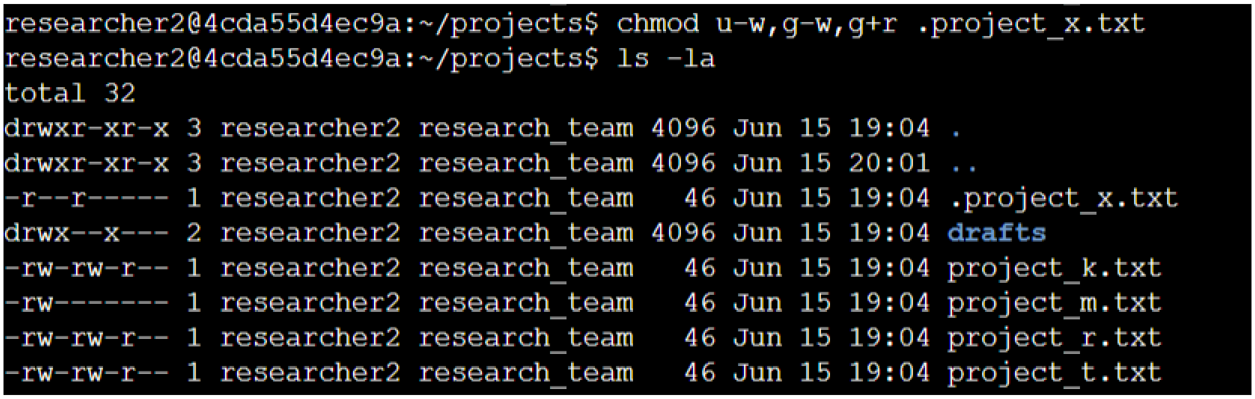
Change file permissions



```
researcher2@82d5caa47514:~/projects$ chmod o-w project_k.txt
researcher2@82d5caa47514:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jun 15 18:58 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 15 18:58 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 18:58 project_t.txt
researcher2@82d5caa47514:~/projects$ chmod g-r project_m.txt
```

The first two lines of the screenshot display the commands I entered, and the other lines show the output of the second command. The `chmod` command changes the permissions on files and directories. The first argument indicates what permissions should be changed, and the second argument specifies the file or directory. In this example, I removed write permissions from others for the `project_k.txt` file. After this, I used `ls -l` to review the updates I made.

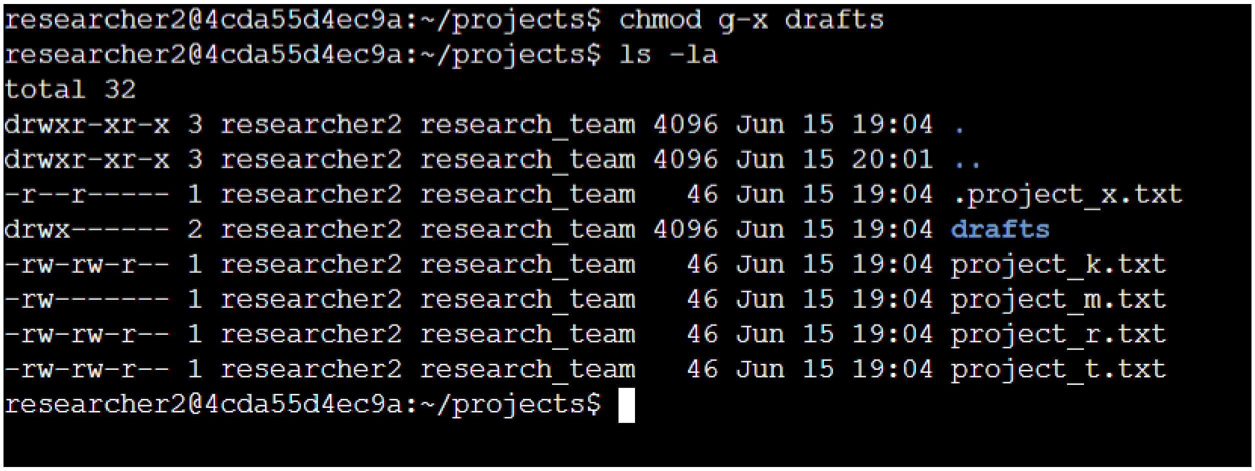
Change file permissions on a hidden file



```
researcher2@4cda55d4ec9a:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@4cda55d4ec9a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 19:04 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 20:01 ..
-r--r----- 1 researcher2 research_team   46 Jun 15 19:04 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 15 19:04 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_k.txt
-rw------- 1 researcher2 research_team   46 Jun 15 19:04 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_t.txt
```

The first two lines of the screenshot display the commands I entered, and the other 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 example, I removed write permissions from the user and group and added read permissions to the group. I removed write permissions from the user with `u-w`, removed write permissions from the group with `g-w`, and added read permissions to the group with `g+r`.

Change directory permissions



```
researcher2@4cda55d4ec9a:~/projects$ chmod g-x drafts
researcher2@4cda55d4ec9a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 19:04 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 15 20:01 ..
-r--r----- 1 researcher2 research_team   46 Jun 15 19:04 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Jun 15 19:04 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_k.txt
-rw------- 1 researcher2 research_team   46 Jun 15 19:04 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 15 19:04 project_t.txt
researcher2@4cda55d4ec9a:~/projects$ 
```

The output here displays the permission listing for several files and directories. Line 1 indicates the current directory (projects), and line 2 indicates the parent directory (home). Line 3 indicates a regular file titled `.project_x.txt`. Line 4 is the directory `drafts` with restricted permissions. Here you can see that only `researcher2` has execute permissions. It was previously determined that the group had execute permissions, so I used the `chmod` command to remove them. The `researcher2` user already had execute permissions, so they did not need to be added.

Summary

I changed multiple permissions to match the level of authorization my organization wanted for files and directories in the projects directory. The first step in this was using `ls -la` to check the permissions for the directory. This informed my decisions in the following steps. I then used the `chmod` command multiple times to change the permissions on files and directories.

-Kushagra Gupta