

File permissions in Linux

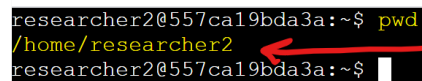
Project description

In this project, the security analyst is assigning and removing permissions for each group in the Bash shell.

Check file and directory details

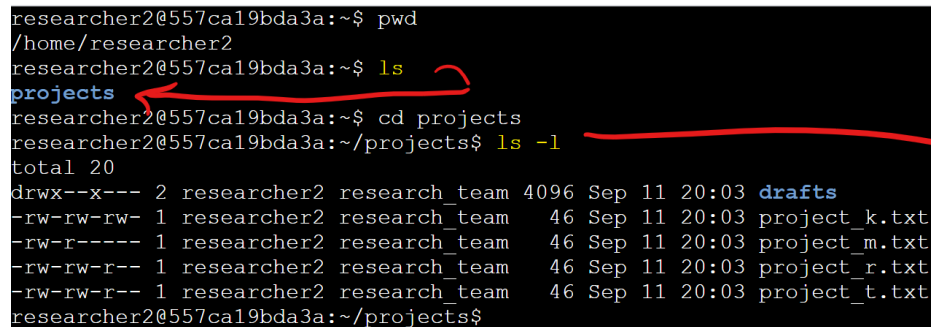
First, the “`pwd`” command was executed to assure we are in the correct directory

```
researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$
```

A terminal window with a black background. The prompt is 'researcher2@557ca19bda3a:~\$'. The command 'pwd' is entered and executed, returning '/home/researcher2'. A red arrow points from the command to the output.

Next I accessed the projects directory using the “`cd projects`” command, and opened all the available files to check their permissions using the “`ls -l`” command

```
researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$ ls
projects
researcher2@557ca19bda3a:~$ cd projects
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$
```

A terminal window with a black background. The prompt is 'researcher2@557ca19bda3a:~\$'. The command 'pwd' is entered and executed, returning '/home/researcher2'. The command 'ls' is entered and executed, returning 'projects'. The command 'cd projects' is entered and executed. The command 'ls -l' is entered and executed, showing a list of files and directories with their permissions, owner, group, size, and timestamp. A red arrow points from the 'cd projects' command to the 'ls -l' command. A red bracket highlights the file permissions for 'project_k.txt', 'project_m.txt', 'project_r.txt', and 'project_t.txt'.

Then I used the “`ls -a`” command to determine if there were any hidden files in the directory

```
researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$ ls
projects
researcher2@557ca19bda3a:~$ cd projects
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ ls -la
.  ..  .project_x.txt  drafts  project_k.txt  project_m.txt  project_r.txt  project_t.txt
researcher2@557ca19bda3a:~/projects$
```

Afterwards, I began to work on the permissions on the necessary files.

Describe the permissions string

The permissions string is the first set of 10 digits that are listed for a file to display its permissions. For a directory, the string is marked with a “`d`” at the beginning. File and all other materials are marked with a “`-`” at the beginning. Following the first digit, there are 3 sets of digits, each containing 3 digits.

The first set of 3 digits (2-4) are for the user (u), or the creator of the file. The next set (5-7) represents the group (g), of which the user is a part of. The last set of digits (8-10) represent all other users (o).

Each digit is represented by one or 3 letters, determining the type of permission the group has. The first digit in the group is the “`r`” permission. R stands for read. That means the user has the ability to read the file. The second digit is the “`w`” permission, which means “write”. The user has the permission to change the contents of the file. The last digit is the “`x`” permission, which means execute. The `x` permission allows users to execute files that are executable. Any permissions not granted will be marked with a “`-`” digit in the string.

Change file permissions

The first file we are changing permissions for is “project_k”. The others group for all the other files only have the read permission, yet “project_k” allows the others group to have a writings permission

```

researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$ ls
projects
researcher2@557ca19bda3a:~$ cd projects
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ ls -a
. . . .project_x.txt drafts project_k.txt project_m.txt project_r.txt project_t.txt
researcher2@557ca19bda3a:~/projects$

```

To remove the write permission, the command “`chmod o-w project_k.txt`” was executed. Once the command was executed, the write permission was removed.

```

researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$ ls
projects
researcher2@557ca19bda3a:~$ cd projects
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-rw- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ ls -a
. . . .project_x.txt drafts project_k.txt project_m.txt project_r.txt project_t.txt
researcher2@557ca19bda3a:~/projects$ chmod o-w project_k.txt
researcher2@557ca19bda3a:~/projects$
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-r--r-- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$

```

Change file permissions on a hidden file

I have already disclosed the hidden file using the “`ls -a`” command. I want to change the file permissions on this file, so that both the user and the group only have the read permission. However, the file has both the user and the group with the write permission, with the group only having the write permission.

```

researcher2@557ca19bda3a:~$ pwd
/home/researcher2
researcher2@557ca19bda3a:~$ ls
projects
researcher2@557ca19bda3a:~$ cd projects
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-rw- 1 researcher2 research_team 46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team 46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ ls -a
. . .project_x.txt drafts project_k.txt project_m.txt project_r.txt project_t.txt
researcher2@557ca19bda3a:~/projects$ chmod o-w project_k.txt
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_k.txt
-rw-r----- 1 researcher2 research_team 46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ chmod g-r project_m.txt
researcher2@557ca19bda3a:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_k.txt
-rw----- 1 researcher2 research_team 46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:03 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:19 ..
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_k.txt
-rw----- 1 researcher2 research_team 46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$

```

To change this I executed the command “`chmod u-w,g-w,g+r .project_x.txt`”

The command removed the write permission for both the user and the group, and added the read permission for the group

```

researcher2@557ca19bda3a:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@557ca19bda3a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:03 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:19 ..
-r--r----- 1 researcher2 research_team 46 Sep 11 20:03 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_k.txt
-rw----- 1 researcher2 research_team 46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team 46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$

```

Change directory permissions

The name of the directory we want to change the permissions for is “drafts”. The draft directory has the user and group given the execution permission. We only want the user to have the execution permission, so the execution permission must be removed from the group

```
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:03 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:19 ..
-r--r----- 1 researcher2 research_team  46 Sep 11 20:03 .project_x.txt
drwx--x-- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$
```

The command “`chmod g-x drafts`” was executed to do just that.

```
researcher2@557ca19bda3a:~/projects$ chmod g-x drafts
researcher2@557ca19bda3a:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:03 .
drwxr-xr-x 3 researcher2 research_team 4096 Sep 11 20:19 ..
-r--r----- 1 researcher2 research_team  46 Sep 11 20:03 .project_x.txt
drwx--x-- 2 researcher2 research_team 4096 Sep 11 20:03 drafts
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_k.txt
-rw----- 1 researcher2 research_team  46 Sep 11 20:03 project_m.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_r.txt
-rw-rw-r-- 1 researcher2 research_team  46 Sep 11 20:03 project_t.txt
researcher2@557ca19bda3a:~/projects$
```

Summary

Overall, the goal was to change permissions for both files and directories in the lab, while explaining how to read the permissions string. I believe I have executed both goals.