File permissions in Linux

Project description

Linux commands allow users to interact with the operating system via the use of a command-line interface (CLI). They are a method of communicating with the system via a text-based interface.

Check file and directory details

In order to check permissions on a file or directory in Linux, you can use the `ls -la` command. This command lists every file in the current directory, along with the current permissions for that file or directory.

The current permissions on the files in the `projects` directory can be seen in the following screen capture:


```
researcher2@ead9dc4fa064:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:00 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:32 ..
-rw--w---- 1 researcher2 research_team   46 Aug 26 16:00 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:00 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 26 16:00 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 26 16:00 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_t.txt
researcher2@ead9dc4fa064:~/projects
researcher2@ead9dc4fa064:~/projects
researcher2@ead9dc4fa064:~/projects
researcher2@ead9dc4fa064:~/projects$ 
```

Describe the permissions string

Taking the first entry in the command's output, the 10-character string in the first column is used to denote the permissions that have been assigned to the file or directory.

The first character in the string denotes whether the entry pertains to a file or a directory. If the first character in the string is d, then the entry is a directory, otherwise it is a file and this character is a hyphen.

The next three characters are permissions for the current user of the system, and there are three permissions; read, write, and execute. The next three characters are the permissions

for the group that the entry belongs to, and the final three are permissions that apply to everyone who is neither the user nor in the group that the file belongs to.

Change file permissions

In order to change the permissions on the files so that everyone who is neither the user nor in the group the file belongs to has no permissions on that file, the command that needs to be used is the `chmod` command.

The permission string that needs to be used is - r w x r w x- - - and the execution of the command to change the permissions, as well as the permission state before and after changing the file permissions can be seen in the following screen capture:

```
researcher2@ead9dc4fa064:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:00 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:32 ..
-rw--w---- 1 researcher2 research_team   46 Aug 26 16:00 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:00 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug 26 16:00 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 26 16:00 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_t.txt
researcher2@ead9dc4fa064:~/projects
researcher2@ead9dc4fa064:~/projects$ chmod o-w project_k.txt
researcher2@ead9dc4fa064:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:00 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:32 ..
-rw--w---- 1 researcher2 research_team   46 Aug 26 16:00 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:00 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug 26 16:00 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:00 project_t.txt
researcher2@ead9dc4fa064:~/projects
researcher2@ead9dc4fa064:~/projects$ 
```

Change file permissions on a hidden file

In order to accomplish the task of removing the write permissions for all users on the hidden file `.project_x.txt`, the permissions need to be changed using the `chmod` command. The permission string that accomplishes this task is `chmod u-w,g-w,o-w`

A hidden file in Linux is denoted using a full stop at the beginning of the file name, as in .project_x.txt. This has the effect of hiding the file in the output of the `ls` command, but it can be

revealed using the -a option that can be passed to the `ls` command.

The operations performed to accomplish this, as well as the permission states before and after the modifications can be seen in the following screen capture:

```
researcher2@def6d291281b:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:59 ..
-rw--w---- 1 researcher2 research_team   46 Aug 26 16:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 26 16:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_t.txt
researcher2@def6d291281b:~/projects$ chmod u+r,g+r .project_x.txt
researcher2@def6d291281b:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:59 ..
-rw-rw---- 1 researcher2 research_team   46 Aug 26 16:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 26 16:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_t.txt
researcher2@def6d291281b:~/projects$ chmod u-w,g-w .project_x.txt
researcher2@def6d291281b:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:59 ..
-r--r----- 1 researcher2 research_team   46 Aug 26 16:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 26 16:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_t.txt
researcher2@def6d291281b:~/projects
researcher2@def6d291281b:~/projects$ 
```

Change directory permissions

In order to modify the permissions for the `projects` directory so that only the user `researcher2` is able to access the files within that directory, the `chmod` command needs to be used. This command allows the permissions for a file or directory to be changed so that it is only accessible to a certain group of people or any particular person.

The following screen capture shows the state of the directory before and after changing the

permissions on the `projects` directory using the `chmod` command:

```
researcher2@def6d291281b:~/projects$ ls -al
total 32
researcher2@def6d291281b:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:59 ..
-r--r----- 1 researcher2 research_team   46 Aug 26 16:09 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug 26 16:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 26 16:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_t.txt
researcher2@def6d291281b:~/projects$ chmod g-x drafts/
researcher2@def6d291281b:~/projects$ ls -al
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:09 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug 26 16:59 ..
-r--r----- 1 researcher2 research_team   46 Aug 26 16:09 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug 26 16:09 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_k.txt
-rw------- 1 researcher2 research_team   46 Aug 26 16:09 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug 26 16:09 project_t.txt
researcher2@def6d291281b:~/projects
researcher2@def6d291281b:~/projects$ []
```

The first argument of the `chmod` command should be the permission string that you wish to use in order to set the permissions for that resource, and the second parameter should be the resource that you want to change the permissions on.

In this instance, the permission string is `drwx--x---` and the user for whom the permissions are being set is `researcher2`.

Summary

In this assignment, I modified the permissions of files belonging to the researchers in an organisation to make sure that only the required people were able to access the files, ensuring the principle of least access was upheld.

The tasks involved using the `chmod` and `ls` commands in order to view file and directory permissions, and change them to suit the requirements of the organisation in the scenario.