File permissions in Linux

Project description

I will be analyzing the current file structure and modifying permissions for users, groups and other to follow the Principle of Least Privilege. Commands of interest:

- pwd: view current directory
- cd ...: change working directory to folder where file permissions need to be modified
- chmod arg1 arg2: change permissions either by direct permissions assignment, or via removal/addition of permissions commands. arg1 is the permission being added, removed or assigned. **u** for user, **g** for group and **o** for other, and r, w, or x for the permission being added, removed or assigned. If we add a write permission for the user to the **access.txt** file in current directory, the command is: **chmod u+w access.txt.** If you want to remove a permission, use the "-" operator, and to assign, use the "=" operator. Note "=" removes all previous permissions on that file.
- mv arg1 arg2: arg1 is the file you wish to move (relative path if in current working directory, absolute path if in different folder), and arg2 is the path to the directory you want to move the file to
- touch: to create a new file in the current working directory
- nano arg1: opens text editor of the file specified by arg1, and we can modify the contents
- ls : list contents of current working directory
- ls -la : lists all files including hidden files and permissions of current working directory

Check file and directory details

In the /home/researcher2/projects directory, there are five files with the following

names and permissions:

- project_k.txt
  - User = read, write,
  - Group = read, write
  - Other = read, write
- project_m.txt
  - User = read, write
  - Group = read
  - Other = none
- project_r.txt
  - User= read, write
  - Group = read, write
  - Other = read
- project_t.txt
  - User = read, write
  - Group = read, write
  - Other = read

● .project_x.txt

○ User = read, write

○ Group = write

○ Other = none

There is also one subdirectory inside the projects directory named drafts. The permissions

on drafts are:

● User = read, write, execute

● Group = execute

● Other = none

Describe the permissions string

$$a_1 a_2 a_3 a_4 a_5 a_6 a_7 a_8 a_9 a_{10}$$

- a_1 represents whether the permission is for a directory (d) or regular file (-)
- a_2 – a_4 represent the **read (r)**, **write (w)**, **execute (x)** permissions for the User in that order. rwx would indicate all permissions granted, --- would indicate no permissions
- a_5 – a_7 represent the **read (r), write (w), execute (x)** permissions for the Group
- a_8 – a_{10} represent the **read (r), write (w), execute (x)** permissions for Other

Full permissions on a directory would be: drwxrwxrwx
Full permissions on a file: -rwxrwxrwx
Read-write for user and group only on a file: -rw-rw----

Change file permissions

chmod command: chmod arg1 arg2
arg1 is of the form $a_1a_2a_3$ where a_1 is the type of author (u for user, g for group, o for other); a_2 is the operator (+ to add, - to remove, = to assign); a_3 is the permission type (r for read, w for write, x for execute).
Example to add read-write privileges to the group for file access.txt: **chmod g+rw access.txt**

Change file permissions on a hidden file

Syntax is the same as changing file permissions except hidden files start with a “.” Symbol
Example to assign only execute privileges to the other for .access.txt file: **chmod o=x .access.txt**

Change directory permissions

Same as file permissions, except you just use the name of the directory. For example in the file structure above, the following commands would remove the execute privileges of the group for the drafts folder:

- cd /home/researcher2/projects
- chmod g-x drafts

if it’s a hidden directory, it can be listed using ls -la with permissions also listed

Summary

This document explains how to change file and directory permissions