# File permissions in Linux

## Project description

The research team at an organization needs to ensure that the people in this team are authorized with the appropriate permissions to keep the system secure. My task is to examine existing permissions on the file system, and determine if the permissions match the authorization that should be given. If they don’t match, I will modify the permissions to grant permission to the appropriate users and remove the unauthorized access.

## Check file and directory details

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Yapay zeka tarafından oluşturulmuş içerik yanlış olabilir.Following image demonstrates how I used the Linux bash commands to check the file and folder details including the permission details.

In the first line, I am checking the path with “pwd” to make sure that I am in the right directory.

Then, I am checking that the folder named “projects” exists with “ls” and accessing the folder with “cd” command.

After that, I am displaying the files inside the directory with “-la” option to display the access details and hidden files. The directory has one folder, one hidden file named “.project\_x.txt” and four other files that are not hidden.

The first column has the 10-character permission string of each file/folder indicating who can do what type of actions on the file.

## Describe the permissions string

The 10-character permission string is used to analyze the file/folder permissions. The characters can be analyzed in 4 groups:

1. First group contains only one character. This character represents the file type, and this character will be “d” if it is a directory. Otherwise, it will be a hyphen “ – “, indicating it is a regular file.
2. Second group contains 3 characters, displaying the access permissions for the “User”. Each letter indicates different type of permission. Letter “r” indicates “read”, “w” indicates “write” and “x” indicates execution permission. These letters are replaced by a hyphen “ – “ to indicate that the “User” doesn’t have that type of permission.
3. Third group of letters have the same characteristics as the second group of letters. The only difference is that this group of letters are representing the access permissions for the “Group”.
4. Fourth group of letters have the same characteristics as the second and third group of letters. The only difference is that this group of letters are representing the access permissions for the “Other”.

As an example, file “project\_m.txt” file has the permission string “-rw-r-----“. Analyzing this file starting from the first character, we can see that a hyphen was used indicating that this is a regular file. The second group of letters that should contain “rwx” for complete access has “rw-“ instead. This indicates that “User” has access to read and write but not to execute. The third group of letter are “r--” indicating that the “Group” has access to only read, but not to write or execute. The fourth group of letters are “---” indicating that the “Other” has no access to either read, write or execute the file.

## Change file permissions

The research team asked for couple of changes made to some files.

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Yapay zeka tarafından oluşturulmuş içerik yanlış olabilir.The first change they asked was on the file named “ project\_k.txt ”. Everyone was able to write on the file, but they wanted to limit the writing ability to only the user and the group. The image below demonstrates change I did.

The first line shows the command I used to make the change. The “chmod” command allows me to make change on the file, and the “o-w” specifies that “w” access should be removed from the other, on the specified file. The result of the change was displayed.

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Yapay zeka tarafından oluşturulmuş içerik yanlış olabilir.The second change they requested was removing the “research\_team” group’s access to read the “project\_m.txt” file. The image below shows how I made the changes.

Same procedure that was applied to the “project\_k.txt” file was done to remove the access. The command difference to remove was “g-r” indicating that read will be removed from the group access.

## Change file permissions on a hidden file

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Yapay zeka tarafından oluşturulmuş içerik yanlış olabilir.The procedure that was used on the normal files were used exactly the same. The only difference is that the file is hidden meaning that its name is starting with a “.” Indicating that it is hidden. The team asked to remove the “write” access from the user, and the group, but they wanted the group to be able to read the file. The image below shows the actions I took on “.project\_x.txt” to modify the permissions.

The command “u-w” removes the “write ability from user, and the next command that was separated by comma “g=r” gives read permission to group while removing all other permissions. The results of the change was also displayed.

## Change directory permissions

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Yapay zeka tarafından oluşturulmuş içerik yanlış olabilir.The research team also wanted to modify the access to the directory named “drafts”. They wanted to remove the execute permission of the group, letting only the user to make any actions on the directory. The actions I took can be seen on the image below.

The process is exactly the same as the previous ones. There is no extra procedure or command change for directories. The command “g-x” indicates that the execute permission will be removed from the group.

## Summary

I applied multiple permission changes in the directory named “projects” that were wanted by research team. The changes were made on files and a directory to ensure that only authorized people can access and make changes on them. I used “ls -la” to display files and directories, including the hidden ones, with their permissions. Then, I used “chmod” command to apply the change requests on files and directories.

The ”write” permission of “Other” on “project\_k.txt” was removed.

The “read” permission of “Group” on “project\_m.txt” was removed.

The “write” permission of “User” and “Group” was removed, and “read” permission was granted to “Group” on “.project\_x.txt”.

The “execute” permission of “Group” on directory “drafts” was removed.