File Permissions

check the current permissions of the file or directory: ls -l filename

#Linux file permissions are divided into three categories:

1. **Owner**: The user who owns the file.
2. **Group**: The group that the file belongs to.
3. **Others**: Everyone else

#Each category can have three types of permissions:

1. **Read (r)**: Permission to read the file.
2. **Write (w)**: Permission to modify the file.
3. **Execute (x)**: Permission to execute the file (if it's a script or a program).

#e.g:

- `rwxr-xr--` represents the permissions as follows:
- `rwx` for the owner (read, write, execute)
- `r-x` for the group (read, execute)
- `r--` for others (read)

#Changing Permissions with chmod:

Symbolic notation uses letters to represent changes. The format is `[category][operator][permission]`:

- **Category**: `u` (user/owner), `g` (group), `o` (others), `a` (all)
- **Operator**: `+` (add), `-` (remove), `=` (set exact permissions)
- **Permission**: `r` (read), `w` (write), `x` (execute)

e.g:

- Add execute permission for the owner: chmod u+x filename
- Remove write permission for others: chmod o-w filename
- Set read and write permissions for the group: chmod g=rw filename

Numeric (Octal) Notation

Numeric notation uses a three-digit number to represent permissions. Each digit can be from 0 to 7, representing the sum of permissions:

- Read (4)
- Write (2)
- Execute (1)

Examples:

- `7` (4+2+1) = read, write, execute
- `6` (4+2) = read, write
- `5` (4+1) = read, execute
- `4` = read

The format is `chmod [permissions] filename`, where permissions are three digits, one for each category (owner, group, others).

e.g:

- Set permissions to `rwxr-xr--` (owner: read, write, execute; group: read, execute; others: read): chmod 755 filename
- Set permissions to `rw-r--r--` (owner: read, write; group: read; others: read): chmod 644 filename
- Use the `-R` option to change permissions for all files and directories within a directory recursively: chmod -R 755 directoryname
- Combine multiple changes in one command using commas: chmod u+x,g-w,o+r filename
- Use the `-v` option to see a list of files that have been changed: chmod -v 755 filename
    - To change the group permissions while leaving the owner and others unchanged: chmod g=<octal-value> filename as well applied to other also.