



FILE MANAGEMENT IN LINUX

SYMBOLIC MODE & NUMERIC MODE



In Linux, every file and directory has permissions for three groups: Owner, Group, and Others. Use the `chmod` command to view or change permissions.

1. PERMISSION BASICS

There are 3 permission types:
Read (r), Write (w), Execute (x)



FILES

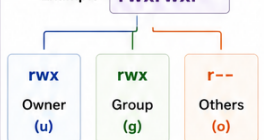
r - read content
w - modify content
x - execute file

DIRECTORIES

r - list files, read names
w - create/delete files (requires x)
x - enter directory

2. UNDERSTANDING PERMISSIONS

Example: `rwXrwxr--`



Permission bits	Value
Read (r)	4
Write (w)	2
Execute (x)	1

Add the values to get the number.

3. SYMBOLIC MODE (chmod)

- Who: u (owner), g (group), o (others), a (all)
- Operator: + add, - remove, = set exact
- Permissions: r (read), w (write), x (execute)

Examples

<code>chmod u+x file.txt</code>	Add execute for owner
<code>chmod g+rx file.txt</code>	Add read & execute for group
<code>chmod o-w file.txt</code>	Remove write for others
<code>chmod u-rwx,g-rx,o=rx file.txt</code>	Set specific permissions
<code>chmod -R ug+x dir/</code>	Recursively add execute for user & group
<code>chmod a+X dir/</code>	Add execute only if directory or already executable

4. NUMERIC MODE

Permissions are represented by a three-digit number:

- First digit = Owner
- Second digit = Group
- Third digit = Others

$r = 4, w = 2, x = 1$
Example: $rwX = 4+2+1 = 7$

Common Values	Meaning
777	rwX rwX rwX (full control for all)
755	rwX r-X r-X (owner full, others read & execute)
744	rwX r-- r-- (owner full, others read)
640	rw- r-- --- (owner read/write, group read)
600	rw- --- --- (owner read/write only)

Examples

`chmod 744 file.txt`
`-rwxr--r--`
(owner rwX, group r--, others r--)

`chmod 755 file.txt`
`-rwxr-xr-x`
(owner rwX, group r-X, others r-X)

`chmod -R 777 dir/`
Recursively give full permissions to directory and its contents

5. CHECK PERMISSIONS & OWNERSHIP

Check permissions:

```
ls -l file.txt
-rwxr-xr-- 1 user group 1024 May 12 10:00 file.txt
  Owner (u)  Group (g)  Others (o)
```

Change ownership:

Change user: `sudo chown -R username file/folder`

Change group: `sudo chgrp -R groupname file/folder`

i Use -R for recursive (affects contents of folders).

SUMMARY

Use symbolic mode for flexibility and numeric mode for quick setting. Understand (r, w, x) and who they apply to!

Permission	Symbolic	Numeric	Value
Read	r	4	Allows reading/listing
Write	w	2	Allows modifying/deleting
Execute	x	1	Allows executing/entering