chmod and chown File permissions

Special bits setuid 4, setgid 2, sticky 1
Owner (u) first digit
Group (g) second digit
Others (o) third digit

CONCEPTS

Mode digits are sums per class: r=4, w=2, x=1. 640 means owner rw-, group r--, others ---.

Octal digit

Digit	Bits	Meaning
7	rwx	read, write, execute
6	rw-	read, write
5	r-x	read, execute
4	r--	read only
0	---	nothing

On directories, r lists names, w creates or deletes entries, x lets you enter and access items by name.

chown normally needs root. chmod works only for the file owner or root.

OCTAL MODES

`chmod 644 <file>`
rw for owner, r for rest

`chmod 755 <file>`
rwx for owner, rx for rest

OCTAL MODES (cont.)

`chmod 600 <file>`
Private to owner

`chmod 700 <dir>`
Private directory

`chmod 664 <file>`
Group-writable file

SYMBOLIC MODES

`chmod +x <file>`
Add execute (per umask)

`chmod a+x <file>`
Add execute for everyone

`chmod u+x <file>`
Add execute for owner

`chmod g+w <file>`
Let group write

`chmod o-rwx <file>`
Remove all access for others

`chmod u=rw,go=r <file>`
Set classes exactly

`chmod g=u <file>`
Copy owner perms to group

`chmod u+x,g-w <file>`
Several changes, comma-separated

RECURSIVE CHANGES

`chmod -R <mode> <dir>`
Recurse into a directory

`chmod -R a+rX <dir>`
Read all, x only on dirs

`chmod -R u=rwX,go=rX <dir>`
Sane tree permissions

```
find <dir> -type d -exec chmod 755 {} +
```
Dirs only

```
find <dir> -type f -exec chmod 644 {} +
```
Files only

SPECIAL BITS

`chmod u+s <file>`
Setuid: run as file owner

`chmod g+s <dir>`
Setgid dir: new files keep group

`chmod +t <dir>`
Sticky: only owners may delete

`chmod 4755 <file>`
Setuid via octal

READING AND COPYING MODES

`ls -l <path>`
Long listing with mode

`ls -ld <dir>`
Mode of the dir itself

`stat -c '%a %U:%G %n' <file>`
Octal mode and owner

`chmod --reference=<ref> <file>`
Copy mode from another file

`chmod -c <mode> <file>`
Report only real changes

CHOWN

`chown <user> <file>`
Change owner

`chown <user>:<group> <file>`
Change owner and group

`chown :<group> <file>`
Change group only

`chown <user>: <file>`
Owner and their login group

`chown -R <user>:<group> <dir>`
Recursive ownership

CHOWN (cont.)

`chgrp <group> <file>`
Change group (no chown needed)

`sudo chown -R $USER: <dir>`
Reclaim files made by root

UMASK

`umask`
Show current mask

`umask 022`
New files 644, dirs 755

`umask 077`
New files private to you

umask removes bits from 666 for files and 777 for dirs. It only affects files created later by that shell and its children.

RECIPES

Web content tree

```
find /srv/www -type d -exec chmod 755 {} +
find /srv/www -type f -exec chmod 644 {} +
chown -R www-data:www-data /srv/www
```