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Linux file permissions on a VPS: chmod, chown and Permission denied

VPS & Servers

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A “Permission denied”, or a 403 on a website, is almost always one of two things: the file’s **owner** is not who the service runs as, or a **permission** is missing on the file or on one of the folders in its path. See with `ls -l` who owns it and what is allowed, and with `namei -l /full/path` the first folder in the path that blocks. You fix it with `chown` (change the owner) and `chmod` (change the permissions). On an unmanaged VPS this is yours to do.

Reading what ls -l says

A line like `-rw-r--r-- 1 deploy www-data 1200 Oct 10 site.php` has three parts. The first ten characters are the type and permissions (`-` file, `d` folder; then three groups of three: **owner**, **group**, **others**, each with *r* read, *w* write, *x* execute). Then come the owner (`deploy`) and the group (`www-data`).

Number	Meaning	When to use it
644	Owner reads and writes; group and others only read	A site’s files
755	Owner reads, writes, executes; others read and execute	Folders, and programs
600	Only the owner reads and writes	Secrets: keys, files with passwords
700	Only the owner gets in	Private folders, like <code>~/ .ssh</code>
777	Everybody does everything	Never. It cures the symptom and opens the door to whoever gets in through any other site.

Step by step for a site giving 403 or “Permission denied”

1

Find out who the service is. `ps aux | grep -E "nginx|apache|httpd|php-fpm" | head .` On Debian and Ubuntu it is usually `www-data` ; on AlmaLinux and Rocky, `nginx` or `apache` .

2

Look at the whole path. `namei -l /var/www/yourdomain.tld/public/index.php` shows the permissions of each folder down to the file. The server must be able to **traverse** (x permission) every folder in the path, not just read the file. A closed home folder (`/home/user` at `700`) blocks everything inside it.

3

Set the owner right. If the site is managed by a user of yours and served by another, give the right group: `sudo chown -R deploy:www-data /var/www/yourdomain.tld` . Or let the service own only the folders it must write to (uploads, caches).

4

Set the permissions to sensible values: `sudo find /var/www/yourdomain.tld -type d -exec chmod 755 {} \;` and `sudo find /var/www/yourdomain.tld -type f -exec chmod 644 {} \;` .

5

Give write access only where needed. An uploads folder needs write for the service (for example `chmod 775` with the service's group); the rest of the site does not.

6

Test again and read the error log. If it is still denied once everything is right, it may be SELinux or AppArmor: **when they block a service.**

Mind the -R in the wrong place. `chown -R` or `chmod -R` on a folder higher up than you meant (the root `/`, `/etc`, `/home`) can break the whole system: SSH stops accepting keys with loose permissions, and system programs need their owners. Read the path twice before pressing Enter.

Do not make root the owner of the site. If a root task writes into the folder, the files end up root's and the site cannot change them. Run that task as the right user: **cron that does not run.**

Secrets want 600: a `.env` file with passwords is read only by its owner (**environment variables and secrets**). And a systemd service runs as whichever user you give it: **running your own program as a service.**

Locked yourself out by touching system permissions? The panel console gets you in without the network: tell us what you did.

[Open a support ticket](#)

SEE ALSO

[SELinux or AppArmor blocking a service](#)

[Running your own program as a systemd service](#)

[Environment variables and secrets](#)

[Keeping your VPS secure](#)



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