*ALGUNOS PASOS COMO INSTALLAR APACPHE O NGINX NO ESTAN PORQUE YA LOS INSTLÉ EN LA ANTERIOR PRÁCTICA*

```
root@UbuntuDesktop:/home/vboxuser# sudo apt update && sudo apt upgrade -y
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:2 http://es.archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1.21
3 kB]
Get:4 http://es.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [202
kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21
,5 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata
 [8.748 B]
Get:8 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages
 [1.967 kB]
Get:9 http://es.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-e
n [448 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Compone
nts [208 B]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages
```

Actualiza la lista de paquetes y mejora el sistema a las últimas versiones

```
  GNU nano 7.2                                  /etc/apache2/ports.conf *
# If you just change the port or add more ports here, you will likely also
# have to change the VirtualHost statement in
# /etc/apache2/sites-enabled/000-default.conf

Listen 8080

<IfModule ssl_module>
        Listen 443
</IfModule>

<IfModule mod_gnutls.c>
        Listen 443
</IfModule>
```

Abre el archivo de configuración de puertos. Cambia Listen 80 por Listen 8080.

```
 GNU nano 7.2                        /etc/apache2/sites-available/000-default.conf *
<VirtualHost *:8080>
        # The ServerName directive sets the request scheme, hostname and port that
        # the server uses to identify itself. This is used when creating
        # redirection URLs. In the context of virtual hosts, the ServerName
        # specifies what hostname must appear in the request's Host: header to
        # match this virtual host. For the default virtual host (this file) this
        # value is not decisive as it is used as a last resort host regardless.
        # However, you must set it for any further virtual host explicitly.
        #ServerName www.example.com

        ServerAdmin webmaster@localhost
        DocumentRoot /var/www/html

        # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
        # error, crit, alert, emerg.
        # It is also possible to configure the loglevel for particular
        # modules, e.g.
        #LogLevel info ssl:warn

        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

        # For most configuration files from conf-available/, which are
        # enabled or disabled at a global level, it is possible to
        # include a line for only one particular virtual host. For example the
        # following line enables the CGI configuration for this host only
        # after it has been globally disabled with "a2disconf".
        #Include conf-available/serve-cgi-bin.conf
```

Cambia VirtualHost (80) por (8080)

```
root@UbuntuDesktop:/home/vboxuser# sudo apt install php libapache2-mod-php -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
php is already the newest version (2:8.3+93ubuntu2).
libapache2-mod-php is already the newest version (2:8.3+93ubuntu2).
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 18 not upgraded.
root@UbuntuDesktop:/home/vboxuser#
```

Instala PHP y su módulo para funcionar con Apache.

```
root@UbuntuDesktop:/home/vboxuser# sudo systemctl restart apache2
Warning: The unit file, source configuration file or drop-ins of apache2.service changed on disk. Run 'systemctl daemon-
reload' to reload units.
root@UbuntuDesktop:/home/vboxuser# sudo systemctl daemon-reload
root@UbuntuDesktop:/home/vboxuser#
```

Reinicia Apache para aplicar los cambios

```
root@UbuntuDesktop:/home/vboxuser# sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-10 07:12:56 UTC; 15s ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 7265 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 7269 (apache2)
      Tasks: 6 (limit: 4603)
     Memory: 10.6M (peak: 11.4M)
        CPU: 37ms
     CGroup: /system.slice/apache2.service
             ├─7269 /usr/sbin/apache2 -k start
             ├─7271 /usr/sbin/apache2 -k start
             ├─7272 /usr/sbin/apache2 -k start
             ├─7273 /usr/sbin/apache2 -k start
             ├─7274 /usr/sbin/apache2 -k start
             └─7275 /usr/sbin/apache2 -k start

oct 10 07:12:56 UbuntuDesktop systemd[1]: Starting apache2.service - The Apache HTTP Server...
oct 10 07:12:56 UbuntuDesktop apachectl[7268]: AH00558: apache2: Could not reliably determine the server's fully qualif>
oct 10 07:12:56 UbuntuDesktop systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-20/20 (END)
```

Comprueba que Apache está funcionando correctamente en el puerto 8080.

```
root@UbuntuDesktop:/home/vboxuser# echo "<?php phpinfo(); ?>" | sudo tee /var/www/html/info.php
<?php phpinfo(); ?>
root@UbuntuDesktop:/home/vboxuser#
```

Crea un archivo que muestra información del PHP instalado.

```
root@UbuntuDesktop:/home/vboxuser# curl http://localhost:8080/info.php
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"><head>
<style type="text/css">
body {background-color: #fff; color: #222; font-family: sans-serif;}
pre {margin: 0; font-family: monospace;}
a:link {color: #009; text-decoration: none; background-color: #fff;}
a:hover {text-decoration: underline;}
table {border-collapse: collapse; border: 0; width: 934px; box-shadow: 1px 2px 3px rgba(0, 0, 0, 0.2);}
.center {text-align: center;}
.center table {margin: 1em auto; text-align: left;}
.center th {text-align: center !important;}
td, th {border: 1px solid #666; font-size: 75%; vertical-align: baseline; padding: 4px 5px;}
th {position: sticky; top: 0; background: inherit;}
h1 {font-size: 150%;}
h2 {font-size: 125%;}
h2 a:link, h2 a:visited{color: inherit; background: inherit;}
.p {text-align: left;}
.e {background-color: #ccf; width: 300px; font-weight: bold;}
.h {background-color: #99c; font-weight: bold;}
.v {background-color: #ddd; max-width: 300px; overflow-x: auto; word-wrap: break-word;}
.v i {color: #999;}
img {float: right; border: 0;}
hr {width: 934px; background-color: #ccc; border: 0; height: 1px;}
:root {--php-dark-grey: #333; --php-dark-blue: #4F5B93; --php-medium-blue: #8892BF; --php-light-blue: #E2E4EF; --php-acc
```

Verifica que Apache sirve correctamente el contenido PHP.

```
  GNU nano 7.2                                /etc/nginx/sites-available/default *
##
# You should look at the following URL's in order to grasp a solid understanding
# of Nginx configuration files in order to fully unleash the power of Nginx.
# https://www.nginx.com/resources/wiki/start/
# https://www.nginx.com/resources/wiki/start/topics/tutorials/config_pitfalls/
# https://wiki.debian.org/Nginx/DirectoryStructure
#
# In most cases, administrators will remove this file from sites-enabled/ and
# leave it as reference inside of sites-available where it will continue to be
# updated by the nginx packaging team.
#
# This file will automatically load configuration files provided by other
# applications, such as Drupal or Wordpress. These applications will be made
# available underneath a path with that package name, such as /drupal8.
#
# Please see /usr/share/doc/nginx-doc/examples/ for more detailed examples.
##

# Default server configuration
#
server {
        listen 8081 default_server;
        listen [::]:8081 default_server;

        # SSL configuration
        #
        # listen 443 ssl default_server;
        # listen [::]:443 ssl default_server;
```

Abre la configuración por defecto. Cambia listen 80 por listen 8081

```
root@UbuntuDesktop:/home/vboxuser# echo "<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>" | sudo tee /var/www/h
tml/index.html
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
```

:Crea una página HTML identificable para Nginx.

```
root@UbuntuDesktop:/var/www/html# sudo systemctl restar nginx
Unknown command verb 'restar', did you mean 'restart'?
root@UbuntuDesktop:/var/www/html# sudo systemctl restart nginx
root@UbuntuDesktop:/var/www/html# sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-10 07:37:31 UTC; 5s ago
       Docs: man:nginx(8)
    Process: 7757 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 7759 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 7760 (nginx)
      Tasks: 5 (limit: 4603)
     Memory: 5.0M (peak: 5.5M)
        CPU: 18ms
     CGroup: /system.slice/nginx.service
             ├─7760 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             ├─7761 "nginx: worker process"
             ├─7762 "nginx: worker process"
             ├─7764 "nginx: worker process"
             └─7765 "nginx: worker process"

oct 10 07:37:31 UbuntuDesktop systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy s
oct 10 07:37:31 UbuntuDesktop systemd[1]: Started nginx.service - A high performance web server and a reverse proxy se

root@UbuntuDesktop:/var/www/html# netstat -tulpn | grep 8081
tcp        0      0 0.0.0.0:8081            0.0.0.0:*               LISTEN      7760/nginx: master
tcp6       0      0 :::8081                 :::*                    LISTEN      7760/nginx: master
root@UbuntuDesktop:/var/www/html# curl -i localhost:8081
HTTP/1.1 200 OK
Server: nginx/1.24.0 (Ubuntu)
Date: Fri, 10 Oct 2025 07:38:08 GMT
Content-Type: text/html
Content-Length: 57
```

```
Content-Length: 57
Last-Modified: Fri, 10 Oct 2025 07:32:51 GMT
Connection: keep-alive
ETag: "68e8b6a3-39"
Accept-Ranges: bytes

<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/var/www/html#
```

Reinicia Nginx para aplicar los cambios de configuración.

Comprueba que Nginx está funcionando correctamente en el puerto 8081

Verifica que Nginx sirve correctamente el contenido HTML.

```
root@UbuntuDesktop:/# sudo apt install -y debian-keyring debian-archive-keyring apt-transport-https
curl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  apt-transport-https debian-archive-keyring debian-keyring
0 upgraded, 3 newly installed, 0 to remove and 18 not upgraded.
Need to get 31,5 MB of archives.
After this operation, 33,4 MB of additional disk space will be used.
Get:1 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 apt-transport-https all 2.8.3 [3.970 B]
Get:2 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 debian-archive-keyring all 2023.4ubuntu1 [168 kB]
Get:3 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 debian-keyring all 2023.12.24 [31,3 MB]
Fetched 31,5 MB in 8s (3.978 kB/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 153087 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.8.3_all.deb ...
Unpacking apt-transport-https (2.8.3) ...
Selecting previously unselected package debian-archive-keyring.
Preparing to unpack .../debian-archive-keyring_2023.4ubuntu1_all.deb ...
Unpacking debian-archive-keyring (2023.4ubuntu1) ...
Selecting previously unselected package debian-keyring.
Preparing to unpack .../debian-keyring_2023.12.24_all.deb ...
Unpacking debian-keyring (2023.12.24) ...
Setting up apt-transport-https (2.8.3) ...
Setting up debian-archive-keyring (2023.4ubuntu1) ...
Setting up debian-keyring (2023.12.24) ...
curl: try 'curl --help' or 'curl --manual' for more information
root@UbuntuDesktop:/#
```

Instala herramientas necesarias para añadir repositorios externos.

```
root@UbuntuDesktop:/# curl -1sLf 'https://dl.cloudsmith.io/public/caddy/stable/gpg.key' | sudo gpg --
dearmor -o /usr/share/keyrings/caddy-stable-archive-keyring.gpg
curl -1sLf 'https://dl.cloudsmith.io/public/caddy/stable/debian.deb.txt' | sudo
tee /etc/apt/sources.list.d/caddy-stable.list
gpg: directory '/root/.gnupg' created
gpg: keybox '/root/.gnupg/pubring.kbx' created
gpg: WARNING: no command supplied.  Trying to guess what you mean ...
pub   rsa4096 2016-04-01 [SC]
      5760C51EDEA2017CEA2CA15155B6D79CA56EA34
uid           Caddy Web Server <contact@caddyserver.com>
sub   rsa4096 2020-12-29 [S] [expires: 2025-12-28]
dearmor: command not found
usage: sudo -h | -K | -k | -V
usage: sudo -v [-ABkNnS] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-ABkNnS] [-g group] [-h host] [-p prompt] [-U user]
            [-u user] [command [arg ...]]
usage: sudo [-ABbEHkNnPS] [-r role] [-t type] [-C num] [-D directory]
            [-g group] [-h host] [-p prompt] [-R directory] [-T timeout]
            [-u user] [VAR=value] [-i | -s] [command [arg ...]]
usage: sudo -e [-ABkNnS] [-r role] [-t type] [-C num] [-D directory]
            [-g group] [-h host] [-p prompt] [-R directory] [-T timeout]
            [-u user] file ...
```

Añade el repositorio oficial de Caddy a tu sistema

```
root@UbuntuDesktop:/# sudo apt update && sudo apt install caddy -y
Hit:1 http://es.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://es.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://es.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
18 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  libnss3-tools
The following NEW packages will be installed:
  caddy libnss3-tools
0 upgraded, 2 newly installed, 0 to remove and 18 not upgraded.
Need to get 11,2 MB of archives.
After this operation, 41,2 MB of additional disk space will be used.
Get:1 http://es.archive.ubuntu.com/ubuntu noble/main amd64 libnss3-tools amd64 2:3.98-1build1 [615 kB]
Get:2 http://es.archive.ubuntu.com/ubuntu noble-updates/universe amd64 caddy amd64 2.6.2-6ubuntu0.24.04.3 [10,5 MB]
Fetched 11,2 MB in 3s (3.528 kB/s)
Selecting previously unselected package libnss3-tools.
(Reading database ... 153123 files and directories currently installed.)
Preparing to unpack .../libnss3-tools_2%3a3.98-1build1_amd64.deb ...
Unpacking libnss3-tools (2:3.98-1build1) ...
Selecting previously unselected package caddy.
Preparing to unpack .../caddy_2.6.2-6ubuntu0.24.04.3_amd64.deb ...
Unpacking caddy (2.6.2-6ubuntu0.24.04.3) ...
Setting up libnss3-tools (2:3.98-1build1)
```

Actualiza la lista de paquetes e instala Caddy

```
root@UbuntuDesktop:/# sudo mkdir -p /var/www/caddy
root@UbuntuDesktop:/#
```

Crea un directorio específico para los archivos de Caddy

```
root@UbuntuDesktop:/# echo "# Bienvenido a Caddy" | sudo tee /var/www/caddy/README.md
echo "" | sudo tee -a /var/www/caddy/README.md
echo "Este servidor está funcionando correctamente." | sudo tee -a
/var/www/caddy/README.md
echo "" | sudo tee -a /var/www/caddy/README.md
echo "## Características" | sudo tee -a /var/www/caddy/README.md
echo "- Servidor moderno" | sudo tee -a /var/www/caddy/README.md
echo "- HTTPS automático" | sudo tee -a /var/www/caddy/README.md
echo "- Fácil configuración" | sudo tee -a /var/www/caddy/README.md
# Bienvenido a Caddy

Este servidor está funcionando correctamente.
bash: /var/www/caddy/README.md: Permission denied

## Características
- Servidor moderno
- HTTPS automático
- Fácil configuración
root@UbuntuDesktop:/#
```

Crea un archivo Markdown con contenido de ejemplo.

```
root@UbuntuDesktop:/# curl -o /tmp/test-image.jpg "https://www.python.org/static/apple-touch-icon-144x144-precomposed.pn
g"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  7382  100  7382    0     0   195k      0 --:--:-- --:--:-- --:--:--  200k
root@UbuntuDesktop:/# sudo mv /tmp/test-image.jpg /var/www/caddy/test.jpg
root@UbuntuDesktop:/#
```

Descarga una imagen de prueba para verificar que Caddy sirve archivos estáticos.

```
  GNU nano 7.2                                  /etc/caddy/Caddyfile
# The Caddyfile is an easy way to configure your Caddy web server.
#
# Unless the file starts with a global options block, the first
# uncommented line is always the address of your site.
#
# To use your own domain name (with automatic HTTPS), first make
# sure your domain's A/AAAA DNS records are properly pointed to
# this machine's public IP, then replace ":80" below with your
# domain name.

:8082 {
root * /var/www/caddy
file_server browse
@markdown path *.md
header @markdown Content-Type text/plain
}

# Refer to the Caddy docs for more information:
# https://caddyserver.com/docs/caddyfile
```

Abre el archivo de configuración de Caddy

Escribe el siguiente contenido

```
root@UbuntuDesktop:/# sudo systemctl restart caddy
root@UbuntuDesktop:/# sudo systemctl status caddy
● caddy.service - Caddy
     Loaded: loaded (/usr/lib/systemd/system/caddy.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-10 08:00:38 UTC; 18s ago
       Docs: https://caddyserver.com/docs/
   Main PID: 9029 (caddy)
      Tasks: 10 (limit: 4603)
     Memory: 7.1M (peak: 7.7M)
        CPU: 33ms
     CGroup: /system.slice/caddy.service
             └─9029 /usr/bin/caddy run --environ --config /etc/caddy/Caddyfile

oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.696879,"msg":"using provided configuration",>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"warn","ts":1760083238.6984956,"msg":"Caddyfile input is not format>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.699897,"logger":"admin","msg":"admin endpoin>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.700121,"logger":"tls.cache.maintenance","msg>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.7001617,"logger":"http.log","msg":"server ru>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.7004874,"msg":"autosaved config (load with ->
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.7005663,"msg":"serving initial configuration>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.7004933,"logger":"tls","msg":"cleaning stora>
oct 10 08:00:38 UbuntuDesktop caddy[9029]: {"level":"info","ts":1760083238.7007244,"logger":"tls","msg":"finished clean>
oct 10 08:00:38 UbuntuDesktop systemd[1]: Started caddy.service - Caddy.
lines 1-21/21 (END)
```

Reinicia Caddy para aplicar la nueva configuración.

Comprueba que Caddy está funcionando en el puerto 8082

```
root@UbuntuDesktop:/# curl http://localhost:8082/
<!DOCTYPE html>
<html>

<head>
    <title>/</title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <style>
        * {
            padding: 0;
            margin: 0;
        }

        body {
            font-family: sans-serif;
            text-rendering: optimizespeed;
            background-color: #ffffff;
        }

        a {
            color: #006ed3;
            text-decoration: none;
        }

        a:hover,
        h1 a:hover {
            color: #319cff;
        }
```

Lista los archivos disponibles en el servidor Caddy.

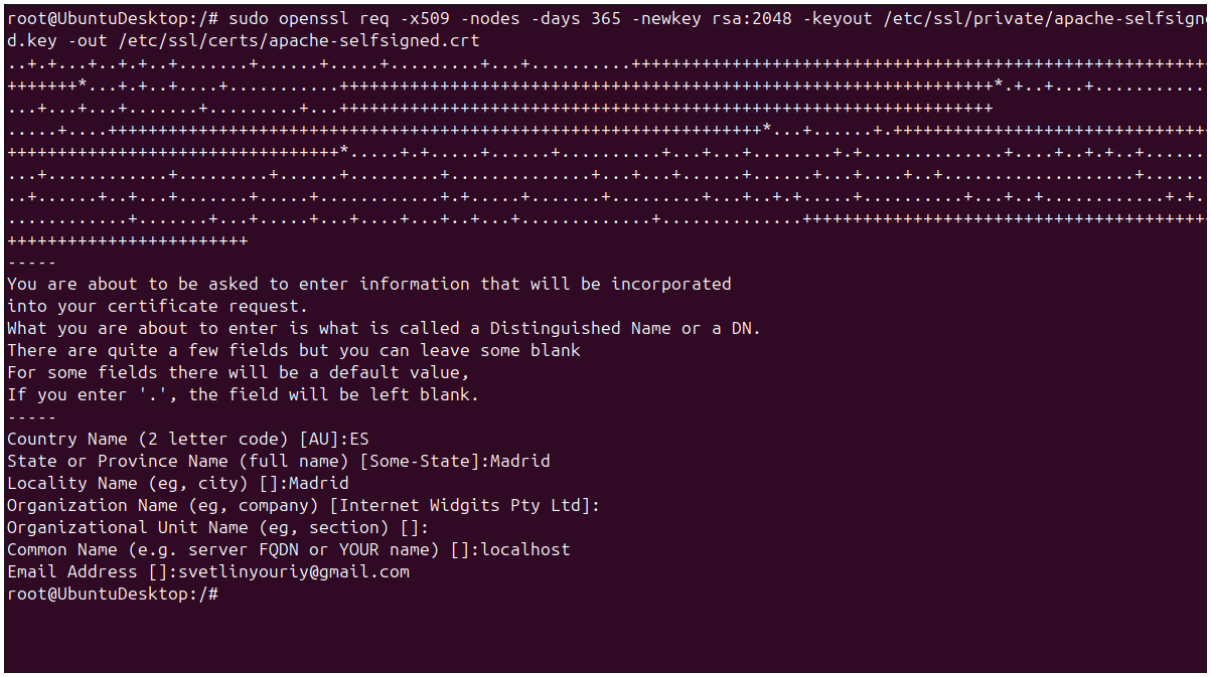
```
root@UbuntuDesktop:/# curl http://localhost:8082/README.md
# Bienvenido a Caddy


## Características
- Servidor moderno
- HTTPS automático
- Fácil configuración
root@UbuntuDesktop:/#
```

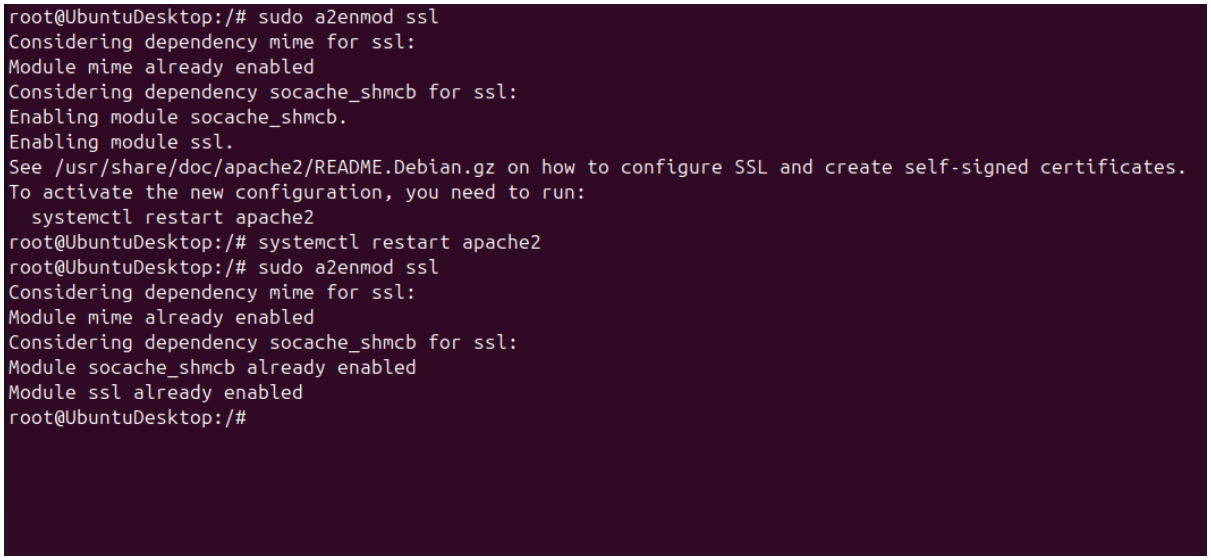
Verifica que Caddy sirve correctamente archivos Markdown

```
root@UbuntuDesktop:/# sudo apt install certbot python3-certbot-apache -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  augeas-lenses libaugeas0 python3-acme python3-augeas python3-certbot python3-configargparse python3-icu
  python3-josepy python3-openssl python3-parsedatetime python3-rfc3339
Suggested packages:
  augeas-doc python-certbot-doc python3-certbot-nginx augeas-tools python-acme-doc python-certbot-apache-doc
  python-openssl-doc python3-openssl-dbg
The following NEW packages will be installed:
  augeas-lenses certbot libaugeas0 python3-acme python3-augeas python3-certbot python3-certbot-apache
  python3-configargparse python3-icu python3-josepy python3-openssl python3-parsedatetime python3-rfc3339
0 upgraded, 13 newly installed, 0 to remove and 18 not upgraded.
Need to get 1.705 kB of archives.
After this operation, 8.858 kB of additional disk space will be used.
Get:1 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 augeas-lenses all 1.14.1-1build2 [323 kB]
Get:2 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 libaugeas0 amd64 1.14.1-1build2 [166 kB]
Get:3 http://es.archive.ubuntu.com/ubuntu noble/main amd64 python3-openssl all 23.2.0-1 [47,8 kB]
Get:4 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-josepy all 1.14.0-1 [22,1 kB]
Get:5 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-rfc3339 all 1.1-4 [6.744 B]
Get:6 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-acme all 2.9.0-1 [48,5 kB]
Get:7 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-augeas all 0.5.0-1.1 [9.124 B]
Get:8 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-configargparse all 1.7-1 [31,7 kB]
Get:9 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-parsedatetime all 2.6-3 [32,8 kB]
Get:10 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-certbot all 2.9.0-1 [267 kB]
Get:11 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 certbot all 2.9.0-1 [89,2 kB]
Get:12 http://es.archive.ubuntu.com/ubuntu noble/universe amd64 python3-certbot-apache all 2.9.0-1 [128 kB]
Get:13 http://es.archive.ubuntu.com/ubuntu noble/main amd64 python3-icu amd64 2.12-1build2 [534 kB]
```

Instala Certbot y su integración con Apache para gestionar certificados SSL




Crea un certificado autofirmado para practicar HTTPS localmente. Completa los campos solicitados (puedes usar valores por defecto).




Activa el módulo SSL necesario para HTTPS en Apache.

```
<VirtualHost *:8443>
        ServerAdmin webmaster@localhost

        DocumentRoot /var/www/html

        # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
        # error, crit, alert, emerg.
        # It is also possible to configure the loglevel for particular
        # modules, e.g.
        #LogLevel info ssl:warn

        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

        # For most configuration files from conf-available/, which are
        # enabled or disabled at a global level, it is possible to
        # include a line for only one particular virtual host. For example the
        # following line enables the CGI configuration for this host only
        # after it has been globally disabled with "a2disconf".
        #Include conf-available/serve-cgi-bin.conf
```

Añade la línea Listen 8443 para que Apache escuche HTTPS en puerto 8443.

```
  GNU nano 7.2                                  /etc/apache2/ports.conf
# If you just change the port or add more ports here, you will likely also
# have to change the VirtualHost statement in
# /etc/apache2/sites-enabled/000-default.conf

Listen 8080
Listen 8443

<IfModule ssl_module>
        Listen 443
</IfModule>

<IfModule mod_gnutls.c>
        Listen 443
</IfModule>
```

Añade la línea Listen 8443 para que Apache escuche HTTPS en puerto 8443.

```
root@UbuntuDesktop:/# sudo a2ensite default-ssl.conf
Enabling site default-ssl.
To activate the new configuration, you need to run:
  systemctl reload apache2
root@UbuntuDesktop:/# systemctl restart apache2
root@UbuntuDesktop:/# sudo a2ensite default-ssl.conf
Site default-ssl already enabled
root@UbuntuDesktop:/#
```

Activa la configuración SSL en Apache.

```
root@UbuntuDesktop:/# systemctl restart apache2
root@UbuntuDesktop:/# curl -i -k https://localhost:8443
HTTP/1.1 200 OK
Date: Fri, 10 Oct 2025 08:25:48 GMT
Server: Apache/2.4.58 (Ubuntu)
Last-Modified: Fri, 10 Oct 2025 07:32:51 GMT
ETag: "39-640c8ecd7d0cf"
Accept-Ranges: bytes
Content-Length: 57
Content-Type: text/html

<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/#
```

Prueba la conexión HTTPS (el flag -k ignora el aviso del certificado autofirmado).

```
root@UbuntuDesktop:/# sudo systemctl status apache2 nginx caddy
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-10 08:25:44 UTC; 1min 12s ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 9950 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 9956 (apache2)
      Tasks: 6 (limit: 4603)
     Memory: 11.6M (peak: 12.0M)
        CPU: 56ms
     CGroup: /system.slice/apache2.service
             ├─9956 /usr/sbin/apache2 -k start
             ├─9958 /usr/sbin/apache2 -k start
             ├─9959 /usr/sbin/apache2 -k start
             ├─9960 /usr/sbin/apache2 -k start
             ├─9961 /usr/sbin/apache2 -k start
             └─9962 /usr/sbin/apache2 -k start

oct 10 08:25:44 UbuntuDesktop systemd[1]: Starting apache2.service - The Apache HTTP Server...
oct 10 08:25:44 UbuntuDesktop apachectl[9955]: AH00558: apache2: Could not reliably determine the server's fully qualif
oct 10 08:25:44 UbuntuDesktop systemd[1]: Started apache2.service - The Apache HTTP Server.

● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-10 07:37:31 UTC; 49min ago
       Docs: man:nginx(8)
   Main PID: 7760 (nginx)
```

Muestra el estado de los tres servidores simultáneamente.

```
root@UbuntuDesktop:/# sudo netstat -tulpn | grep -E '8080|8081|8082|8443'
tcp        0      0 0.0.0.0:8081            0.0.0.0:*               LISTEN      7760/nginx: master
tcp6       0      0 :::8443                 :::*                    LISTEN      9956/apache2
tcp6       0      0 :::8080                 :::*                    LISTEN      9956/apache2
tcp6       0      0 :::8081                 :::*                    LISTEN      7760/nginx: master
tcp6       0      0 :::8082                 :::*                    LISTEN      9029/caddy
root@UbuntuDesktop:/#
```

Lista los puertos donde están escuchando los servidores.

```
root@UbuntuDesktop:/# curl http://localhost:8080
curl http://localhost:8081
curl http://localhost:8082
curl -k https://localhost:8443
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
<!DOCTYPE html>
<html>

<head>
    <title>/</title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <style>
        * {
            padding: 0;
            margin: 0;
        }

        body {
            font-family: sans-serif;
            text-rendering: optimizespeed;
            background-color: #ffffff;
        }

        a {
            color: #006ed3;
            text-decoration: none;
        }

        a:hover,
        h1 a:hover {
            color: #319cff;
```

```
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/# curl -k https://localhost:8443
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/# curl -k https://localhost:8080
curl: (35) OpenSSL/3.0.13: error:0A00010B:SSL routines::wrong version number
root@UbuntuDesktop:/# curl http://localhost:8080
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/# curl http://localhost:8081
<h1>Servidor Nginx</h1><p>Funcionando en puerto 8081</p>
root@UbuntuDesktop:/# curl http://localhost:8082
<!DOCTYPE html>
<html>
```

Verifica que cada servidor responde correctamente en su puerto asignado