

PARTE 1: INSTALACIÓN Y CONFIGURACIÓN DE APACHE

1. Actualizar el sistema

Comando:

```
sudo apt update && sudo apt upgrade -y
```

```
hector@hector-virtualbox:~$ sudo apt update && sudo apt upgrade -y
[sudo] contraseña para hector:
Des:1 http://deb.debian.org/debian trixie InRelease [140 kB]
Des:2 http://security.debian.org/debian-security trixie-security InRelease [43,4 kB]
Des:3 http://deb.debian.org/debian trixie-updates InRelease [47,3 kB]
Des:4 http://deb.debian.org/debian trixie-backports InRelease [54,0 kB]
Des:5 http://security.debian.org/debian-security trixie-security/main Sources [91,5 kB]
Des:6 http://deb.debian.org/debian trixie/main Translation-es [278 kB]
Des:7 http://security.debian.org/debian-security trixie-security/non-free-firmware Sources [6
Des:8 http://deb.debian.org/debian trixie-updates/main Sources [2.788 B]
Des:9 http://security.debian.org/debian-security trixie-security/main amd64 Packages [69,2 kB]
Des:10 http://security.debian.org/debian-security trixie-security/main Translation-en [45,2 kB]
Des:11 http://deb.debian.org/debian trixie-updates/main amd64 Packages [5.412 B]
Des:12 http://deb.debian.org/debian trixie-updates/main Translation-en [4.096 B]
Des:13 http://security.debian.org/debian-security trixie-security/non-free-firmware amd64 Packages
Des:14 http://security.debian.org/debian-security trixie-security/non-free-firmware Translation-en
Des:15 http://deb.debian.org/debian trixie-backports/non-free-firmware Sources [1.052 B]
Des:16 http://deb.debian.org/debian trixie-backports/main Sources [81,7 kB]
Des:17 http://deb.debian.org/debian trixie-backports/main amd64 Packages [102 kB]
Des:18 http://deb.debian.org/debian trixie-backports/main Translation-en [78,8 kB]
Des:19 http://deb.debian.org/debian trixie-backports/non-free-firmware amd64 Packages [3.648 kB]
Des:20 http://deb.debian.org/debian trixie-backports/non-free-firmware Translation-en [2.712 kB]
Descargados 1.054 kB en 10s (103 kB/s)
Se pueden actualizar 113 paquetes. Ejecute «apt list --upgradable» para verlos.
Upgrading:
  cups          firefox-esr-l10n-fa   firefox-esr-l10n-pt-pt libjavascriptcoregtk-3.0-1
  cups-client    firefox-esr-l10n-fi   firefox-esr-l10n-ro  libmagickcore-7.q16-1
  cups-common    firefox-esr-l10n-fr   firefox-esr-l10n-ru  libmagickcore-7.q16-1
  cups-ppd        firefox-esr-l10n-es   firefox-esr-l10n-si  libmagickcore-7.q16-1
```

2. Instalar Apache2

Comando:

```
sudo apt install apache2 -y
```

```
hector@hector-virtualbox:~$ sudo apt install apache2 -y
Installing:
  apache2

Installing dependencies:
  apache2-bin   apache2-utils   libaprutil1-dbd-sqlite3  libaprutil1t
  apache2-data   libapr1t64     libaprutil1-ldap       liblua5.4-0

Paquetes sugeridos:
  apache2-doc   apache2-suexec-pristine | apache2-suexec-custom  ufw

Summary:
  Upgrading: 0, Installing: 9, Removing: 0, Not Upgrading: 0
  Download size: 2.371 kB
  Space needed: 8.488 kB / 10,1 GB available

0% [Trabajando]
```

3. Configurar Apache en puerto 8080

Comando:

```
sudo nano /etc/apache2/ports.conf
```

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

```
GNU nano 8.4                               /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>
```

4. Modificar el VirtualHost

Comando:

```
sudo nano /etc/apache2/sites-available/000-default.conf
```

Descripción: Cambia <VirtualHost*:80> por <VirtualHost*:8080>.

```
GNU nano 8.4                               /etc/apache2/sites-available/000-default.conf
<VirtualHost *:8080>
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>■
```

5. Instalar PHP

Comando:

```
sudo apt install php libapache2-mod-php -y
```

```
hector@hector-virtualbox:~$ sudo apt install php libapache2-mod-php -y
Installing:
  libapache2-mod-php  php

Installing dependencies:
  libapache2-mod-php8.4  php-common  php8.4  php8.4-cli  php8.4-common  php8.4-opcache  php8.4-readline

Paquetes sugeridos:
  php-pear

Summary:
  Upgrading: 0, Installing: 9, Removing: 0, Not Upgrading: 0
  Download size: 4.922 kB
  Space needed: 23,8 MB / 10,1 GB available

0% [Trabajando]■
```

6. Reiniciar Apache

Comando:

```
sudo systemctl restart apache2
```

```
hector@hector-virtualbox:~$ sudo systemctl restart apache2
hector@hector-virtualbox:~$ ■
```

7. Verificar estado de Apache

Comando:

sudo systemctl status apache2

```
hector@hector-virtualbox:~$ 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 Wed 2025-11-05 10:38:32 CET; 41s ago
     Invocation: a5b929fcfdab4a72ab4691a0a2fd19bf
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 21936 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 21939 (apache2)
      Tasks: 6 (limit: 4538)
        Memory: 11.9M (peak: 12.5M)
         CPU: 35ms
        CGroup: /system.slice/apache2.service
            └─21939 /usr/sbin/apache2 -k start
              ├─21941 /usr/sbin/apache2 -k start
              ├─21942 /usr/sbin/apache2 -k start
              ├─21943 /usr/sbin/apache2 -k start
              ├─21944 /usr/sbin/apache2 -k start
              └─21945 /usr/sbin/apache2 -k start

nov 05 10:38:32 hector-virtualbox systemd[1]: Starting apache2.service - The Apache HTTP Server...
nov 05 10:38:32 hector-virtualbox apachectl[21938]: AH00558: apache2: Could not reliably determine the server's
nov 05 10:38:32 hector-virtualbox systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-21/21 (END)
```

Comando adicional para verificar puerto: sudo netstat -tulpn | grep apache2

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep apache2
tcp6       0      0 :::8080          ::::*               LISTEN      21939/apache2
hector@hector-virtualbox:~$
```

8. Crear archivo PHP de prueba

Comando:

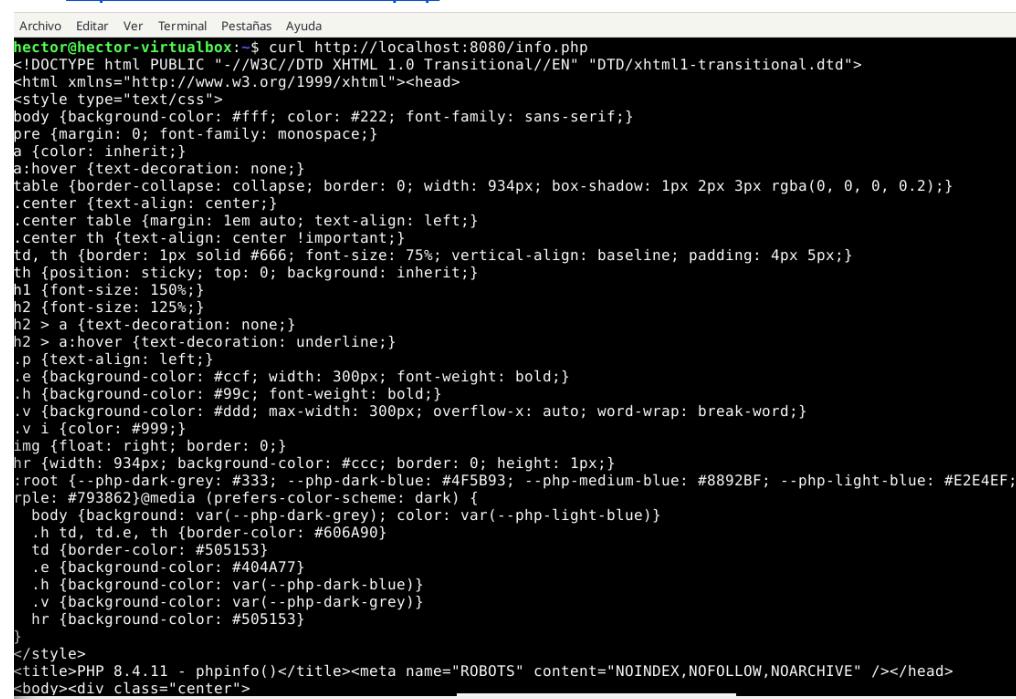
echo "<?php phpinfo(); ?>" | sudo tee /var/www/html/info.php

```
hector@hector-virtualbox:~$ echo "<?php phpinfo(); ?>" | sudo tee /var/www/html/info.php
<?php phpinfo(); ?>
hector@hector-virtualbox:~$
```

9. Probar Apache desde terminal

Comando:

curl <http://localhost:8080/info.php>



```
Archivo Editar Ver Terminal Pestañas Ayuda
hector@hector-virtualbox:~$ 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 {color: inherit;}
a:hover {text-decoration: none;}
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 {text-decoration: none;}
h2 > a:hover {text-decoration: underline;}
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;
purple: #793862}@media (prefers-color-scheme: dark) {
  body {background: var(--php-dark-grey); color: var(--php-light-blue)}
  .h td, td.e, th {border-color: #606A90}
  td {border-color: #505153}
  .e {background-color: #404A77}
  .h {background-color: var(--php-dark-blue)}
  .v {background-color: var(--php-dark-grey)}
  hr {background-color: #505153}
}
</style>
<title>PHP 8.4.11 - phpinfo()</title><meta name="ROBOTS" content="NOINDEX,NOFOLLOW,NOARCHIVE" /></head>
<body><div class="center">
```

PARTE 2: INSTALACIÓN Y CONFIGURACIÓN DE NGINX

1. Instalar Nginx

Comando:

```
sudo apt install nginx -y
```

```
hector@hector-virtualbox:~$ sudo apt install nginx -y
```

```
Installing:
```

```
  nginx
```

```
Installing dependencies:
```

```
  nginx-common
```

```
Paquetes sugeridos:
```

```
  fcgiwrap  nginx-doc
```

```
Summary:
```

```
Upgrading: 0, Installing: 2, Removing: 0, Not Upgrading: 0
```

```
Download size: 717 kB
```

```
Space needed: 1.891 kB / 10,1 GB available
```

```
0% [Trabajando]
```

2. Configurar Nginx en puerto 8081

Comando:

```
sudo nano /etc/nginx/sites-available/default
```

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

```
server {
    listen 8081 default_server;
    listen [::]:8081 default_server;
```

3. Crear página HTML personalizada

Comando: echo "<h1>Servidor Nginx</h1><p> Funcionando en puerto 8081</p>" | sudo tee /usr/share/nginx/html/index.html

```
hector@hector-virtualbox:~$ echo "<h1>Servidor Nginx</h1><p> Funcionando en puerto 8081</p>" | sudo tee /u
ndex.html
<h1>Servidor Nginx</h1><p> Funcionando en puerto 8081</p>
hector@hector-virtualbox:~$
```

4. Reiniciar Nginx

Comando:

```
sudo systemctl restart nginx
```

```
hector@hector-virtualbox:~$ sudo systemctl restart nginx
hector@hector-virtualbox:~$
```

5. Verificar estado de Nginx

Comando:

sudo systemctl status nginx

```
hector@hector-virtualbox:~$ 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 Wed 2025-11-05 11:00:20 CET; 1min 44s ago
  Invocation: 0789a398a7d44549810f533b36926820
    Docs: man:nginx(8)
  Process: 22355 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, stat
  Process: 22357 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCC
 Main PID: 22359 (nginx)
   Tasks: 5 (limit: 4538)
  Memory: 3.9M (peak: 4.3M)
    CPU: 27ms
   CGrou.../system.slice/nginx.service
      ├─22359 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
      ├─22360 "nginx: worker process"
      ├─22361 "nginx: worker process"
      ├─22362 "nginx: worker process"
      └─22363 "nginx: worker process"

nov 05 11:00:19 hector-virtualbox systemd[1]: Starting nginx.service - A high performance web server and a
nov 05 11:00:20 hektor-virtualbox systemd[1]: Started nginx.service - A high performance web server and a
lines 1-20/20 (END)
```

Comando adicional para verificar puerto:

sudo netstat -tulpn | grep nginx

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep nginx
tcp        0      0 0.0.0.0:8081          0.0.0.0:*          LISTEN      22359/nginx: master
tcp6       0      0 ::1:8081           ::*:*            LISTEN      22359/nginx: master
hector@hector-virtualbox:~$
```

6. Probar Nginx desde terminal

Comando:

curl http://localhost:8081

```
hector@hector-virtualbox:~$ curl http://localhost:8081
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-tr
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
    <title>Apache2 Debian Default Page: It works</title>
    <style type="text/css" media="screen">
      * {
        margin: 0px 0px 0px 0px;
        padding: 0px 0px 0px 0px;
      }

      body, html {
        padding: 3px 3px 3px 3px;
        background-color: #D8DBE2;

        font-family: Verdana, sans-serif;
        font-size: 11pt;
        text-align: center;
      }

      div.main_page {
        position: relative;
        display: table;

        width: 800px;

        margin-bottom: 3px;
        margin-left: auto;
        margin-right: auto;
        padding: 0px 0px 0px 0px;

        border-width: 2px;
        border-color: #212738;
```

PARTE 3: INSTALACIÓN Y CONFIGURACIÓN DE CADDY

1. Instalar dependencias necesarias

Comando:

```
sudo apt install -y debian-keyring debian-archive-keyring apt-transport-https curl
```

```
hector@hector-virtualbox:~$ sudo apt install -y debian-keyring debian-archive-keyring apt-transport-https
debian-archive-keyring ya está en su versión más reciente (2025.1).
curl ya está en su versión más reciente (8.14.1-2).
fijado curl como instalado manualmente.
Installing:
  apt-transport-https  debian-keyring

Summary:
  Upgrading: 0, Installing: 2, Removing: 0, Not Upgrading: 0
  Download size: 33,8 MB
  Space needed: 35,7 MB / 10,1 GB available

Des:1 http://deb.debian.org/debian trixie/main amd64 apt-transport-https all 3.0.3 [38,6 kB]
Des:2 http://deb.debian.org/debian trixie/main amd64 debian-keyring all 2025.07.26 [33,8 MB]
Descargados 33,8 MB en 11s (3.179 kB/s)
Seleccionando el paquete apt-transport-https previamente no seleccionado.
(Leyendo la base de datos ... 220221 ficheros o directorios instalados actualmente.)
Preparando para desempaquetar .../apt-transport-https_3.0.3_all.deb ...
Desempaquetando apt-transport-https (3.0.3) ...
Seleccionando el paquete debian-keyring previamente no seleccionado.
Preparando para desempaquetar .../debian-keyring_2025.07.26_all.deb ...
Desempaquetando debian-keyring (2025.07.26) ...
Configurando apt-transport-https (3.0.3) ...
Configurando debian-keyring (2025.07.26) ...
hector@hector-virtualbox:~$ █
```

2. Agregar repositorio de Caddy

Comando:

```
curl -sLf 'https://dl.cloudsmith.io/public/caddy/stable/gpg.key' | sudo gpg --dearmor -o
/usr/share/keyrings/caddy-stable-archive-keyring.gpg curl -sLf
'https://dl.cloudsmith.io/public/caddy/stable/debian.deb.txt' | sudo tee
/etc/apt/sources.list.d/caddy-stable.list
```

```
hector@hector-virtualbox:~$ curl -sLf 'https://dl.cloudsmith.io/public/caddy/stable/gpg.key' | sudo gpg --dearmor -o /usr/sha
re/keyrings/caddy-stable-archive-keyring.gpg
hector@hector-virtualbox:~$ curl -sLf 'https://dl.cloudsmith.io/public/caddy/stable/debian.deb.txt' | sudo tee /etc/apt/sourc
es.list.d/caddy-stable.list
# Source: Caddy
# Site: https://github.com/caddyserver/caddy
# Repository: Caddy / stable
# Description: Fast, multi-platform web server with automatic HTTPS

deb [signed-by=/usr/share/keyrings/caddy-stable-archive-keyring.gpg] https://dl.cloudsmith.io/public/caddy/stable/deb/debian a
ny-version main

deb-src [signed-by=/usr/share/keyrings/caddy-stable-archive-keyring.gpg] https://dl.cloudsmith.io/public/caddy/stable/deb/debi
an any-version main
hector@hector-virtualbox:~$ █
```

3. Actualizar e instalar Caddy

Comando:

```
sudo apt update && sudo apt install caddy -y
```

```
hector@hector-virtualbox:~$ sudo apt update && sudo apt install caddy -y
Des:1 http://deb.debian.org/debian trixie InRelease [140 kB]
Obj:2 http://security.debian.org/debian-security trixie-security InRelease
Obj:3 http://deb.debian.org/debian trixie-updates InRelease
Obj:4 http://deb.debian.org/debian trixie-backports InRelease
Des:5 https://dl.cloudsmith.io/public/caddy/stable/deb/debian any-version InRelease [14,8 kB]
Des:6 https://dl.cloudsmith.io/public/caddy/stable/deb/debian any-version/main amd64 Packages [4.329 B]
Descargados 160 kB en 11s (14,5 kB/s)
Todos los paquetes están actualizados.
Installing:
  caddy

Summary:
  Upgrading: 0, Installing: 1, Removing: 0, Not Upgrading: 0
  Download size: 16,0 MB
  Space needed: 44,5 MB / 9.975 MB available

Des:1 https://dl.cloudsmith.io/public/caddy/stable/deb/debian any-version/main amd64 caddy amd64 2.10.2 [16,0 MB]
Descargados 16,0 MB en 10s (1.536 kB/s)
Seleccionando el paquete caddy previamente no seleccionado.
(Leyendo la base de datos ... 220238 ficheros o directorios instalados actualmente.)
Preparando para desempaquetar .../caddy_2.10.2_amd64.deb ...
Desempaquetando caddy (2.10.2) ...
Configurando caddy (2.10.2) ...
Created symlink '/etc/systemd/system/multi-user.target.wants/caddy.service' → '/usr/lib/systemd/system/caddy.service'.
Procesando disparadores para man-db (2.13.1-1) ...
hector@hector-virtualbox:~$ █
```

4. Crear directorio para Caddy

Comando:

```
sudo mkdir -p /var/www/caddy
```

```
hector@hector-virtualbox:~$ sudo mkdir -p /var/www/caddy  
hector@hector-virtualbox:~$ █
```

5. Crear archivo Markdown de prueba

Comando:

```
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
```

```
hector@hector-virtualbox:~$ echo "# Bienvenido a Caddy" | sudo tee /var/www/caddy/README.md  
# Bienvenido a Caddy
```

```
hector@hector-virtualbox:~$ echo "" | sudo tee -a /var/www/caddy/README.md
```

```
hector@hector-virtualbox:~$ echo "Este servidor está funcionando correctamente." | sudo tee -a /var/www/caddy/README.md  
Este servidor está funcionando correctamente.
```

```
hector@hector-virtualbox:~$ █
```

```
hector@hector-virtualbox:~$ echo "" | sudo tee -a /var/www/caddy/README.md
```

```
hector@hector-virtualbox:~$ echo "## Características" | sudo tee -a /var/www/caddy/README.md  
## Características
```

```
hector@hector-virtualbox:~$ echo "- Servidor moderno" | sudo tee -a /var/www/caddy/README.md  
- Servidor moderno
```

```
hector@hector-virtualbox:~$ echo "- HTTPS automático" | sudo tee -a /var/www/caddy/README.md  
- HTTPS automático
```

```
hector@hector-virtualbox:~$ echo "- Fácil configuración" | sudo tee -a /var/www/caddy/README.md  
- Fácil configuración
```

6. Crear imagen de prueba (cuidado WSL hay que hacer ajustes)

Comando:

```
curl -o /tmp/test-image.jpg "https://www.python.org/static/apple-touch-icon-144x144-precomposed.png"
```

```
sudo mv /tmp/test-image.jpg /var/www/caddy/test.jpg
```

```
hector@hector-virtualbox:~$ curl -o /tmp/test-image.jpg "https://www.python.org/static/apple-touch-icon-144x144-precomposed.png"  
  % Total    % Received % Xferd  Average Speed   Time   Time     Time Current  
  100  7382  100  7382    0     0  1465      0  0:00:05  0:00:05  --- 1966  
hector@hector-virtualbox:~$ █
```

7. Crear Caddyfile personalizado

Comando:

```
sudo nano /etc/caddy/Caddyfile
```

```
hector@hector-virtualbox:~$ sudo nano /etc/caddy/Caddyfile
```

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

```
GNU nano 8.4                                     /etc/caddy/Caddyfile
:8082 {
    root * /var/www/caddy
    file_server browse
    @markdown path *.md
    header @markdown Content-Type text/plain
}
```

8. Reiniciar Caddy

Comando:

sudo systemctl restart caddy

```
hector@hector-virtualbox:~$ sudo systemctl restart caddy
```

9. Verificar estado de Caddy

Comando:

sudo systemctl status caddy

```
hector@hector-virtualbox:~$ sudo systemctl status caddy
● caddy.service - Caddy
   Loaded: loaded (/usr/lib/systemd/system/caddy.service; enabled; preset: enabled)
   Active: active (running) since Wed 2025-11-05 14:43:21 CET; 37s ago
     Invocation: 672e506ad9234e8db8428fc44a27427
       Docs: https://caddyserver.com/docs/
      Main PID: 2879 (caddy)
        Tasks: 10 (limit: 4538)
       Memory: 13.4M (peak: 14.1M)
         CPU: 63ms
        CGroup: /system.slice/caddy.service
                └─2879 /usr/bin/caddy run --environ --config /etc/caddy/Caddyfile

nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1357284, "logger":"admin", "msg":"admin endpoint"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"warn", "ts":1762350201.1359365, "logger":"http", "msg":"HTTP/2 skipped"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"warn", "ts":1762350201.1359766, "logger":"http", "msg":"HTTP/3 skipped"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1359804, "logger":"http.log", "msg":"server runn"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1362665, "msg":"autosaved config (load with --P")
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1363144, "logger":"tls.cache.maintenance", "msg"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1363432, "msg":"serving initial configuration"}
nov 05 14:43:21 hector-virtualbox systemd[1]: Started caddy.service - Caddy.
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.1402788, "logger":"tls", "msg":"storage cleaning"}
nov 05 14:43:21 hector-virtualbox caddy[2879]: {"level":"info", "ts":1762350201.140331, "logger":"tls", "msg":"finished cleaning"
lines 1-22/22 (END)
```

Comando adicional para verificar puerto: sudo netstat -tulpn | grep caddy

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep caddy
tcp        0      0 127.0.0.1:2019          0.0.0.0:*          LISTEN      2879/caddy
tcp6       0      0 ::::8082              ::::*           LISTEN      2879/caddy
hector@hector-virtualbox:~$
```

10. Probar Caddy desde terminal

Comando:

```
curl http://localhost:8082/
```

```
hector@hector-virtualbox:~$ curl http://localhost:8082/  
  
<!DOCTYPE html>  
<html>  
  <head>  
    <title>/</title>  
    <link rel="canonical" href="/" />  
    <meta charset="utf-8">  
    <meta name="color-scheme" content="light dark">  
    <meta name="viewport" content="width=device-width, initial-scale=1.0">  
<style nonce="fed3ff42-928b-4788-abf8-c889c355f461">  
* { padding: 0; margin: 0; box-sizing: border-box; }  
  
body {  
  font-family: Inter, system-ui, sans-serif;  
  font-size: 16px;  
  text-rendering: optimizespeed;  
  background-color: #f3f6f7;  
  min-height: 100vh;  
}  
  
img,  
svg {  
  vertical-align: middle;  
  z-index: 1;  
}  
  
img {  
  max-width: 100%;  
  max-height: 100%;  
  border-radius: 5px;  
}  
  
td img {  
  max-width: 1.5em;  
  max-height: 2em;  
  object-fit: cover;
```

11. Probar archivo Markdown

Comando:

```
curl http://localhost:8082/README.md
```

```
hector@hector-virtualbox:~$ curl http://localhost:8082/README.md  
# Bienvenido a Caddy  
  
Este servidor está funcionando correctamente.  
  
## Características  
- Servidor moderno  
- HTTPS automático  
- Fácil configuración  
hector@hector-virtualbox:~$ █
```

PARTE 4: CONFIGURACIÓN DE HTTPS CON CERTBOT EN APACHE

1. Instalar Certbot y el plugin de Apache

Comando:

```
sudo apt install certbot python3-certbot-apache -y
```

```
hector@hector-virtualbox:~$ sudo apt install certbot python3-certbot-apache -y
[sudo] contraseña para hector:
Installing:
  certbot  python3-certbot-apache

Installing dependencies:
  libaugeas0  python3-augeas  python3-cffi-backend  python3-configobj  python3-idna  python3-josepy  python3-openssl  python3-parsedatetime
  lsb-release  python3-certbot  python3 charset-normalizer  python3-distro  python3-icu
  python3-acme  python3-certifi  python3-configargparse  python3-cryptography  python3-cryptography-vectors  python3-requests-doc
  python3-certbot-doc  python3-certbot-apache-doc  python3-cryptography-doc  python3-cryptographyparser  python3-socks
  python3-certbot-nginx  python3 charset-normalizer-doc  python3-openssl-doc
  augeas-tools  python3-configobj-doc  python3-cryptography-vectors-doc  python3-requests-doc

Paquetes sugeridos:
  augeas-doc  python-acme-doc  python-cryptography-doc  python-requests-doc
  python-certbot-doc  python-certbot-apache-doc  python3-cryptography-vectors
  python3-certbot-nginx  python3 charset-normalizer-doc  python3-openssl-doc
  augeas-tools  python3-configobj-doc  python3-socks

Summary:
  Upgrading: 0, Installing: 25, Removing: 0, Not Upgrading: 0
  Download size: 3.887 kB
  Space needed: 18,0 MB / 9.916 MB available

Des:1 http://deb.debian.org/debian trixie/main amd64 augeas-lenses all 1.14.1-1 [463 kB]
Des:2 http://deb.debian.org/debian trixie/main amd64 python3-bcrypt amd64 4.2.0-2.1+b1 [211 kB]
Des:3 http://deb.debian.org/debian trixie/main amd64 python3-cffi-backend amd64 1.17.1-3 [93,4 kB]
Des:4 http://deb.debian.org/debian trixie/main amd64 python3-cryptography amd64 43.0.0-3 [941 kB]
Des:5 http://deb.debian.org/debian trixie/main amd64 python3-openssl all 25.0.0-1 [52,1 kB]
Des:6 http://deb.debian.org/debian trixie/main amd64 python3-josepy all 2.0.0-1 [23,6 kB]
Des:7 http://deb.debian.org/debian trixie/main amd64 python3-ptz all 2025.2-3 [152 kB]
Des:8 http://deb.debian.org/debian trixie/main amd64 python3-certifi all 2025.1.31+ds-1 [9,652 B]
Des:9 http://deb.debian.org/debian trixie/main amd64 python3 charset-normalizer amd64 3.4.2-1 [128 kB]
Des:10 http://deb.debian.org/debian trixie/main amd64 python3-idna all 3.10-1 [42,0 kB]
Des:11 http://deb.debian.org/debian trixie/main amd64 python3-chardet all 5.2.0+dfsg-2 [108 kB]
Des:12 http://deb.debian.org/debian trixie/main amd64 python3-requests all 2.32.3+dfsg-5 [72,2 kB]
Des:13 http://deb.debian.org/debian trixie/main amd64 python3-rfc3339 all 2.0.1-1 [6.272 B]
Des:14 http://deb.debian.org/debian trixie/main amd64 python3-acme all 4.0.0-1 [48,6 kB]
Des:15 http://deb.debian.org/debian trixie/main amd64 python3-configargparse all 1.7-2 [31,4 kB]
Des:16 http://deb.debian.org/debian trixie/main amd64 python3-configobj all 5.0.9-1 [34,0 kB]
```

2. Verificar dominio o usar localhost

Comando:

```
sudo openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout
```

```
/etc/ssl/private/apache-selfsigned.key -out /etc/ssl/certs/apache-selfsigned.crt
```

State or Province Name (full name) [Some-State]:Madrid

Locality Name (eg, city) []:Madrid

```
Organization Name (eg, company) [Internet Widgits Pty Ltd]:  
Organizational Unit Name (eg, section) []:  
Common Name (e.g. server FQDN or YOUR name) []:localhost
```

```
Email Address []:hectoritogorrion@gmail.com
```

3. Habilitar módulo SSL en Apache

Comando:

```
sudo a2enmod ssl
```

```
hector@hector-virtualbox:~$ sudo a2enmod ssl  
Considering dependency mime for ssl:  
Module mime already enabled  
Considering dependency socache_shmcb for ssl:  
Enabling module socache_shmcb.  
Enabling module ssl.  
See /usr/share/doc/apache2/README.Debian.gz on how to configure SSL and create self-signed certificates.  
To activate the new configuration, you need to run:  
    systemctl restart apache2  
hector@hector-virtualbox:~$
```

4. Cambiar puerto SSL

Comando:

```
sudo nano /etc/apache2/ports.conf
```

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

```
GNU nano 8.4                               /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>  
  
Listen 8443
```

5. Modificar VirtualHost SSL

Comando:

```
sudo nano /etc/apache2/sites-available/default-ssl.conf
```

Cambia <VirtualHost *:443> por <VirtualHost *:8443>

```
GNU nano 8.4                               /etc/apache2/sites-available/default-ssl.conf  
<VirtualHost *:8443>  
    ServerAdmin webmaster@localhost  
  
    DocumentRoot /var/www/html  
  
    # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
```

6. Habilitar sitio SSL

Comando:

```
sudo a2ensite default-ssl.conf
```

```
hector@hector-virtualbox:~$ sudo a2ensite default-ssl.conf
Enabling site default-ssl.
To activate the new configuration, you need to run:
  systemctl reload apache2
hector@hector-virtualbox:~$ █
```

7. Reiniciar Apache

Comando:

```
sudo systemctl restart apache2
```

```
hector@hector-virtualbox:~$ sudo systemctl restart apache2
hector@hector-virtualbox:~$ █
```

8. Verificar HTTPS

Comando:

```
curl -i -k https://localhost:8443
```

```
hector@hector-virtualbox:~$ curl -i -k https://localhost:8443
HTTP/1.1 200 OK
Date: Thu, 06 Nov 2025 09:00:05 GMT
Server: Apache/2.4.65 (Debian)
Last-Modified: Wed, 05 Nov 2025 09:24:12 GMT
ETag: "29cf-642d582eba357"
Accept-Ranges: bytes
Content-Length: 10703
Vary: Accept-Encoding
Content-Type: text/html

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
    <title>Apache2 Debian Default Page: It works</title>
    <style type="text/css" media="screen">
      * {
        margin: 0px 0px 0px 0px;
        padding: 0px 0px 0px 0px;
      }

      body, html {
        padding: 3px 3px 3px 3px;
        background-color: #D8DBE2;
        font-family: Verdana, sans-serif;
        font-size: 11pt;
        text-align: center;
      }

      div.main_page {
        position: relative;
        display: table;
        width: 800px;
      }
    
  </head>
  <body>
    <div>
      <h1>It works</h1>
      <p>This is the default web page for this server.</p>
      <p>The Apache2 web server</p>
      <p>Version: Apache/2.4.65 (Debian)</p>
      <p>Generated by: hector@hector-virtualbox</p>
    </div>
  </body>
</html>
```

PARTE 5: VERIFICACIÓN FINAL DE LOS TRES SERVIDORES

1. Verificar que todos los servicios están activos

Comando para verificar Apache:

- sudo systemctl status apache2

```
hector@hector-virtualbox:~$ 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 Thu 2025-11-06 09:58:46 CET; 5min ago
     Invocation: f88a89460208457b8ef1bfecd7ecef01
       Docs: https://httpd.apache.org/docs/2.4/
   Process: 1976 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
 Main PID: 1979 (apache2)
   Tasks: 6 (limit: 4538)
  Memory: 19.8M (peak: 20M)
    CPU: 111ms
   CGroup: /system.slice/apache2.service
           └─1979 /usr/sbin/apache2 -k start
             ├─1981 /usr/sbin/apache2 -k start
             ├─1982 /usr/sbin/apache2 -k start
             ├─1983 /usr/sbin/apache2 -k start
             ├─1984 /usr/sbin/apache2 -k start
             └─1985 /usr/sbin/apache2 -k start

nov 06 09:58:46 hector-virtualbox systemd[1]: Starting apache2.service - The Apache HTTP Server...
nov 06 09:58:46 hector-virtualbox apachectl[1978]: AH00558: apache2: Could not reliably determine the server's
nov 06 09:58:46 hector-virtualbox systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-21/21 (END)
```

Comando para verificar puerto de Apache:

- sudo netstat -tulpn | grep apache2

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep apache2
tcp6      0      0 :::8443          ::::*                      LISTEN      1979/apache2
tcp6      0      0 ::::443         ::::*                      LISTEN      1979/apache2
tcp6      0      0 ::::8080        ::::*                      LISTEN      1979/apache2
hector@hector-virtualbox:~$
```

Comando para verificar Nginx:

- sudo systemctl status nginx

```
hector@hector-virtualbox:~$ 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 Thu 2025-11-06 09:52:12 CET; 13min ago
     Invocation: aa7ab6e822f948bb83e3b340051049b0
       Docs: man:nginx(8)
   Process: 874 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Process: 876 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
 Main PID: 882 (nginx)
   Tasks: 5 (limit: 4538)
  Memory: 6.1M (peak: 6.5M)
    CPU: 46ms
   CGroup: /system.slice/nginx.service
           ├─882 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
           ├─883 "nginx: worker process"
           ├─884 "nginx: worker process"
           ├─885 "nginx: worker process"
           └─886 "nginx: worker process"

nov 06 09:52:12 hector-virtualbox systemd[1]: Starting nginx.service - A high performance web server and a rev
nov 06 09:52:12 hector-virtualbox systemd[1]: Started nginx.service - A high performance web server and a rev
lines 1-20/20 (END)
```

Comando para verificar puerto de Nginx:

- sudo netstat -tulpn | grep nginx

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep nginx
tcp      0      0 0.0.0.0:8081          0.0.0.0:*
                                             LISTEN      882/nginx: master p
tcp6     0      0 ::::8081            ::::*                      LISTEN      882/nginx: master p
hector@hector-virtualbox:~$
```

Comando para verificar Caddy:

- sudo systemctl status caddy

```
tcp0      0.0.0.0...8081          ... LISTEN      882/nginx: master p
hector@hector-virtualbox:~$ sudo systemctl status caddy
● caddy.service - Caddy
   Loaded: loaded (/usr/lib/systemd/system/caddy.service; enabled; preset: enabled)
   Active: active (running) since Thu 2025-11-06 09:52:12 CET; 14min ago
     Invocation: 31066a26a7104a209a34a7e85230d62a
       Docs: https://caddyserver.com/docs/
    Main PID: 872 (caddy)
      Tasks: 9 (limit: 4538)
     Memory: 53.1M (peak: 55M)
        CPU: 260ms
      CGroup: /system.slice/caddy.service
              └─ 872 /usr/bin/caddy run --environ --config /etc/caddy/Caddyfile

nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.650674, "logger": "admin", "msg": "Caddy v2.8.0 starting up on port 8081."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.652691, "logger": "tls.cache.main", "msg": "TLS cache initialized."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "warn", "ts": 1762419132.6548452, "logger": "http", "msg": "HTTP port 8081 is already in use by another process."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "warn", "ts": 1762419132.6548767, "logger": "http", "msg": "HTTP port 8081 is already in use by another process."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.6551976, "logger": "http.log", "msg": "HTTP log initialized."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.6584108, "msg": "autosaved config loaded."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.6587439, "msg": "serving initial request."}
nov 06 09:52:12 hector-virtualbox systemd[1]: Started caddy.service - Caddy.
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.6650903, "logger": "tls", "msg": "TLS port 8081 is now listening."}
nov 06 09:52:12 hector-virtualbox caddy[872]: {"level": "info", "ts": 1762419132.665133, "logger": "tls", "msg": "TLS port 8081 is now listening."}
lines 1-22/22 (END)
```

Comando para verificar puerto de Caddy:

- ```
- sudo netstat -tulpn | grep caddy
```

```
hector@hector-virtualbox:~$ sudo netstat -tuln | grep caddy
tcp 0 0 127.0.0.1:2019 0.0.0.0:* LISTEN 872/caddy
tcp6 0 0 :::8082 :::* LISTEN 872/caddy
hector@hector-virtualbox:~$
```

## 2. Verificar puertos en uso (todos simultáneamente)

## Comando:

```
sudo netstat -tulpn | grep -E '8080|8081|8082|8443'
```

```
hector@hector-virtualbox:~$ sudo netstat -tulpn | grep -E '8080|8081|8082|8443'
tcp 0 0 0.0.0.0:8081 0.0.0.0:* LISTEN 882/nginx: master p
tcp6 0 0 :::8443 ::::* LISTEN 1979/apache2
tcp6 0 0 :::8080 ::::* LISTEN 1979/apache2
tcp6 0 0 :::8081 ::::* LISTEN 882/nginx: master p
tcp6 0 0 :::8082 ::::* LISTEN 872/caddy
hector@hector-virtualbox:~$
```

### 3. Probar todos los servidores

Comandos:

```
curl http://localhost:8080
```

```
curl http://localhost:8081
```

```
curl http://localhost:8082
```

```
curl -i -k https://localhost:8443
```

```
hector@hector-virtualbox:~$ curl http://localhost:8080
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<title>Apache2 Debian Default Page: It works</title>
<style type="text/css" media="screen">
* {
margin: 0px 0px 0px 0px;
padding: 0px 0px 0px 0px;
}

body, html {
padding: 3px 3px 3px 3px;
background-color: #D8DBE2;

font-family: Verdana, sans-serif;
font-size: 11pt;
text-align: center;
}

div.main_page {
position: relative;
display: table;
width: 800px;

margin-bottom: 3px;
margin-left: auto;
margin-right: auto;
padding: 0px 0px 0px 0px;

border-width: 2px;
border-color: #212738;
border-style: solid;
}
```

```
hector@hector-virtualbox:~$ curl http://localhost:8081
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<title>Apache2 Debian Default Page: It works</title>
<style type="text/css" media="screen">
* {
margin: 0px 0px 0px 0px;
padding: 0px 0px 0px 0px;
}

body, html {
padding: 3px 3px 3px 3px;
background-color: #D8DBE2;

font-family: Verdana, sans-serif;
font-size: 11pt;
text-align: center;
}

div.main_page {
position: relative;
display: table;
width: 800px;

margin-bottom: 3px;
margin-left: auto;
margin-right: auto;
padding: 0px 0px 0px 0px;

border-width: 2px;
border-color: #212738;
border-style: solid;
}
```

```
hector@hector-virtualbox:~$ curl http://localhost:8082
<!DOCTYPE html>
<html>
<head>
<title></title>
<link rel="canonical" href="/" />
<meta charset="utf-8">
<meta name="color-scheme" content="light dark">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<style nonce="b0566c1c-3fc3-4f63-8e5f-450c410f3105">
* { padding: 0; margin: 0; box-sizing: border-box; }

body {
 font-family: Inter, system-ui, sans-serif;
 font-size: 16px;
 text-rendering: optimizeSpeed;
 background-color: #f3f6f7;
 min-height: 100vh;
}

img,
svg {
 vertical-align: middle;
 z-index: 1;
}

img {
 max-width: 100%;
 max-height: 100%;
 border-radius: 5px;
}

td img {
 max-width: 1.5em;
 max-height: 2em;
 object-fit: cover;
}
```

```
hector@hector-virtualbox:~$ curl -i -k https://localhost:8443
HTTP/1.1 200 OK
Date: Thu, 06 Nov 2025 09:14:44 GMT
Server: Apache/2.4.65 (Debian)
Last-Modified: Wed, 05 Nov 2025 09:24:12 GMT
ETag: "29cf-642d582eba357"
Accept-Ranges: bytes
Content-Length: 10703
Vary: Accept-Encoding
Content-Type: text/html

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
 <head>
 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
 <title>Apache2 Debian Default Page: It works</title>
 <style type="text/css" media="screen">
 * {
 margin: 0px 0px 0px 0px;
 padding: 0px 0px 0px 0px;
 }

 body, html {
 padding: 3px 3px 3px 3px;

 background-color: #D8DBE2;

 font-family: Verdana, sans-serif;
 font-size: 11pt;
 text-align: center;
 }

 div.main_page {
 position: relative;
 display: table;

 width: 800px;
 }

 </head>
 <body>
 <div>
 <h1>It works</h1>
 <p>This is the default web page for this server.

 The web server software is running normally.

 This page is automatically generated by the server.

 If you reached this page while trying to access a particular page, please try again.

 If you did not mean to reach this page, you may have typed the address incorrectly or

 your browser is not able to find the requested file.

 You can also check the address in your browser's address bar to make sure it is correct.

 If you are the administrator of this server, you may want to check the configuration files

 to ensure that the document root is set correctly and that the server is configured to serve

 the desired content.

 You can also check the logs for more information about the error.

 If you are still having trouble, you may want to consult the documentation for your

 web server or seek help from a support forum or community.

 Thank you for visiting our website!</p>
 </div>
 </body>
</html>
```