

INTRODUCCIÓN

APLICACIONES WEB CON

APACHE



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CETI Puesta en Producción Segura

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1. INTRODUCCIÓN.

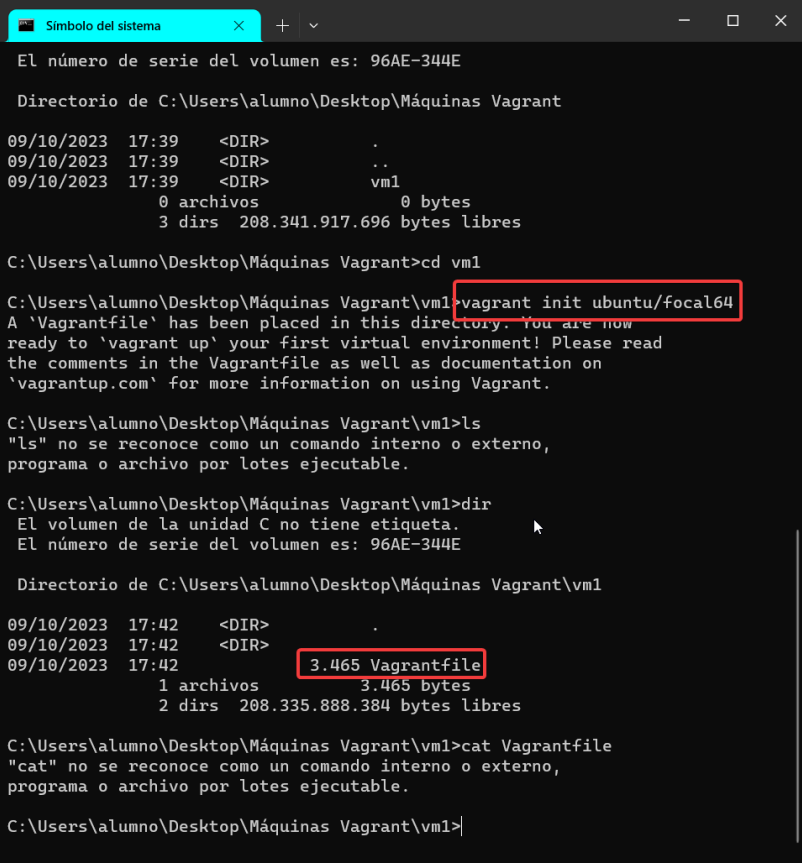
Apache es uno de los servidores web con más tradición en el mundo. Por defecto ofrece contenido estático, pero también es capaz de ofrecer contenido dinámico con una pequeña configuración.

El objetivo de esta actividad es explorar cómo funciona Apache y cómo con sencillas configuraciones podemos servir tanto contenido estático como dinámico.

2. ACTIVIDAD PROPUESTA.

2.1 Crea una máquina Ubuntu focal64 con vagrant.

Creemos carpeta box de Ubuntu focal 64 con **vagrant init Ubuntu/focal64** y comprobamos que se ha creado con **dir**:



```
Símbolo del sistema
El número de serie del volumen es: 96AE-344E

Directorio de C:\Users\alumno\Desktop\Máquinas Vagrant
09/10/2023 17:39 <DIR> .
09/10/2023 17:39 <DIR> ..
09/10/2023 17:39 <DIR> vm1
0 archivos 0 bytes
3 dirs 208.341.917.696 bytes libres

C:\Users\alumno\Desktop\Máquinas Vagrant>cd vm1
C:\Users\alumno\Desktop\Máquinas Vagrant\vm1>vagrant init ubuntu/focal64
A 'Vagrantfile' has been placed in this directory. You are now
ready to 'vagrant up' your first virtual environment! Please read
the comments in the Vagrantfile as well as documentation on
'vagrantup.com' for more information on using Vagrant.

C:\Users\alumno\Desktop\Máquinas Vagrant\vm1>ls
"ls" no se reconoce como un comando interno o externo,
programa o archivo por lotes ejecutable.

C:\Users\alumno\Desktop\Máquinas Vagrant\vm1>dir
El volumen de la unidad C no tiene etiqueta.
El número de serie del volumen es: 96AE-344E

Directorio de C:\Users\alumno\Desktop\Máquinas Vagrant\vm1
09/10/2023 17:42 <DIR> .
09/10/2023 17:42 <DIR> ..
09/10/2023 17:42 3.465 Vagrantfile
1 archivos 3.465 bytes
2 dirs 208.335.888.384 bytes libres

C:\Users\alumno\Desktop\Máquinas Vagrant\vm1>cat Vagrantfile
"cat" no se reconoce como un comando interno o externo,
programa o archivo por lotes ejecutable.

C:\Users\alumno\Desktop\Máquinas Vagrant\vm1>
```

Para descargar la máquina virtual: **vagrant up**.

```
Símbolo del sistema
C:\Users\alumno\Desktop\Máquinas Vagrant\vm>vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
=> default: Box 'ubuntu/focal64' could not be found. Attempting to find and install...
default: Box Provider: virtualbox
default: Box Version: >= 0
=> default: Loading metadata for box 'ubuntu/focal64'
default: URL: https://vagrantcloud.com/ubuntu/focal64
=> default: Adding box 'ubuntu/focal64' (v20231003.0.0) for provider: virtualbox
default: Downloading: https://vagrantcloud.com/ubuntu/boxes/focal64/versions/20231003.0.0/providers/virtualbox/unknown/vagrant.box
Download redirected to host: cloud-images.ubuntu.com
default:
=> default: Successfully added box 'ubuntu/focal64' (v20231003.0.0) for 'virtualbox'!
=> default: Importing base box 'ubuntu/focal64'...
=> default: Matching MAC address for NAT networking...
=> default: Checking if box 'ubuntu/focal64' version '20231003.0.0' is up to date...
=> default: Setting the name of the VM: vml.default.109686646292.56837
Vagrant is currently configured to create VirtualBox synced folders with
the 'SharedFoldersEnableSymlinksCreate' option enabled. If the Vagrant
guest is not trusted, you may want to disable this option. For more
information on this option, please refer to the VirtualBox manual:

https://www.virtualbox.org/manual/ch04.html#sharedfolders

This option can be disabled globally with an environment variable:

VAGRANT_DISABLE_VBOXSYMLINKSCREATE=1

or on a per folder basis within the Vagrantfile:

config.vm.synced_folder 'host/path', '/guest/path', SharedFoldersEnableSymlinksCreate: false
=> default: Clearing any previously set network interfaces...
=> default: Preparing network interfaces based on configuration...
default: Adapter 1: nat
=> default: Forwarding ports...
default: 22 (guest) => 2222 (host) (adapter 1)
=> default: Running 'pre-boot' VM customizations...
=> default: Booting VM...
=> default: Waiting for machine to boot. This may take a few minutes...
default: SSH address: 127.0.0.1:2222
default: SSH username: vagrant
default: SSH auth method: private key
```

Para iniciar la máquina virtual: **vagrant ssh**

```
vagrant@ubuntu-focal: ~
==> default: Checking for guest additions in VM...
default: The guest additions on this VM do not match the installed version of
default: VirtualBox! In most cases this is fine, but in rare cases it can
default: prevent things such as shared folders from working properly. If you see
e
default: shared folder errors, please make sure the guest additions within the
default: virtual machine match the version of VirtualBox you have installed on
default: your host and reload your VM.
default:
default: Guest Additions Version: 6.1.38
default: VirtualBox Version: 7.0
==> default: Mounting shared folders...
default: /vagrant => C:\Users\alumno\Desktop\Máquinas Vagrant\vm1

C:\Users\alumno\Desktop\Máquinas Vagrant\vm>vagrant ssh
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.4.0-163-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Oct 9 15:53:10 UTC 2023

System load:  0.15          Processes:      122
Usage of /:   3.7% of 38.70GB Users logged in:  0
Memory usage: 20%          IPv4 address for enp0s3: 10.0.2.15
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

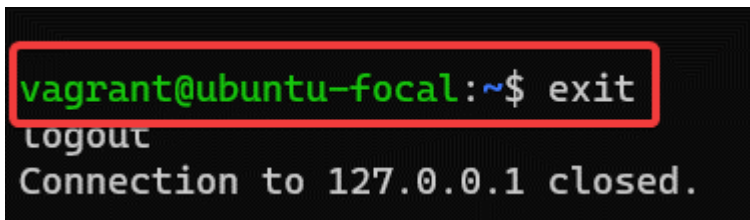
0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

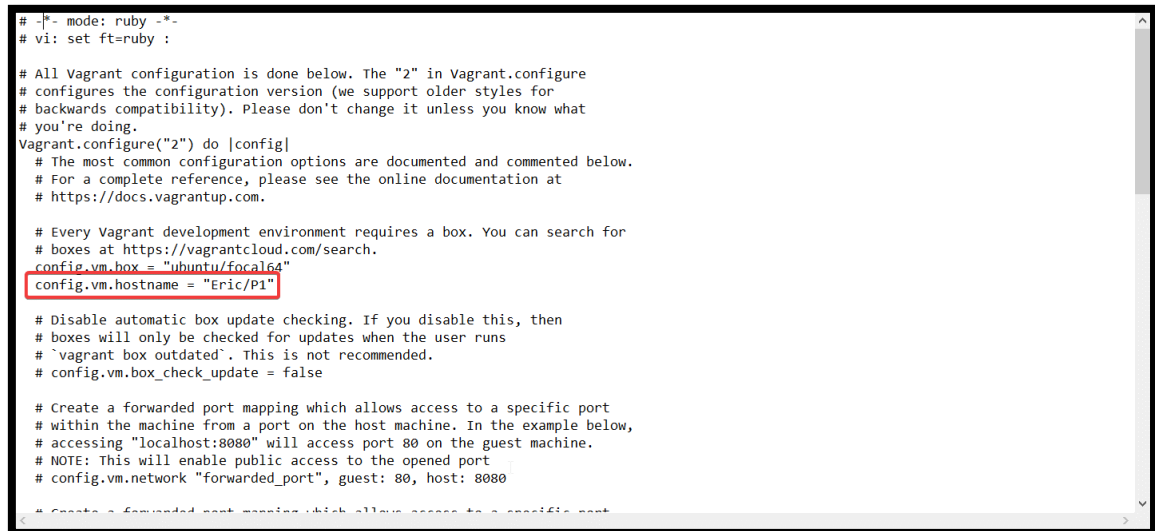
vagrant@ubuntu-focal:~$
```

Para salirnos de la máquina: **exit**



```
vagrant@ubuntu-focal:~$ exit
logout
Connection to 127.0.0.1 closed.
```

Cambiar hostname.



```
# -*- mode: ruby -*-
# vi: set ft=ruby :

# All Vagrant configuration is done below. The "2" in Vagrant.configure
# configures the configuration version (we support older styles for
# backwards compatibility). Please don't change it unless you know what
# you're doing.
Vagrant.configure("2") do |config|
  # The most common configuration options are documented and commented below.
  # For a complete reference, please see the online documentation at
  # https://docs.vagrantup.com.

  # Every Vagrant development environment requires a box. You can search for
  # boxes at https://vagrantcloud.com/search.
  config.vm.box = "ubuntu/focal64"
  config.vm.hostname = "Eric/P1"

  # Disable automatic box update checking. If you disable this, then
  # boxes will only be checked for updates when the user runs
  # `vagrant box outdated`. This is not recommended.
  # config.vm.box_check_update = false

  # Create a forwarded port mapping which allows access to a specific port
  # within the machine from a port on the host machine. In the example below,
  # accessing "localhost:8080" will access port 80 on the guest machine.
  # NOTE: This will enable public access to the opened port
  # config.vm.network "forwarded_port", guest: 80, host: 8080

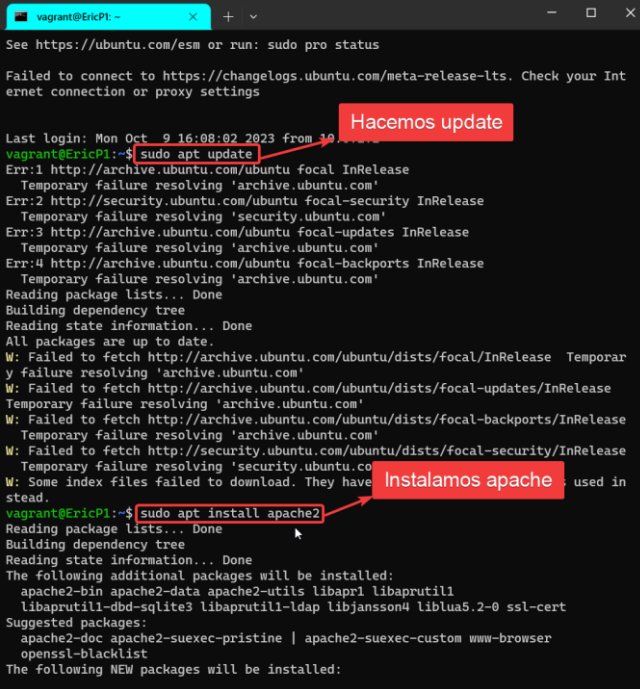
  # Create a forwarded port mapping which allows access to a specific port
```

Hacemos un reload para que se apliquen los cambios: **vagrant reload**

2.2 Instalar Apache2 en la máquina virtual y configurar para que el puerto 8080 del host redirija al puerto 80 al guest (Máquina Vagrant)

sudo apt update

sudo apt install apache2



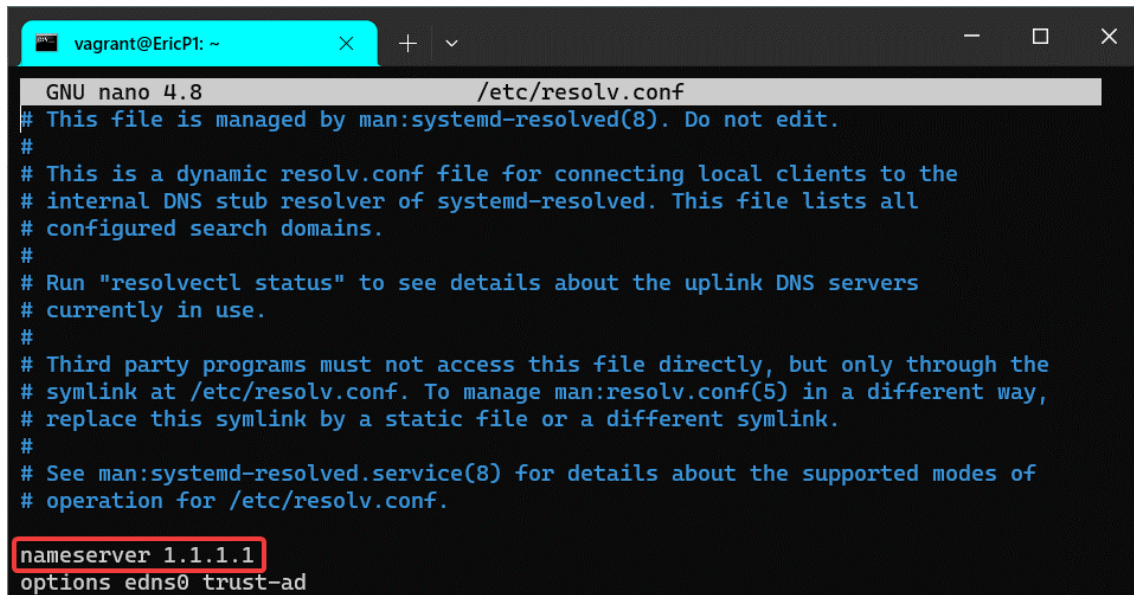
```
vagrant@EricP1:~$ sudo apt update
See https://ubuntu.com/esm or run: sudo pro status
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

Last login: Mon Oct  9 16:08:02 2023 from 10.0.2.15
vagrant@EricP1:~$ sudo apt update
Err:1 http://archive.ubuntu.com/ubuntu focal InRelease
Temporary failure resolving 'archive.ubuntu.com'
Err:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Temporary failure resolving 'security.ubuntu.com'
Err:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Temporary failure resolving 'archive.ubuntu.com'
Err:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Temporary failure resolving 'archive.ubuntu.com'
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
W: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/focal/InRelease Temporary failure resolving 'archive.ubuntu.com'
W: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/focal-updates/InRelease Temporary failure resolving 'archive.ubuntu.com'
W: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/focal-backports/InRelease Temporary failure resolving 'archive.ubuntu.com'
W: Failed to fetch http://security.ubuntu.com/ubuntu/dists/focal-security/InRelease Temporary failure resolving 'security.ubuntu.com'
W: Some index files failed to download. They have been ignored, and existing index files are used instead.
vagrant@EricP1:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.2-0 ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser
  openssl-blacklist
The following NEW packages will be installed:
```

Arreglando problema de DNS.

sudo nano /etc/resolv.conf

```
vagrant@EricP1:~$ sudo nano /etc/resolv.conf
```

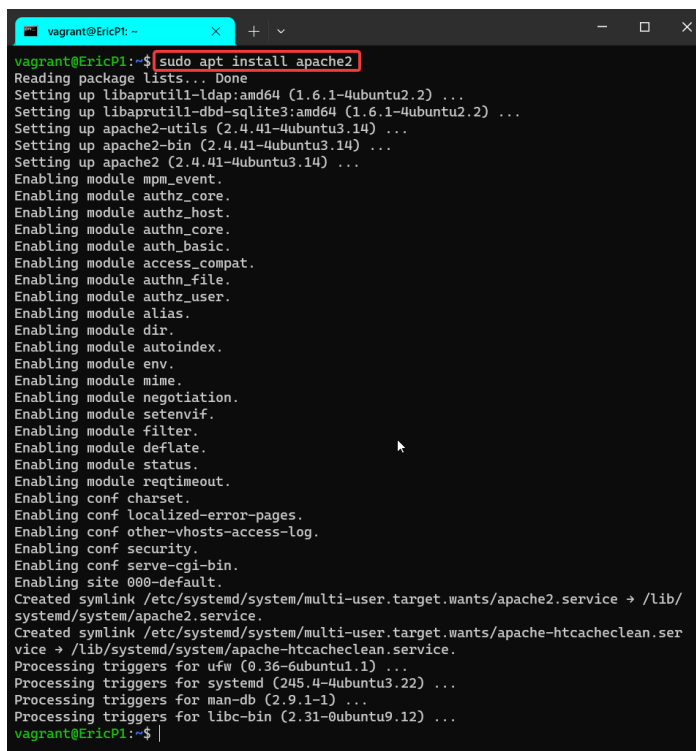


The screenshot shows a terminal window titled 'vagrant@EricP1: ~'. The nano editor is open to the file '/etc/resolv.conf'. The file contains several lines of comments explaining its purpose as a dynamic resolv.conf file for connecting local clients to the internal DNS stub resolver of systemd-resolved. The line 'nameserver 1.1.1.1' is highlighted with a red box, and the line 'options edns0 trust-ad' is visible below it.

```
GNU nano 4.8 /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.
nameserver 1.1.1.1
options edns0 trust-ad
```

Empezamos instalación de Apache2.

sudo apt install apache2



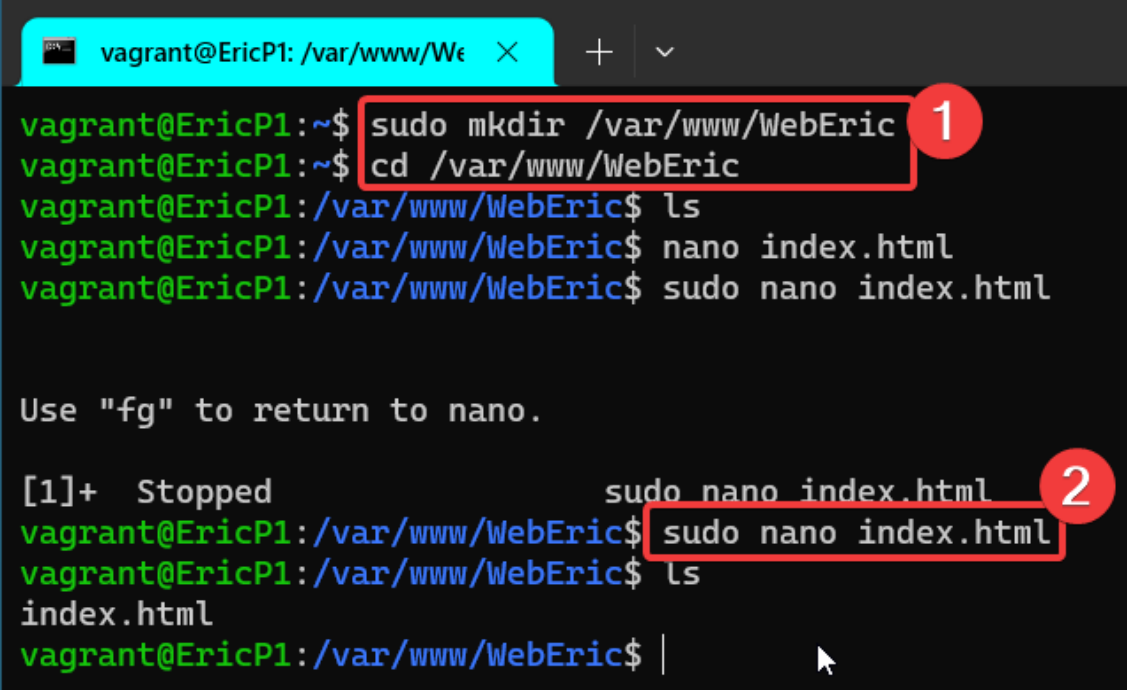
The screenshot shows a terminal window titled 'vagrant@EricP1: ~'. The command 'sudo apt install apache2' is entered and highlighted with a red box. The output shows the installation progress, including reading package lists, setting up various dependencies like libaprutil1-ldap, libaprutil1-dbd-sqlite3, and apache2-utils, and enabling various modules like mpm_event, authz_core, authz_host, authn_core, authn_file, authn_basic, access_compat, alias, dir, autoindex, env, mime, negotiation, setenvif, filter, deflate, status, reqtimeout, and conf_charset. The installation is completed successfully, and the prompt returns to 'vagrant@EricP1:~\$'.

```
vagrant@EricP1:~$ sudo apt install apache2
Reading package lists... Done
Setting up libaprutil1-ldap:amd64 (1.6.1-4ubuntu2.2) ...
Setting up libaprutil1-dbd-sqlite3:amd64 (1.6.1-4ubuntu2.2) ...
Setting up apache2-utils (2.4.41-4ubuntu3.14) ...
Setting up apache2-bin (2.4.41-4ubuntu3.14) ...
Setting up apache2 (2.4.41-4ubuntu3.14) ...
Enabling module mpm_event.
Enabling module authz_core.
Enabling module authz_host.
Enabling module authn_core.
Enabling module authn_file.
Enabling module authn_basic.
Enabling module access_compat.
Enabling module alias.
Enabling module dir.
Enabling module autoindex.
Enabling module env.
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/
systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.ser
vice → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36-6ubuntu1.1) ...
Processing triggers for systemd (245.4-4ubuntu3.22) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.12) ...
vagrant@EricP1:~$
```

2.3 Configurar un Site en Apache2 con una página de bienvenida estática utilizando una configuración virtualhost propia.

```
sudo mkdir /var/www/WebEric
```

```
cd /var/www/WebEric
```

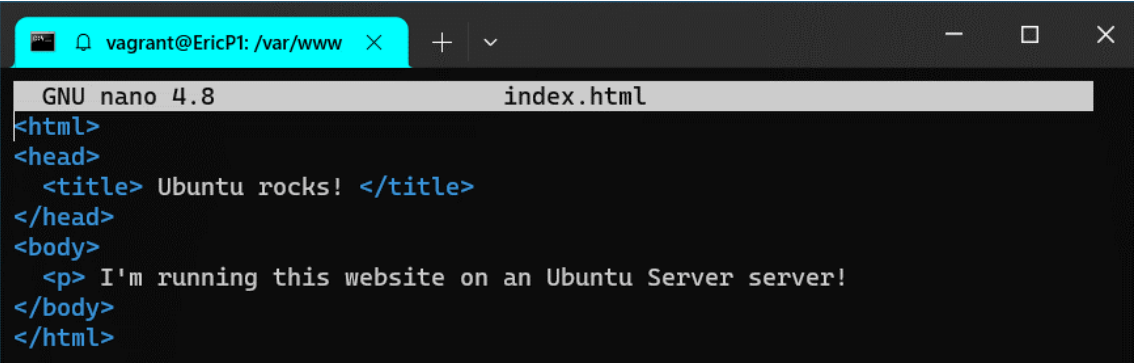


A terminal window titled 'vagrant@EricP1: /var/www/We' shows the following commands and output:

```
vagrant@EricP1:~$ sudo mkdir /var/www/WebEric
vagrant@EricP1:~$ cd /var/www/WebEric
vagrant@EricP1:/var/www/WebEric$ ls
vagrant@EricP1:/var/www/WebEric$ nano index.html
vagrant@EricP1:/var/www/WebEric$ sudo nano index.html
```

Below the commands, it says 'Use "fg" to return to nano.' and then '[1]+ Stopped sudo nano index.html'. A red box highlights the command 'sudo nano index.html' which is preceded by a red circle with the number '2'.

Pegamos un HTML fácil en index.html.



A screenshot of the GNU nano 4.8 editor editing 'index.html'. The content of the file is:

```
<html>
<head>
  <title> Ubuntu rocks! </title>
</head>
<body>
  <p> I'm running this website on an Ubuntu Server server!
</body>
</html>
```


Ahora nos disponemos a copiar todo lo que hay dentro de 000-default.conf en mi archivo de configuración **WebEric.conf**.

```
vagrant@EricP1:/var/www/WebEric$ ls
index.html
vagrant@EricP1:/var/www/WebEric$ cd /etc/apache2/sites-available/
vagrant@EricP1:/etc/apache2/sites-available$ sudo cp 000-default.conf WebEric.conf
vagrant@EricP1:/etc/apache2/sites-available$ sudo nano WebEric.conf
vagrant@EricP1:/etc/apache2/sites-available$ sudo nano WebEric.conf
vagrant@EricP1:/etc/apache2/sites-available$ nano index.html
vagrant@EricP1:/etc/apache2/sites-available$ cd ..
```

En el archivo vamos a cambiar los campos **ServerAdmin** y **DocumentRoot**.

```
GNU nano 4.8 WebEric.conf Modified
<VirtualHost *:80>
    # The ServerName directive sets the request scheme, hostname and port
    # 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)
    # the 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 cire78961@gmail.com
    DocumentRoot /var/www/WebEric
```

Para poder ver la página en localhost, quitaremos la almohadilla de la línea de texto que vemos a continuación.

```
Vagrantfile: Bloc de notas
Archivo Edición Formato Ver Ayuda
# -*- mode: ruby -*-
# vi: set ft=ruby :

# All Vagrant configuration is done below. The "2" in Vagrant.configure
# configures the configuration version (we support older styles for
# backwards compatibility). Please don't change it unless you know what
# you're doing.
Vagrant.configure("2") do |config|
  # The most common configuration options are documented and commented below.
  # For a complete reference, please see the online documentation at
  # https://docs.vagrantup.com.

  # Every Vagrant development environment requires a box. You can search for
  # boxes at https://vagrantcloud.com/search.
  config.vm.box = "ubuntu/focal64"
  config.vm.hostname = "EricP1"

  # Disable automatic box update checking. If you disable this, then
  # boxes will only be checked for updates when the user runs
  # 'vagrant box outdated'. This is not recommended.
  # config.vm.box_check_update = false

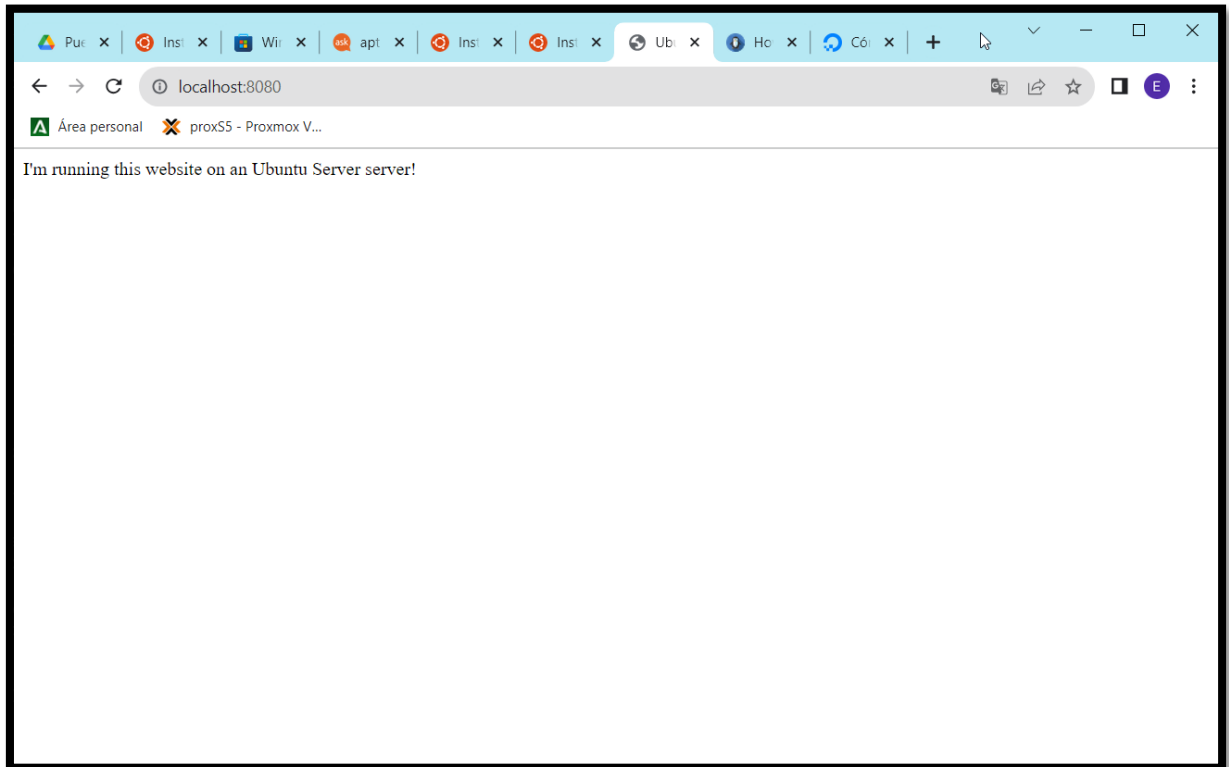
  # Create a forwarded port mapping which allows access to a specific port
  # within the machine from a port on the host machine. In the example below,
  # accessing "localhost:8080" will access port 80 on the guest machine.
  # NOTE: This will enable public access to the opened port
  config.vm.network "forwarded_port", guest: 80, host: 8080

  # Create a forwarded port mapping which allows access to a specific port
```

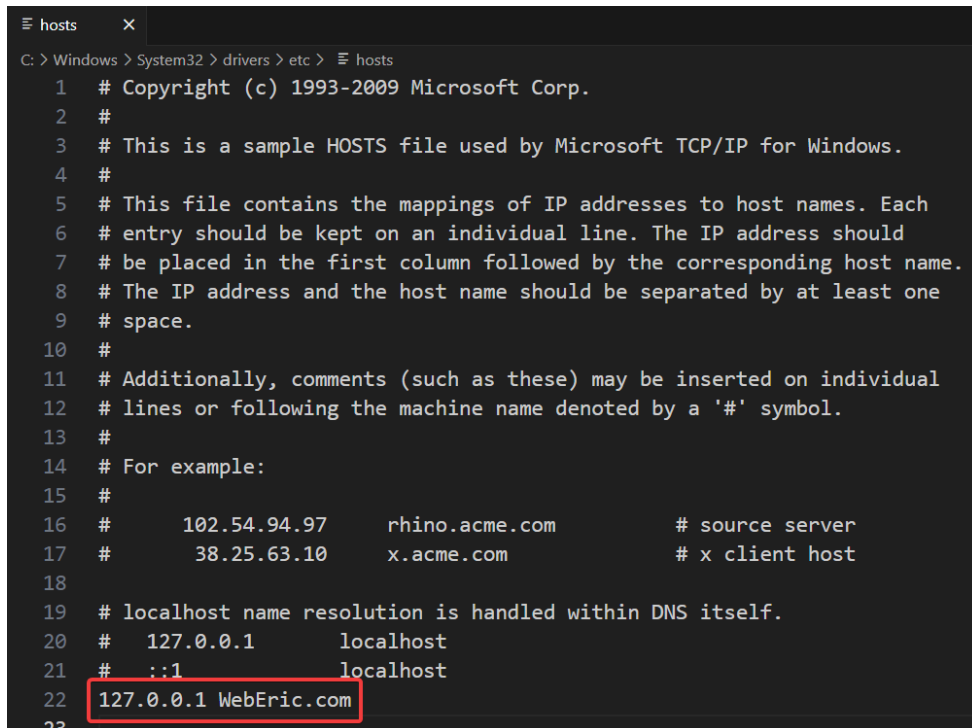
Por último, haremos un **sudo systemctl reload apache2**.

```
vagrant@EricP1:/var/www/html$ sudo systemctl reload apache2
vagrant@EricP1:/var/www/html$
```

Y ya podemos ver nuestra página poniendo **localhost:8080**.

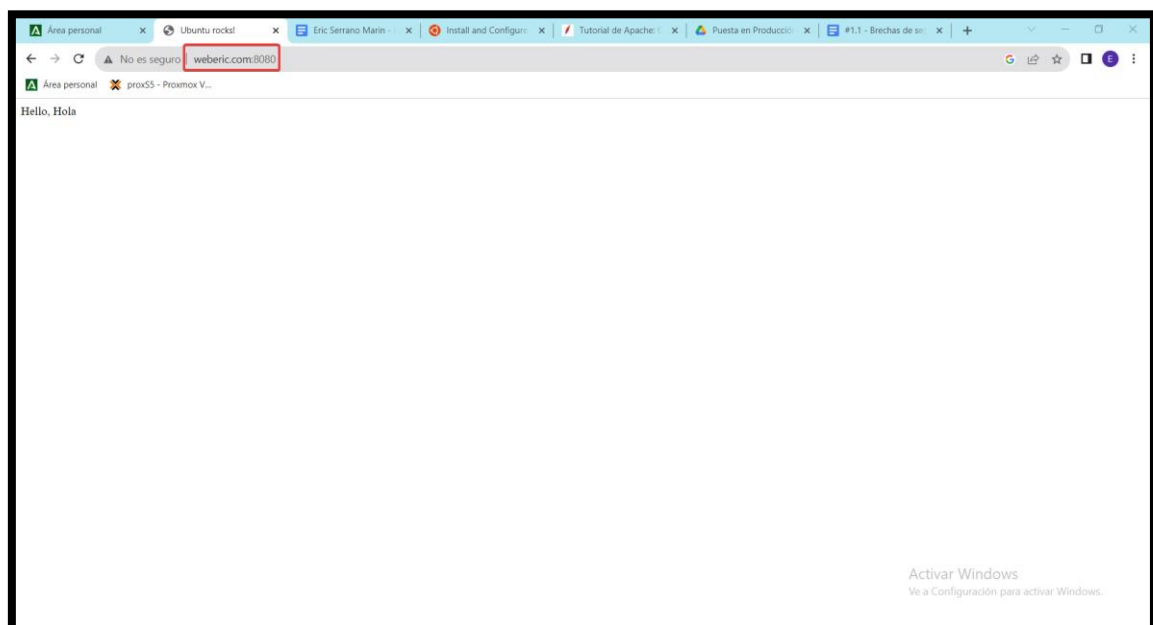


Para poder acceder a nuestra página usando nuestro nombre de dominio, tendremos que cambiar en nuestro Windows el archivo **hosts**.

A screenshot of a Windows file explorer window showing the 'hosts' file. The file is located at 'C:\Windows\System32\drivers\etc\hosts'. The file content is displayed in a text editor. The file contains several lines of text, including a copyright notice, a description of the file, and a list of IP addresses mapped to host names. The line '127.0.0.1 WebEric.com' is highlighted with a red box.

```
1 # Copyright (c) 1993-2009 Microsoft Corp.
2 #
3 # This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
4 #
5 # This file contains the mappings of IP addresses to host names. Each
6 # entry should be kept on an individual line. The IP address should
7 # be placed in the first column followed by the corresponding host name.
8 # The IP address and the host name should be separated by at least one
9 # space.
10 #
11 # Additionally, comments (such as these) may be inserted on individual
12 # lines or following the machine name denoted by a '#' symbol.
13 #
14 # For example:
15 #
16 #         102.54.94.97       rhino.acme.com          # source server
17 #         38.25.63.10       x.acme.com              # x client host
18
19 # localhost name resolution is handled within DNS itself.
20 #   127.0.0.1       localhost
21 #   ::1             localhost
22 127.0.0.1 WebEric.com
23
```

Como podemos observar, ya hemos podido acceder con nuestro nombre de dominio.



2.4 Desarrollar un Script en C que haga un Hola Mundo con un parámetro de entrada que se envíe por parámetros en la petición HTTP.

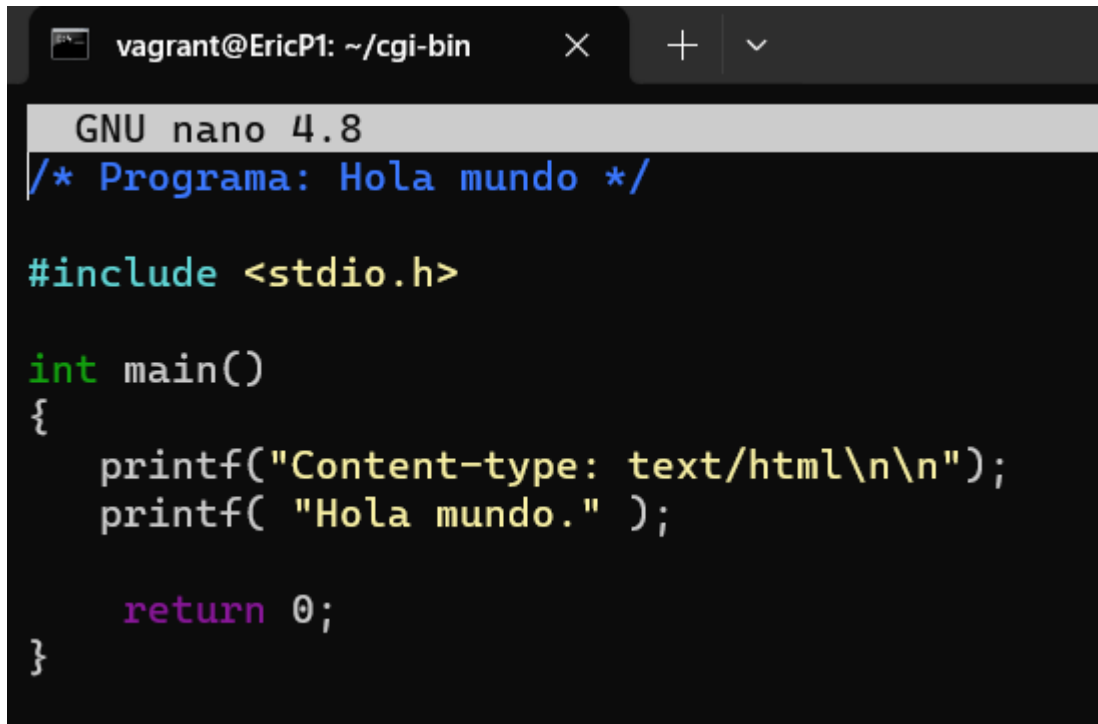
Para este paso he tenido que hacer muchas cosas, de las cuales las voy a enumerar.

- **sudo a2enmod cgi** se utiliza para habilitar el módulo cgi en el servidor web Apache.
- Configuraciones de archivos: **WebEric.conf**

```
ServerAdmin esermar492@iesmartinezm.com
DocumentRoot /var/www/WebEric
ServerName weberic.com
```

```
ScriptAlias /cgi-bin/ /home/vagrant/cgi-bin/
#LoadModule cgid_module modules/mod_cgid.so
<Directory "/home/vagrant/cgi-bin/">
    Options +ExecCGI
    #AddHandler cgi-script .cgi
    SetHandler cgi-script
    Require all granted
</Directory>
```

- Obviamente también tendremos que hacer **sudo chmod +x** al script.



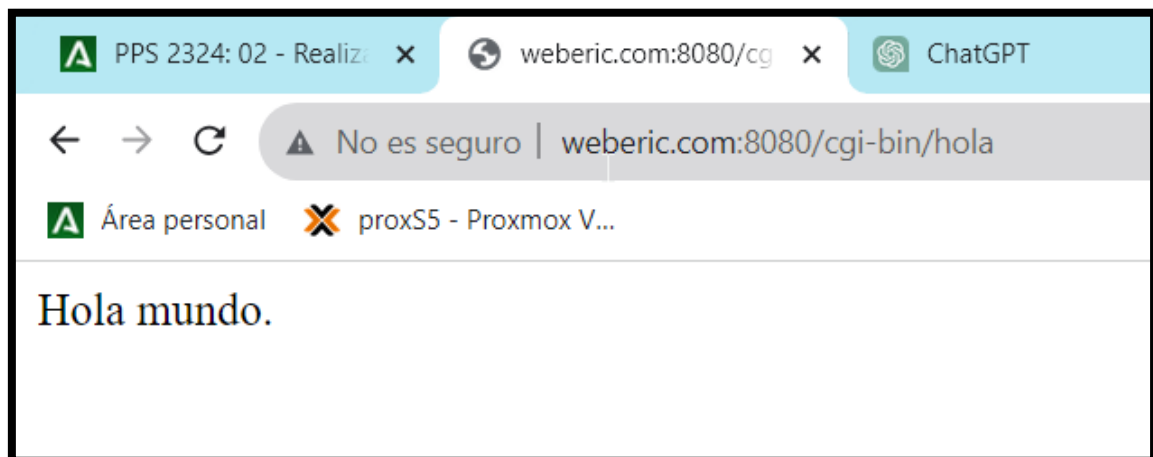
The screenshot shows a terminal window with the prompt `vagrant@EricP1: ~/cgi-bin`. The GNU nano 4.8 editor is open, displaying a C program. The program includes `<stdio.h>` and has a `main` function that prints the content type and a greeting.

```
GNU nano 4.8
/* Programa: Hola mundo */

#include <stdio.h>

int main()
{
    printf("Content-type: text/html\n\n");
    printf( "Hola mundo." );

    return 0;
}
```



2.5 Desarrolla un script en PERL con estructuras selectivas (IF-ELSE). Ejemplo: Mensaje diferente en función de la hora.

`sudo apt-get update`

`sudo apt-get install perl`

```
vagrant@EricP1: /  
vagrant@EricP1:/$ sudo apt-get update  
Hit:1 http://archive.ubuntu.com/ubuntu focal InRelease  
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease  
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]  
Hit:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease  
Fetched 114 kB in 1s (92.1 kB/s)  
Reading package lists... Done  
vagrant@EricP1:/$ sudo apt-get install perl  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
perl is already the newest version (5.30.0-9ubuntu0.4).  
perl set to manually installed.  
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.  
vagrant@EricP1:/$ |
```

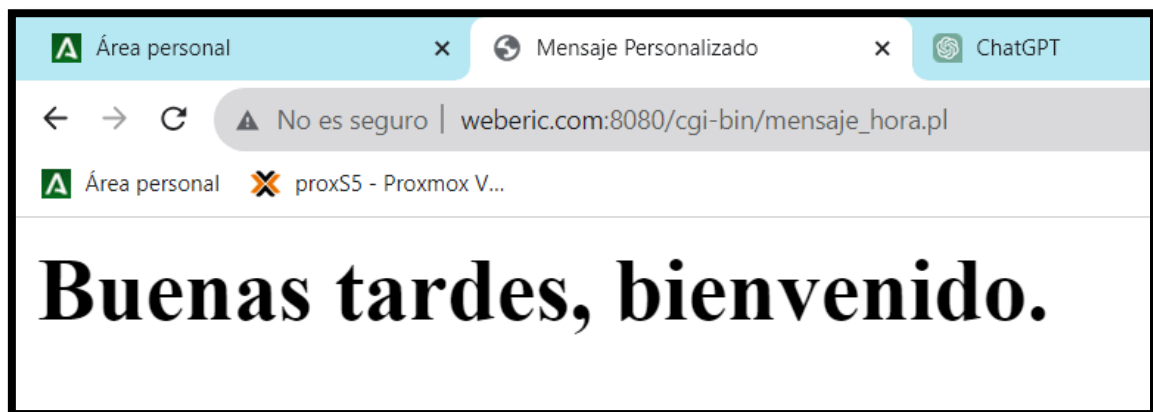
Vamos a darle permisos al archivo .pl: `sudo chmod +x mensaje_hora.pl`

```
vagrant@EricP1:~/cgi-bin$ sudo chmod +x mensaje_hora.pl
```

El código imprime un saludo dependiendo de la hora que sea.

```
vagrant@EricP1: /etc/apache2/  
GNU nano 4.8 /home/vagrant/cgi-bin/mensaje_hora.pl  
#!/usr/bin/perl  
  
use strict;  
use warnings;  
  
# Obtener la hora actual  
my ($sec, $min, $hour) = localtime();  
  
# Aplicar estructura selectiva (IF-ELSE) basada en la hora  
if ($hour < 12) {  
    $mensaje = "Buenos días, bienvenido.";  
} elsif ($hour < 18) {  
    $mensaje = "Buenas tardes, bienvenido.";  
} else {  
    $mensaje = "Buenas noches, bienvenido.";  
}  
  
# Imprimir la cabecera HTTP y el contenido HTML  
print "Content-Type: text/html\n\n";  
print "<html><head><title>Mensaje Personalizado</title></head><body>";  
print "<h1>$mensaje</h1>";  
print "</body></html>";
```

Como son las 17:00 de la tarde nos dice Buenas tardes.



2.6 Desarrollar un script en Python con estructuras iterativas (WHILE-FOR). Ejemplo imprimir la tabla de multiplicación de la hora del día que sea.

```
GNU nano 4.8          tabla_multiplicar.py
#!/usr/bin/env python3

import time

# Obtener la hora actual
hora_actual = time.localtime().tm_hour

# Mensaje predeterminado
mensaje = f"Tabla de multiplicar para la hora {hora_actual}:<br>"

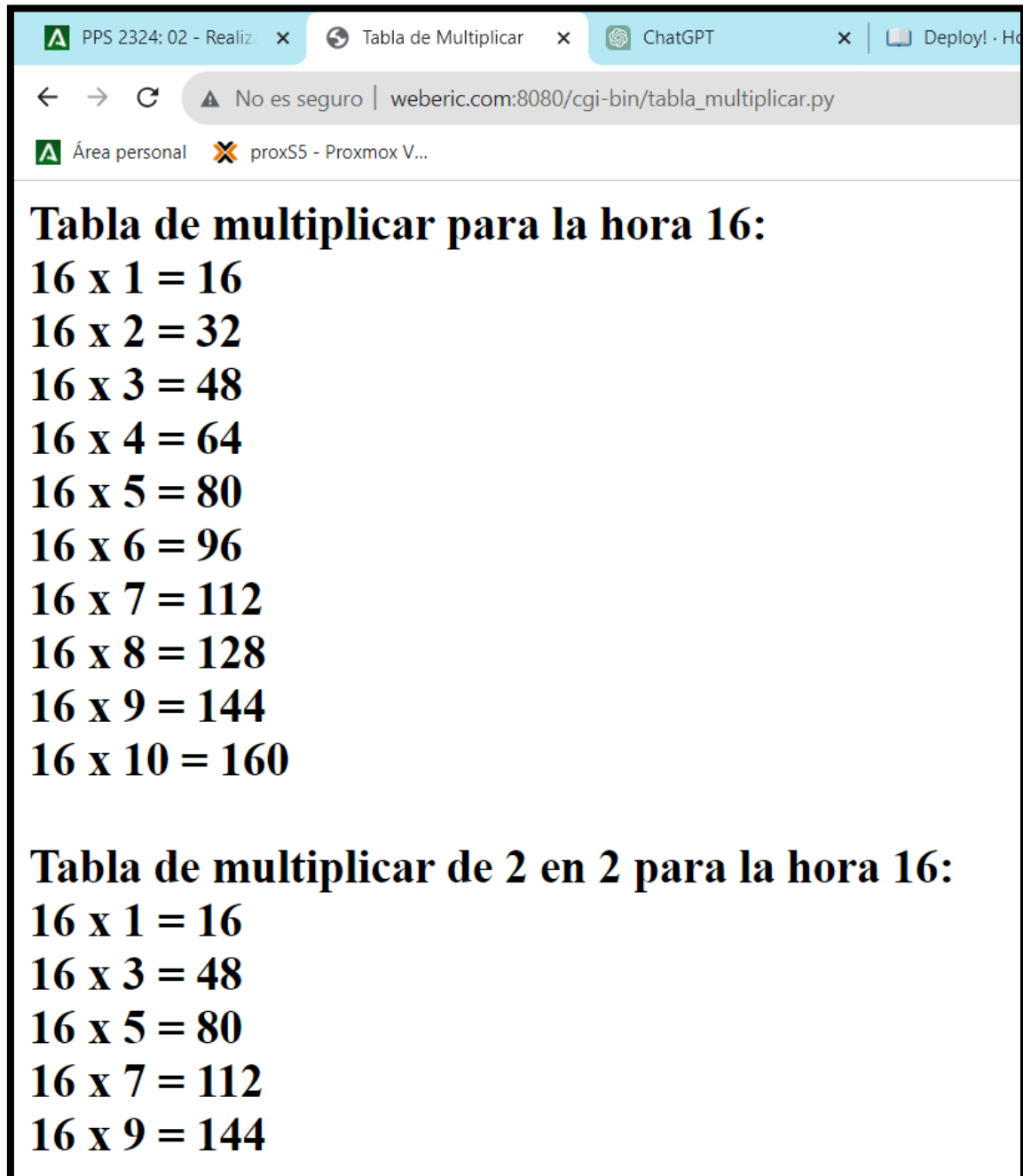
# Estructura WHILE para imprimir la tabla de multiplicar
contador = 1
while contador <= 10:
    resultado = hora_actual * contador
    mensaje += f"{hora_actual} x {contador} = {resultado}<br>"
    contador += 1

# Añadir un salto de línea entre las dos tablas
mensaje += "<br>"

# Estructura FOR para imprimir la tabla de multiplicar de 2 en 2
mensaje += f"Tabla de multiplicar de 2 en 2 para la hora {hora_actual}:<br>"
for contador in range(1, 11, 2):
    resultado = hora_actual * contador
    mensaje += f"{hora_actual} x {contador} = {resultado}<br>"

# Imprimir el mensaje
print("Content-type: text/html\n\n")
print("<html><head><title>Tabla de Multiplicar</title></head><body>")
print(f"<h2>{mensaje}</h2>")
print("</body></html>")
```

Tenemos que darle permisos de ejecución con `sudo chmod +x tabla_multiplicar.py`.



The screenshot shows a web browser window with the address bar displaying `weberic.com:8080/cgi-bin/tabla_multiplicar.py`. The page content is as follows:

Tabla de multiplicar para la hora 16:

16 x 1	= 16
16 x 2	= 32
16 x 3	= 48
16 x 4	= 64
16 x 5	= 80
16 x 6	= 96
16 x 7	= 112
16 x 8	= 128
16 x 9	= 144
16 x 10	= 160

Tabla de multiplicar de 2 en 2 para la hora 16:

16 x 1	= 16
16 x 3	= 48
16 x 5	= 80
16 x 7	= 112
16 x 9	= 144