UNIVERSIDAD DE COSTA RICA
FACULTAD DE INGENIERÍA
ESCUELA DE CIENCIAS DE LA
COMPUTACIÓN E INFORMÁTICA

CI0121 – REDES DE COMUNICACIÓN DE DATOS
Prof. José Antonio Brenes Carranza

TAREA CORTA #2

Elaborado por:

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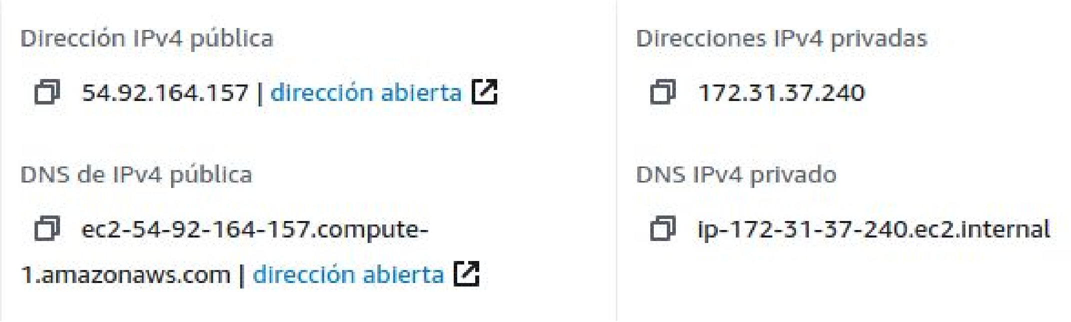
Detalles y especificaciones de la máquina virtual

Recursos asignados a la máquina virtual: 1gb ram, 8 gb ssd, 1 cpu virtual, tipo de virtualización hvm.
Sistema operativo: Linux - Ubuntu 20.04 LTS
Arquitectura: x86 de 64 bits.
Direccionamiento IPv4 y detalles del DNS:



Dirección IPv4 pública

54.92.164.157 | dirección abierta

DNS de IPv4 pública

ec2-54-92-164-157.compute-1.amazonaws.com | dirección abierta

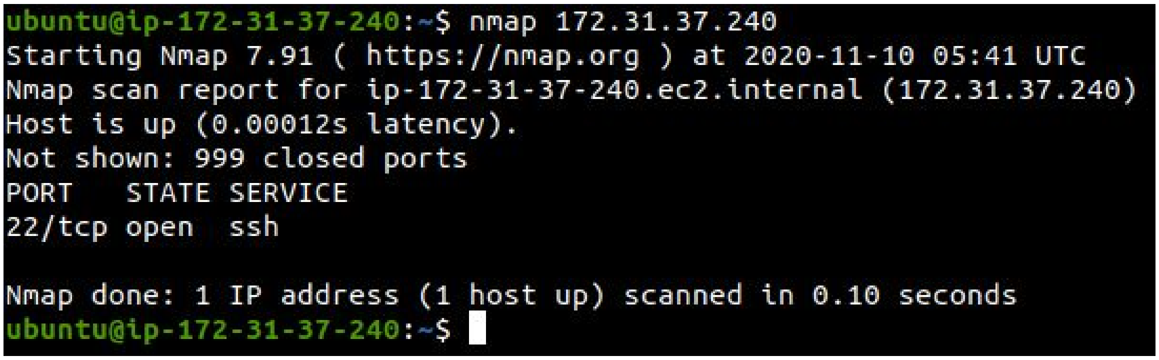
Direcciones IPv4 privadas

172.31.37.240

DNS IPv4 privado

ip-172-31-37-240.ec2.internal

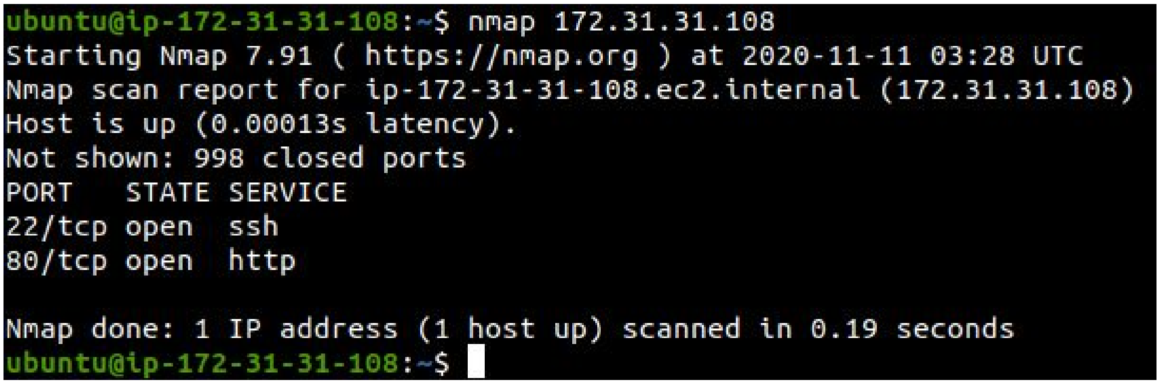
Puertos con nmap



```
ubuntu@ip-172-31-37-240:~$ nmap 172.31.37.240
Starting Nmap 7.91 ( https://nmap.org ) at 2020-11-10 05:41 UTC
Nmap scan report for ip-172-31-37-240.ec2.internal (172.31.37.240)
Host is up (0.00012s latency).
Not shown: 999 closed ports
PORT   STATE SERVICE
22/tcp open  ssh

Nmap done: 1 IP address (1 host up) scanned in 0.10 seconds
ubuntu@ip-172-31-37-240:~$
```

Después de habilitar el servidor apache:

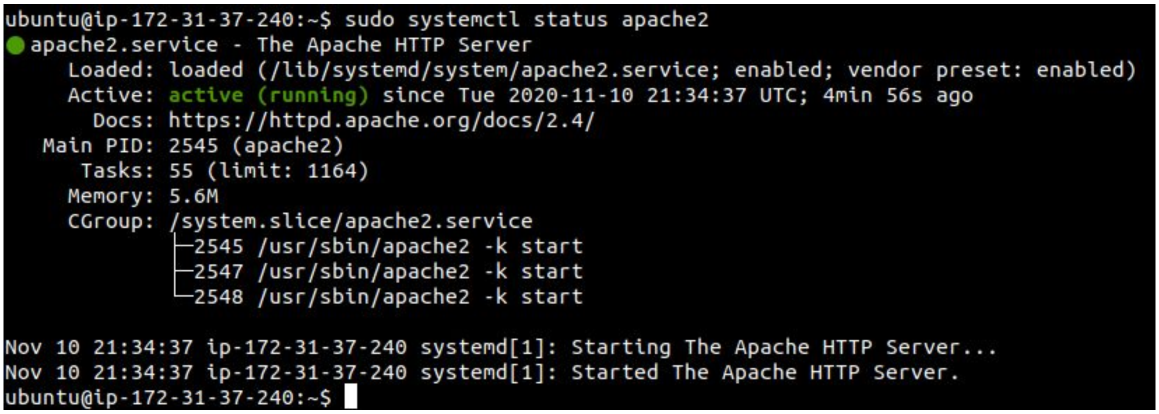


```
ubuntu@ip-172-31-31-108:~$ nmap 172.31.31.108
Starting Nmap 7.91 ( https://nmap.org ) at 2020-11-11 03:28 UTC
Nmap scan report for ip-172-31-31-108.ec2.internal (172.31.31.108)
Host is up (0.00013s latency).
Not shown: 998 closed ports
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http

Nmap done: 1 IP address (1 host up) scanned in 0.19 seconds
ubuntu@ip-172-31-31-108:~$
```

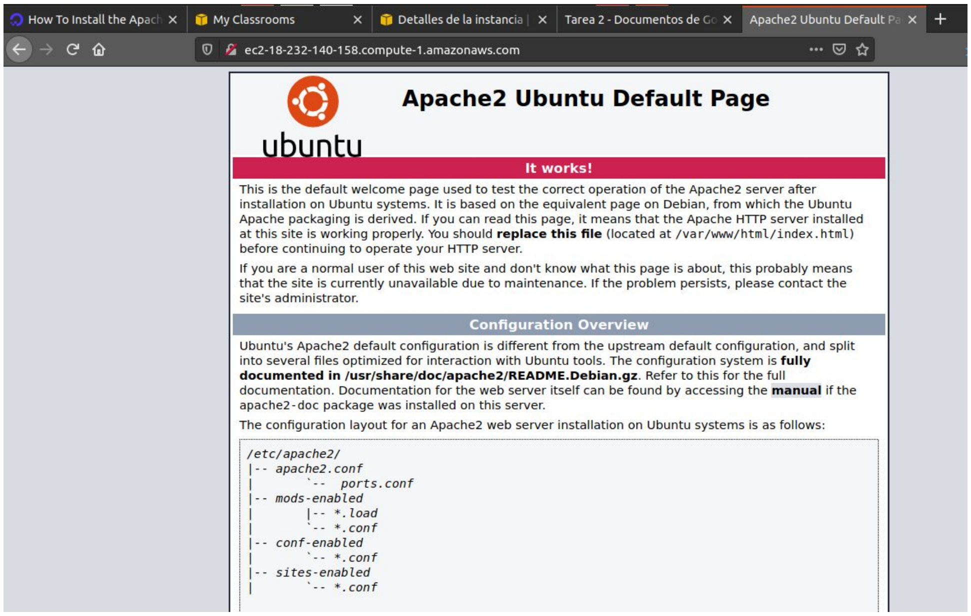
Instalación de Apache

Servidor Apache activo:



```
ubuntu@ip-172-31-37-240:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2020-11-10 21:34:37 UTC; 4min 56s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2545 (apache2)
      Tasks: 55 (limit: 1164)
     Memory: 5.6M
     CGroup: /system.slice/apache2.service
             ├─2545 /usr/sbin/apache2 -k start
             ├─2547 /usr/sbin/apache2 -k start
             └─2548 /usr/sbin/apache2 -k start

Nov 10 21:34:37 ip-172-31-37-240 systemd[1]: Starting The Apache HTTP Server...
Nov 10 21:34:37 ip-172-31-37-240 systemd[1]: Started The Apache HTTP Server.
ubuntu@ip-172-31-37-240:~$ 
```


How To Install the Apach
My Classrooms
Detalles de la instancia |
Tarea 2 - Documentos de Go
Apache2 Ubuntu Default Pa
ec2-18-232-140-158.compute-1.amazonaws.com
ubuntu

Apache2 Ubuntu Default Page

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at /var/www/html/index.html) before continuing to operate your HTTP server.

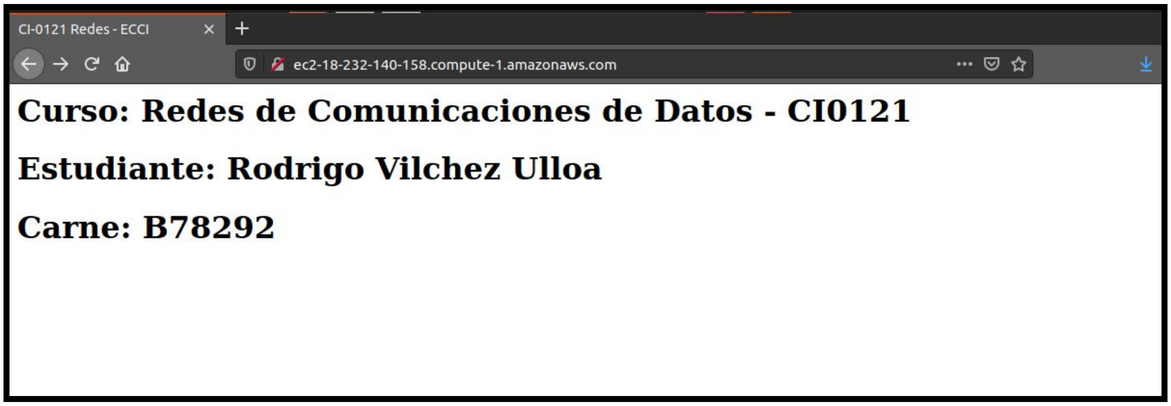
If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in /usr/share/doc/apache2/README.Debian.gz**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the apache2-doc package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|       `--  ports.conf
|-- mods-enabled
|       |-- *.load
|       `-- *.conf
|-- conf-enabled
|       `-- *.conf
|-- sites-enabled
|       `-- *.conf
|
```



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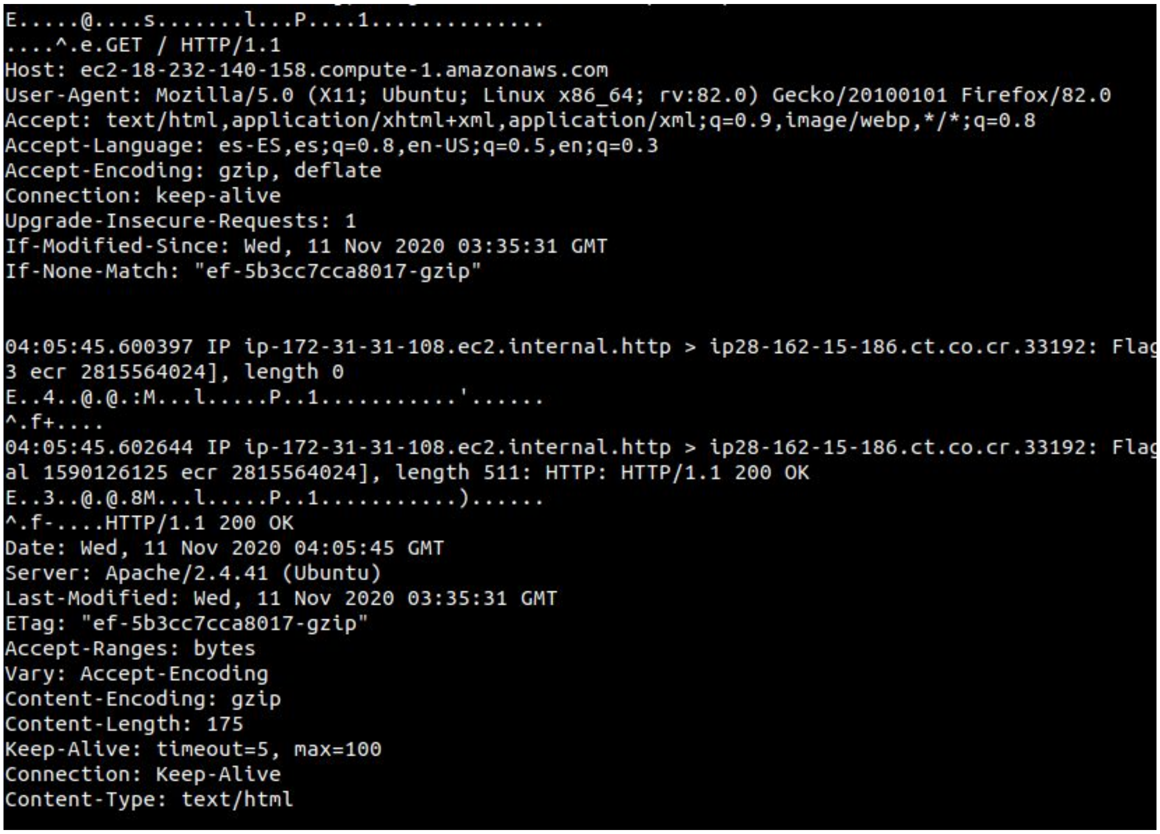
Carne: B78292

Filtrado de paquetes

Se utilizó el siguiente comando para filtrar los paquetes asociados a la consulta de la página web recién creada:

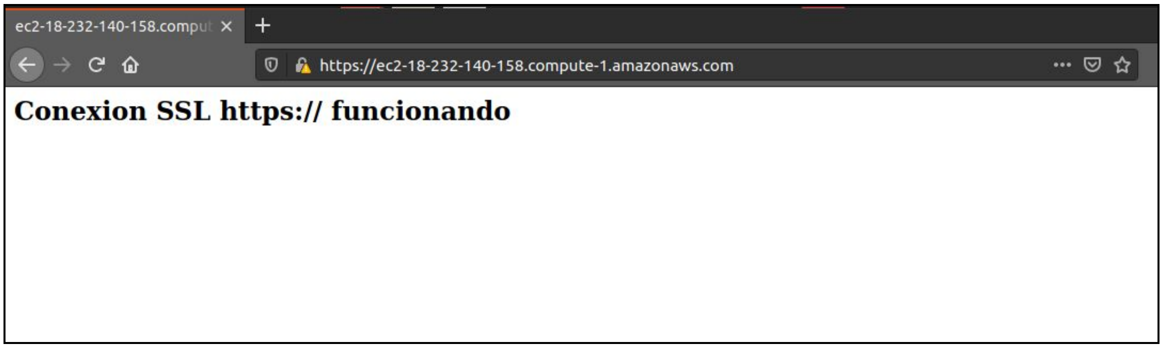
sudo tcpdump -A -s 0 'tcp port 8*0'*

Tras consultar la página web desde el navegador, el servidor capturó la respuesta y la solicitud HTTP y la mostró en la consola (se muestran los headers):



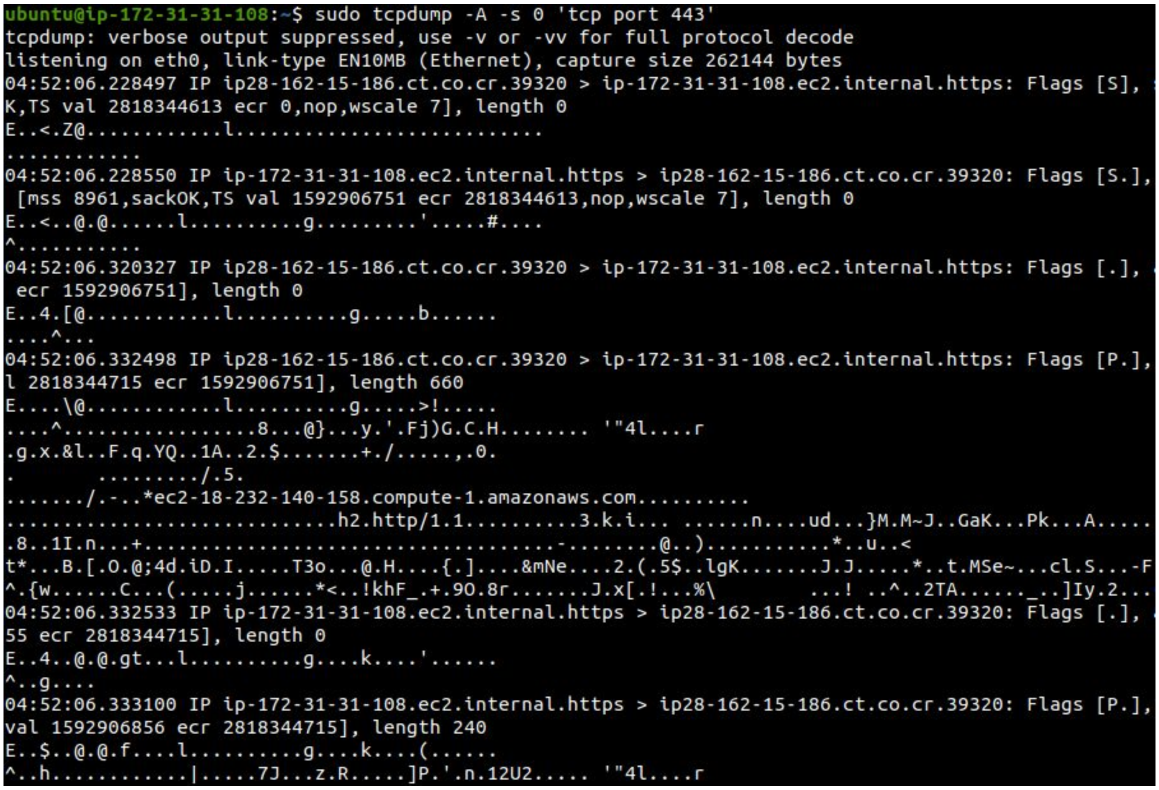
```
E.....@....s.......l...P....1..............
....^.e.GET / HTTP/1.1
Host: ec2-18-232-140-158.compute-1.amazonaws.com
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:82.0) Gecko/20100101 Firefox/82.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: es-ES,es;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
If-Modified-Since: Wed, 11 Nov 2020 03:35:31 GMT
If-None-Match: "ef-5b3cc7cca8017-gzip"


04:05:45.600397 IP ip-172-31-31-108.ec2.internal.http > ip28-162-15-186.ct.co.cr.33192: Flag
3 ecr 2815564024], length 0
E..4..@.@.:M...l.....P..1...........'......
^.f+....
04:05:45.602644 IP ip-172-31-31-108.ec2.internal.http > ip28-162-15-186.ct.co.cr.33192: Flag
al 1590126125 ecr 2815564024], length 511: HTTP: HTTP/1.1 200 OK
E..3..@.@.8M...l.....P..1...........)......
^.f-....HTTP/1.1 200 OK
Date: Wed, 11 Nov 2020 04:05:45 GMT
Server: Apache/2.4.41 (Ubuntu)
Last-Modified: Wed, 11 Nov 2020 03:35:31 GMT
ETag: "ef-5b3cc7cca8017-gzip"
Accept-Ranges: bytes
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 175
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html
```

Conexión SSL


ec2-18-232-140-158.comput
https://ec2-18-232-140-158.compute-1.amazonaws.com

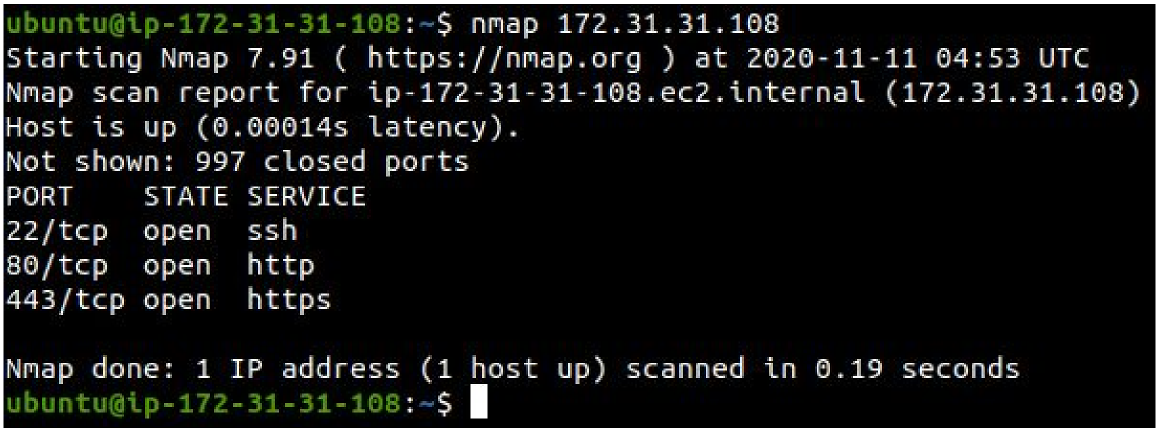
Conexion SSL https:// funcionando

Comando tcpdump con el puerto que acepta la conexión SSL, no se muestra el texto plano pues está encriptado y es necesario un mecanismo para desencriptar paquetes SSL.



```
ubuntu@ip-172-31-31-108:~$ sudo tcpdump -A -s 0 'tcp port 443'
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
04:52:06.228497 IP ip28-162-15-186.ct.co.cr.39320 > ip-172-31-31-108.ec2.internal.https: Flags [S],
K,TS val 2818344613 ecr 0,nop,wscale 7], length 0
E..<.Z@...........l.........................
............
04:52:06.228550 IP ip-172-31-31-108.ec2.internal.https > ip28-162-15-186.ct.co.cr.39320: Flags [S.],
 [mss 8961,sackOK,TS val 1592906751 ecr 2818344613,nop,wscale 7], length 0
E..<..@.@......l.........g.........'.....#....
^...........
04:52:06.320327 IP ip28-162-15-186.ct.co.cr.39320 > ip-172-31-31-108.ec2.internal.https: Flags [.],
 ecr 1592906751], length 0
E..4.[@...........l.........g.....b......
....^...
04:52:06.332498 IP ip28-162-15-186.ct.co.cr.39320 > ip-172-31-31-108.ec2.internal.https: Flags [P.],
l 2818344715 ecr 1592906751], length 660
E....\@...........l.........g.....>!.....
....^.................8...@}...y.'.Fj)G.C.H........ '"4l....r
.g.x.&l..F.q.YQ..1A..2.$.......+./.....,.0.
.        ........./.5.
......./.-..*ec2-18-232-140-158.compute-1.amazonaws.com..........
............................h2.http/1.1..........3.k.i...  ......n....ud...}M.M~J..GaK...Pk...A.....
.8..1I.n...+..................................-........@..)...........*..u..<
t*...B.[.O.@;4d.iD.I.....T3o...@.H....{.]....&mNe....2.(.5$..lgK.......J.J.....*..t.MSe~...cl.S...-F
^.{w......C...(.....j......*<..!khF_.+.9O.8r.......J.x[.!...%\        ...! ..^..2TA......_..]Iy.2...
04:52:06.332533 IP ip-172-31-31-108.ec2.internal.https > ip28-162-15-186.ct.co.cr.39320: Flags [.],
55 ecr 2818344715], length 0
E..4..@.@.gt...l.........g....k....'......
^..g....
04:52:06.333100 IP ip-172-31-31-108.ec2.internal.https > ip28-162-15-186.ct.co.cr.39320: Flags [P.],
val 1592906856 ecr 2818344715], length 240
E..$..@.@.f....l.........g....k....(......
^..h............|.....7J...z.R.....]P.'.n.12U2..... '"4l....r
```

Puertos con nmap una vez configurado el certificado digital



```
ubuntu@ip-172-31-31-108:~$ nmap 172.31.31.108
Starting Nmap 7.91 ( https://nmap.org ) at 2020-11-11 04:53 UTC
Nmap scan report for ip-172-31-31-108.ec2.internal (172.31.31.108)
Host is up (0.00014s latency).
Not shown: 997 closed ports
PORT    STATE SERVICE
22/tcp  open  ssh
80/tcp  open  http
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 0.19 seconds
ubuntu@ip-172-31-31-108:~$ 
```