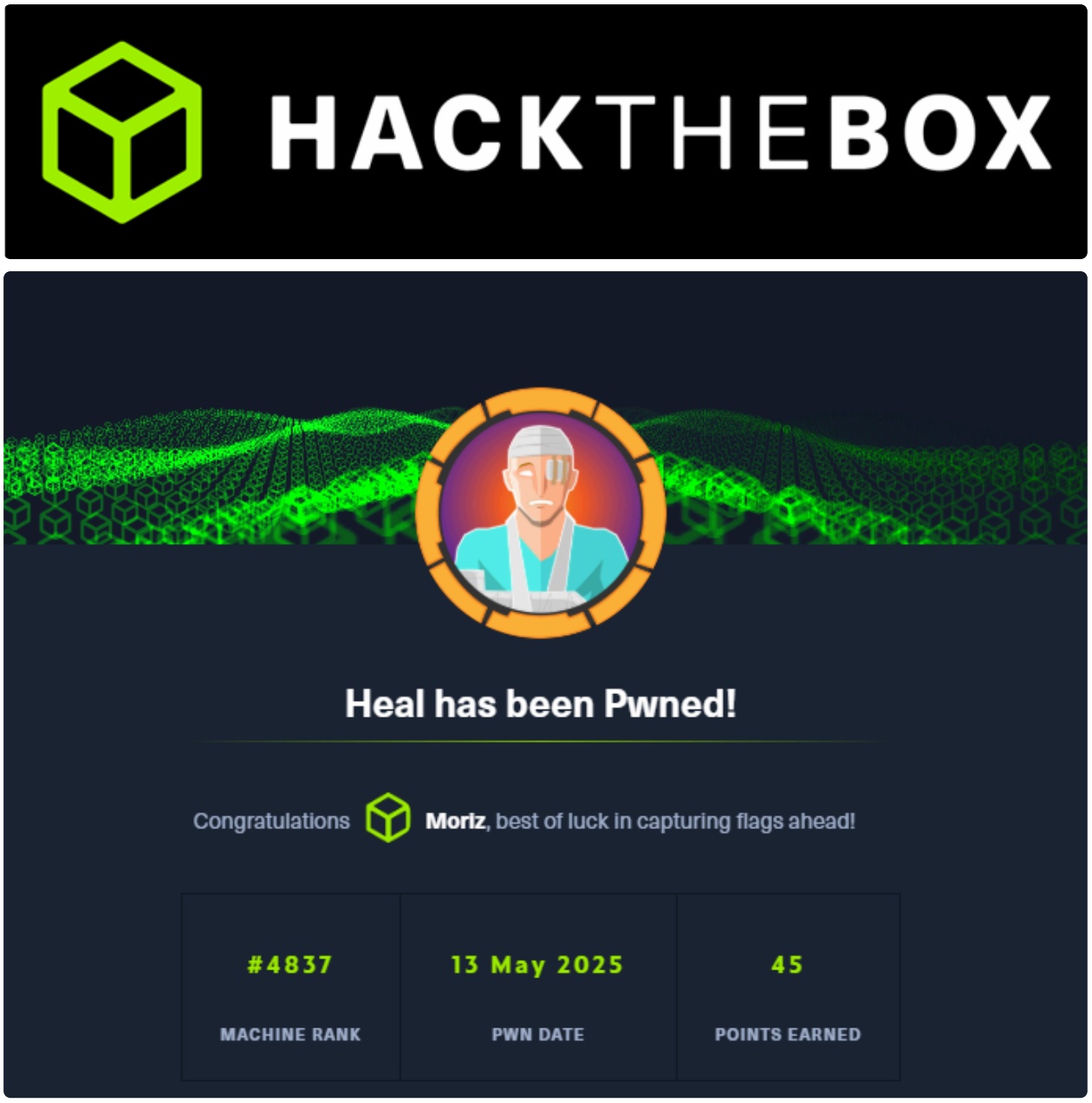


Description:

Heal is a medium HTB Linux machine that focuses on web vulnerabilities such as LFI, Plugin RCE and API enumeration. The user enumeration requires knowledge of sqlite3 and ruby on rails web API.
Difficulty: `Medium`
Operating System: `Linux`

Skills Required:

- Linux Basics
- Port Scanning / Enumeration
- Burp Suite Basics
- sqlite3 basics
- Password cracking basics

Enumeration

Port Scanning - Nmap

```
moriz in arch in ~/htb/heal ❯❯❯ nmap -sV -sC -A -T5 -p- 10.10.11.46 --min-rate 2000
Starting Nmap 7.95 ( https://nmap.org ) at 2025-05-13 15:26 CDT
Warning: 10.10.11.46 giving up on port because retransmission cap hit (2).
Nmap scan report for heal.htb (10.10.11.46)
Host is up (0.067s latency).
Not shown: 65517 closed tcp ports (conn-refused)
PORT      STATE    SERVICE      VERSION
22/tcp    open     ssh          OpenSSH 8.9p1 Ubuntu 3ubuntu0.10 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   256 68:af:80:86:6e:61:7e:bf:0b:ea:10:52:d7:7a:94:3d (ECDSA)
|_  256 52:f4:8d:f1:c7:85:b6:6f:c6:5f:b2:db:a6:17:68:ae (ED25519)
80/tcp    open     http         nginx 1.18.0 (Ubuntu)
|_http-title: Heal
|_http-server-header: nginx/1.18.0 (Ubuntu)
```

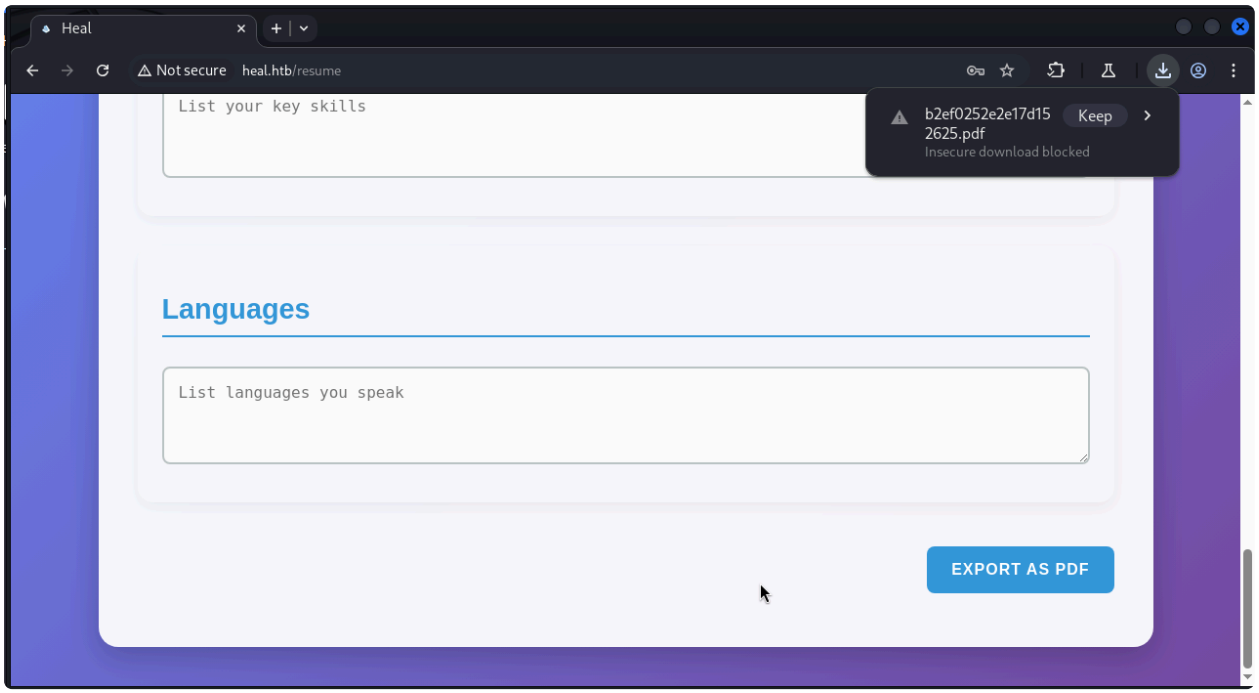
The **Nmap** scan here reveals on the machine there is both **ssh** and **http** open on the server. This also reveals a DNS entry of **heal.htb** which we can add to our **/etc/hosts** file to resolve.

```
└─$ nmap -T5 -A api.heal.htb -p 80 --min-rate 2000
Starting Nmap 7.95 ( https://nmap.org ) at 2025-05-13 17:33 EDT
Nmap scan report for api.heal.htb (10.10.11.46)
Host is up (0.13s latency).

PORT   STATE SERVICE VERSION
80/tcp open  http    nginx 1.18.0 (Ubuntu)
|_http-title: Ruby on Rails 7.1.4
|_http-server-header: nginx/1.18.0 (Ubuntu)
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose
Running: Linux 4.X|5.X
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5
OS details: Linux 4.15 - 5.19
Network Distance: 2 hops
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE (using port 80/tcp)
HOP RTT       ADDRESS
1   123.76 ms 10.10.16.1
2   62.28 ms  api.heal.htb (10.10.11.46)

OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 15.73 seconds
```

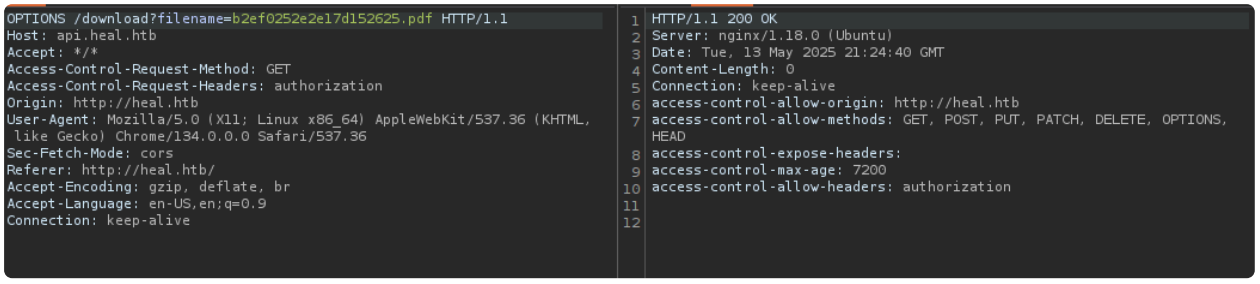
This **Nmap** scan is for enumeration of the API discovered within the web enumeration as the login page will not work without this host also being added to **/etc/hosts**. This scan shows that the web API is being run in both **Ruby on Rails** and **nginx**.

Web Enumeration - Burp Suite

After registering on the Login page of the website, we are greeted with a resume page where you can enter your information and generate a resume in pdf format.



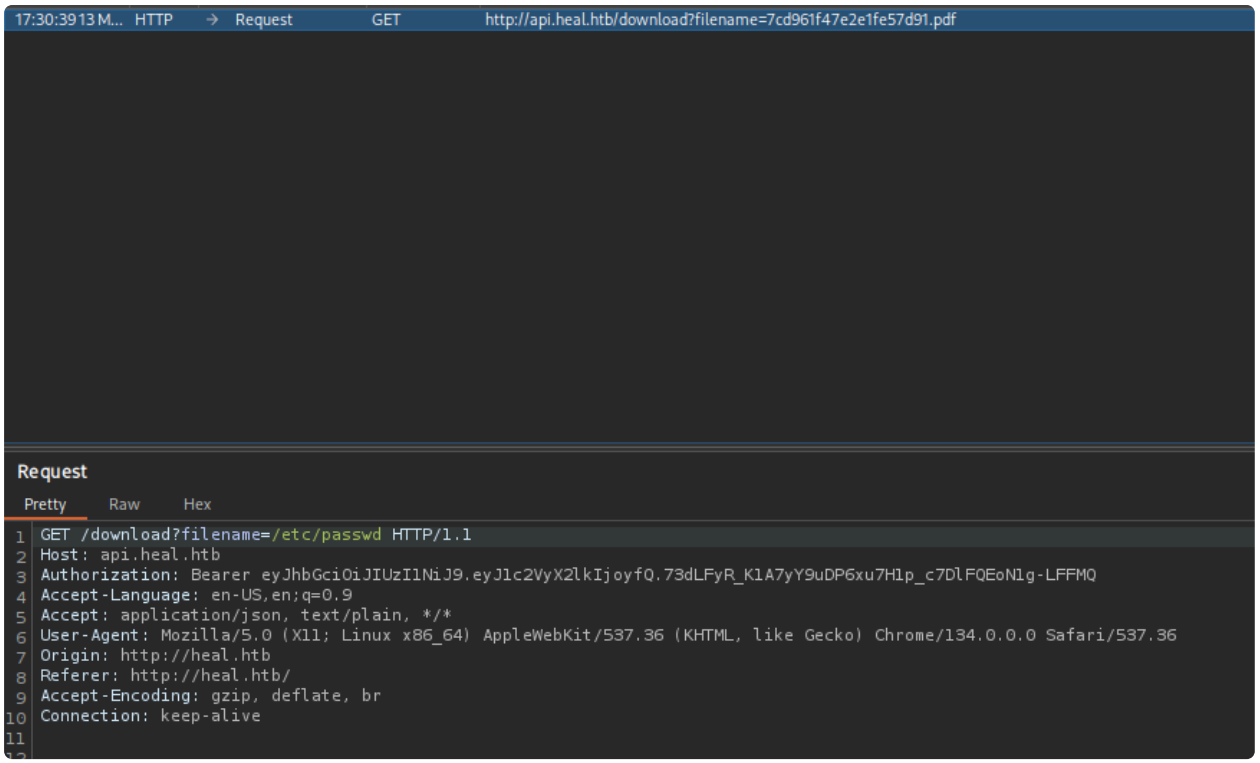
The first thing that will catch your eye is the **download button**. This button gives us access to files generated on the system so lets take a deeper look into how that is handled.



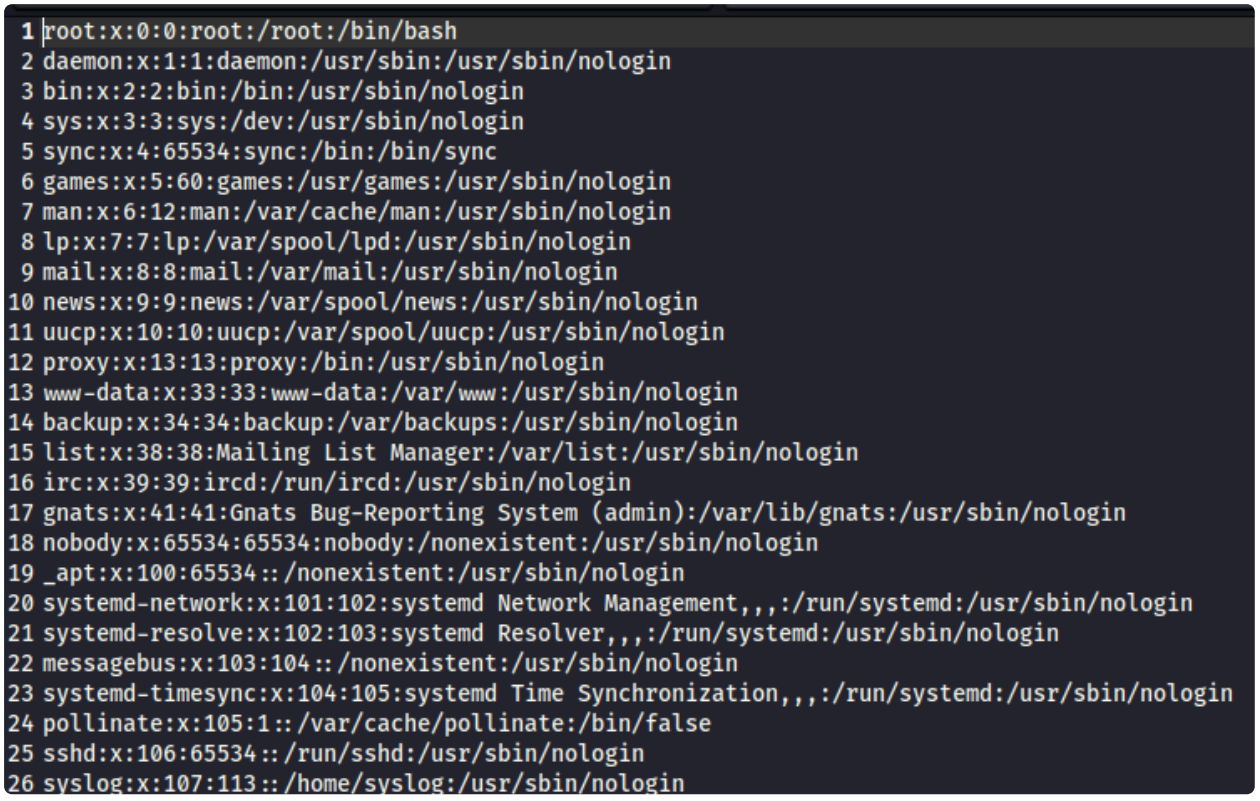
```
OPTIONS /download?filename=b2ef0252e2e17d152625.pdf HTTP/1.1
Host: api.heal.htb
Accept: */*
Access-Control-Request-Method: GET
Access-Control-Request-Headers: authorization
Origin: http://heal.htb
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML,
like Gecko) Chrome/134.0.0.0 Safari/537.36
Sec-Fetch-Mode: cors
Referer: http://heal.htb/
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
Connection: keep-alive
```

```
1  HTTP/1.1 200 OK
2  Server: nginx/1.18.0 (Ubuntu)
3  Date: Tue, 13 May 2025 21:24:40 GMT
4  Content-Length: 0
5  Connection: keep-alive
6  access-control-allow-origin: http://heal.htb
7  access-control-allow-methods: GET, POST, PUT, PATCH, DELETE, OPTIONS,
   HEAD
8  access-control-expose-headers:
9  access-control-max-age: 7200
10 access-control-allow-headers: authorization
11
12
```

In **Burp Suite** we see the download is being obtained by first checking the options then running a GET request with the file name. Using the **Burp Suite interceptor** lets edit this request in our favor.



This is what our modified web request will now look like before we send it to the server. Note that **/etc/passwd** is a common file on all Linux systems, available to all users, which contains information on users for login purposes. This file will tell us if we can download whatever file the **www-data** user can access or if we are restricted **(www-data is the default web hosting user)**.

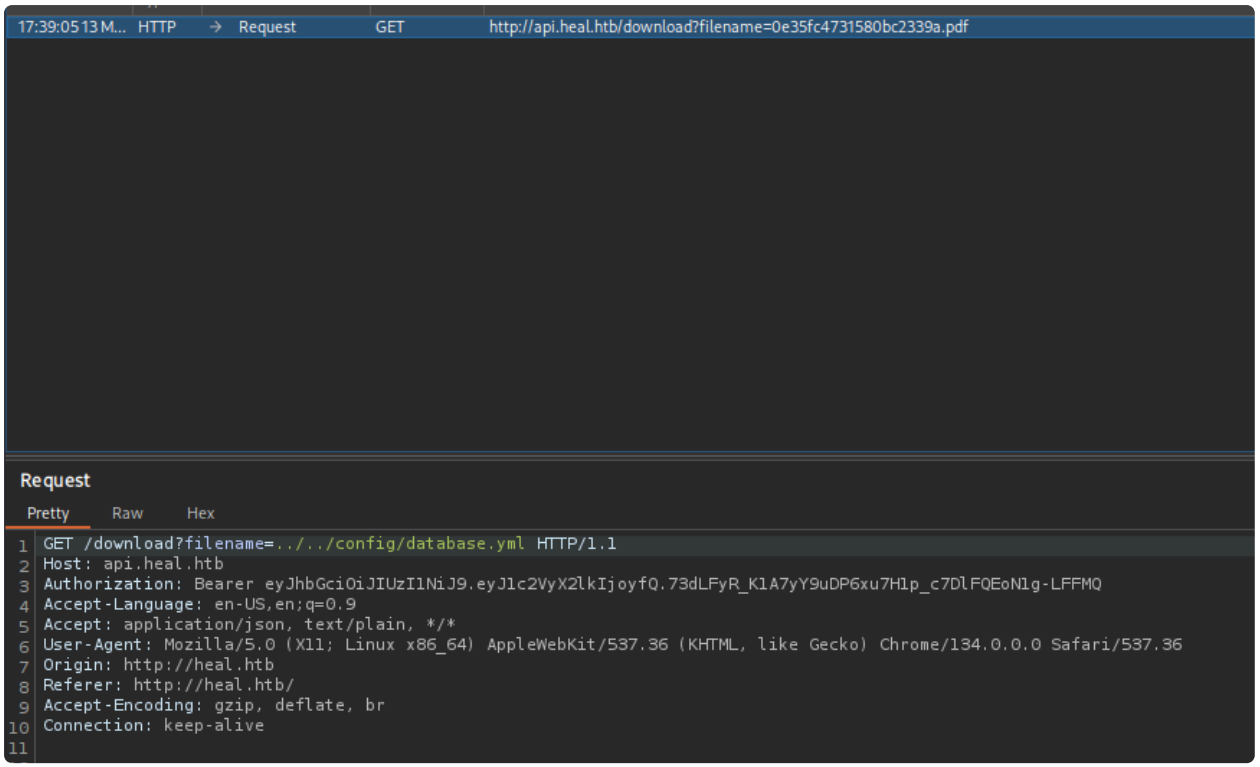


As you can see above this is the output of the downloaded file after executing the request. There is not much useful information in here but we can see our **LFI** or **Local File Inclusion** attack works here.

Foothold

User Enumeration

Now lets create a request to grab some important configuration info the web server has for us.

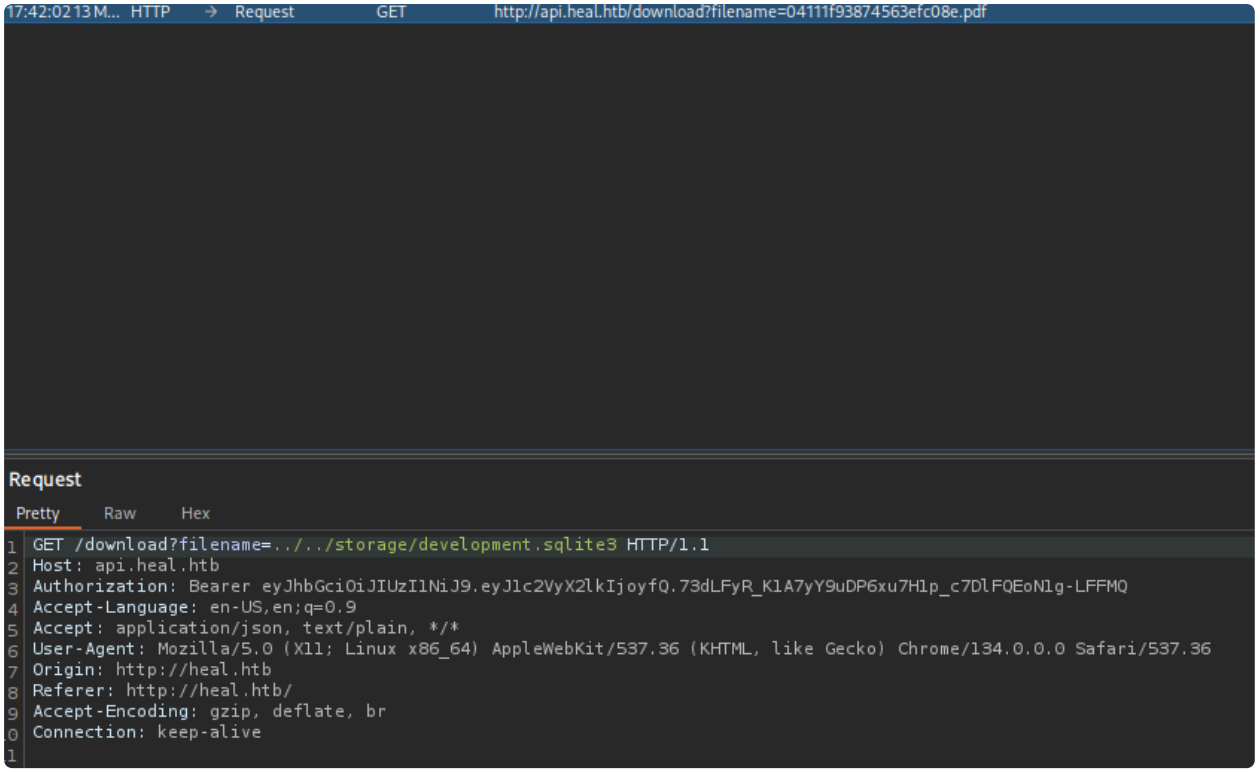


This request will exit our nesting folders into the **Ruby on Rails** configuration directory where we can get the **database.yml** file. This file will contain all important info on how the service is setup, and perhaps gain a user / admin login.

```yaml
# SQLite. Versions 3.8.0 and up are supported.
#   gem install sqlite3
#
#   Ensure the SQLite 3 gem is defined in your Gemfile
#   gem "sqlite3"
#
default: &default
  adapter: sqlite3
  pool: <%= ENV.fetch("RAILS_MAX_THREADS") { 5 } %>
  timeout: 5000

development:
  <<: *default
  database: storage/development.sqlite3

# Warning: The database defined as "test" will be erased and
# re-generated from your development database when you run "rake".
# Do not set this db to the same as development or production.
test:
  <<: *default
  database: storage/test.sqlite3

production:
  <<: *default
  database: storage/development.sqlite3
```

Looking into the configuration file there is a development database using **sqlite3** in the storage directory. We can grab this off the web server as well to enumerate whatever

users have access to the development and production branches.



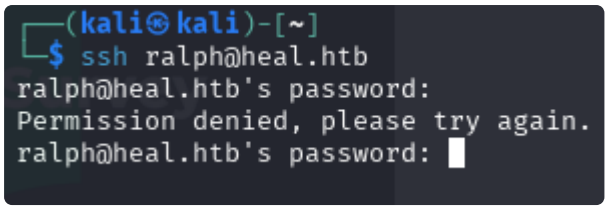
The above request is used to get this database file.

	id	email	password_digest	created_at	updated_at	fullname	username	is_admin
	...	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	1	ralph@heal.htb	$2a$12$dUZ/…	2024-09-27 07:49:31.614858	2024-09-27 07:49:31.614858	Administrator	ralph	1

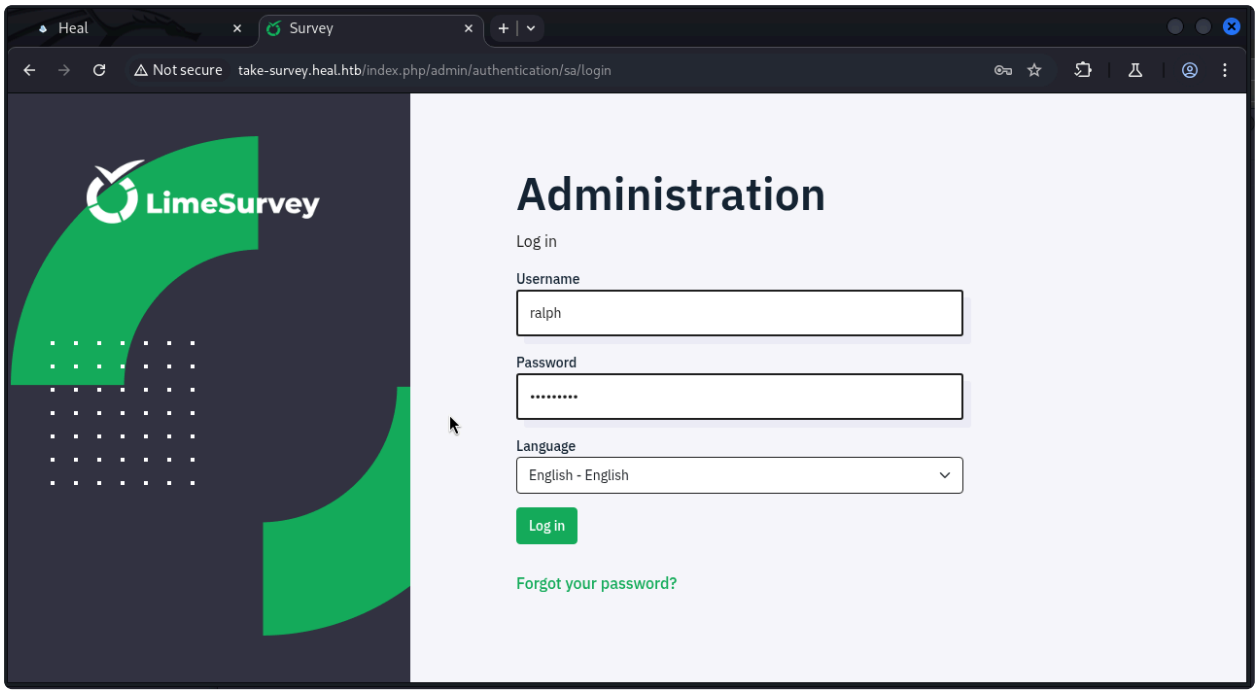
When opening this SQL Database in **SQLLiteStudio** we can see the user **ralph** is a **Admin** on the website along with their password hash. We can run **hashcat** on this hash to try and crack the password.

```
PS G:\hashcat-6.2.6> .\hashcat.exe -m 3200 -a 0 .\hash.txt ..\rockyou.txt.gz
hashcat (v6.2.6) starting

CUDA API (CUDA 12.8)
====================
* Device #1: NVIDIA GeForce RTX 4070, 11094/12281 MB, 46MCU

OpenCL API (OpenCL 3.0 CUDA 12.8.90) - Platform #1 [NVIDIA Corporation]
=======================================================================
* Device #2: NVIDIA GeForce RTX 4070, skipped

Minimum password length supported by kernel: 0
Maximum password length supported by kernel: 72

Hashes: 1 digests; 1 unique digests, 1 unique salts
Bitmaps: 16 bits, 65536 entries, 0x0000ffff mask, 262144 bytes, 5/13 rotates
Rules: 1

Optimizers applied:
* Zero-Byte
* Single-Hash
* Single-Salt

Watchdog: Temperature abort trigger set to 90c

Host memory required for this attack: 302 MB

Dictionary cache hit:
* Filename..: ..\rockyou.txt.gz
* Passwords.: 14344387
* Bytes.....: 53291009
* Keyspace..: 14344387

$2a$12$dUZ/O7KJT3.zE4TOK8p4RuxH3t.Bz45DSr7A94VLvY9SWx1GCSZnG:14[redacted]
```

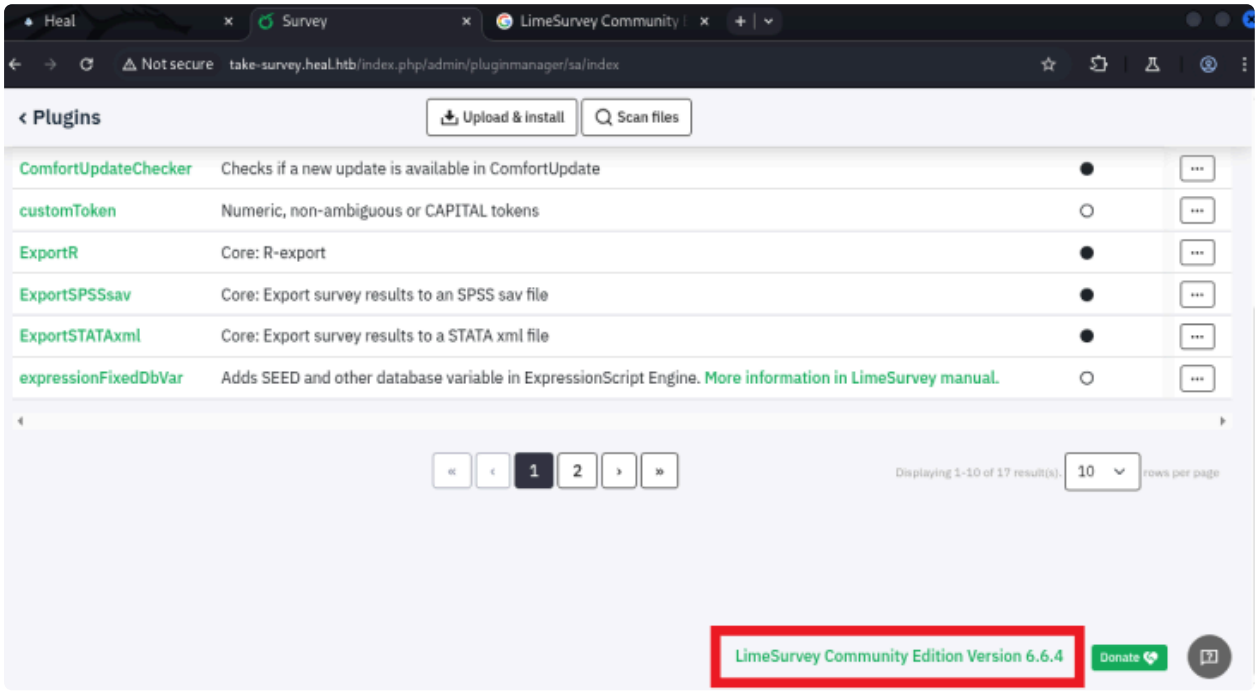
After running the common passwords lists **rockyou.txt**, we are able to extract the **password** for **ralph** which should allow us to login as an admin on the websites admin panel.



Just to check I did try and ssh as ralph, however the users password is either incorrect or not allowed to ssh on the machine. So lets try to now find the websites admin panel!



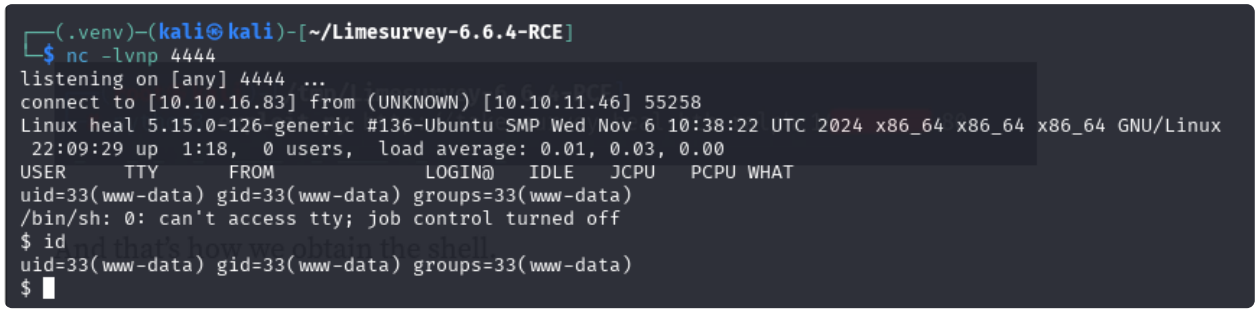
After some digging, the admin page can be located after trying to submit a survey as **ralph**, the **admin** user, in the **/admin** directory.



Looking into the admin panel for more user information or ways to gain shell, we can see the website uses LimeSurvey along with the verison it runs on. We can search for a CVE / Exploit that may be listed under this service. What I found was

https://github.com/N4s1rl1/Limesurvey-6.6.4-RCE?tab=readme-ov-file. This is a python script by N4s1rl1 on GitHub which gives an in depth tutorial on the RCE exploit.

The above image shows me running the exploit on the server after uploading the reverse shell payload as a plugin to the server.



Now we have a shell under the www-data user! While this is not the user flag just yet this allows us to enumerate the server and find a way to escalate privilege.

Privilege Escalation

```
$ pwd
/var/www/limesurvey/application/config
$ cat config.php | grep password
|    'password' The password used to connect to the database
                    'connectionString' ⇒ 'pgsql:host=localhost;port=5432;user=db_user;password=AdmiDi0_pA$$w0rd;dbname=survey;',
                    'password' ⇒ 'AdmiDi0_pA$$w0rd',
```

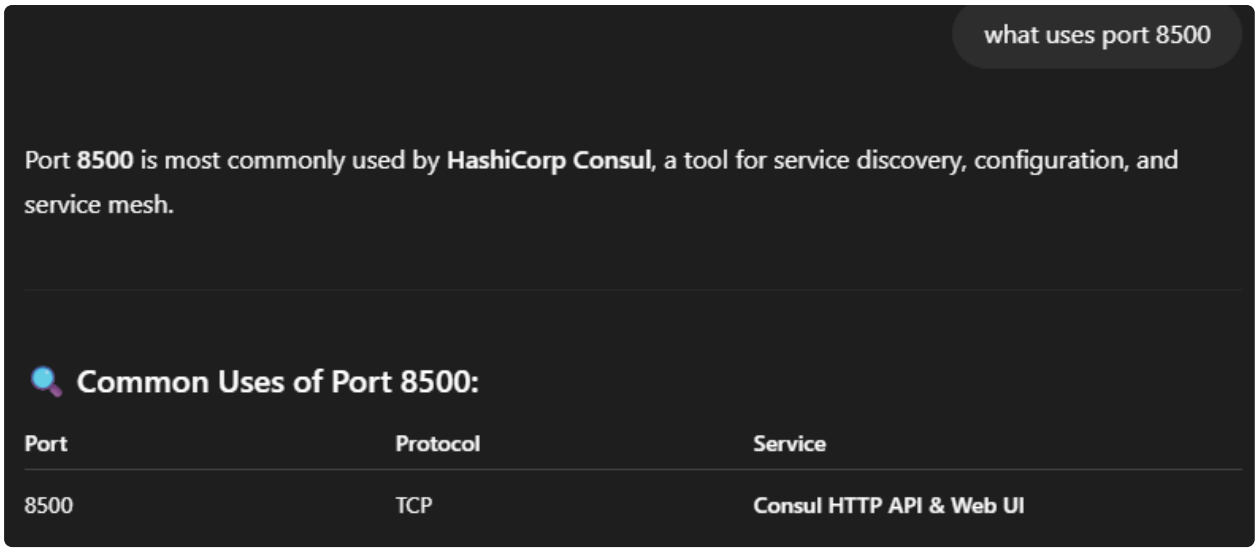
After searching around for the Lime Survey configuration file we can find the file and its contents in the above image. This allows us to leak the credentials of the PostgreSQL database.

```
$ ls /var/lib/postgresql/
14
$ cd /var/lib/postgresql/
$ ls
14
$ cd 14
$ ls
main
$ cd main
/bin/sh: 35: cd: can't cd to main
$ ls
main
$ cat main
cat: main: Permission denied
```

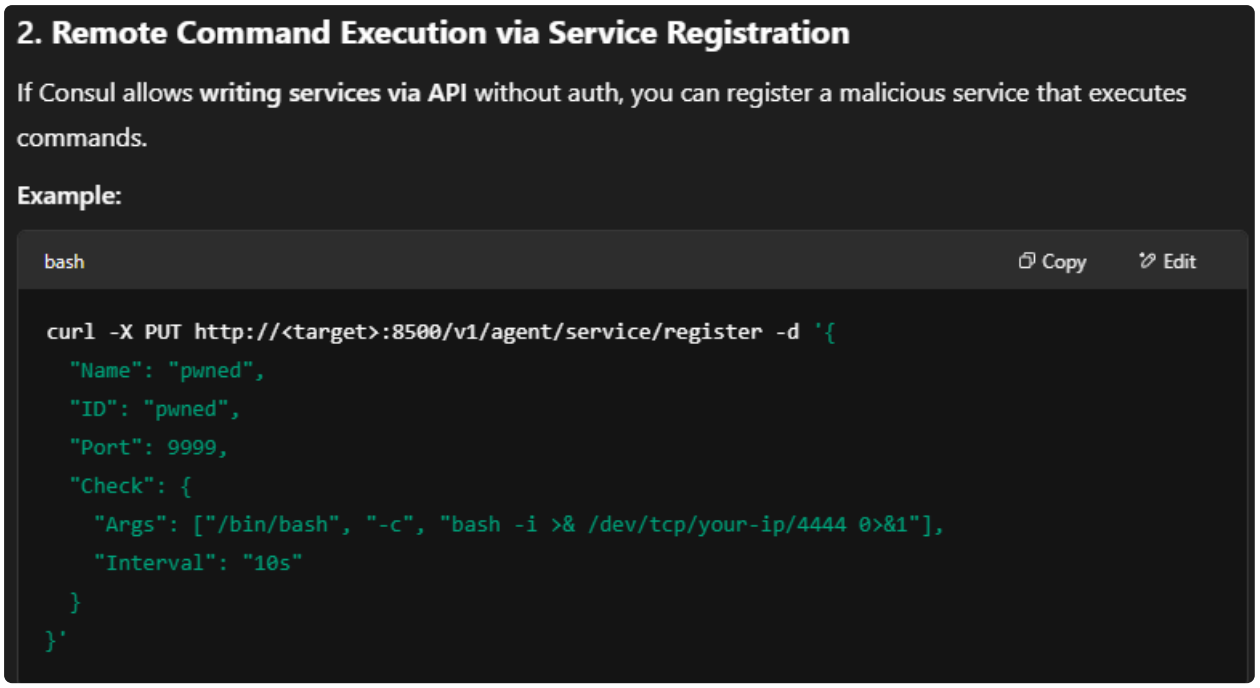
Unfortunately we do not have permission to login to the PostgreSQL database under the www-data user. While this is a dead end we can enumerate other section of the machine.

```
$ ss -tuln
Netid State  Recv-Q Send-Q Local Address:Port  Peer Address:PortProcess
udp   UNCONN 0      0          127.0.0.1:8600       0.0.0.0:*
udp   UNCONN 0      0            0.0.0.0:5353       0.0.0.0:*
udp   UNCONN 0      0      127.0.0.53%lo:53         0.0.0.0:*
udp   UNCONN 0      0            0.0.0.0:68         0.0.0.0:*
udp   UNCONN 0      0            0.0.0.0:47208      0.0.0.0:*
udp   UNCONN 0      0          127.0.0.1:8301       0.0.0.0:*
udp   UNCONN 0      0          127.0.0.1:8302       0.0.0.0:*
udp   UNCONN 0      0                [::]:5353          [::]:*
udp   UNCONN 0      0                [::]:59231         [::]:*
tcp   LISTEN 0      244        127.0.0.1:5432       0.0.0.0:*
tcp   LISTEN 0      511          0.0.0.0:80         0.0.0.0:*
tcp   LISTEN 0      128          0.0.0.0:22         0.0.0.0:*
tcp   LISTEN 0      4096   127.0.0.53%lo:53         0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8500       0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8503       0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8600       0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8301       0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8300       0.0.0.0:*
tcp   LISTEN 0      4096       127.0.0.1:8302       0.0.0.0:*
tcp   LISTEN 0      1024       127.0.0.1:3001       0.0.0.0:*
tcp   LISTEN 0      511        127.0.0.1:3000       0.0.0.0:*
tcp   LISTEN 0      128              [::]:22            [::]:*
```

The above command will list all ports the machine is listening on, perhaps there is a service running on the machine locally that we can exploit. Starting with the loopback addresses it can be noticed that port 8302-8600 are all pointing to the same local port. While I am unsure of the meaning of these ports we can ask ChatGPT if it knows any services on the ports.



It seems that ChatGPT found that HashiCorp's Consul service is being in on port 8500, which is vulnerable to RCE as the root user.



After asking ChatGPT to write an exploit for this vulnerability, we get a payload we can edit in order to gain a root shell on the remote host. This payload is a web request to the Consul service that will send a reverse shell to my host.

After running this as the www-data user I am able to get another shell as root and gather the root and user flag at the same time! On HTB machines these are always in `/root/root.txt` and `/home/{Some User}/user.txt`.