PSP0201

Week 5

Writeup

Group Name: 3 Ekor

Members

ID	Name	Role
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Day 16: Scripting - Help! Where is Santa?.

Tools used: Firefox, Linux Kali, BPython, Terminal, Text Editor

Solution/walkthrough:

Q1: What is the port number for the web server?

STEP 1 and ANSWER FOR Q1

Open Terminal and use nmap with the IP address provided to see the available port number. For http protocol, the port number 80 is available

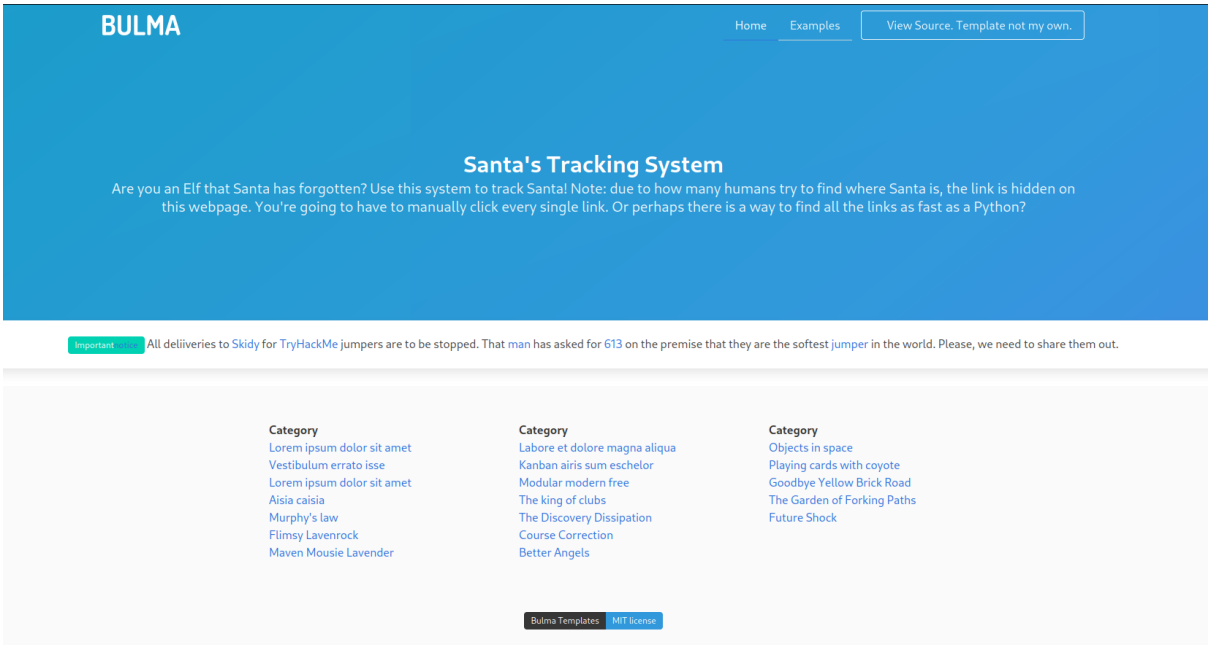
```
┌──(1211103527㉿kali)-[~]
└─$ nmap 10.10.220.26
Starting Nmap 7.92 ( https://nmap.org ) at 2022-07-04 11:29 EDT
Nmap scan report for 10.10.220.26
Host is up (0.20s latency).
Not shown: 998 closed tcp ports (conn-refused)
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http

Nmap done: 1 IP address (1 host up) scanned in 30.98 seconds
```

Q2: What templates are being used?

STEP 2 and ANSWER FOR Q2

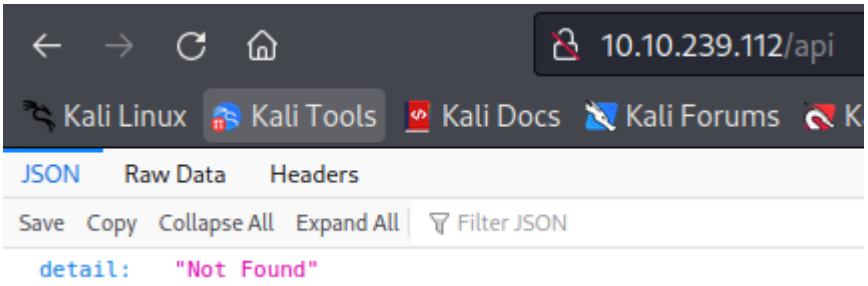
Use the IP address and open it in Firefox. The website will open and show the templates used at the top left corner of the website



Q3: Without using enumerations tools such as Dirbuster, what is the directory for the API? (without the API key)

STEP 3 and ANSWER FOR Q3

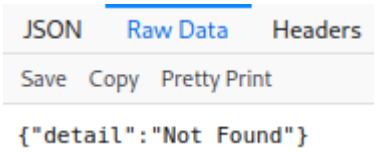
To open the website directory for API, just type in /api/ at the back of the IP address on Firefox search bar



Q4: Go the API endpoint. What is the Raw Data returned if no parameters are entered?

ANSWER FOR Q4

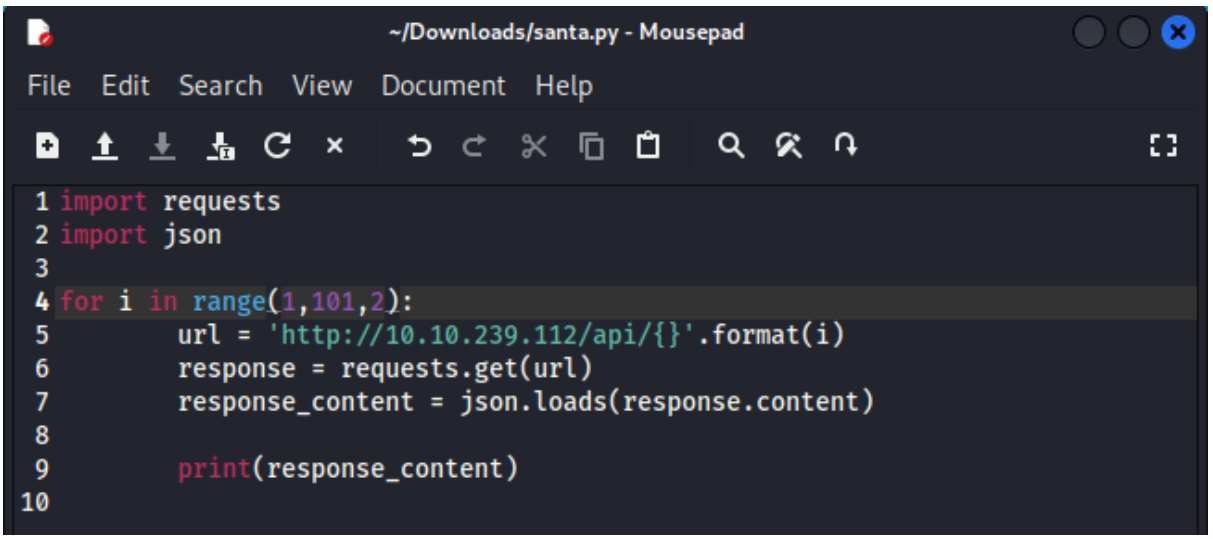
Click on “Raw Data” and the answer will be provided



Q5: Where is Santa right now?

STEP 4

Open Text Editor and use Python language to find out the correct API key by using “for” so it can loop the codes until we got the true API key



STEP 5 and ANSWER FOR Q5

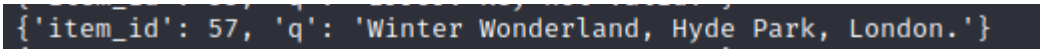
Copy every line in the Text Editor and open BPython which is already pre-installed in Kali. Run the code in BPython and wait for the process to finish. For the API key “57”, there is a result showing that santa is actually at Winter Wonderland, Hyde Park, London

```
bpython version 0.22.1 on top of Python 3.10.4 /usr/bin/python3
>>> import requests
>>> import json
>>>
>>> for i in range(1,101,2):
...         url = 'http://10.10.239.112/api/{}'.format(i)
...         response = requests.get(url)
...         response_content = json.loads(response.content)
...
...         print(response_content)
...
{'item_id': 1, 'q': 'Error. Key not valid!'}
{'item_id': 3, 'q': 'Error. Key not valid!'}
{'item_id': 5, 'q': 'Error. Key not valid!'}
{'item_id': 7, 'q': 'Error. Key not valid!'}
{'item_id': 9, 'q': 'Error. Key not valid!'}
{'item_id': 11, 'q': 'Error. Key not valid!'}
{'item_id': 13, 'q': 'Error. Key not valid!'}
{'item_id': 15, 'q': 'Error. Key not valid!'}
{'item_id': 17, 'q': 'Error. Key not valid!'}
{'item_id': 19, 'q': 'Error. Key not valid!'}
{'item_id': 21, 'q': 'Error. Key not valid!'}
{'item_id': 23, 'q': 'Error. Key not valid!'}
{'item_id': 25, 'q': 'Error. Key not valid!'}
{'item_id': 27, 'q': 'Error. Key not valid!'}
{'item_id': 29, 'q': 'Error. Key not valid!'}
{'item_id': 31, 'q': 'Error. Key not valid!'}
{'item_id': 33, 'q': 'Error. Key not valid!'}
{'item_id': 35, 'q': 'Error. Key not valid!'}
{'item_id': 37, 'q': 'Error. Key not valid!'}
{'item_id': 39, 'q': 'Error. Key not valid!'}
{'item_id': 41, 'q': 'Error. Key not valid!'}
{'item_id': 43, 'q': 'Error. Key not valid!'}
{'item_id': 45, 'q': 'Error. Key not valid!'}
{'item_id': 47, 'q': 'Error. Key not valid!'}
{'item_id': 49, 'q': 'Error. Key not valid!'}
{'item_id': 51, 'q': 'Error. Key not valid!'}
{'item_id': 53, 'q': 'Error. Key not valid!'}
{'item_id': 55, 'q': 'Error. Key not valid!'}
{'item_id': 57, 'q': 'Winter Wonderland, Hyde Park, London.'}
{'item_id': 59, 'q': 'Error. Key not valid!'}
```

Q6: Find out the correct API key. Remember, this is an odd number between 0-100. After too many attempts, Santa's Sled will block you. To unblock yourself, simply terminate and re-deploy the target instance (10.10.94.92)

ANSWER FOR Q6

The correct API key is “57” as it shows santa’s current location



Thought Process/Methodology:

To find out what port number is available for our IP address, we must use nmap. So after using nmap, the available port number will show and we can see that there is port 80 for http files. To open the API website directory, just type in /api/ at the back of the IP address on Firefox search bar. Open TExt Editor and we have to use our recent Python knowledge to test out all correct API number combinations. We can use the code, “for” so we can loop and test different API numbers until we get it correct. Copy every line in the Text Editor and open BPython which is already pre-installed in Kali. Run the code in BPython and wait for the process to finish. For the API key “57”, there is a result showing that Santa is actually at Winter Wonderland, Hyde Park, London.

Day 17: Reverse Engineering - ReverseElfneering.

Tools used: SSH, Terminal

Solution/walkthrough:

Q1: Match the data type with the size in bytes

Q3: What is the command to set a breakpoint in radare2?

Q4: What is the command to execute a program until we hit a breakpoint?

STEP 1 / ANSWER FOR Q1, Q3, Q4

This can be answered by referring to the table in nothe notes such as given below. Q3 and Q4 can be answered by reading the notes which the answers are db and dc respectively.

Initial Data Type	Suffix	Size (bytes)
Byte	b	1
Word	w	2
Double Word	l	4
Quad	q	8
Single Precision	s	4
Double Precision	l	8

STEP 2

We first need to establish a ssh connection with the target which in this case has the IP address of 10.10.17.45. The credentials are given in which the username is elfmceager with the password adventofcyber.

```
┌──(1211103546㉿kali)-[~]
└─$ ssh elfmceager@10.10.17.45
elfmceager@10.10.17.45's password:
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 4.15.0-128-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Tue Jul 12 01:22:13 UTC 2022

  System load:  0.0               Processes:           95
  Usage of /:   39.4% of 11.75GB  Users logged in:     0
  Memory usage: 8%                IP address for ens5: 10.10.17.45
  Swap usage:   0%


0 packages can be updated.
0 updates are security updates.

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check yo
ur Internet connection or proxy settings


Last login: Tue Jul 12 00:56:03 2022 from 10.18.30.248
```

STEP 3

After accessing the machine, we then are tasked with analysing the challenge1 file located on the machine. We can access the file by running the command as shown below which will open the binary in debugging mode.

```
elfmceager@tbfc-day-17:~$ r2 -d ./challenge1
Process with PID 1679 started...
= attach 1679 1679
bin.baddr 0x00400000
Using 0x400000
Warning: Cannot initialize dynamic strings
asm.bits 64
```

Q2: What is the command to analyse the program in radare2?

STEP 4 / ANSWER FOR Q2

We then need to enter the command aa to analyse it. This may take some time

```
[0x00400a30]> aa
[ ] Analyze all flags starting with sym. and entry0 (aa)
 WARNING : block size exceeding max block size at 0x006ba220
[+] Try changing it with e anal.bb.maxsize
 WARNING : block size exceeding max block size at 0x006bc860
[+] Try changing it with e anal.bb.maxsize
[x] Analyze all flags starting with sym. and entry0 (aa)
```

STEP 5

After its done, we can find a list of functions by using the afl command. But to be more specific, we can run the command (afl | grep main), to specify the type of functions you want listed which in this case is the ones containing main.

```
[0x00400a30]> afl | grep main
0x00400b4d    1 35           sym.main
0x00400de0   10 1007 → 219   sym.__libc_start_main
0x00403840   39 661  → 629   sym._nl_find_domain
0x00403ae0  308 5366 → 5301  sym._nl_load_domain
0x00415ef0    1 43           sym._IO_switch_to_main_get_area
0x0044ce10    1 8            sym._dl_get_dl_main_map
0x00470430    1 49           sym._IO_switch_to_main_wget_area
0x0048f9f0    7 73   → 69    sym._nl_finddomain_subfreeres
0x0048fa40   16 247  → 237   sym._nl_unload_domain
```

Q5: What is the value of local_ch when its corresponding movl instruction is called?

Q6: What is the value of eax when the imull instruction is called?

Q7: What is the value of local_4h before eax is set to 0

STEP 6 / ANSWER FOR Q5, Q6, Q7

As we can see that there is a function at main we can use the command pdf@main to examine the assembly code. In this we can use the results shown to answer the question 5, 6 and 7 in which the answer is 1, 6, 6 respectively.

```
[0x00400a30]> pdf @main
            ;-- main:
/ (fcn) sym.main 35
|   sym.main ();
|           ; var int local_ch @ rbp-0x c
|           ; var int local_8h @ rbp-0x8
|           ; var int local_4h @ rbp-0x4
|              ; DATA XREF from 0x00400a4d (entry0)
|           0x00400b4d      55              push rbp
|           0x00400b4e      4889e5          mov rbp, rsp
|           0x00400b51      c745f4010000.   mov dword [local_ch], 1
|           0x00400b58      c745f8060000.   mov dword [local_8h], 6
|           0x00400b5f      8b45f4          mov eax, dword [local_ch]
|           0x00400b62      0faf45f8        imul eax, dword [local_8h]
|           0x00400b66      8945fc          mov dword [local_4h], eax
|           0x00400b69      b800000000      mov eax, 0
|           0x00400b6e      5d              pop rbp
\           0x00400b6f      c3              ret
```

Thought Process/Methodology:

All we need to do is first establish a ssh connection with the ip address using the credentials already given. We then will be met with 2 files in which we are tasked with analysing the first one which is titled challenge1. By using the respective commands, we found that there is a file in sym.main which will be our target. We can then open this file with the pdf@main command and see the assembly language in it.

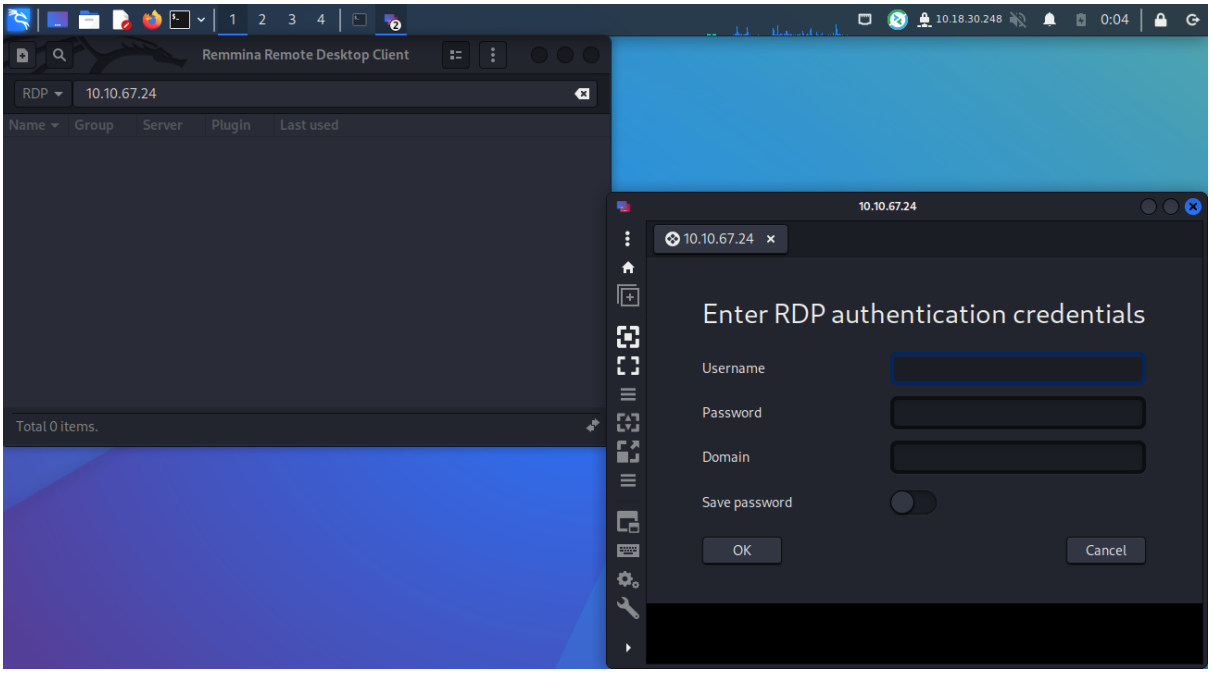
Day 18: Reverse Engineering - The Bits of Christmas.

Tools used: Remmina, ILspy

Solution/walkthrough:

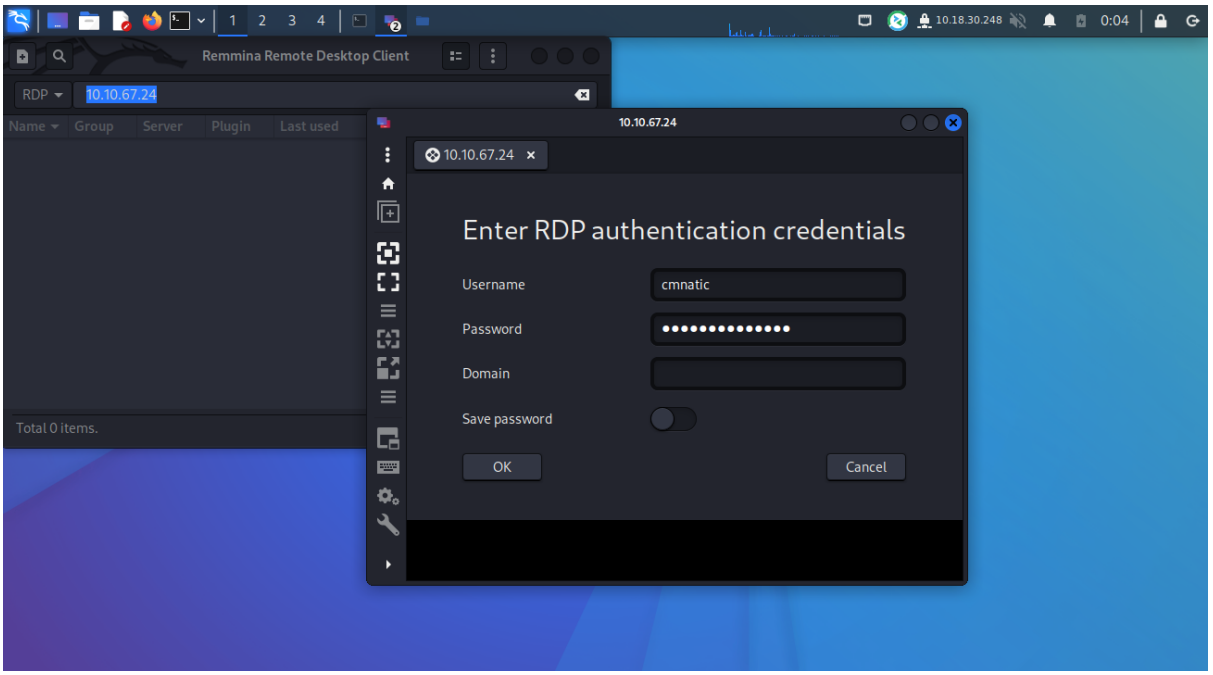
STEP 1

Use remmina to connect rdp with the ip address which will then show the below tab.



STEP 2

Use the credentials given to log in which the username is cmnatic with the password Adventofcyber!

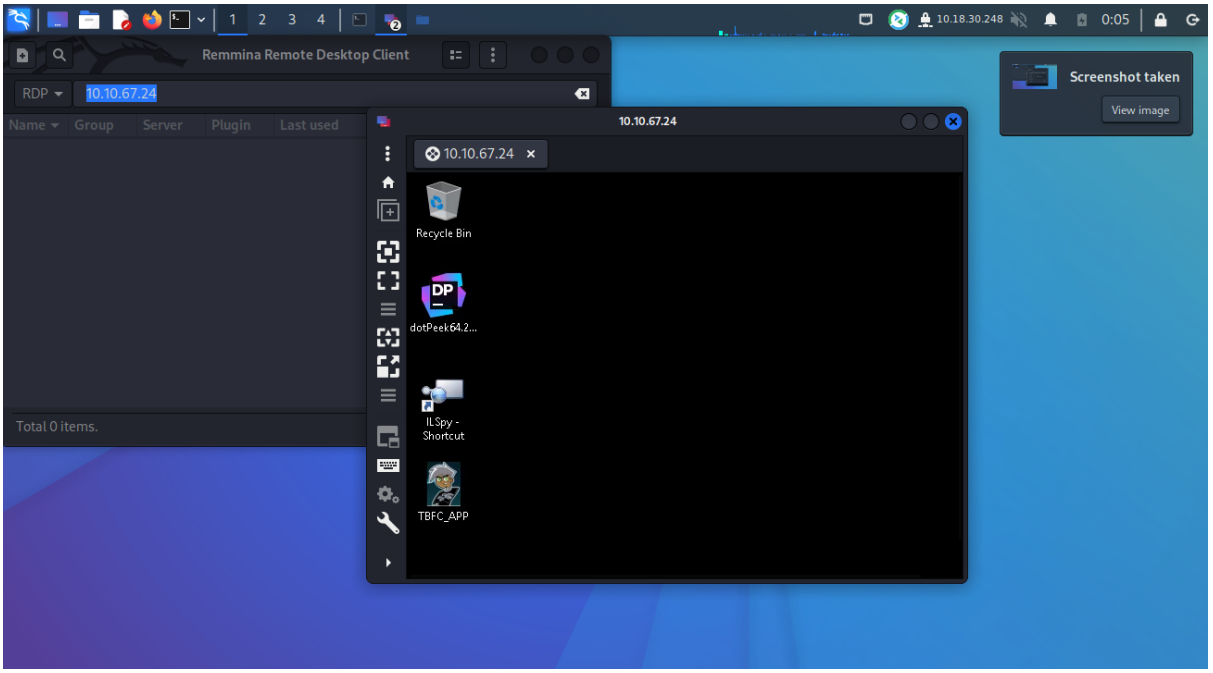


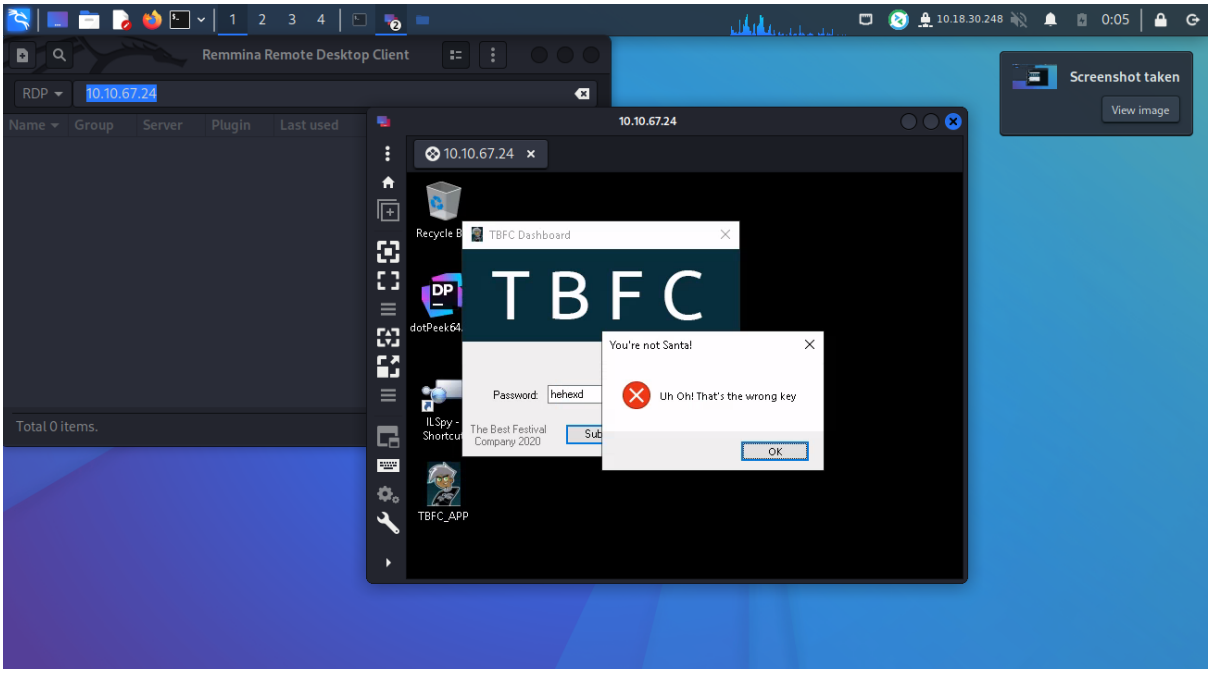
Q1: What is the message that shows up if you enter the wrong password for TBFC_APP?

Q2: What does TBFC stands for?

STEP 3 / ANSWER FOR Q1,Q2

This will show you this tab which has both tbfc app and the ILspy. The second pic also shows the answers for Q1 and Q2 which is “Uh Oh! That's the wrong key” and “The Best Festival Company” respectively.

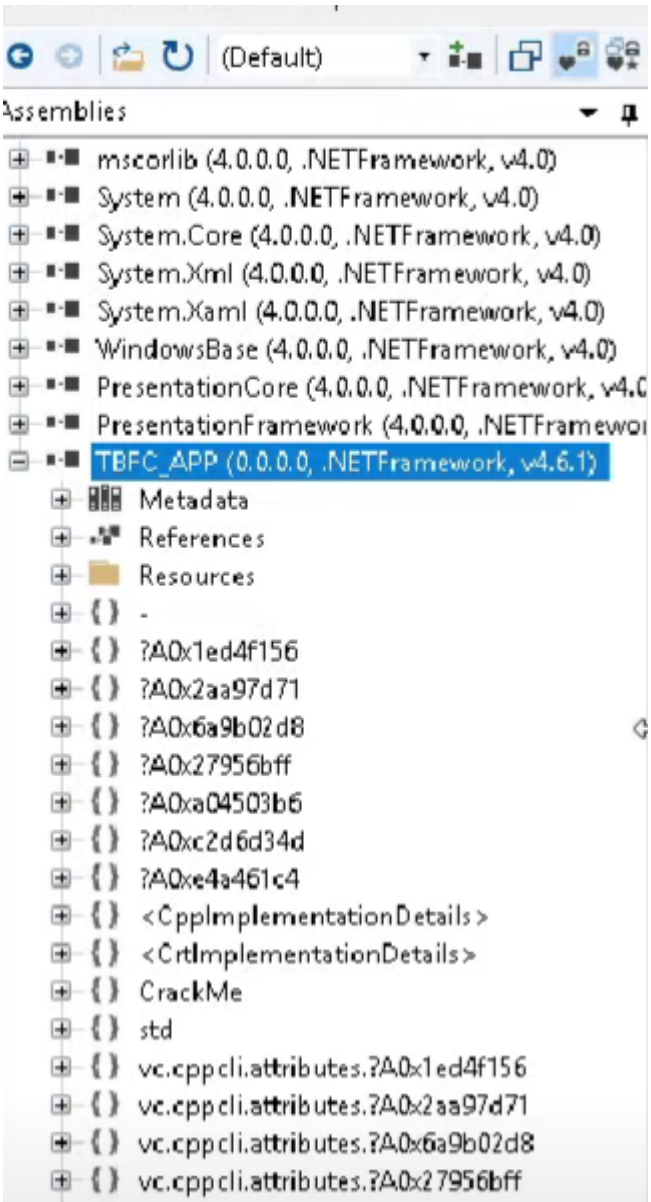




Q3: Decompile the TBFC_APP with ILSpy. What is the module that catches your attention?

STEP 4 / ANSWER FOR Q3

We then need to open ILspy to analyse the app. Open the app in ILspy and analyze it. We can see that in the list, one sticks out which seems weird in the list. This is the one named crack me.



Q4: Within the module, there are two forms. Which contains the information we are looking for?

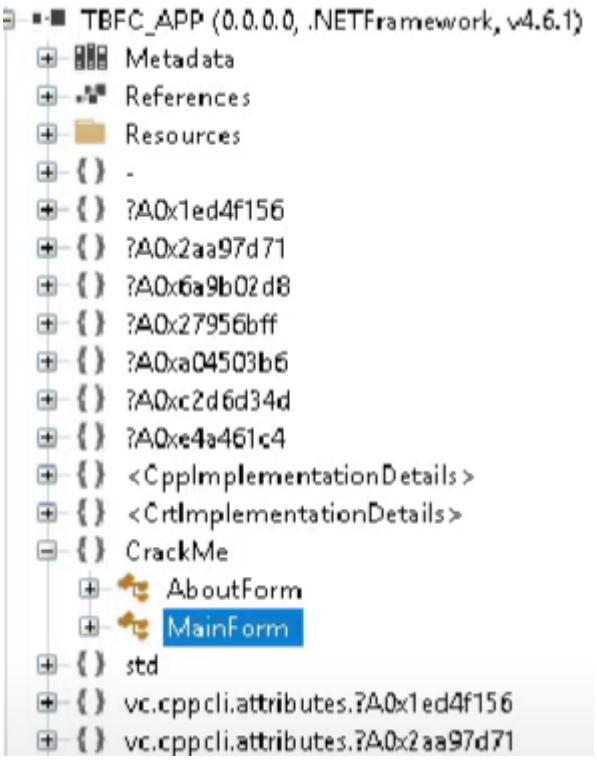
Q5:Which method within the form from Q4 will contain the information we are seeking?

Q6: What is santa's password?

Q7: Now that you've retrieved this password, try to login… What is the flag?

STEP 5 / ANSWER FOR Q4, Q5, Q6, Q7

Under crack me, we can see 2 files which is aboutform and mainform. After tinkering around we can find that the one we are looking for is under mainform/buttonActivate_Click. This shows basically all the information we need. With this we can answer all questions from Q4 to Q7. The password is santapassword321 as seen on the line which has ptr=. To check on this more, we can double click on the text and we will be taken to a tab where ILspy shows more of the details. In this we can see the hexadecimal value which we can translate to normal text using the like of cyberchef. The bottom 2 lines also shows the message we will get when either we enter the right or even wrong password. This enables us to see the flag that will be given if we enter the right password. The answers for the questions are Mainform, buttonActivate_click, santapassword321 and thm{046af} respectively.



```
using ...

private unsafe void buttonActivate_Click(object sender, EventArgs e)
{
    IntPtr value = Marshal.StringToHGlobalAnsi(textBoxKey.Text);
    sbyte* ptr = (sbyte*)System.Runtime.CompilerServices.Unsafe.AsPointer(ref <Module>.??_C@_088@IKKDFEPG@santapassword821@);
    void* ptr2 = (void*)value;
    byte b = *(byte*)ptr2;
    byte b2 = 115;
    if ((uint)b >= 115u)
    {
        while ((uint)b <= (uint)b2)
        {
            if (b != 0)
            {
                ptr2 = (byte*)ptr2 + 1;
                ptr++;
                b = *(byte*)ptr2;
                b2 = (byte)(*ptr);
                if ((uint)b < (uint)b2)
                {
                    break;
                }
                continue;
            }
            MessageBox.Show("Welcome, Santa, here's your flag thm{046af}", "That's the right key!", MessageBoxButtons.OK, MessageBoxIcon.Asterisk);
            return;
        }
    }
    MessageBox.Show("Uh Oh! That's the wrong key", "You're not Santa!", MessageBoxButtons.OK, MessageBoxIcon.Hand);
}
```

Thought Process/Methodology:

In this, we would need to use remmina to connect to the ip address and then use the provided credentials to log in. After accessing it, we need to gain access to the TBFC app but we do not have the password to access it. This is where ILspy comes in handy. It allows us to see the building blocks of the app and the code on which it is constructed. In it we can see one odd looking file named crack me which we can see contains the part that handles the logging in part of the app. We can then find the very structure of the code that runs the login part which clearly shows the correct password which belongs to Santa and the message box it will display when we enter the correct password and even the wrong one.

Day 19: Web Exploitation - The Naughty or Nice List

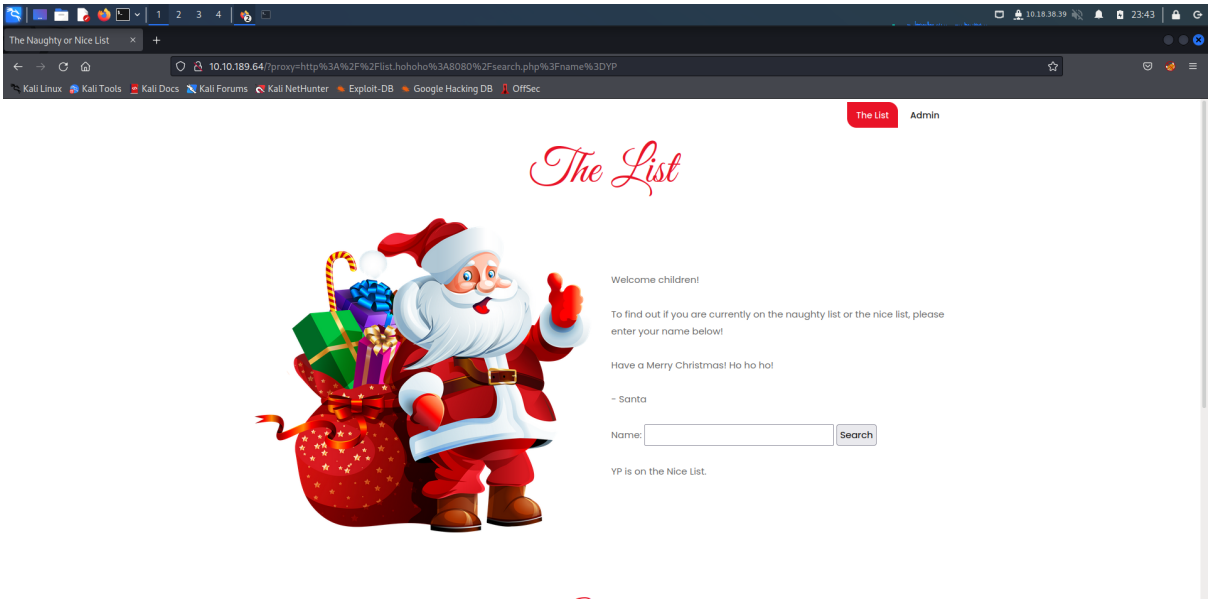
Tools used: Web Browser

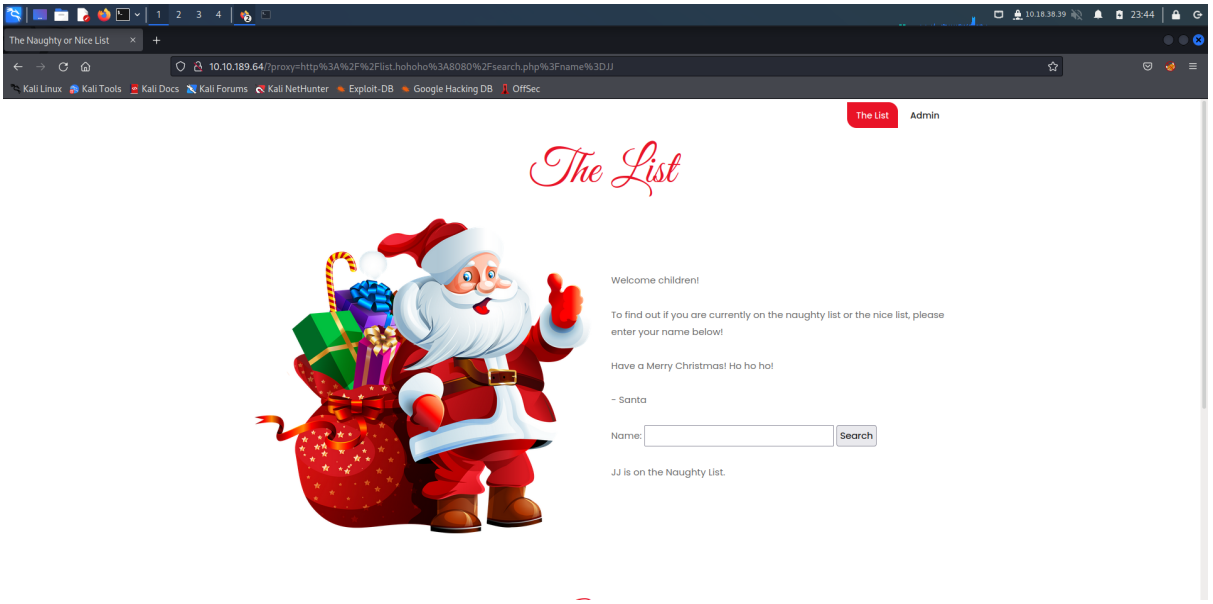
Solutions/Walkthrough:

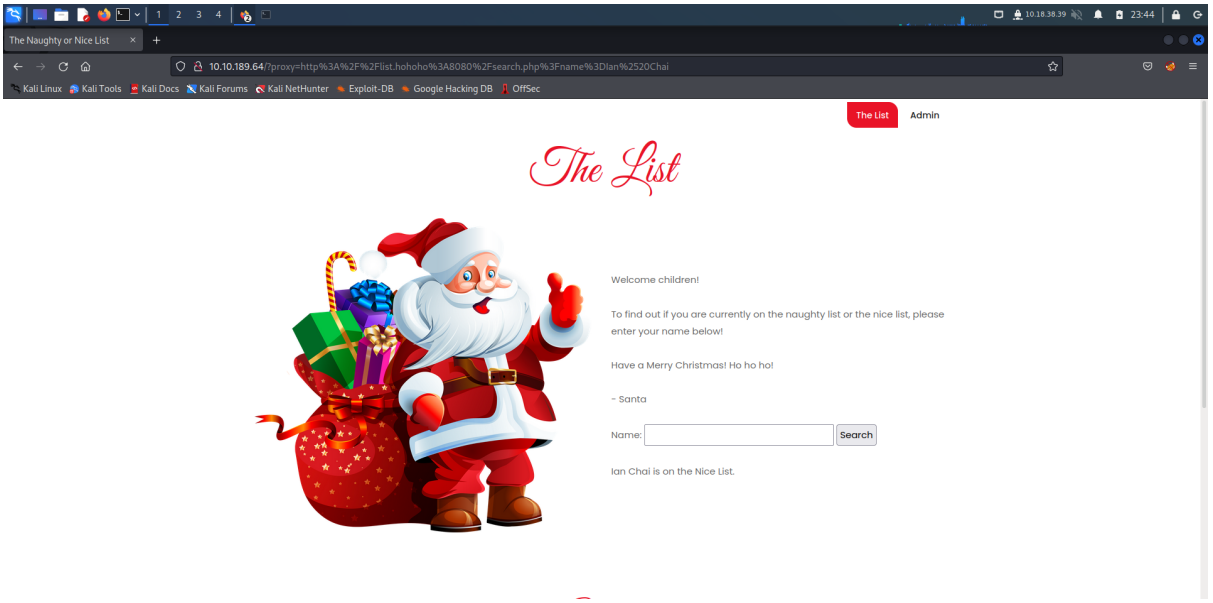
Q1:Which list is this person on?

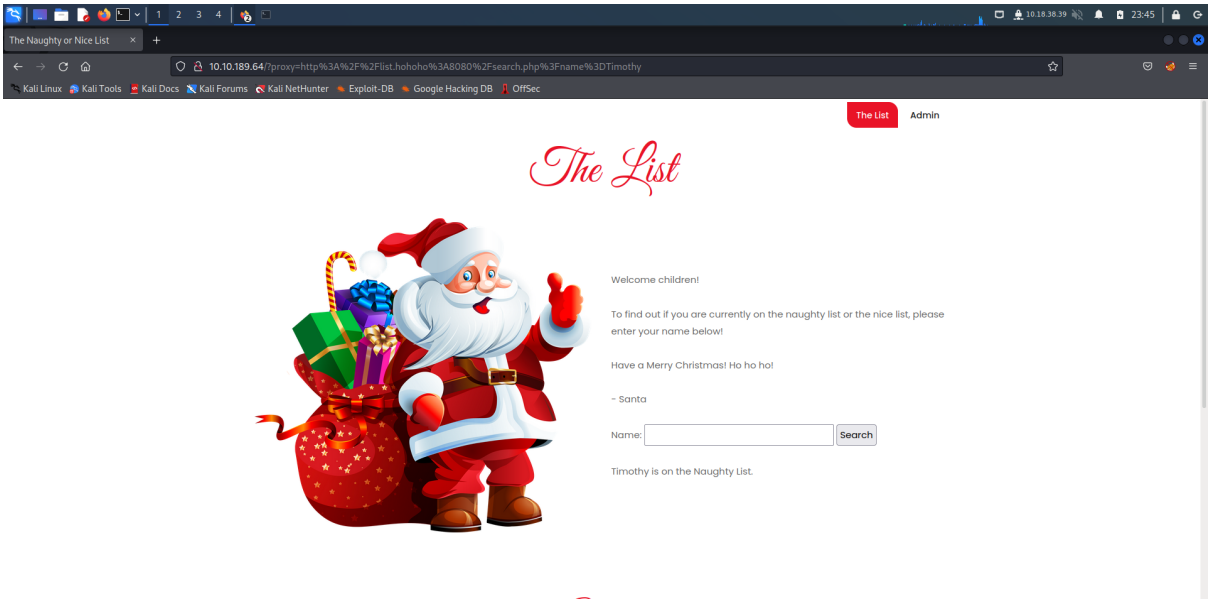
STEP 1 and ANSWER FOR Q1

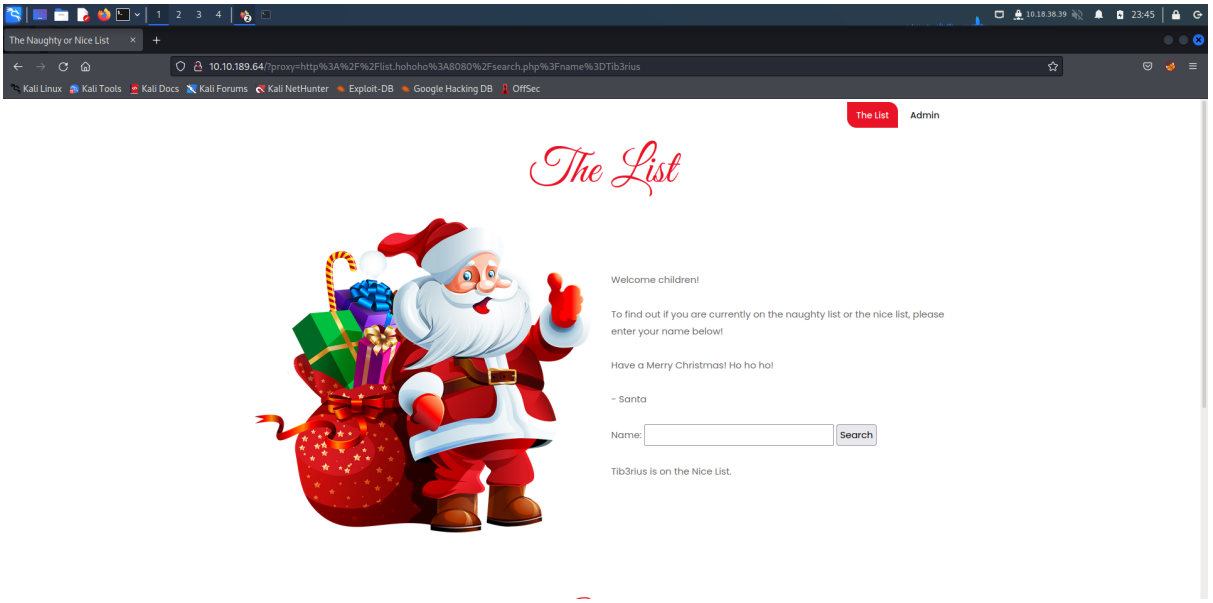
Access the webpage and enter the names YP, JJ, Ian Chai, Timothy, Tib3rius and Kanes one by one into the search box. The answer for Q1:

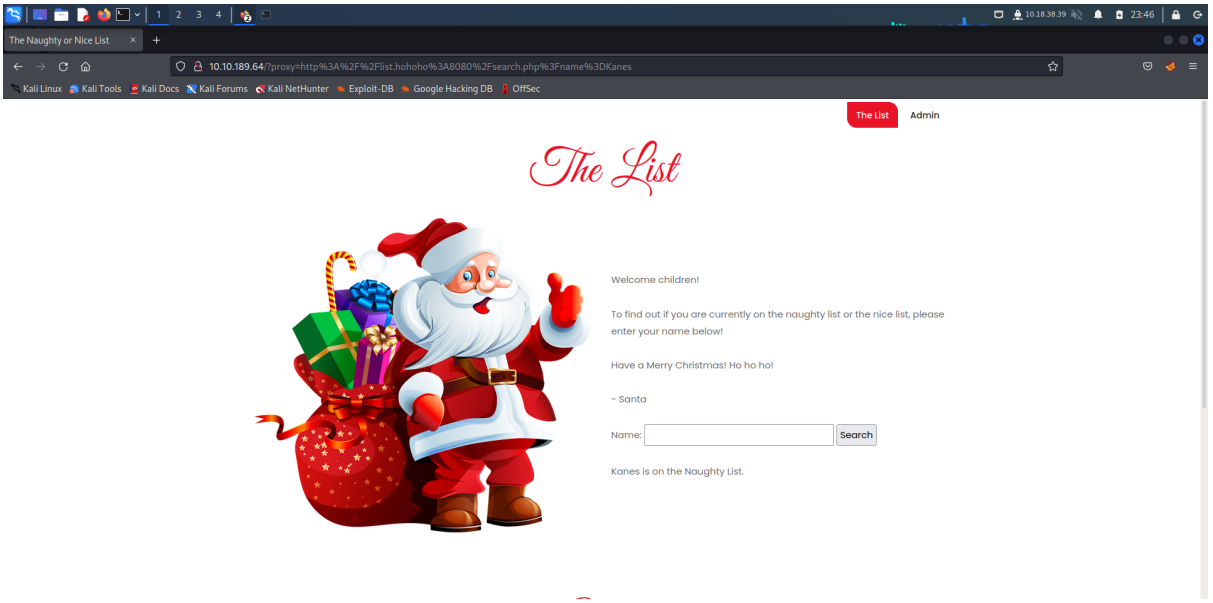





The Naughty or Nice List
10.10.189.64/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2Fsearch.php%3Fname%3Dlan%2520Chai
Kali Linux Kali Tools Kali Docs Kali Forums Kali NetHunter Exploit-DB Google Hacking DB OffSec
The List
Admin
The List
Welcome children!
To find out if you are currently on the naughty list or the nice list, please enter your name below!
Have a Merry Christmas! Ho ho ho!
- Santa
Name:
Search
Ian Chai is on the Nice List.


The Naughty or Nice List
10.10.189.64/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2Fsearch.php%3Fname%3DTimothy
Kali Linux Kali Tools Kali Docs Kali Forums Kali NetHunter Exploit-DB Google Hacking DB OffSec
The List
Admin
The List
Welcome children!
To find out if you are currently on the naughty list or the nice list, please enter your name below!
Have a Merry Christmas! Ho ho ho!
- Santa
Name:
Search
Timothy is on the Naughty List.

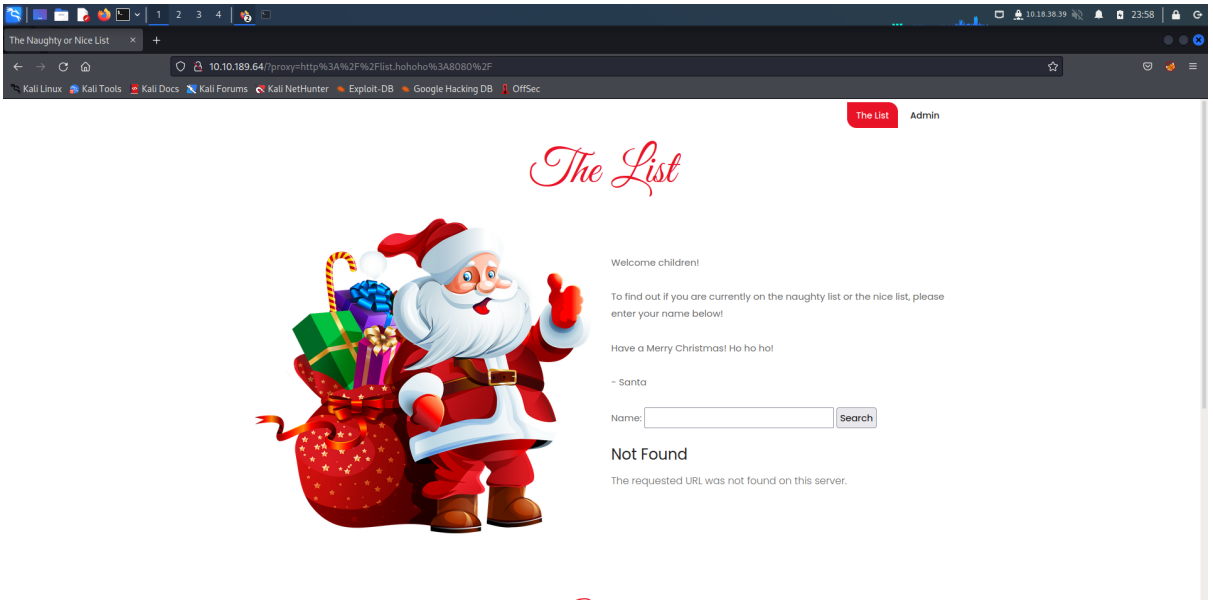

The Naughty or Nice List
10.10.189.64/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2Fsearch.php%3Fname%3DTib3rius
Kali Linux
Kali Tools
Kali Docs
Kali Forums
Kali NetHunter
Exploit-DB
Google Hacking DB
OffSec
The List
Admin
The List
Welcome children!
To find out if you are currently on the naughty list or the nice list, please enter your name below!
Have a Merry Christmas! Ho ho ho!
- Santa
Name:
Search
Tib3rius is on the Nice List.


The Naughty or Nice List
10.10.189.64/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2Fsearch.php%3Fname%3DKanes
Kali Linux
Kali Tools
Kali Docs
Kali Forums
Kali NetHunter
Exploit-DB
Google Hacking DB
OffSec
The List
Admin
The List
Welcome children!
To find out if you are currently on the naughty list or the nice list, please enter your name below!
Have a Merry Christmas! Ho ho ho!
- Santa
Name:
Search
Kanes is on the Naughty List.

Q2: What is displayed on the page when you use "/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2F"?

STEP 2 and ANSWER FOR Q2

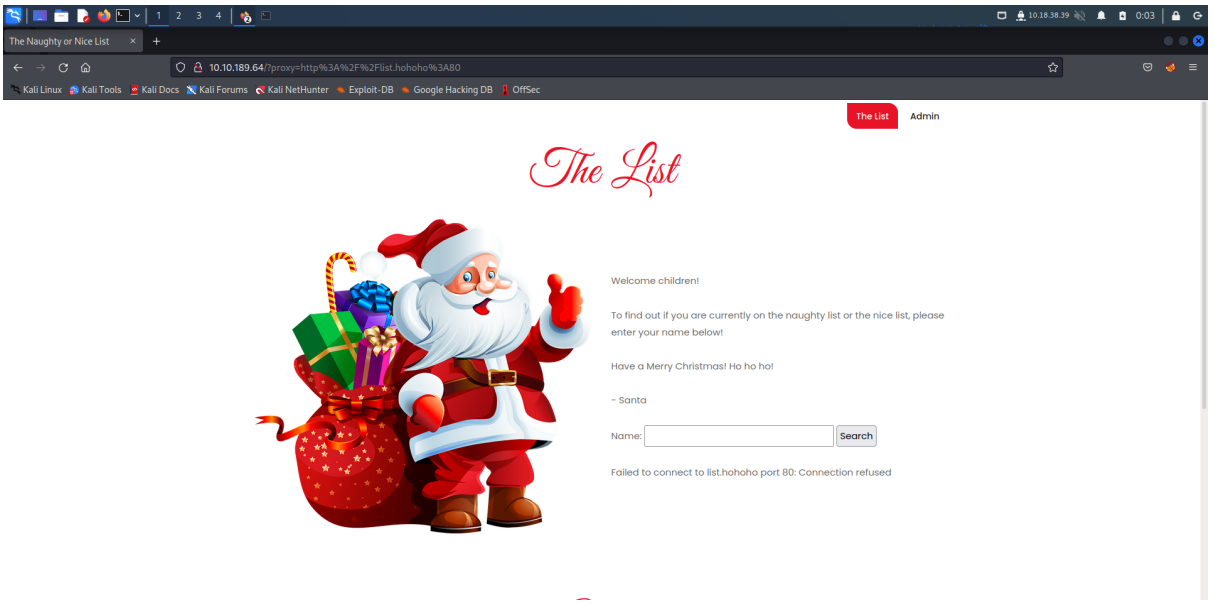
Add "/?proxy=http%3A%2F%2Flist.hohoho%3A8080%2F" into the url behind the web server's original url. The answer for Q2 is “Not Found. The requested URL was not found on this server.”



Q3: What is displayed on the page when you use "/?proxy=http%3A%2F%2Flist.hohoho%3A80"?

STEP 3 and ANSWER FOR Q3

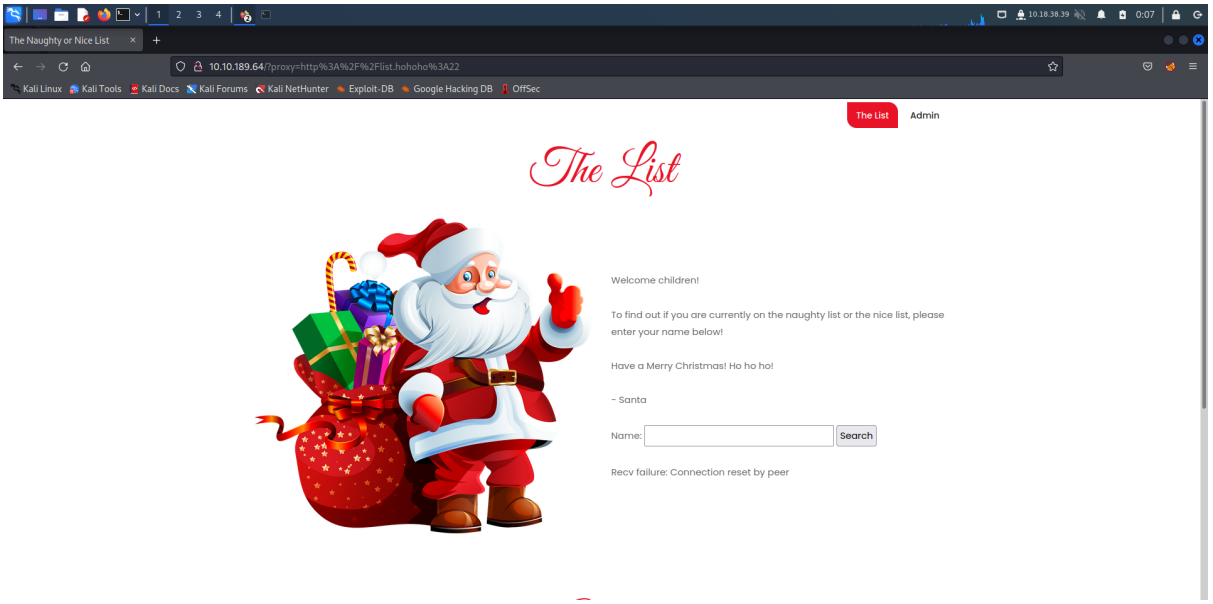
Add "/?proxy=http%3A%2F%2Flist.hohoho%3A80" into the url behind the webserver’s original url. The answer for Q3 is “Failed to connect to list.hohoho port 80: Connection refused”.



Q4: What is displayed on the page when you use "/?proxy=http%3A%2F%2Flist.hohoho%3A22"?

STEP 4 and ANSWER FOR Q4

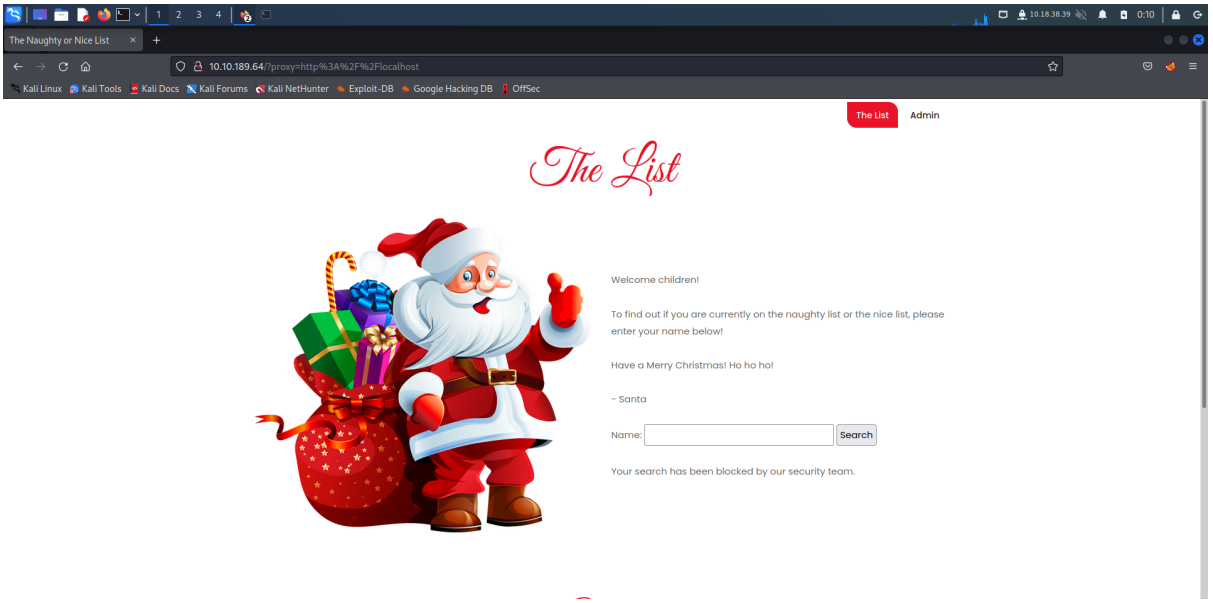
Add "/?proxy=http%3A%2F%2Flist.hohoho%3A22" into the url behind the webserver's original url.
The answer for Q4 is"Recv failure: Connection reset by peer".



Q5: What is displayed on the page when you use "/?proxy=http%3A%2F%2Flocalhost"?

STEP 5 and ANSWER FOR Q5

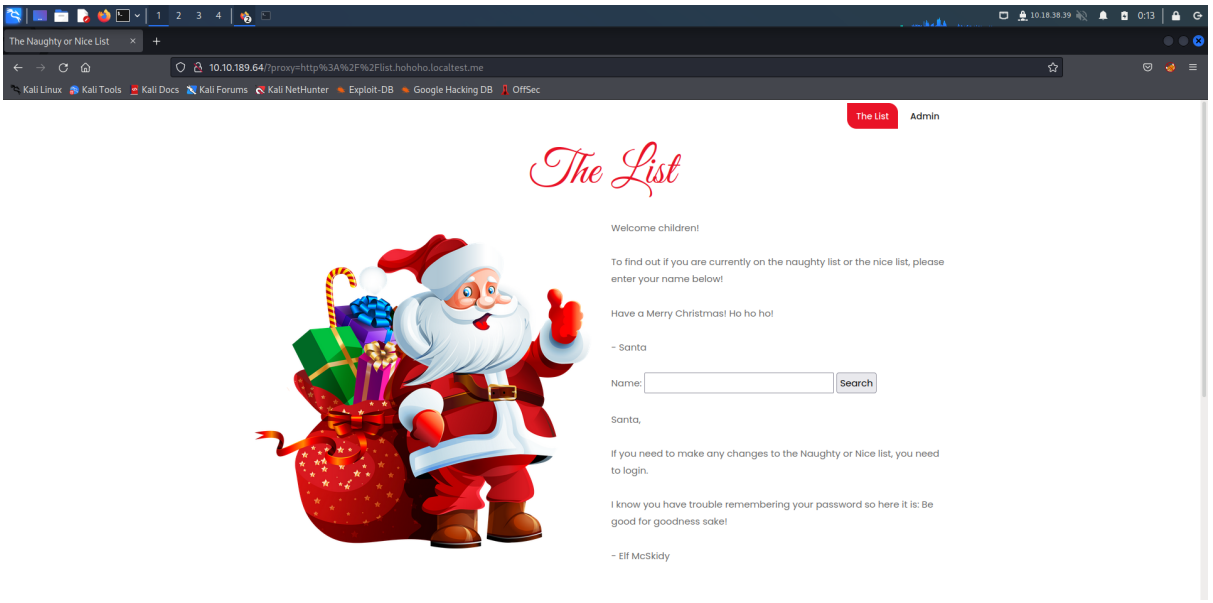
Add "/?proxy=http%3A%2F%2Flocalhost" into the url behind the webserver's original url.
The answer for Q5 is "Your search has been blocked by our security team."



Q6: What is Santa's password?

STEP 6 and ANSWER FOR Q6

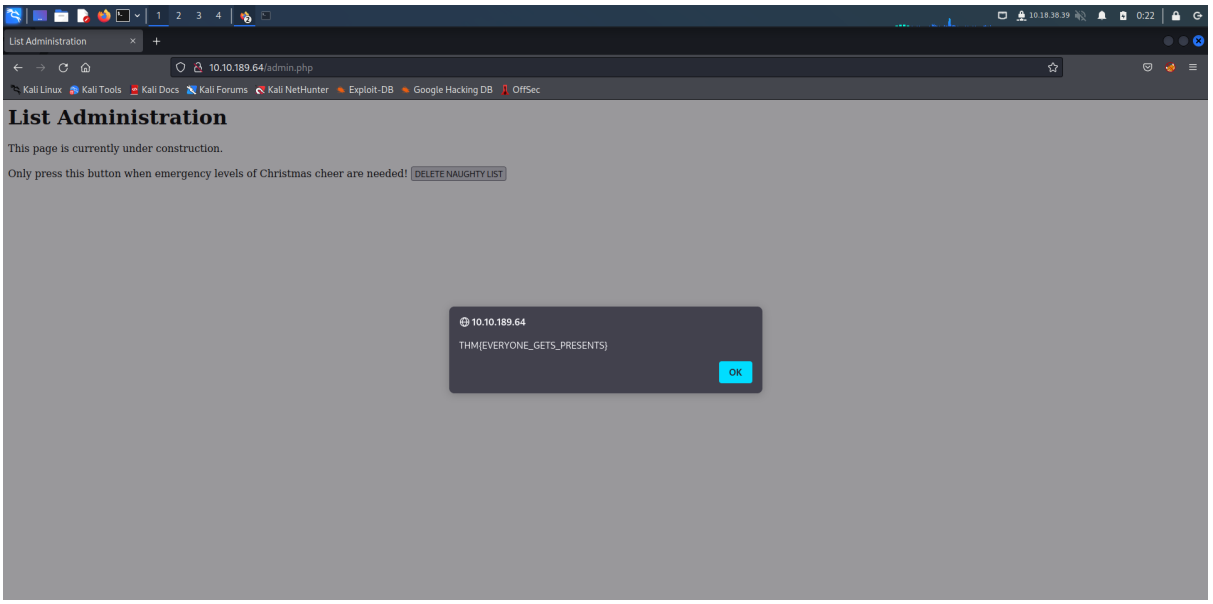
Add “/?proxy=http%3A%2F%2Flist.hohoho.localtest.me” behind the original url and it will reveal a secret message left behind.The answer for Q6 is “Be good for goodness sake!”.



Q7: What is the challenge flag?

STEP 7 and ANSWER FOR Q7

Enter username Santa and password found in Q6 to login as Santa in the admin page and remove the naughty list. The answer for Q7 is THM{EVERYONE_GETS_PRESENTS}.



Thought Process/Methodology:

When we first enter the web server; testing the search box, a change in the url can be seen. After tinkering with the webserver, we discovered that we can exploit the url weakness since the request will pass through as long as the hostname has list.hohoho. Through this weakness, we discover a hidden message left behind for Santa in case he forgets his password.By using this discovered password and username Santa we were able to login, remove the naughty list and get the flag.

Day 20: Blue Teaming - PowershELlf to the rescue

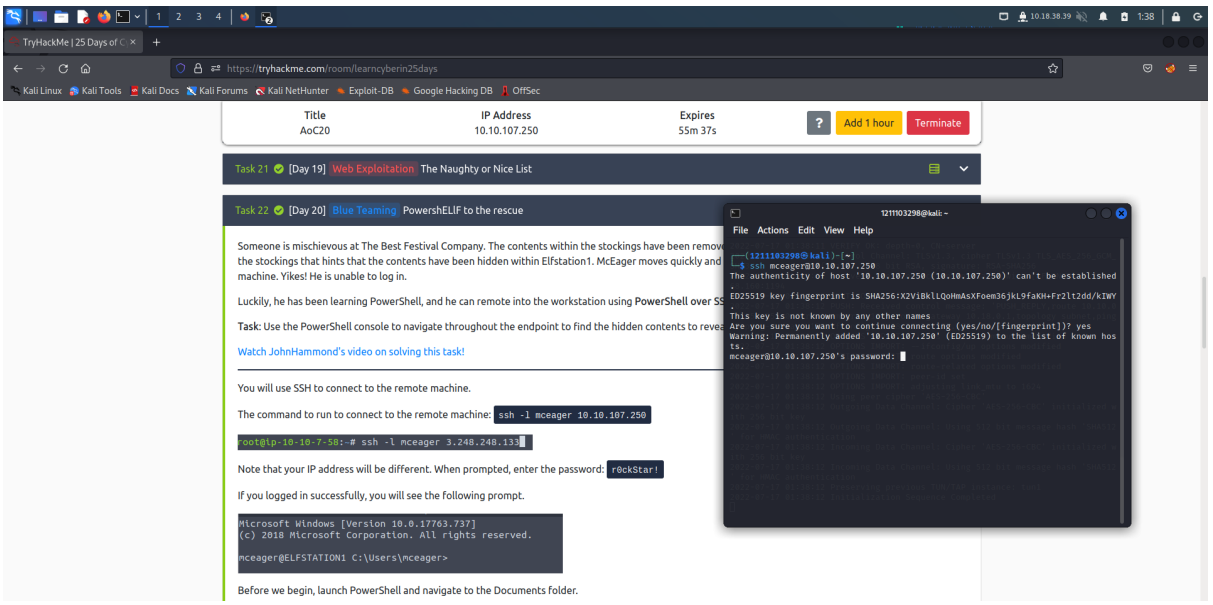
Tools used: Linux Terminal, PowerShell

Solutions/Walkthrough:

Q2: Search for the first hidden elf file within the Documents folder. Read the contents of this file. What does Elf 1 want?

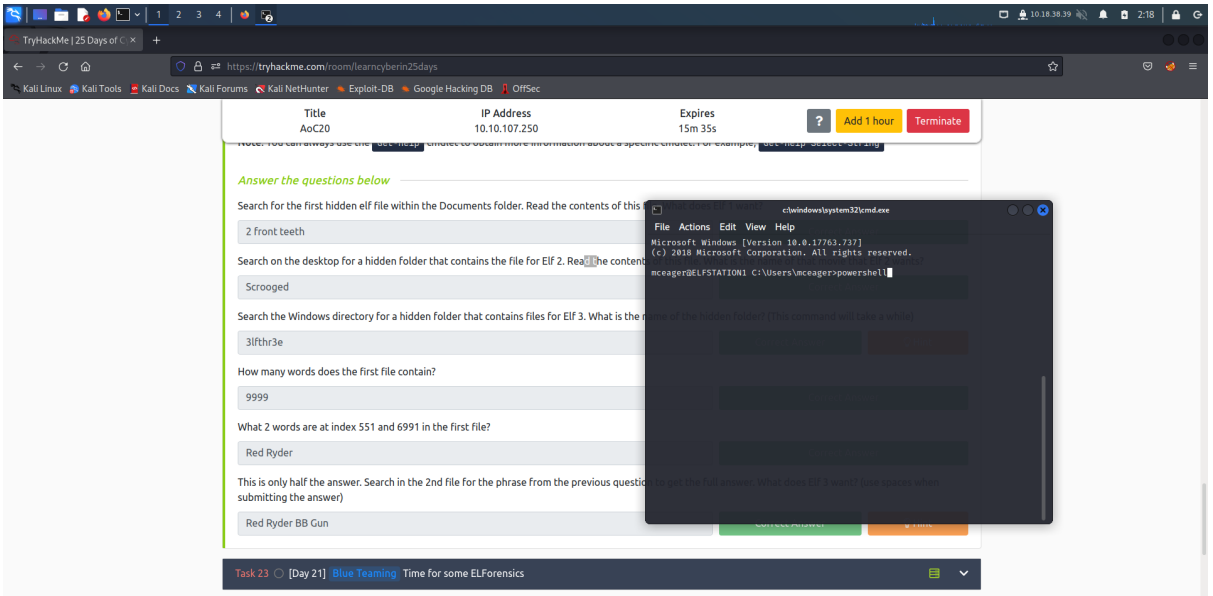
STEP 1

Connect to mceager machine through linux terminal with the password r0ckStar!.



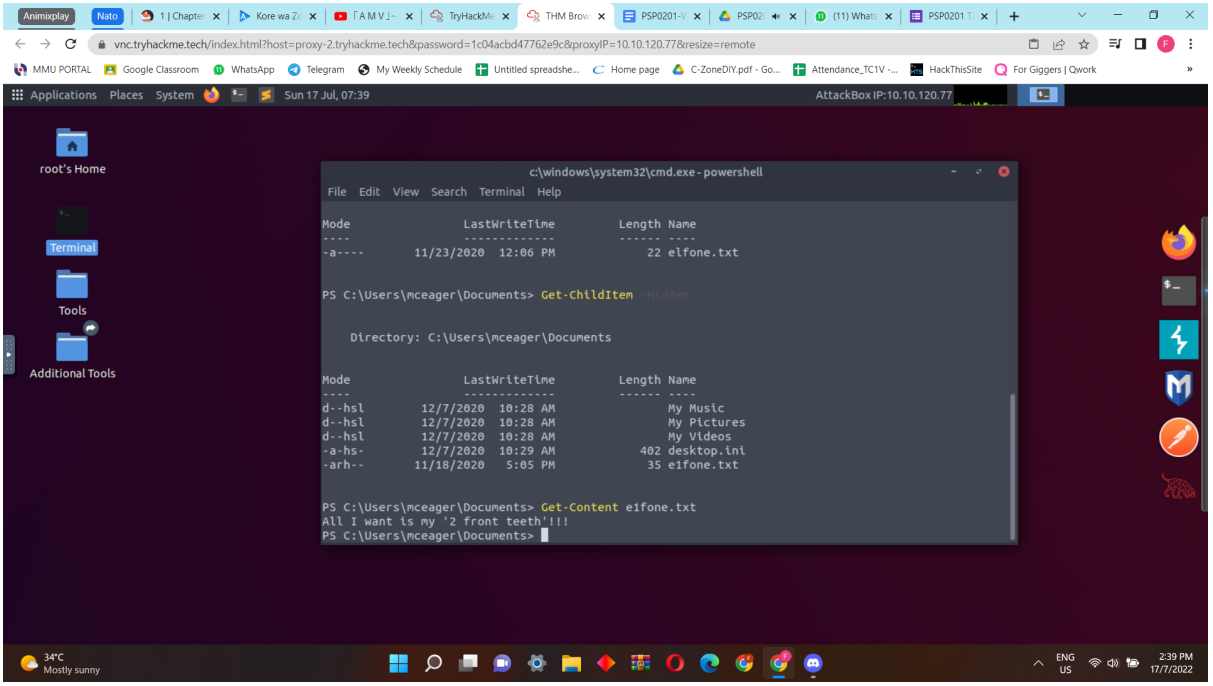
STEP 2

After connecting over to mceager machine through ssh, open powershell.



STEP 3 and ANSWER FOR Q2

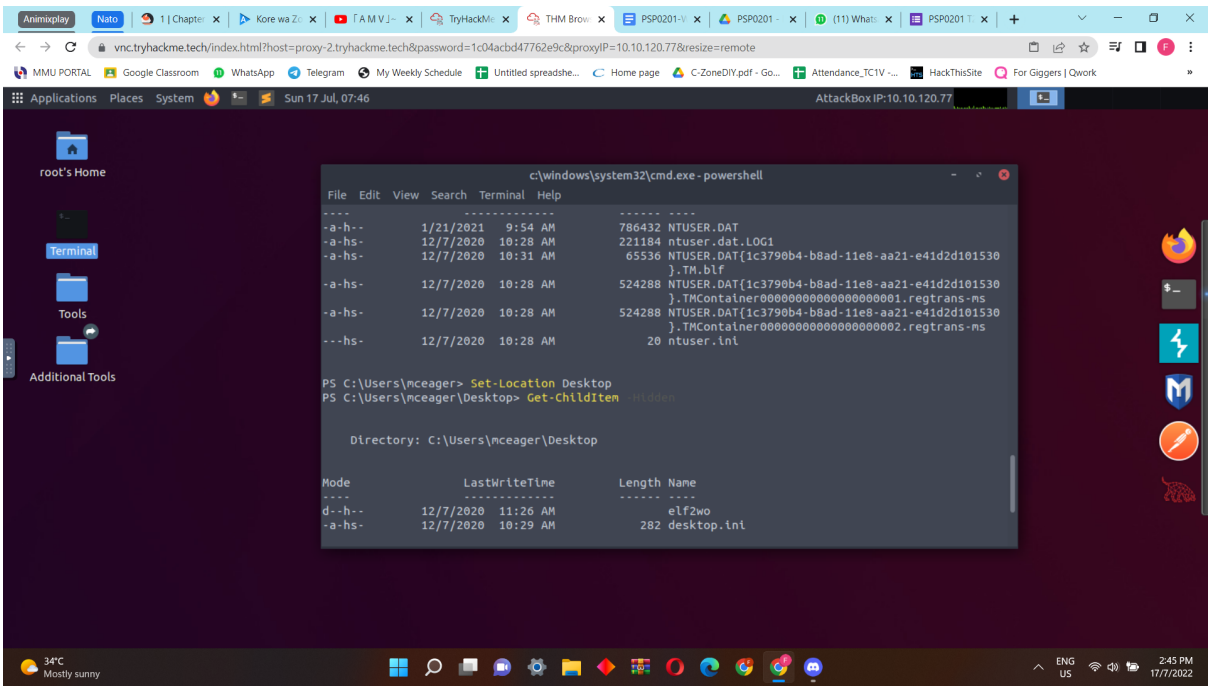
Go into the documents folder by using set-location; to search for the hidden folder, use "Get-ChildItem -Hidden" therefore finding the file and can be retrieved through the cmdlet get-content. The answer for Q2 is '2 front teeth'.



Q3:Search on the desktop for a hidden folder that contains the file for Elf 2. Read the contents of this file. What is the name of that movie that Elf 2 wants?

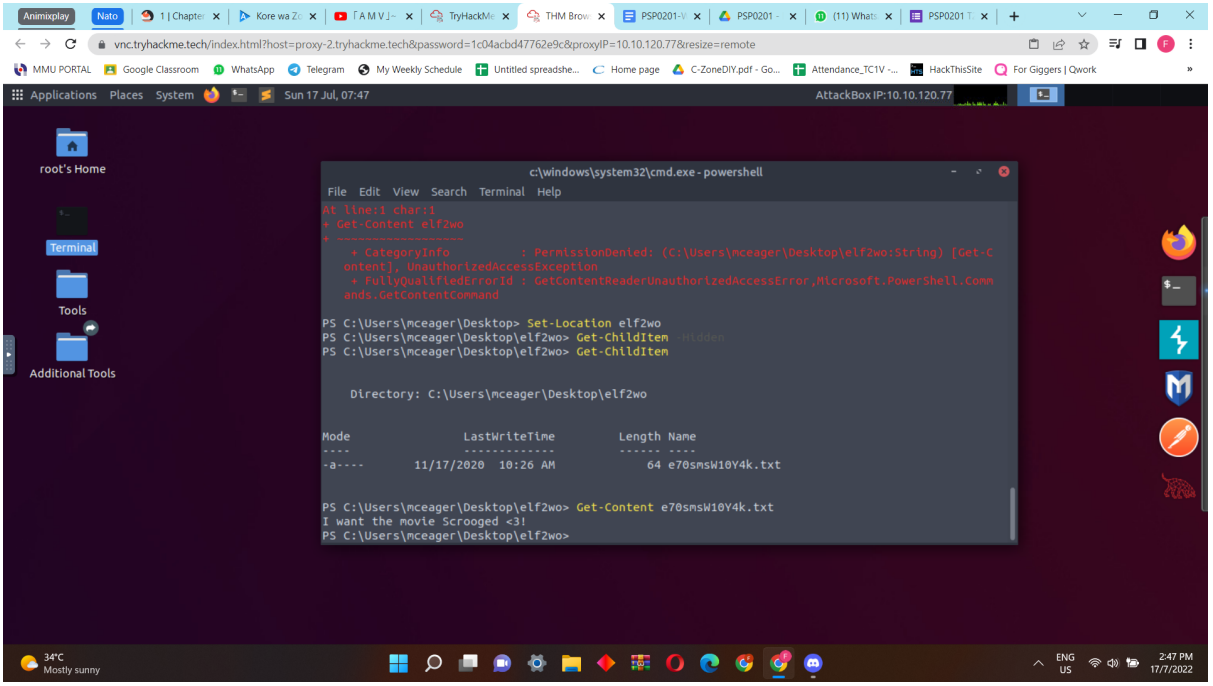
STEP 4

By using cmdlet 'Set-Location' to go to Desktop, we then use cmdlet 'Get-ChildItem -Directory -Hidden' and find the dir elf2wo.



STEP 5 and ANSWER FOR Q3

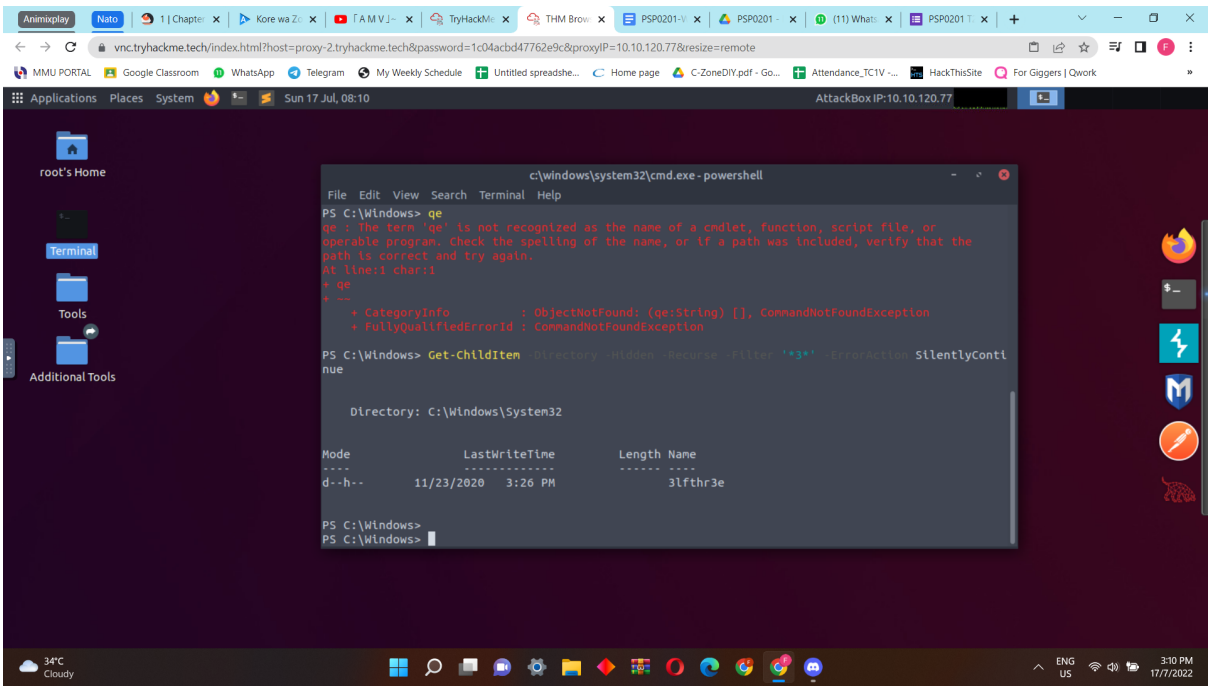
Enter into the directory elf2wo using cmdlet ‘Set-Location’ and use ‘Get-ChildItem -Hidden ‘ to find a file named “e70smsW10Y4K.txt” therefore using get-content cmdlet to get its content.The answer for Q3 is ‘Scrooged’.



Q4: Search the Windows directory for a hidden folder that contains files for Elf 3. What is the name of the hidden folder? (This command will take a while)

STEP 6 and ANSWER FOR Q4

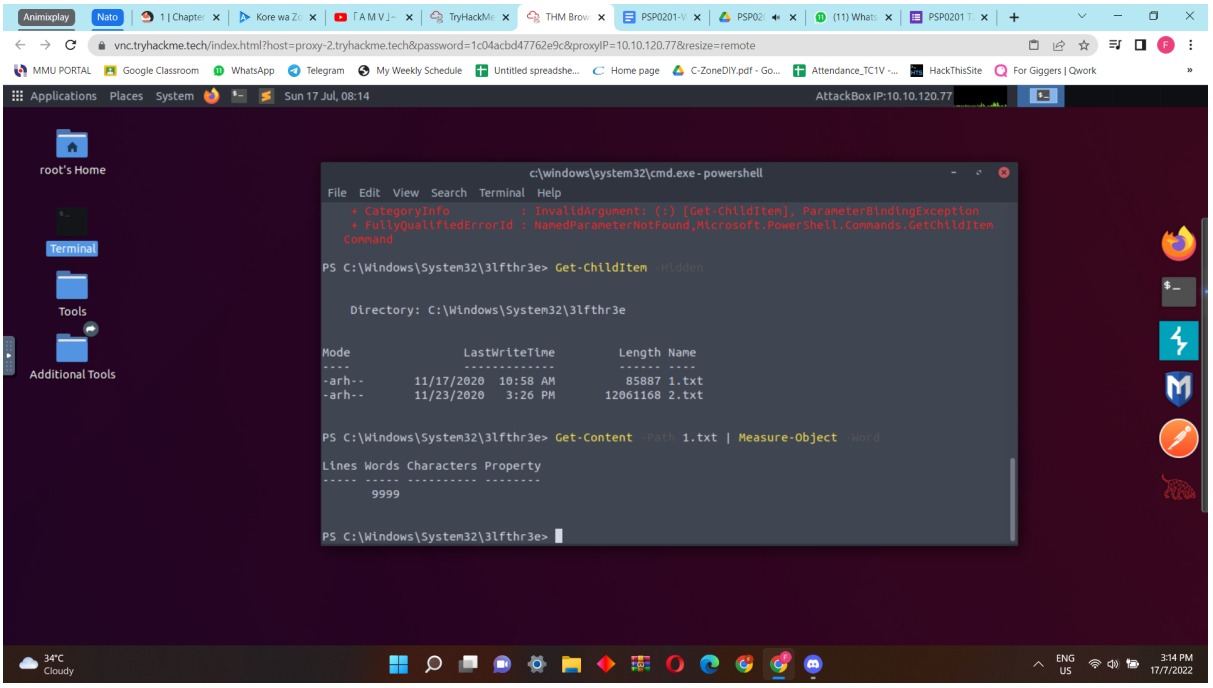
Go to Windows dir using set-locations and use “Get-ChildItem -Directory -Hidden -Recurse -Filter ‘*3*’ -ErrorAction SilentlyContinue” to find the hidden directory. The answer for Q4 is 3lfthr3e.



Q5: How many words does the first file contain?

STEP 7 and ANSWER FOR Q5

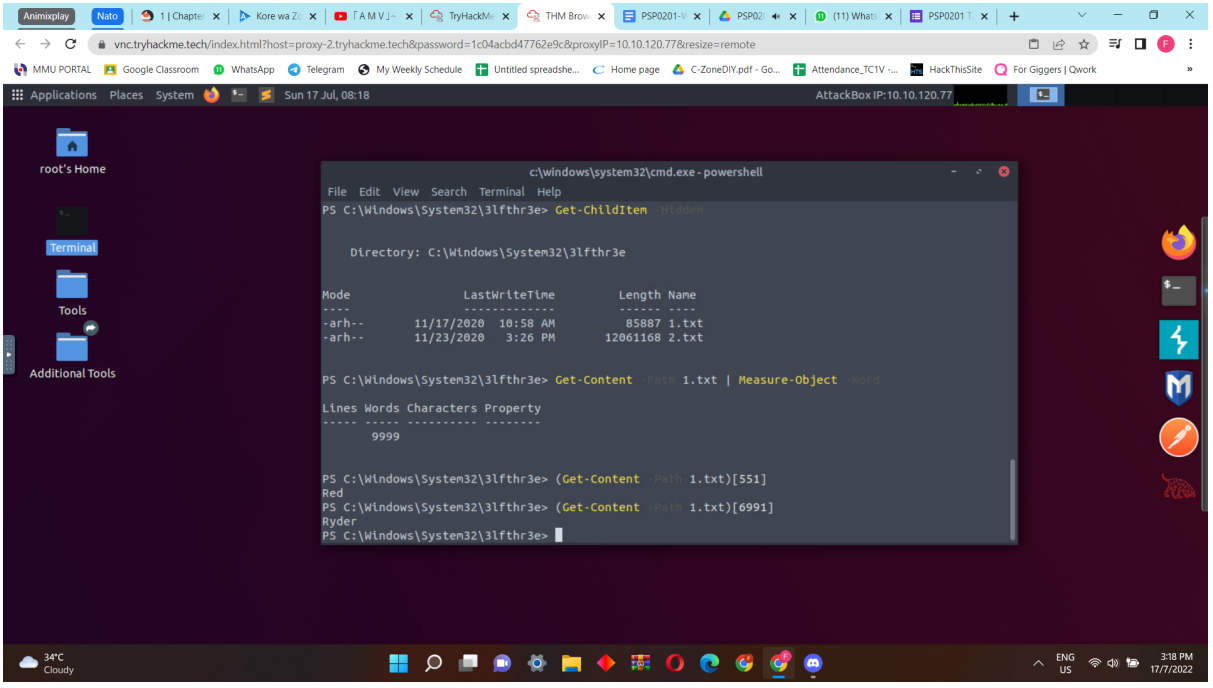
Enter into the directory in Q4 and we will discover 2 files by using cmdlet ‘Get-ChildItem -Hidden’. Use “Get-Content -Path 1.txt | Measure-Object -Word”.The answer for Q5 is 9999.



Q6: What 2 words are at index 551 and 6991 in the first file?

STEP 8 and ANSWER FOR Q6

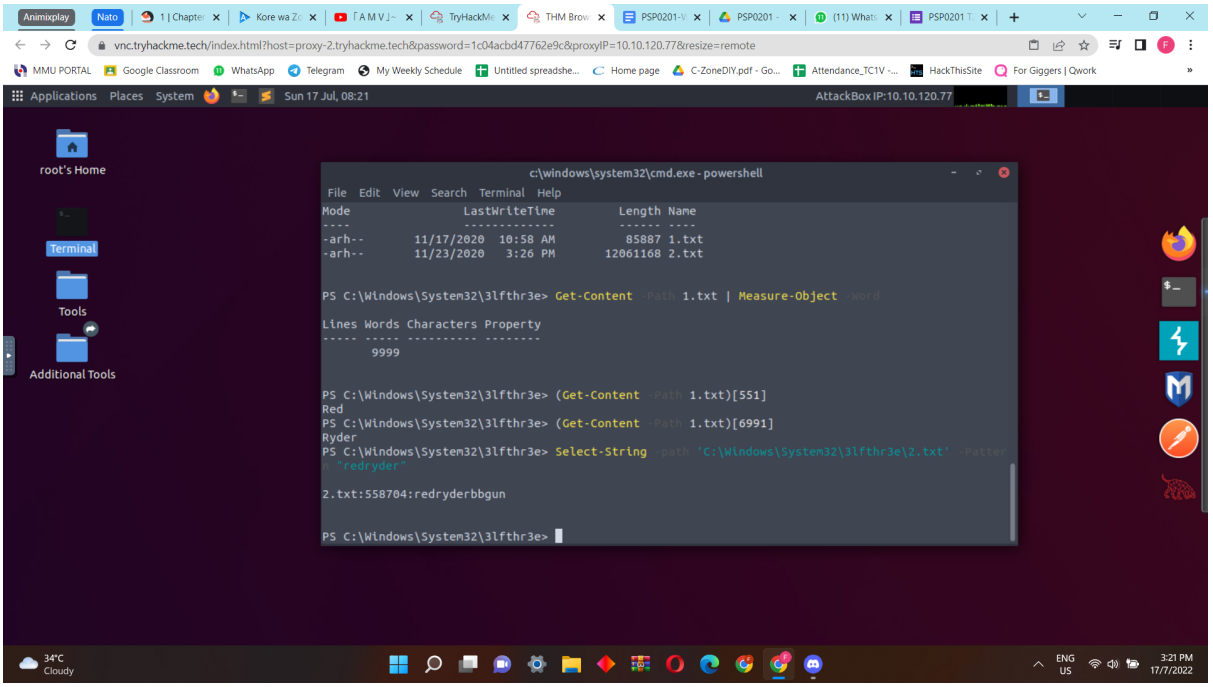
Still in the same directory, use cmdlet”(Get-Content -Path 1.txt)[index]” with indexes 551 and 6991 respectively. The content combine will be the answer for Q6 which is Red Ryder.



Q7: This is only half the answer. Search in the 2nd file for the phrase from the previous question to get the full answer. What does Elf 3 want? (use spaces when submitting the answer)

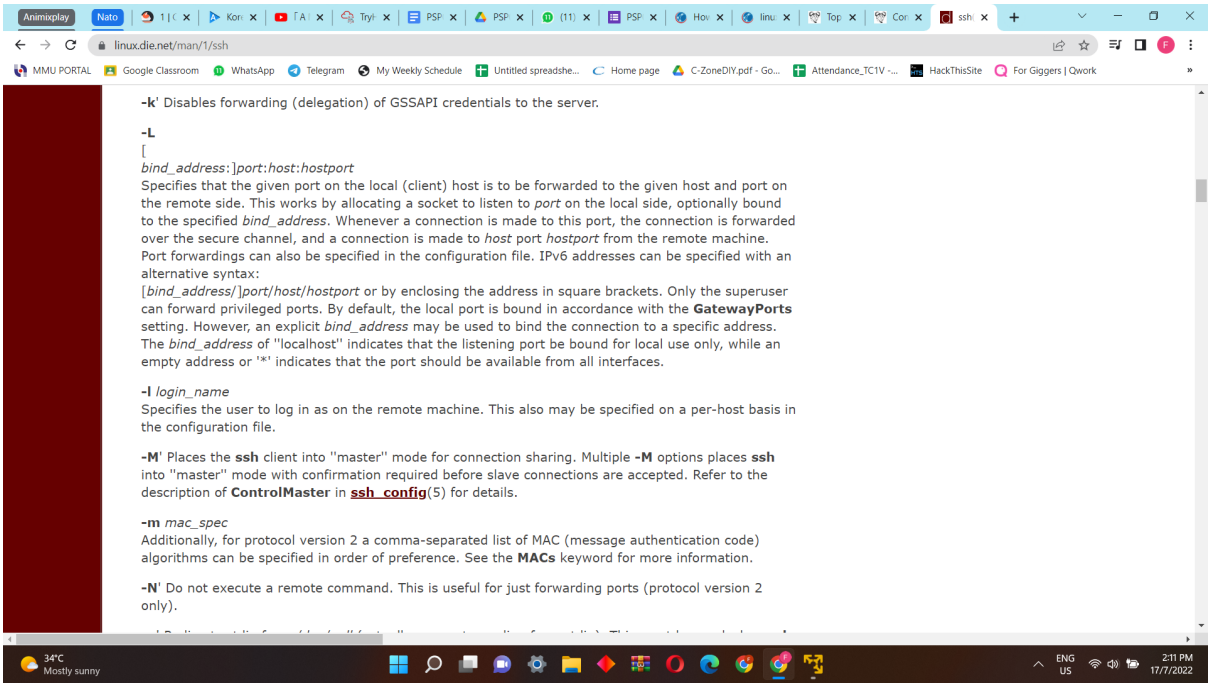
STEP 9 and ANSWER FOR Q7

Use cmdlet, Select-String -path 'C:\Windows\System32\3lfthr3e\2.txt' -pattern "redryder".
The answer for Q7 is 'redryderbbgun'.



Q1: Check the ssh manual. What does the parameter -l do?

The answer is login_name.



Thought Process/Methodology:

In this task, we were introduced to 3 cmdlet for usage in powershell “Get”, “Set” and “Select” with their own respective parameters. By using those provided cmdlet, we were able to scour through the elf mceager machine with ease using “set-location”, finding hidden files and directory and review its content using “Get” and selecting a specific string from a long text using “select-string”. Back to the start, since we can’t use remmina, we were forced to connect to elf mceager windows using ssh since we were not provided with any other alternative in accordance to the task.