Crocodile Write-up

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Introduction

Tier I is all about exploitation vectors that chain together to offer you the possibility of gaining a foothold on the target from one service to another. Credentials could be lost somewhere in a publicly accessible folder which would let you login through a remote shell left untended and unmonitored. A misconfigured service could be leaking information that might allow you to impersonate the digital identity of a victim. Any number of possibilities exist in the real world. However, we will start with some simpler ones.

Tackling an example sewed together from two other previous targets, we will be looking at an insecure access configuration on FTP and an administrative login for a website. Let us proceed to deconstruct this vector and analyze its' components.

Enumeration

We will start by enumerating the target. Our first step is, as always, a thorough nmap scan. By using the following two switches for the scan, we ensure that our nmap script analyses the service being run on any port found in the `open` state and returns a mostly exact service version value in the output and that all of the default analysis scripts are run against the target, as we are not constrained on how intrusive we can be with our scan. Running the scan as mentioned, we can receive results as seen below, with snippets of directories the scan has even found for us!

```
-sC: Performs a script scan using the default set of scripts. It is equivalent to --
script=default. Some of the scripts in this category are considered intrusive and
should not be run against a target network without permission.

-sV: Enables version detection, which will detect what versions are running on what
port.
```

```
$ sudo nmap -sC -sV {target_IP}

Starting Nmap 7.91 ( https://nmap.org ) at 2021-07-09 11:48 CEST
Nmap scan report for {target_IP}
Host is up (0.21s latency).
Not shown: 998 closed ports
PORT   STATE SERVICE VERSION
21/tcp open  ftp     vsftpd 3.0.3
| ftp-anon: Anonymous FTP login allowed (FTP code 230)
| -rw-r--r--    1 ftp      ftp            33 Jun 08 10:58 allowed.userlist
|_-rw-r--r--    1 ftp      ftp            62 Apr 20 11:32 allowed.userlist.passwd
| ftp-syst:
|   STAT:
| FTP server status:
|      Connected to ::ffff:{user_IP}
|      Logged in as ftp
|      TYPE: ASCII
|      No session bandwidth limit
|      Session timeout in seconds is 300
|      Control connection is plain text
|      Data connections will be plain text
|      At session startup, client count was 2
|      vsFTPd 3.0.3 - secure, fast, stable
|_End of status
80/tcp open  http    Apache httpd 2.4.41 ((Ubuntu))
|_http-server-header: Apache/2.4.41 (Ubuntu)
|_http-title: Smash - Bootstrap Business Template
Service Info: OS: Unix

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 11.67 seconds
```

We have two open ports: 21 and 80. Port 21 is the port dedicated to FTP (File Transfer Protocol), meaning that its' primary use is to transfer files between hosts on the same network.

According to Wikipedia, a quick reminder:

```
The File Transfer Protocol (FTP) is a standard communication protocol used to transfer
computer files from a server to a client on a computer network. FTP users may
authenticate themselves with a clear-text sign-in protocol, generally using a username
and password. However, they can connect anonymously if the server is configured to
allow it.
```

Users could connect to the FTP server anonymously if the server is configured to allow it, meaning that we could use it even if we had no valid credentials. If we look back at our nmap scan result, the FTP server is indeed configured to allow anonymous login:

```
ftp-anon: Anonymous FTP login allowed (FTP code 230)
```

If you need a refresher, the `ftp -h` command will help you figure out the available commands for the FTP service on your local host.

```
$ ftp -h

    Usage: { ftp | pftp } [-46pinegvtd] [hostname]
       -4: use IPv4 addresses only
       -6: use IPv6, nothing else
       -p: enable passive mode (default for pftp)
       -i: turn off prompting during mget
       -n: inhibit auto-login
       -e: disable readline support, if present
       -g: disable filename globbing
       -v: verbose mode
       -t: enable packet tracing [nonfunctional]
       -d: enable debugging
```

To connect to the remote FTP server, you need to specify the target's IP address (or hostname), as displayed on the Starting Point lab page. The prompt will then ask us for our login credentials, which is where we can fill in the `anonymous` username. In our case, the FTP server does not request a password, and inputting the `anonymous` username proves enough for us to receive the 230 code, `Login successful`.

```
$ ftp {target_IP}

Connected to {target_IP}.
220 (vsFTPd 3.0.3)
Name ({target_IP}:{username}): anonymous
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.

ftp>
```

Once logged in, you can type the `help` command to check the available commands.

```
ftp> help
Commands may be abbreviated.  Commands are:

!           dir         mdelete     qc          site
$           disconnect  mdir        sendport    size
account     exit        mget        put         status
append      form        mkdir       pwd         struct
ascii       get         mls         quit        system
bell        glob        mode        quote       sunique
binary      hash        modtime     recv        tenex
bye         help        mput        reget       tick
case        idle        newer       rstatus     trace
cd          image       nmap        rhelp       type
cdup        ipany       nlist       rename      user
chmod       ipv4        ntrans      reset       umask
close       ipv6        open        restart     verbose
cr          lcd         prompt      rmdir       ?
delete      ls          passive     runique
debug       macdef      proxy       send
```

We will use `dir` and `get` to list the directories and manipulate the files stored on the FTP server. With the `dir` command, we can check the contents of our current directory on the remote host, where two interesting files catch out attention. They seem to be files left over from the configuration of another service on the host, most likely the HTTPD Web Server. Their names are descriptive, hinting towards a possible username list and associated passwords.

```
ftp> dir

200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rw-r--r--    1 ftp      ftp            33 Jun 08 10:58 allowed.userlist
-rw-r--r--    1 ftp      ftp            62 Apr 20 11:32 allowed.userlist.passwd
226 Directory send OK.
```

Both files can easily be downloaded using the `get` command. The FTP service will report the download status completion back to you during this phase. It should not take long to have them both sitting snuggly on your attacking VM.

```
ftp> get allowed.userlist

local: allowed.userlist remote: allowed.userlist
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for allowed.userlist (33 bytes).
226 Transfer complete.
33 bytes received in 0.00 secs (257.8125 kB/s)

ftp> get allowed.userlist.passwd

local: allowed.userlist.passwd remote: allowed.userlist.passwd
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for allowed.userlist.passwd (62 bytes).
226 Transfer complete.
62 bytes received in 0.00 secs (126.6671 kB/s)
```

Termination of the FTP connection can be done by using the `exit` command. This will return the current terminal tab to its' previous state.

```
ftp> exit

221 Goodbye.
```

Immediately after exiting the FTP service shell, we can type in the `ls` command to check if our files are present in the directory we were last positioned in. In order to read their contents and discover and usernames and passwords within, we can use the `cat` command, followed by the name of the file we want to open.

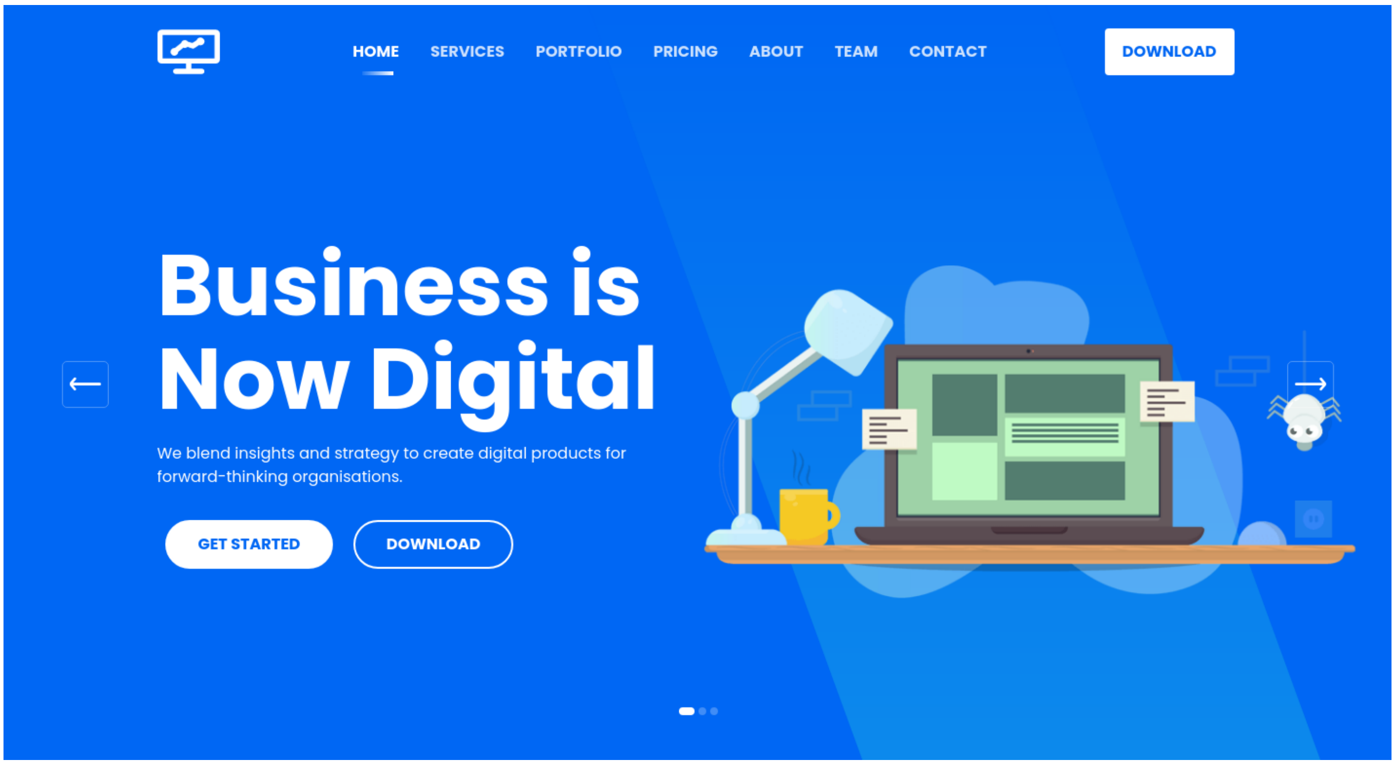
```
$ cat allowed.userlist

aron
pwnmeow
egotisticalsw
admin

$ cat allowed.userlist.passwd

root
Supersecretpassword1
@BaASD&9032123sADS
rKXM59ESxesUFHAd
```

Foothold

After the credentials have been obtained, the next step is to check if they are used on the FTP service for elevated access or the webserver running on port 80 discovered during the nmap scan. Attempting to log in with any of the credentials on the FTP server returns error code `530 This FTP server is anonymous only`. No luck here, so we can exit the FTP service shell.

```
$ ftp {target_IP}

Connected to {target_IP}.
220 (vsFTPd 3.0.3)
Name ({target_IP}:{username}): aron
530 This FTP server is anonymous only.
Login failed.

ftp> exit
221 Goodbye.
```

However, we have one option left. During the nmap scan, the service running on port 80 was reported as `Apache httpd 2.4.41`, an Apache HTTP server. Typing in the IP address of the target into our browser's URL search bar results in this webpage. It seems to be a storefront for a server hosting company.

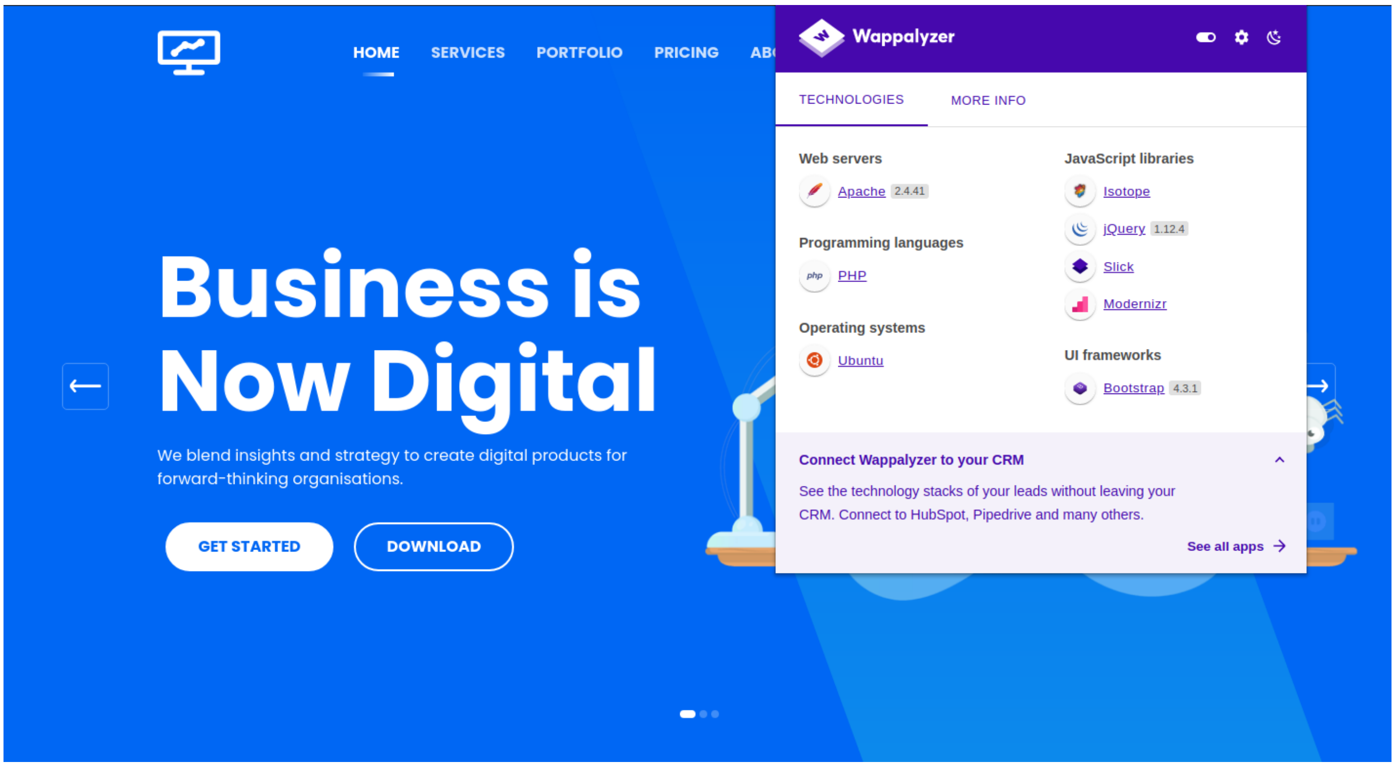


Reading about the target is helpful, but only at a surface level. In order to gain more insight into the technology they have used to create their website and possibly find any associated vulnerabilities, we can use a handy browser plug-in called Wappalyzer. This plug-in analyzes the web page's code and returns all the different technologies used to build it, such as the webserver type, JavaScript libraries, programming languages, and more. You can press the links below to add the plug-in to your browser of choice.

Add me to Chrome!

Add me to Firefox!

Once installed, you can access Wappalyzer by pressing on its' icon at the top right of the browser window. Below are the results for our current target.



Web servers
Apache 2.4.41

Programming languages
PHP

Operating systems
Ubuntu

JavaScript libraries
Isotope
jQuery 1.12.4
Slick
Modernizr

UI frameworks
Bootstrap 4.3.1

Connect Wappalyzer to your CRM
See the technology stacks of your leads without leaving your CRM. Connect to HubSpot, Pipedrive and many others.
See all apps →

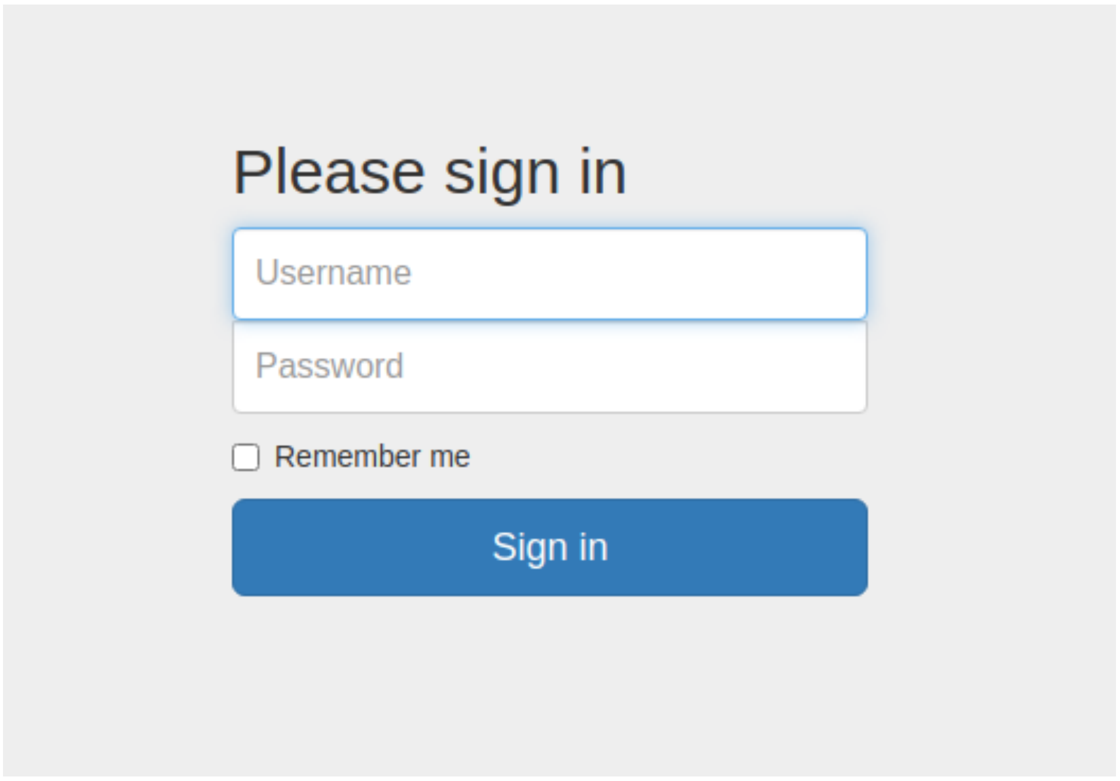
From the output of Wappalyzer, we can note some of the more interesting items, specifically the PHP programming language used to build the web page. However, nothing gives us a direct plan of attack for now. Meanwhile, navigating around the page using the tabs and buttons provided on it leads us nowhere. Referencing previous write-ups, there is mention of a different, more direct way of navigating any hidden or hardly accessible directories and pages, and that is through dir busting. Using gobuster as our tool of choice, we can use the following switches for the script to get the fastest, most accurate results.

```
dir : Uses directory/file enumeration mode.
--url : The target URL.
--wordlist : Path to the wordlist.
-x : File extension(s) to search for.
```

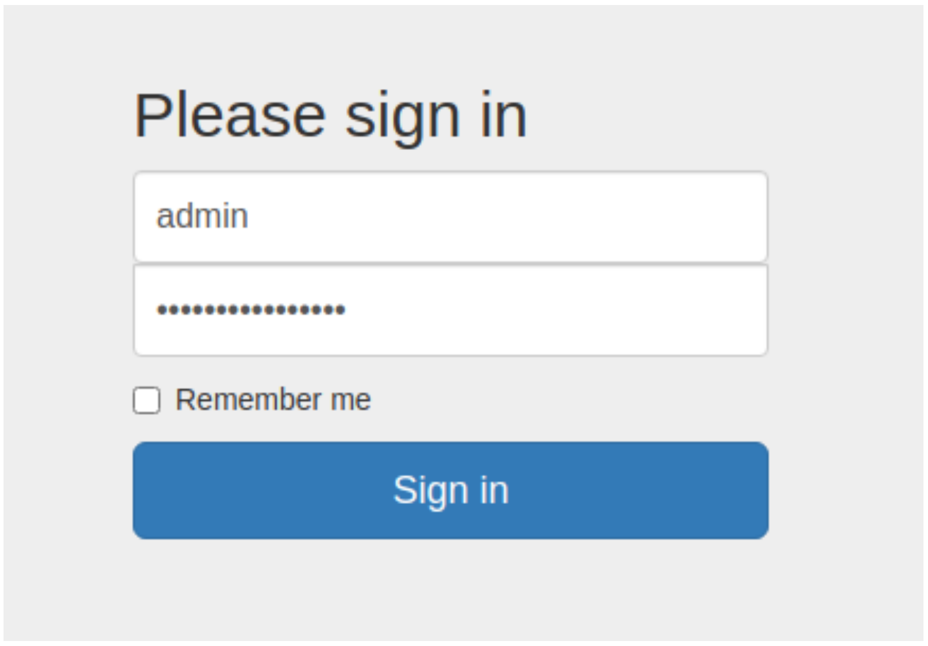
For the `-x` switch, we can specify `php` and `html` to filter out all the unnecessary clutter that does not interest us. PHP and HTML files will most commonly be pages. We might get lucky and find an administrative panel login page that could help us find leverage against the target in combination with the credentials we extracted from the FTP server.

```
$ gobuster dir --url http://{target_IP}/ --wordlist /usr/share/wordlists/dirbuster
/directory-list-2.3-small.txt -x php,html

===============================================================
Gobuster v3.1.0
by OJ Reeves (@TheColonial) & Christian Mehlmauer (@firefart)
===============================================================
[+] Url:                     http://{target_IP}/
[+] Method:                  GET
[+] Threads:                 10
[+] Wordlist:                /usr/share/wordlists/dirbuster/directory-list-2.3-small.txt
[+] Negative Status codes:   404
[+] User Agent:              gobuster/3.1.0
[+] Extensions:              php,html
[+] Timeout:                 10s
===============================================================
2021/07/09 12:56:23 Starting gobuster in directory enumeration mode
===============================================================
/index.html           (Status: 200) [Size: 58565]
/login.php            (Status: 200) [Size: 1577]
/assets               (Status: 301) [Size: 311] [--> http://{target_IP}/assets/]
/css                  (Status: 301) [Size: 308] [--> http://{target_IP}/css/]
/js                   (Status: 301) [Size: 307] [--> http://{target_IP}/js/]
/logout.php           (Status: 302) [Size: 0] [--> login.php]
/config.php           (Status: 200) [Size: 0]
/fonts                (Status: 301) [Size: 310] [--> http://{target_IP}/fonts/]
/dashboard            (Status: 301) [Size: 314] [--> http://{target_IP}/dashboard/]

===============================================================
2021/07/09 13:22:08 Finished
===============================================================
```

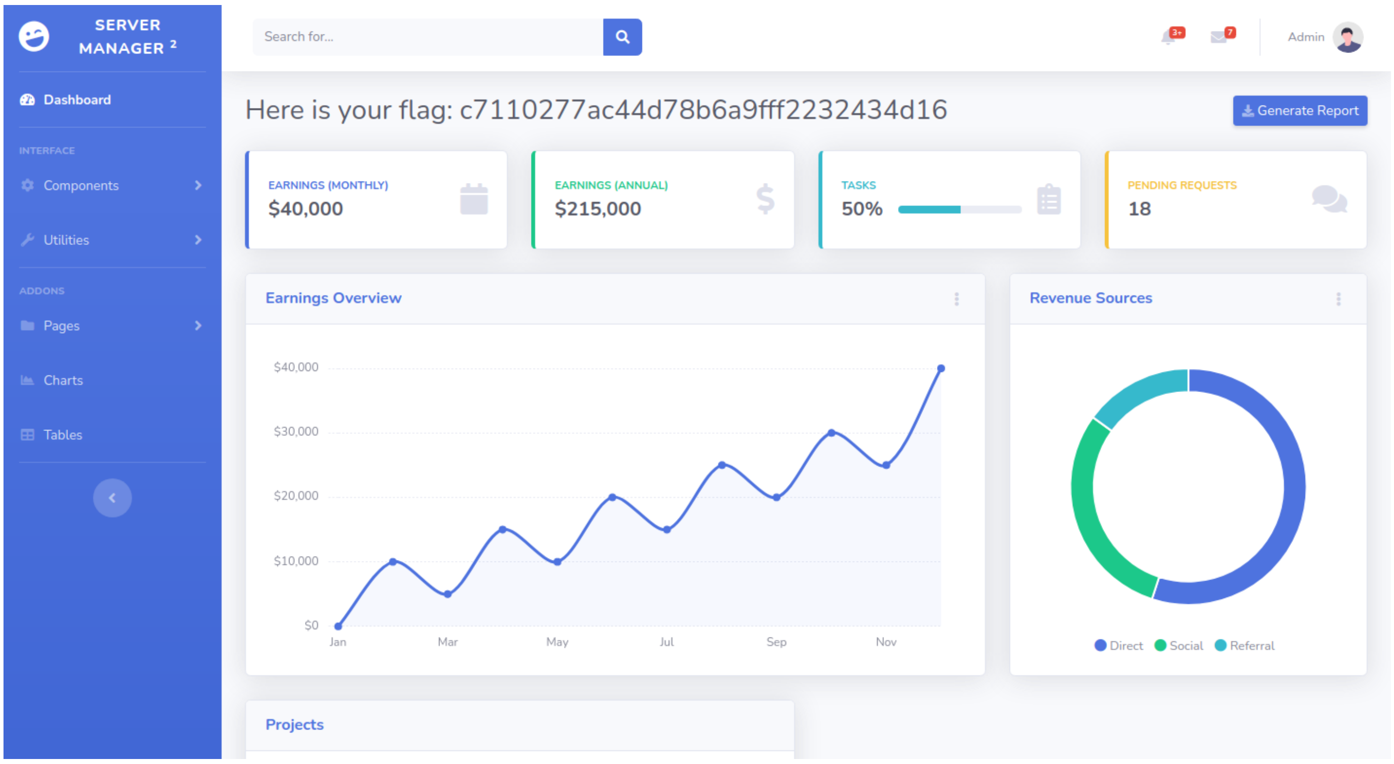
One of the most interesting files gobuster retrieved is the `/login.php` page. Navigating manually to the URL, in the form of `http://{target_IP}/login.php`, we are met with a login page asking for a username/password combination.



If the lists of credentials we found had been longer, we could have used a Metasploit module or a login brute-force script to run through combinations from both lists faster than manual labor. In this case, however, the lists are relatively small, allowing us to attempt logging in manually.



After attempting several username/password combinations, we manage to log in and are met with a Server Manager admin panel. Once here, an attacker could manipulate the website in whichever way they desired, causing havoc for the userbase and owners or extract more information that would assist them with gaining a foothold on the servers hosting the web page.



Here is your flag: c7110277ac44d78b6a9fff2232434d16

EARNINGS (MONTHLY)	$40,000
EARNINGS (ANNUAL)	$215,000
TASKS	50%
PENDING REQUESTS	18

We successfully got the flag! It is displayed for us at the top of the admin panel.

Well done!