Faculty Writeup

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Figure 1: Hack the Box Logo

- **Author**: Felicitas Pojtinger (fp036)
- **Dificulty**: Medium
- **Target**: 10.10.11.169
- **Proof of pwn**:
  https://www.hackthebox.com/achievement/machine/370951/480

Disclaimer

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I hereby confirm that I did not have any kind of assistance during the actual penetration test of the machine, nor with writing this writeup. All methods used are explained, all used resources are linked and ways of success and failure are described. This report was created as submission for HdM Stuttgart's "IT Security: Attack and Defense" course. Sharing or publishing this writeup without written approval is prohibited. There may be other ways to escalate this box and some ways may be patched now as they might not have been intentionally kept open by the box's authors. IPs and other metadata on screenshots and within the quoted and attached notes might differ, due to taking additional screenshots after the initial hacking.

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Preface and Personal Statement

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Faculty is a Linux-based machine created by HTB user gbyolo. It was originally published on July 2nd, 2022 and is rated at medium dificulty.

The machine is CTF-like. This is mostly due to it running a fully custom, purpose-built software and it using some arcane tools to provide hints, such as the UNIX mail system. The custom software is written in PHP, which I used for projects at my job and has been used in quite a few machines we've worked on in the CTF team, which was nice to see.

The user flag was pwned within roughly 4 days; this could have been done much more quickly, but lots of dead ends that seemed promising at first glance led to lots of time being wasted while trying to crack hashes. The root flag however was almost trivial to achieve and I managed to get it in under an hour, mostly because quite a lot of embedded Linux experience from my day job was applicable.

Faculty is the first machine that I pwned fully by myself; all other

Skills Required

Skills Required

In order to pwn the user flag, knowledge of Linux, a surface-level understanding of PHP, SQL injection and file inclusion is required. Once a shell has been acquired, remote code execution and the GNU Debugger help escalate to the root flag.

Conspectus

Conspectus

Faculty exposes a custom PHP faculty scheduling system served by a Nginx webserver running on Ubuntu. Through fuzzing with `ffuf` we can find an admin area, which is vulnerable to SQL injection. Using sqlmap, the login form can be bypassed, after which access to a faculty list is granted. This list and others can be downloaded as a PDF; the used generator is an old version of mpdf, which has a file injection vulnerability. Using this vulnerability, we can fetch arbitray files from the server's filesystem. By causing the server to display a stack trace, we can get the app's source code directory, from which we first fetch the database connection file. It contains a hardcoded password and username, which are also both being used as the SSH credentials. Once SSH access is granted as user gbyolo, we can exploit a remote code execution vulnerability in the installed NPM package meta-git to escalate to user developer by downloading the relevant SSH private key and logging in over SSH again, which allows us to get the user flag. In order to get the root flag, we use a preinstalled

Information Gathering

Information Gathering

First, I used nmap to get the services which are running on the machine:

```
$ nmap -v -p- 10.10.11.169
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-12 14:39
Initiating Ping Scan at 14:39
Scanning 10.10.11.169 [2 ports]
Completed Ping Scan at 14:39, 0.03s elapsed (1 total hosts)
Initiating Parallel DNS resolution of 1 host. at 14:39
Completed Parallel DNS resolution of 1 host. at 14:39, 0.02s
Initiating Connect Scan at 14:39
Scanning 10.10.11.169 [65535 ports]
Discovered open port 80/tcp on 10.10.11.169
Discovered open port 22/tcp on 10.10.11.169
```

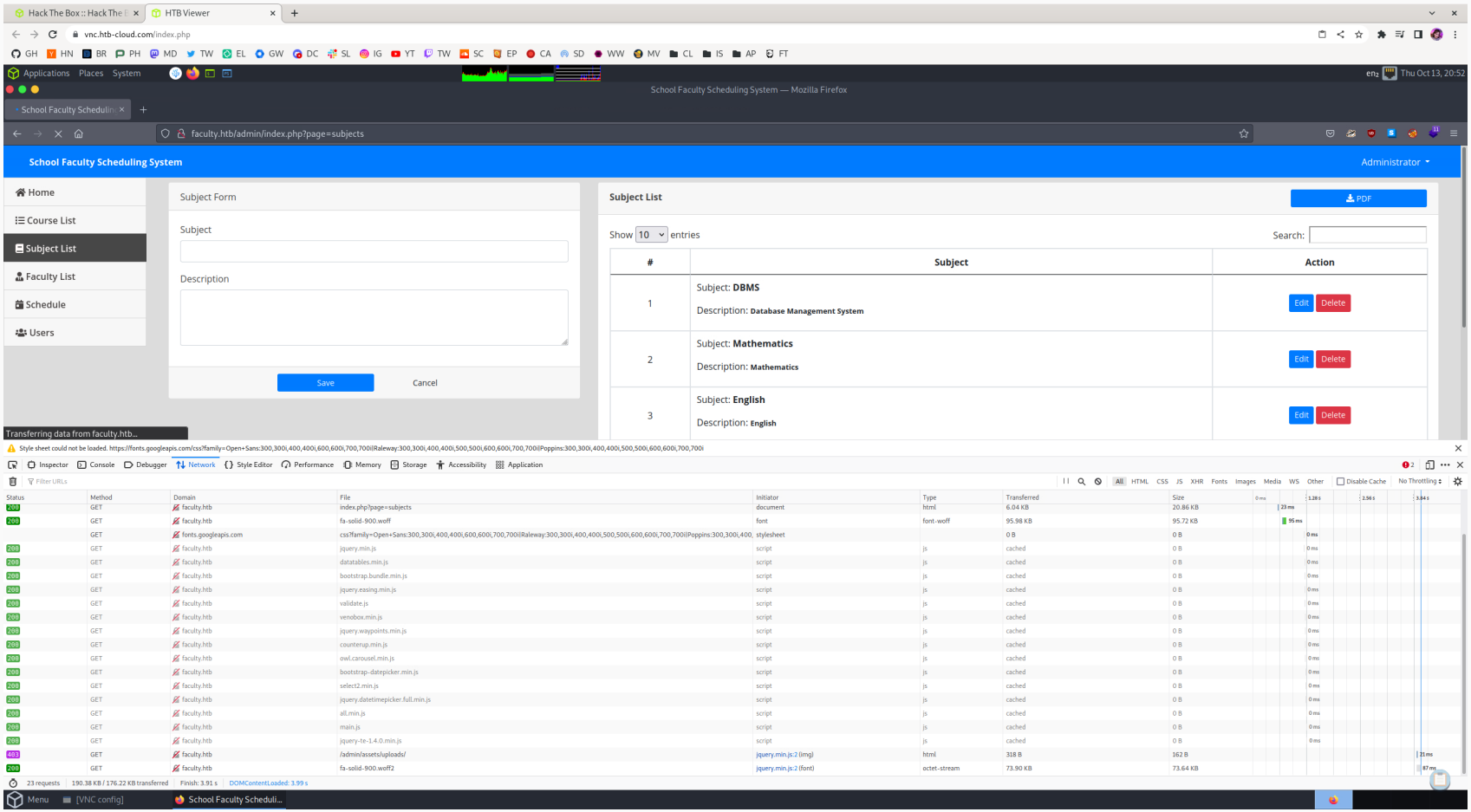
Both port 80 (HTTP) and 22 (SSH) are open.

To access the services, I added the hostname to /etc/hosts:

Exploitation

Exploitation

For the actual exploitation, I used a SQL injection vulnerability on http:// faculty .htb/admin with the username (or password) ' OR 1=1#, which evaluates the expression to always be true.



User Flag

User Flag

The password matched for the user gbyolo:

```
$ ssh gbyolo@10.10.11.169
gbyolo@10.10.11.169's password:
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.4.0-121-generic x8

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

  System information as of Thu Oct 13 20:36:01 CEST 2022

  System load:           0.01
  Usage of /:            82.5% of 4.67GB
  Memory usage:          44%
  Swap usage:            0%
```

Root Flag

Root Flag

In the user directory, a copy of gdb could be found:

```
$ ls -la
total 8292
drwxr-x--- 6 developer developer    4096 Oct 13 11:36 .
drwxr-xr-x 4 root      root         4096 Jun 23 18:50 ..
lrwxrwxrwx 1 developer developer       9 Oct 24
2020 .bash_history -> /dev/null
-rw-r--r-- 1 developer developer     220 Oct 24
2020 .bash_logout
-rw-r--r-- 1 developer developer    3771 Oct 24
2020 .bashrc
drwx------ 2 developer developer    4096 Jun 23 18:50 .cache
drwx------ 3 developer developer    4096 Oct 13 09:52 .gnupg
drwxrwxr-x 3 developer developer    4096 Jun 23 18:50 .local
-rw-r--r-- 1 developer developer     807 Oct 24
```