

Faculty Writeup

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Hack The Box
PEN-TESTING LABS

Figure 1: Hack the Box Logo

- **Author:** Felicitas Pojtinger (fp036)
- **Difficulty:** 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 difficulty.

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

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 arbitrary 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

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-
Initiating Ping Scan at 14:39
Scanning 10.10.11.169 [2 ports]
Completed Ping Scan at 14:39, 0.03s elapsed (1 total)
Initiating Parallel DNS resolution of 1 host. at 14:39
Completed Parallel DNS resolution of 1 host. at 14:39
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.

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.

The screenshot shows a web browser window with the URL `http://10.10.10.10:8080/faculty.htb/admin`. The page displays the 'School Faculty Scheduling System' interface. On the left, there is a sidebar with navigation links: Home, Course List, Subject List (selected), Faculty List, Schedule, and Users. The main content area is titled 'Subject List' and shows a table of subjects. The table has columns for '#', 'Subject', and 'Action'. The subjects listed are:

#	Subject	Action
1	Subject: DBMS Description: Database Management System	Add Delete
2	Subject: Mathematics Description: Mathematics	Add Delete
3	Subject: English Description: English	Add Delete

Below the table, there is a 'Show' dropdown set to '10 entries' and a 'Search' input field. At the bottom of the browser window, the DevTools console shows a message: 'Exploiting data from faculty.htb:'. The status bar at the bottom indicates '20 requests' and '100% (100%)'.

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-
```

- * 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
```

```
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 11:30
```

```
drwxr-xr-x 4 root root 4096 Jun 23 18:30
```

```
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 18:30
```

```
drwx----- 3 developer developer 4096 Oct 13 09:30
```

```
drwxrwxr-x 3 developer developer 4096 Jun 23 18:30
```

```
-rw-r--r-- 1 developer developer 807 Oct 24
```