LOCKED ADMIN PANEL

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1. DESCRIPTION

This time you must investigate a recent attack on your web server. Attackers have dropped some password-protected site there. Your friends from Incident Response Department managed to get network capture file from one of the attackers' computers.

Check out the file and see if you can figure out how to access the site.

The PCAP is here: http://<target>/capture.pcapng and the site is at http://<target>:85/

2. CHALLENGE SPECIFICATIONS

- Categroty: Forensics
- Difficulty: Medium
- Estimated time: 30-60 min

3. QUESTIONS AND ANSWERS

3.1 WHAT FLAG IS DISPLAYED UPON SUCCESSFUL LOGIN?

icsc{Adm1nP@g3F@g}

4. SETUP INSTRUCTIONS

Dockerfile and *docker-compose.yml* are provided to run the task in a container. Multiple parameters can be given through docker-compose environment, see **.env**:

```
$ cat .env
TARGETPORT=85
PCAPPORT=80
FLAG=icsc{Adm1nP@g3F@g}
ACCOUNT=icscadmin
PASSWORD=Onc3@g@1nW3n33d@P@ssw0$d
```

TARGETPORT is where the admin panel is listening. *PCAPPORT* is another HTTP service that is just serving the PCap file. *ACCOUNT* and *PASSWORD* are credentials to log in to the service.

NOTE: DEFAULT VALUES OF ACCOUNT AND PASSWORD MATCH TO KEYSTROKES IN PCAP. IF THESE ARE CHANGED, PCAP MUST BE ADJUSTED ACCORDINGLY!

Run the container with:

```
docker-compose up --build
```

FLAG, ACCOUNT and PASSWORD are inserted to container at build time, ports are mapped at start-up.

4.1 CREATING NEW PCAP FILE

The *capture.pcapng* is created using Wireshark and USBpcap. It can be recreated with few steps:

1. Install USBPcap and Wireshark
2. Unplug any unnecessary USB devices
3. Start Wireshark, capture from USB and network simultaneously
4. Connect to target with browser
5. Log in to the admin page with known credentials. To make task more fun, attempts with wrong password or correction of typos (arrows, backspaces, etc) can be inserted.
6. Inspect HTTP packets in the captured traffic and filter out packets that contain submission of the form
7. Save the filtered traffic

5. ARTIFACTS PROVIDED

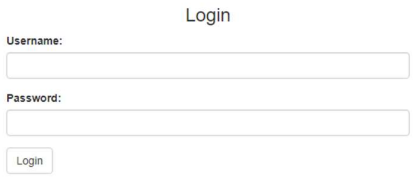
File	SHA-256
locked-admin.tar.gz	4ca02d6a96b3f4a166834b16efc4bd1ad101128b43ccfdd000ad18b68f3e79bf

6. TOOLS NEEDED

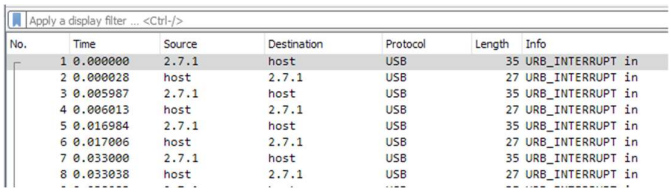
- Wireshark
- Scripting language, e.g., Pyhton with scapy module

7. WALKTHROUGH

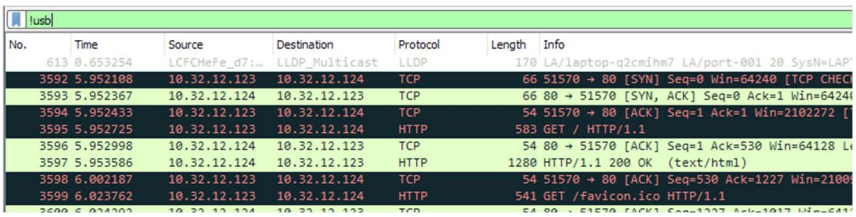
Look at the target with browser. It is a login page:



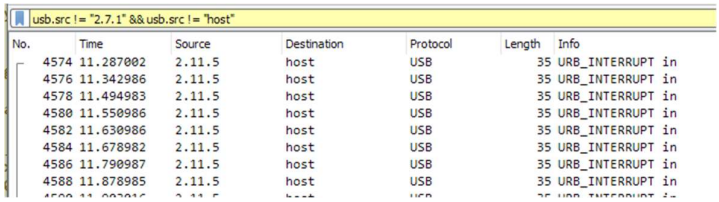
Look at the provided PCap:



It contains USB traffic. When this is filtered out, some HTTP can be noticed also:



HTTP traffic contains the same admin panel, but password is not found there. Moving back to USB traffic. We can see communication with two devices – 2.7.1 and 2.11.5:



Let's make a wild guess that either of these is a keyboard. Since the input from keyboard is not printable strings, but events with scan-codes, a script is necessary to process this data.

Let's take device 2.11.5 first as it has sent less packets.

```
for p in rdpcap('capture.pcapng'):
    if not p.haslayer(usb.USBpcap) \
            or p[usb.USBpcap].bus != 2 \
            or p[usb.USBpcap].device != 11 \
            or (p[usb.USBpcap].endpoint & 0x7f) != 5 \
            or len(p[usb.USBpcap].payload) == 0:
        continue
```

Packet from USB HID is 6 bytes:

- Modifier
- Reserved
- up to 4 keys that can be simultaneously pressed

The parsing can be easily done with dictionaries in Python:

```
modifiers = { 0x80:"<LeftCtrl>", 0x40:"<AltGr>", ... }
chars = { 0x04:"a", 0x05:"b", ... }
payload = bytes(p[usb.USBpcap].payload)
if load[2]:
    if load[0]:
        flag.extend([modifiers[m] for m in modifiers if load[0] & m])
    flag.append(chars[load[2]])
```

Running such script gives output like this:

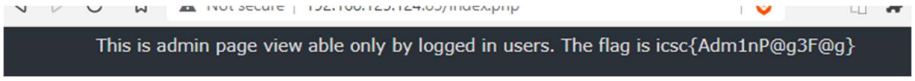
```
$ python3 solver.py
admin<TAB>pass<BS><BS>ssword<RET>icscadmin<TAB>0nc3<HOME><DEL><RightShift>o<END><AltGr>2g<AltGr>2i
n<LEFT><BS>1<RIGHT><RightShift>w3need<LEFT><BS><BS>33<END><AltGr>2p<AltGr>2<LEFT><BS><RightShift>p
<RIGHT>sswo<BS>0<AltGr>4d<LeftShift>1<BS><RightShift>-<BS>
```

This must now be correlated with the web form – as you can see there are <TAB> and <RET> keys pressed which mean jumping between fields and submitting the form.

Eventually a set of usernames and passwords can be found.

There is one trick though – the PCap does not include any information about keyboard layout that was used during capture. This must be figured out by trial and error.

Once the password is guessed, you get the flag from target server:



Done.

8. REFERENCES

https://gist.github.com/MightyPork/6da26e382a7ad91b5496ee55fdc73db2

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