

Malware Unpacking With Memory Dumps - Intermediate Methods (Pe-Sieve, Process Hacker, Hxd and Pe-bear)

embee-research.ghost.io/unpacking-malware-using-process-hacker-and-memory-inspection/

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Intermediate

Demonstrating three additional methods for obtaining unpacked malware samples. Using Process Hacker, Pe-sieve, Hxd and Pe-bear.



In a [previous post](#), we demonstrated a method for unpacking an Asyncrat malware sample by utilising Process Hacker and Dnspy.

We leveraged Process Hacker to identify a suspicious process, then utilised Dnspy to attach to the process and enumerate loaded modules. From there we were able to open a suspicious module from memory, which ultimately obtained the unpacked Asyncrat malware sample.

In this post, we'll go over some additional methods for obtaining the same unpacked payload.

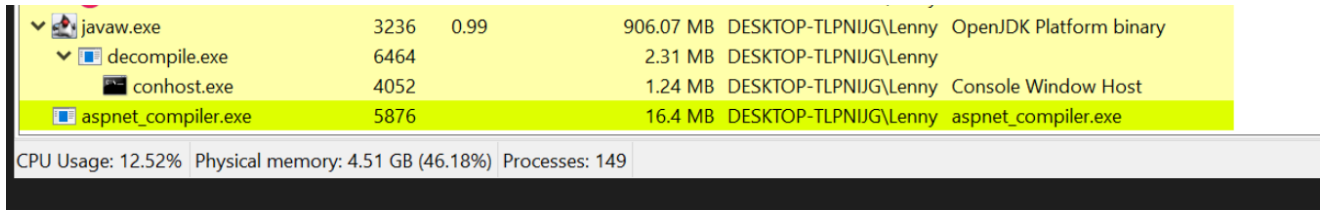
1. Pe-sieve - Directly obtaining the unpacked payload
2. Process Hacker - Monitoring modules and directly dumping memory
3. Process Hacker + X32dbg - Monitoring threads and obtaining the payload using a debugger (x32dbg)

Analysis

We will assume that you have downloaded and unzipped the file from the [previous post](#). You can also [obtain the file here](#).

SHA256: **05c2195aa671d62b3b47ff42630db25f39453375de9cffa92fc4a67fa5b6493b**

We will also assume that you have executed the file inside of a safe virtual machine, which will result in a running process of **aspnet_compiler.exe**. (This is the file which the malware has injected itself into)



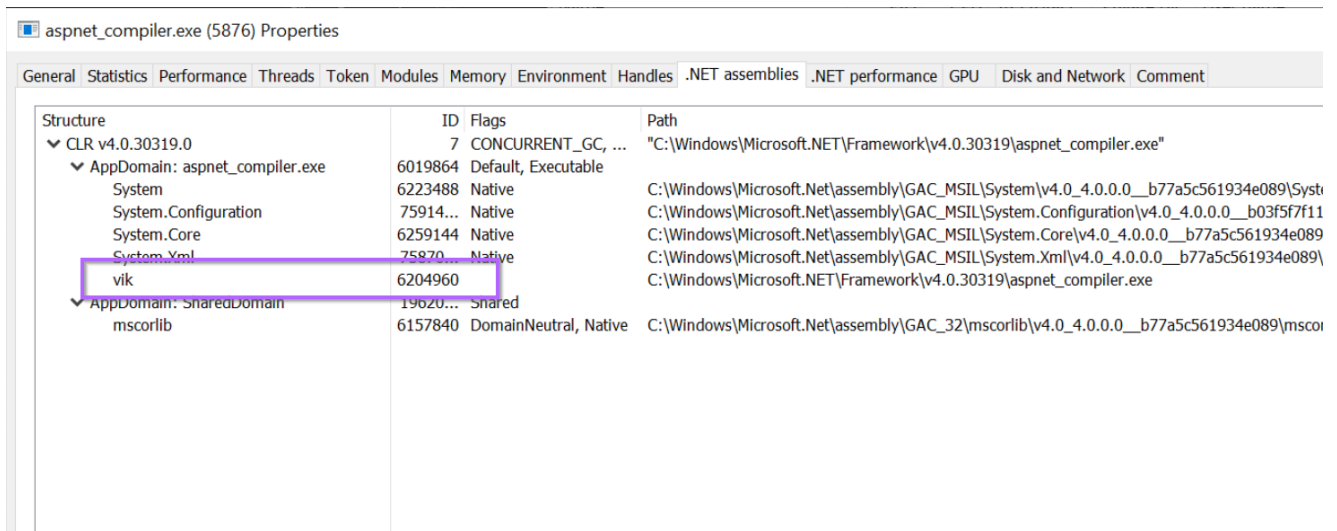
Name	PID	PPID	Working Set	Private Bytes	Working Set	Session Name	Description
javaw.exe	3236	0.99	906.07 MB	DESKTOP-TLPNIJG\Lenny	OpenJDK Platform binary		
decompile.exe	6464		2.31 MB	DESKTOP-TLPNIJG\Lenny			
conhost.exe	4052		1.24 MB	DESKTOP-TLPNIJG\Lenny	Console Window Host		
aspnet_compiler.exe	5876		16.4 MB	DESKTOP-TLPNIJG\Lenny	aspnet_compiler.exe		

CPU Usage: 12.52% Physical memory: 4.51 GB (46.18%) Processes: 149

Recap of Initial Post

In the initial post, we monitored for the creation of **aspnet_compiler.exe** using process hacker.

We then used Process Hacker to view loaded .NET assemblies, which resulted in the identification of a suspicious **vik** module, which appeared to have overwritten the original **aspnet_compiler.exe**

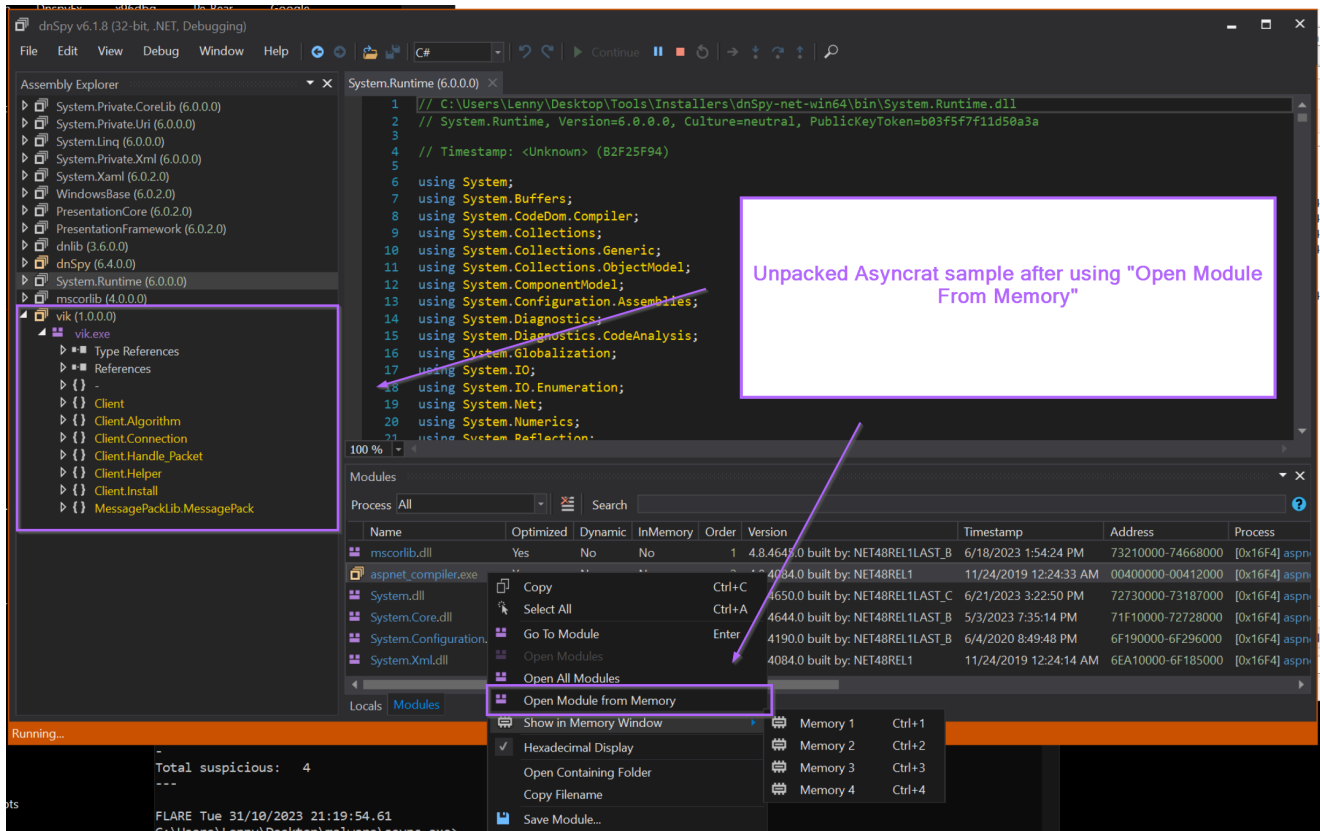


Structure	ID	Flags	Path
CLR v4.0.30319.0	7	CONCURRENT_GC, ...	"C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_compiler.exe"
AppDomain: aspnet_compiler.exe	6019864	Default, Executable	
System	6223488	Native	C:\Windows\Microsoft.Net\assembly\GAC_MSIL\System\v4.0.4.0.0__b77a5c561934e089\System.dll
System.Configuration	75914...	Native	C:\Windows\Microsoft.Net\assembly\GAC_MSIL\System.Configuration\v4.0.4.0.0__b03f5f7f11
System.Core	6259144	Native	C:\Windows\Microsoft.Net\assembly\GAC_MSIL\System.Core\v4.0.4.0.0__b77a5c561934e089
System.Xml	75870...	Native	C:\Windows\Microsoft.Net\assembly\GAC_MSIL\System.Xml\v4.0.4.0.0__b77a5c561934e089\
vik	6204960		C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_compiler.exe
AppDomain: SharedDomain	19620...	Shared	
mscorlib	6157840	DomainNeutral, Native	C:\Windows\Microsoft.Net\assembly\GAC_32\mscorlib\v4.0.4.0.0__b77a5c561934e089\msco

We then used Dnspy to attach to the suspicious **aspnet_compiler.exe** process.

This enabled us to view all loaded modules and open the **aspnet_compiler.exe** file from memory.

By opening the file from memory, we were able to obtain the Asyncrat sample that had overwritten the "real copy" of **aspnet_compiler.exe**



With the recap covered, we will now go over some additional methods that could have been used to obtain the unpacked sample.

These methods work equally as effectively on this particular sample, and also work on samples that are not based on .NET (and hence where Dnspy would not be able to work).

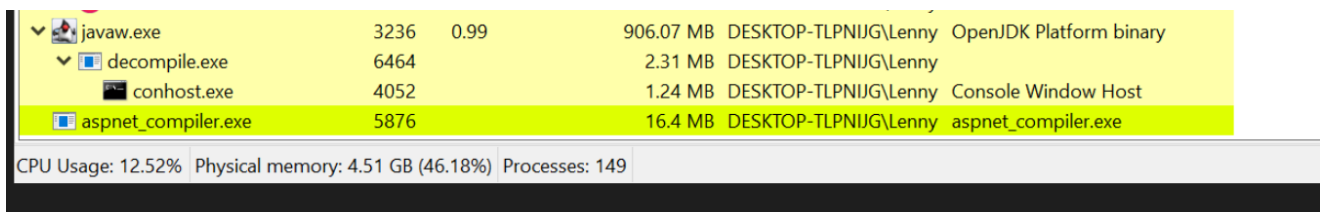
Obtaining the Unpacked Sample Using Pe-sieve

Pe-sieve is one of the quickest and most effective ways to obtain an unpacked sample.

Pe-sieve works by scanning a running process for any suspicious modules that may have been injected or overwritten into memory. If a suspicious module has been identified, pe-sieve will obtain it and save it for you.

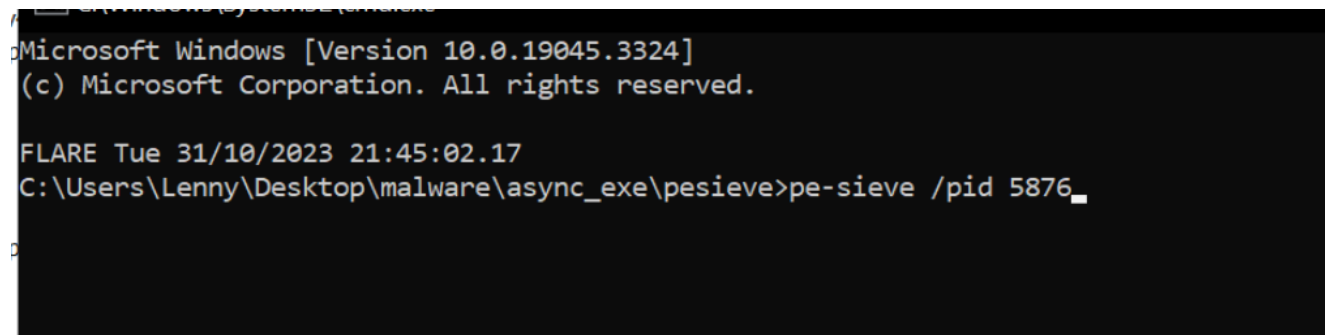
Pe-sieve is an extremely effective and easy-to-use tool.

In the previous screenshot, we identified the suspicious process `aspnet_compiler.exe`, and we can see that its process id (pid) is `5876`.



To scan the process and obtain the unpacked payload, we can run pe-sieve and pass the pid parameter of 5876 (or whichever the pid is in your situation).

To pass the parameter, we can run the command `pe-sieve /pid 5876`



```
Microsoft Windows [Version 10.0.19045.3324]
(c) Microsoft Corporation. All rights reserved.

FLARE Tue 31/10/2023 21:45:02.17
C:\Users\Lenny\Desktop\malware\async_exe\pesieve>pe-sieve /pid 5876_
```

After running the command, you may see a bunch of text come up on the screen. You can largely ignore the text and skip straight to the end.

Here we can see the scan summary, indicating that 52 modules were scanned and 1 "implanted PE" was identified.

```
---
PID: 5876
---
SUMMARY:

Total scanned:      52
Skipped:            0
-
Hooked:             3
Replaced:           1
Hdrs Modified:     0
IAT Hooks:          0
Implanted:          1
Implanted PE:       1
Implanted shc:      0
Unreachable files: 0
Other:              1
-
Total suspicious:   6
---

FLARE Tue 31/10/2023 21:46:52.70
C:\Users\Lenny\Desktop\malware\async_exe\pesieve>
```

A new folder `process_5876` will be created from where you ran the command.

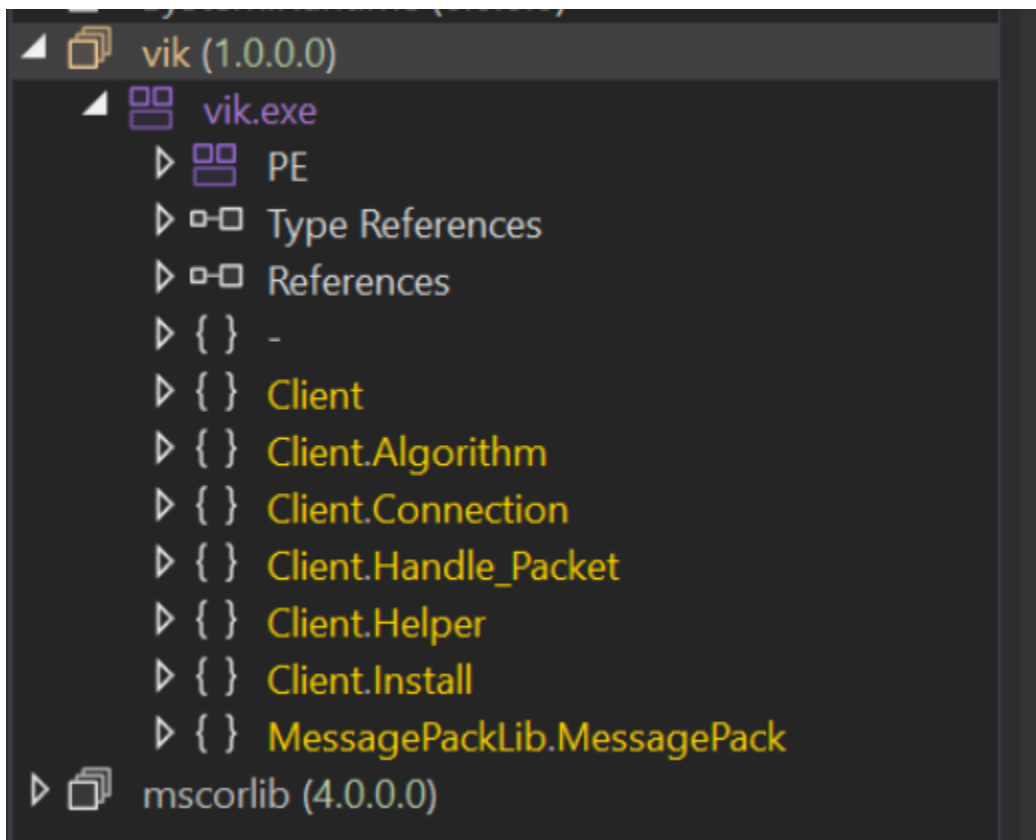
Inside this folder contains a series of files that pe-sieve obtained from memory.

One of these files corresponds to `aspnet_compiler.exe`. Which we previously identified as potentially being overwritten by malware.

Name	Date modified	Type	Size
76d00000.kernel32.dll	31/10/2023 9:46 PM	Application extension	616 KB
76d00000.kernel32.dll.tag	31/10/2023 9:46 PM	TAG File	1 KB
76ee0000.KERNELBASE.dll	31/10/2023 9:46 PM	Application extension	2,280 KB
76ee0000.KERNELBASE.dll.tag	31/10/2023 9:46 PM	TAG File	1 KB
400000.aspnet_compiler.exe	31/10/2023 9:46 PM	Application	45 KB
74740000.clr.dll	31/10/2023 9:46 PM	Application extension	8,480 KB
74740000.clr.dll.tag	31/10/2023 9:46 PM	TAG File	1 KB
dump_report.json	31/10/2023 9:46 PM	JSON Source File	2 KB
scan_report.json	31/10/2023 9:46 PM	JSON Source File	3 KB

By opening the `400000.aspnet_compiler.exe` inside of DnsSpy, we can see the unpacked payload.

This is the same `vik` file as identified in the initial post. In this case, we have obtained the same file by using `pe-sieve`.



Additional Methods for Analysis - Members Section

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Becoming a paid member grants you access to all future bonus content. And helps support the creation of more blogs. You will also get access to a discord server where you can ask questions and receive guidance and help.

In the next two sections, you can learn how to

- Perform a memory dump with Process Hacker
- Identify a broken memory dump using a hex editor
- Identify and Correct a broken memory dump using pe-bear
- Identify a suspicious thread with Process Hacker
- Map a thread to a memory region and obtain it using X32dbg.

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