

Falynne Armstrong

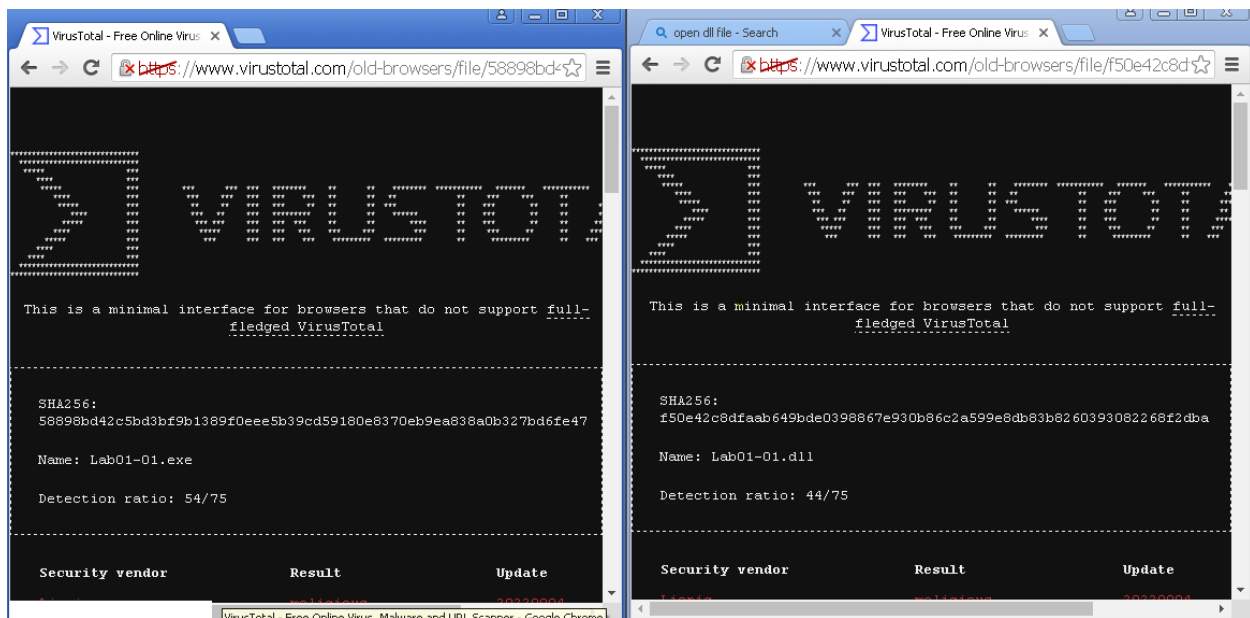
Malware

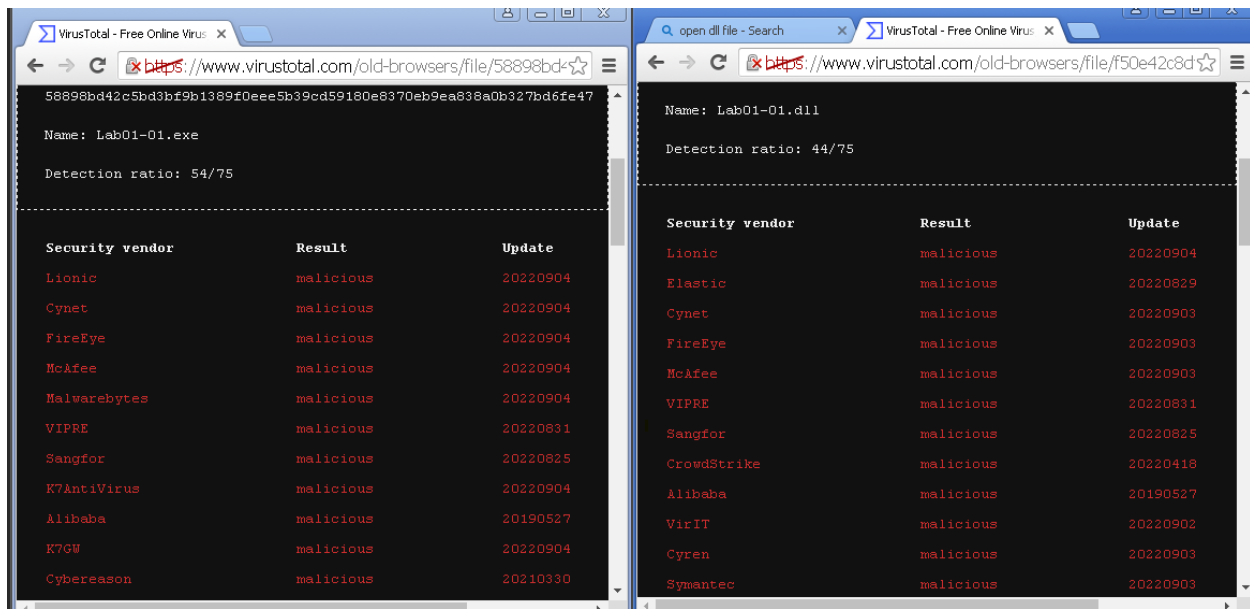
Lab 1

September 4, 2022

Lab 1-1

-First, I followed the instructions of the lab stating to upload the given .dll file and .exe file to VirusTotal. At first, I was using the recent website with the files. But I realized that using the newest website was not analyzing the files once uploaded. After realizing that I used the older version of VirusTotal since in this lab we are using an older model of chrome browser, I used the link <https://www.virustotal.com/old-browsers/>.

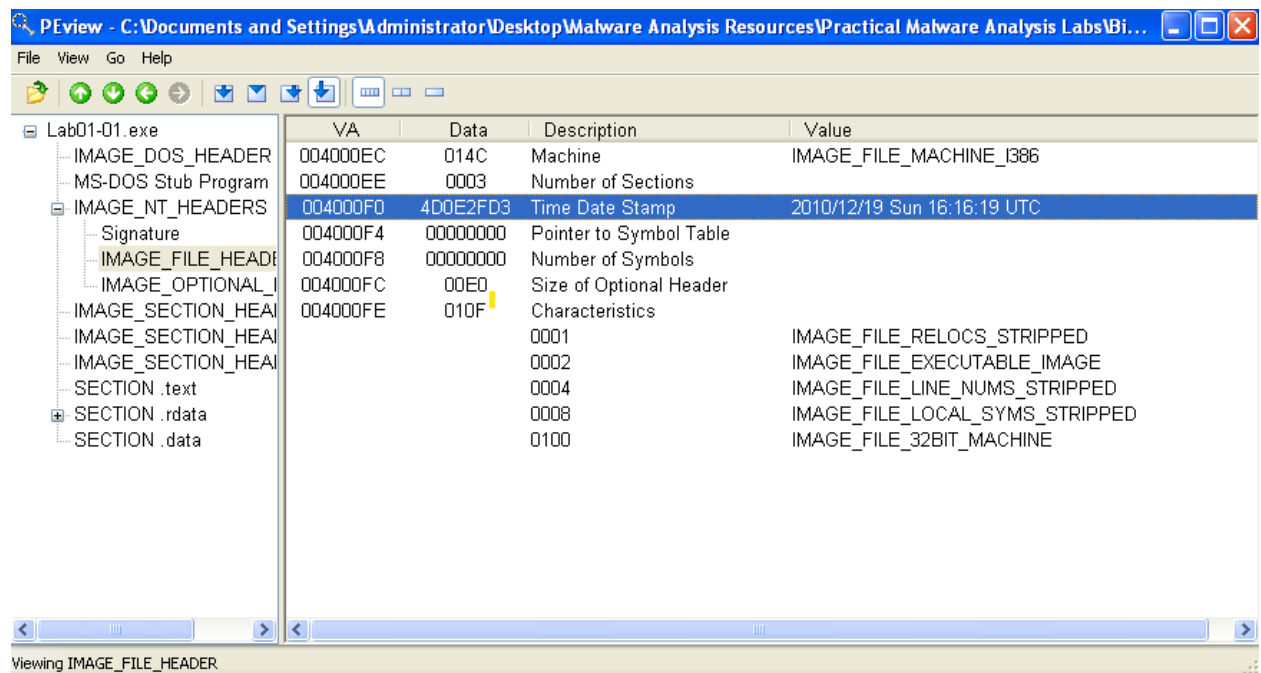




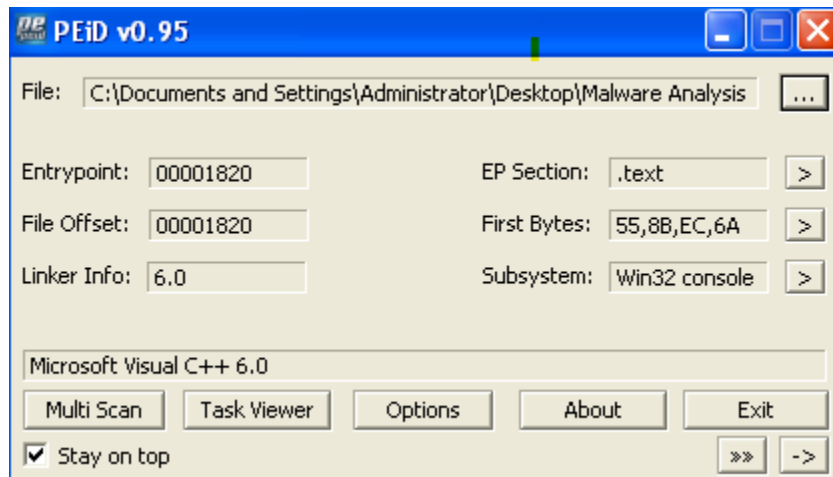
1. Upload the files to <http://www.VirusTotal.com/> and view the reports. Does either file match any existing antivirus signatures?

-First, I uploaded the lab files to VirusTotal. Once done I was able to investigate and research the given name of the antiviruses. Yes, with the screenshot provided above, there are matching antivirus signatures 54/75 and 44/75.

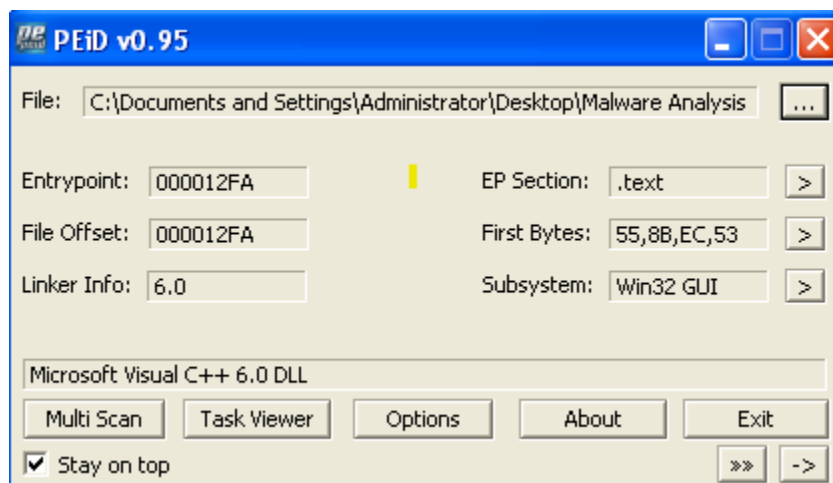
2. When were these files compiled?



- Using the PEView Application given with the virtual machine and uploading Lab 1-1.exe to the application, I found that the files were compiled on 2010/12/19 Sun 16:16:19.
3. Are there any indications that either of these files is packed or obfuscated? If so, what are these indicators?



Lab 1-1.exe analysis



Lab 1-1.dll analysis

- After the analysis, PEView was used to detect whether the files were packed or obfuscated. I found out that the files are not packed if the files were packed PEView would give the result of *packed*.
4. Do any imports hint at what this malware does? If so, which imports are they?

Dependency Walker - [Lab01-01]

File Edit View Options Profile Window Help

LAB01-01.EXE

- KERNEL32.DLL
- NTDLL.DLL
- MSVCRT.DLL
- KERNEL32.DLL
- NTDLL.DLL

PI	Ordinal ^	Hint	Function	Entry Point
	N/A	72 (0x0048)	_XcptFilter	Not Bound
	N/A	88 (0x0058)	__getmainargs	Not Bound
	N/A	100 (0x0064)	_p__initenv	Not Bound
	N/A	106 (0x006A)	_p__commode	Not Bound
	N/A	111 (0x006F)	_p__fmode	Not Bound
	N/A	129 (0x0081)	__set_app_type	Not Bound
	N/A	131 (0x0083)	__setusermatherr	Not Bound

E	Ordinal ^	Hint	Function	Entry Point
	1 (0x0001)	1 (0x0001)	?70__non_rtti_object@@@QAE@ABY0@@@Z	0x0001164B
	2 (0x0002)	2 (0x0002)	?70__non_rtti_object@@@QAE@PBD@@Z	0x00011629
	3 (0x0003)	3 (0x0003)	?70bad_cast@@AAE@PBD@@Z	0x000115C2
	4 (0x0004)	4 (0x0004)	?70bad_cast@@QAE@ABQBD@@Z	0x000115C2
	5 (0x0005)	5 (0x0005)	?70bad_cast@@@QAE@ABY0@@@Z	0x00011590
	6 (0x0006)	6 (0x0006)	?70bad_cast@@@QAE@PBD@@Z	0x0001156D

Module	File Time Stamp	Link Time Stamp	File Size	Attr.	Link Checksum	Real Checksum	CPU	Subsystem	Symbols	Preferred Base	Actual Base	Virtual Size	Load Order	File
KERNEL32.DLL	04/14/2008 5:41a	04/13/2008 7:11p	989,696	A	0x000F44A2	0x000F44A2	x86	Console	CV	0x7C800000	Unknown	0x000F6000	Not Loaded	5.
LAB01-01.EXE	01/08/2012 2:19a	12/19/2010 11:16a	16,384	A	0x00000000	0x00007428	x86	Console	None	0x00400000	Unknown	0x00004000	Not Loaded	N/A
MSVCRT.DLL	04/14/2008 5:42a	04/13/2008 7:12p	343,040	A	0x00057341	0x00057341	x86	GUI	CV	0x77C10000	Unknown	0x00058000	Not Loaded	7.
NTDLL.DLL	04/14/2008 5:41a	04/13/2008 7:11p	706,048	A	0x000B62BC	0x000B62BC	x86	Console	CV	0x7C900000	Unknown	0x000AF000	Not Loaded	5.

Lab 1-1.exe

Dependency Walker - [Lab01-01.dll]

File Edit View Options Profile Window Help

LAB01-01.DLL

- KERNEL32.DLL
- WS2_32.DLL
- ADVAPI32.DLL
- KERNEL32.DLL
- NTDLL.DLL
- RPCRT4.DLL
- WINTRUST.DLL
- SECUR32.DLL
- ADVAPI32.DLL
- KERNEL32.DLL
- NTDLL.DLL
- NETAPI32.DLL
- ADVAPI32.DLL

PI	Ordinal ^	Hint	Function	Entry Point
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E	Ordinal ^	Hint	Function	Entry Point
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Module	File Time Stamp	Link Time Stamp	File Size	Attr.	Link Checksum	Real Checksum	CPU	Subsystem	Symbols	Preferred Base	Actual Base	Virtual Size	Load Order	File
MSJAVA.DLL														
MPR.DLL	04/14/2008 5:41a	04/13/2008 7:10p	59,904	A	0x00013C87	0x00013C87	x86	Console	CV	0x71B20000	Unknown	0x00012000	Not Loaded	5.
ADVAPI32.DLL	04/14/2008 5:41a	04/13/2008 7:09p	617,472	A	0x0009B625	0x0009B625	x86	Console	CV	0x77D00000	Unknown	0x0009B000	Not Loaded	7.
KERNEL32.DLL	04/14/2008 5:41a	04/13/2008 7:11p	989,696	A	0x000F44A2	0x000F44A2	x86	Console	CV	0x7C800000	Unknown	0x000F6000	Not Loaded	5.
LAB01-01.DLL	12/19/2010 11:16a	12/19/2010 11:16a	163,840	A	0x00000000	0x000327BE	x86	GUI	None	0x10000000	Unknown	0x00028000	Not Loaded	5.

Warning: At least one delay-load dependency module was not found.
Warning: At least one module has an unresolved import due to a missing export function in a delay-load dependent module.

Lab 1-1.dll

-To analyze the imports I used the application, Dependency Walker. After opening both .exe and .dll files, I could get a closer look at the import names and research the functions of the imports. Although Lab1-1.dll had very many for the lab , I only researched a few imports as this would be tedious to research all imports given. The malware hints that the function is moving and creating files.

- Are there any other files or host-based indicators that you could look for on infected systems?

Address	Length	T...	String
"...".rdata:0...	00000011	C	_except_handler3
"...".rdata:0...	00000008	C	_controlfp
"...".rdata:0...	00000009	C	_stricmp
"...".data:00...	0000000D	C	kernel32.dll
"...".data:00...	00000005	C	.exe
"...".data:00...	00000005	C	C:*
"...".data:00...	00000021	C	C:\\windows\\system32\\kerne132.dll
"...".data:00...	0000000D	C	Lab01-01.dll
"...".data:00...	00000021	C	C:\\Windows\\System32\\Kernel32.dll
"...".data:00...	00000027	C	WARNING_THIS_WILL_DESTROY_YOUR_MACHINE

Lab1-1.exe

Address	Length	T...	String
"...".rdata:1...	0000000B	C	MSVCRT.dll
"...".rdata:1...	00000005	C	free
"...".rdata:1...	0000000A	C	_inlterm
"...".rdata:1...	00000007	C	malloc
"...".rdata:1...	0000000D	C	_adjust_div
"...".data:10...	00000005	C	exec
"...".data:10...	00000006	C	sleep
"...".data:10...	00000006	C	hello
"...".data:10...	0000000E	C	127.26.152.13
"...".data:10...	00000009	C	SADFHUHF

Lab1-1.dll

-The host-based indicators hints are the *C:\\Windows\\System32\\Kernel32.dll* and the IP address that is given in the second screenshot. I found this information using IDAPro and opened open files using the strings function in the application.

6. What network-based indicators could be used to find this malware on infected machines?

-Within analyzing the application, I was able to network-based indicators. The network-based indicator is the IP address given in the *Lab1-1.dll* screenshot given above. With finding this IP address, it confirms that there are infected machines with this malware.

7. What would you guess is the purpose of these files?

- After analyzing my observations and notes from the lab, I was able to get a result of the purpose of the files. The purpose of these files could be to download files.

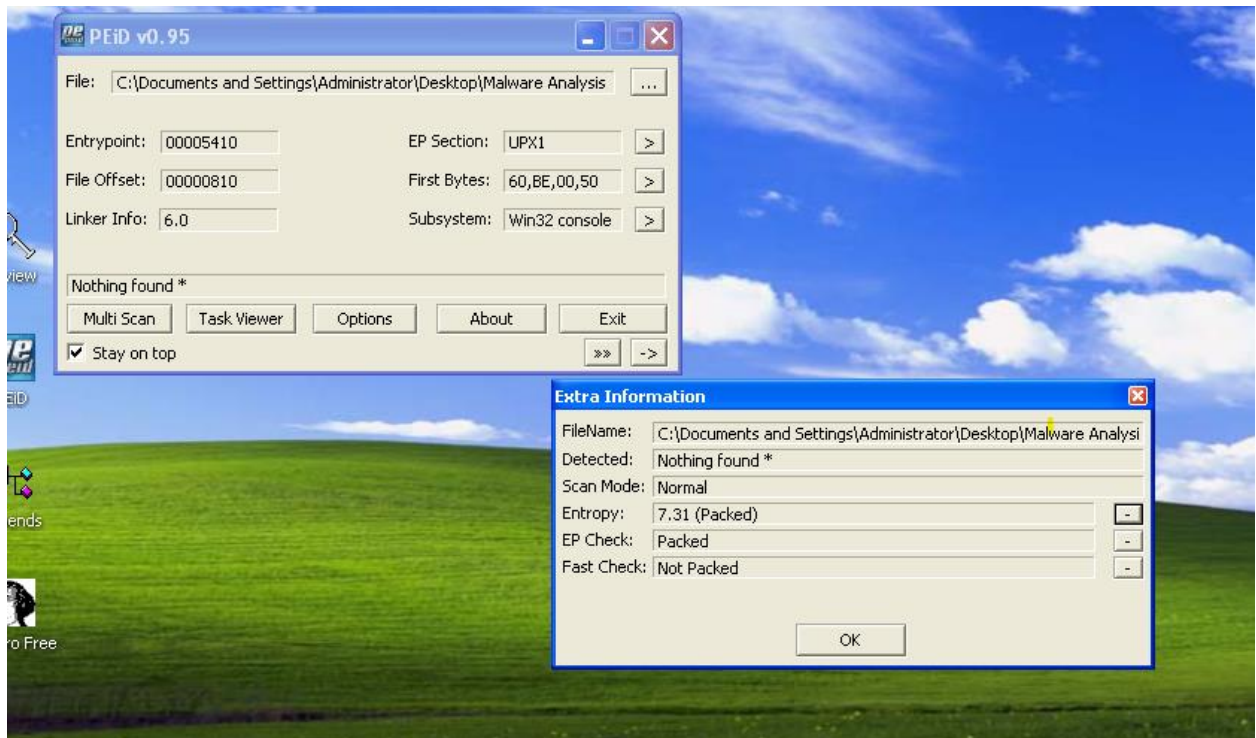
Lab 1-2

1. Upload the Lab01-02.exe file to <http://www.VirusTotal.com/>. Does it match any existing antivirus definitions?

SHA256: c876a332d7dd8da331cb8eee7ab7bf32752834d4b2b54eaa362674a2a48f64a6		
Name: Lab01-02.exe		
Detection ratio: 56/75		
Security vendor	Result	Update
Lionic	malicious	20220905
Cynet	malicious	20220905
FireEye	malicious	20220905
ALYac	malicious	20220905
Malwarebytes	malicious	20220905
VIPRE	malicious	20220831
Sangfor	malicious	20220905
Alibaba	malicious	20190527
Cybereason	malicious	20210330
Baidu	malicious	20190318
VirIT	malicious	20220905
Cyren	malicious	20220905
Symantec	malicious	20220905
Elastic	malicious	20220829

- First, I uploaded the lab files to VirusTotal. Once done I was able to investigate and research the given name of the antiviruses. Yes, 56/75 matches antivirus definitions when uploading Lab1-2 to VirusTotal.

2. Are there any indications that this file is packed or obfuscated? If so, what are these indicators? If the file is packed, unpack it if possible.



3. Do any imports hint at this program's functionality? If so, which imports are they and what do they tell you?

LAB01-02.EXE

- [-] ☐ KERNEL32.DLL
- [-] ☐ ADVAPI32.DLL
- [-] ☒ **KERNEL32.DLL**
 - ☒ **NTDLL.DLL**
 - ☐ RPCRT4.DLL
 - ☐ WINTRUST.DLL
 - ☐ SECUR32.DLL
 - ☐ MSVCRT.DLL
 - ☐ WININET.DLL

PI	Ordinal ^	Hint	Function	Entry Point
G	N/A	0 (0x0000)	InternetOpenA	Not Bound

E	Ordinal ^	Hint	Function	Entry Point
R	101 (0x0065)	N/A	N/A	0x0000C9D2

4. What host- or network-based indicators could be used to identify this malware on infected machines?

- When analyzing the host based indicator, I was able to find a webpage. The host-based indicator that I found using IdaPro was a URL that is labeled as <http://www.malwareanalysisbook.com>

Lab 1-3

1. Upload the Lab01-03.exe file to <http://www.VirusTotal.com/>. Does it match any existing antivirus definitions?

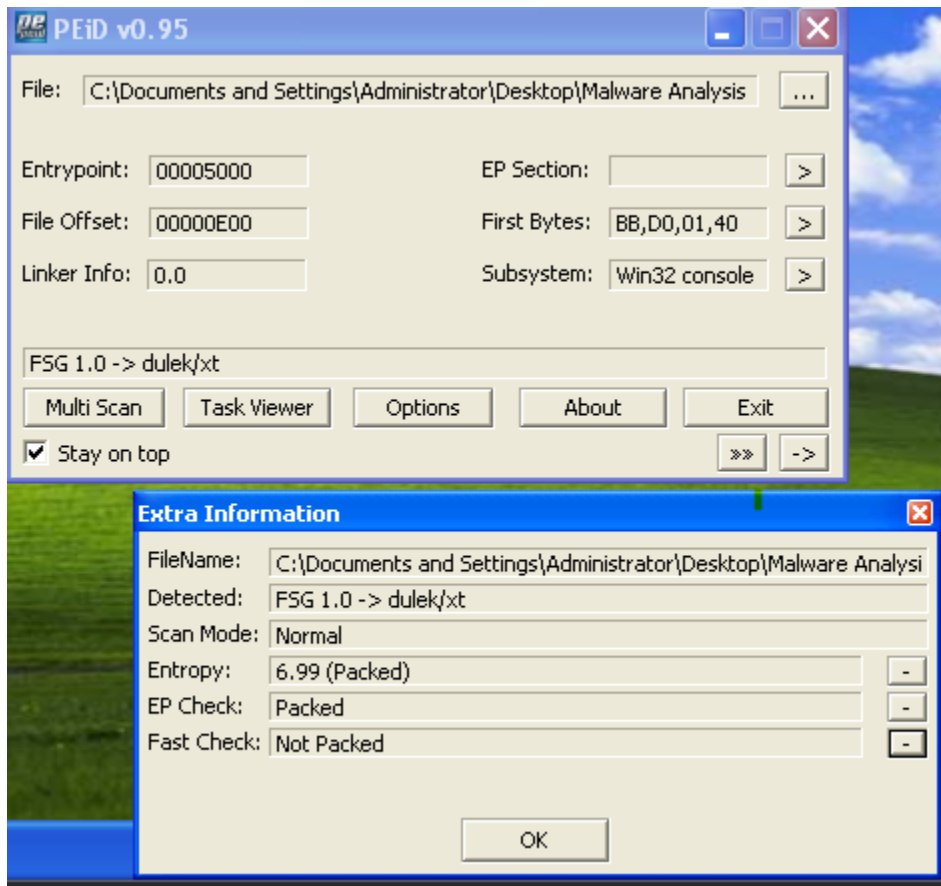
SHA256: 7983a582939924c70e3da2da80fd3352ebc90de7b8c4c427d484ff4f050f0aec

Name: Lab01-03.exe

Detection ratio: 65/75

- First, I uploaded the lab files to VirusTotal. Once done I was able to investigate and research the given name of the antiviruses. I was able to find that 65/75 matches existing antivirus definitions.

2. Are there any indications that this file is packed or obfuscated? If so, what are these indicators? If the file is packed, unpack it if possible.



- *Lab1-03.exe* is packed, I was able to indicate this using the application PEiD. I was not able to unpack this file as I could not find an unpacker for FSG 1.0. Though when fast checking the program it gives a result of *not packed*.

3. Do any imports hint at this program's functionality? If so, which imports are they and what do they tell you?

PI	Ordinal ^	Hint	Function	Entry Point
	N/A	0 (0x0000)	LoadLibraryA	Not Bound
	N/A	0 (0x0000)	GetProcAddress	Not Bound

- I believe that these functionalities aren't hinting more at showing the process of the program. Although since I was not able to unpack the program, I could not find any hints as well.

4. What host- or network-based indicators could be used to identify this malware on infected machines?

-Since I was not able to unpack the file, I could not get any results of host or network-based indicators.

Lab 1-4

1. Upload the Lab01-04.exe file to <http://www.VirusTotal.com/>. Does it match any existing antivirus definitions?

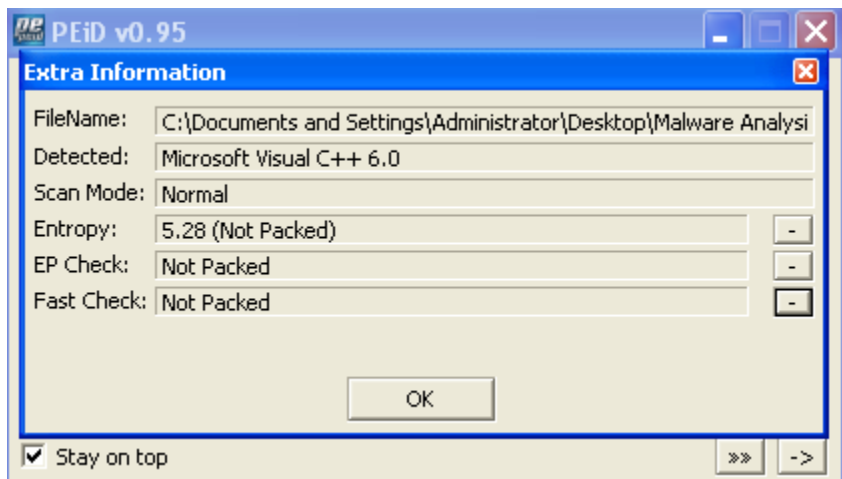
```
SHA256: 0fa1498340fca6c562cfa389ad3e93395f44c72fd128d7ba08579a69aaf3b126

Name: Lab01-04.exe

Detection ratio: 56/75
```

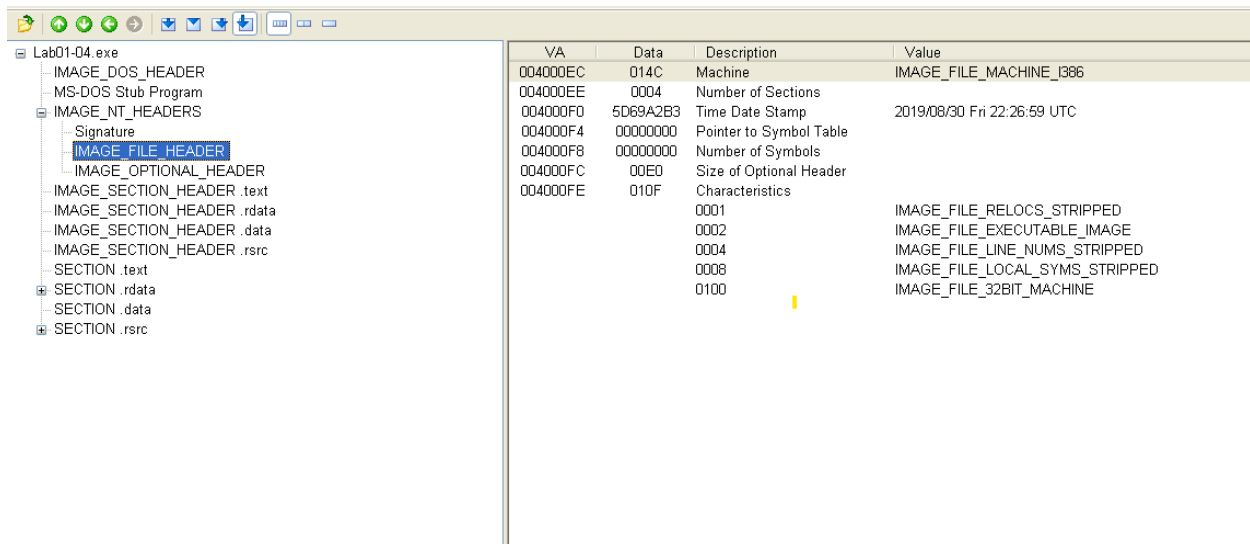
- First, I uploaded the lab files to VirusTotal. Once done I was able to investigate and research the given name of the antiviruses. After I was able to analyze and discover that 56/75 matches existing antivirus definitions.

2. Are there any indications that this file is packed or obfuscated? If so, what are these indicators? If the file is packed, unpack it if possible.



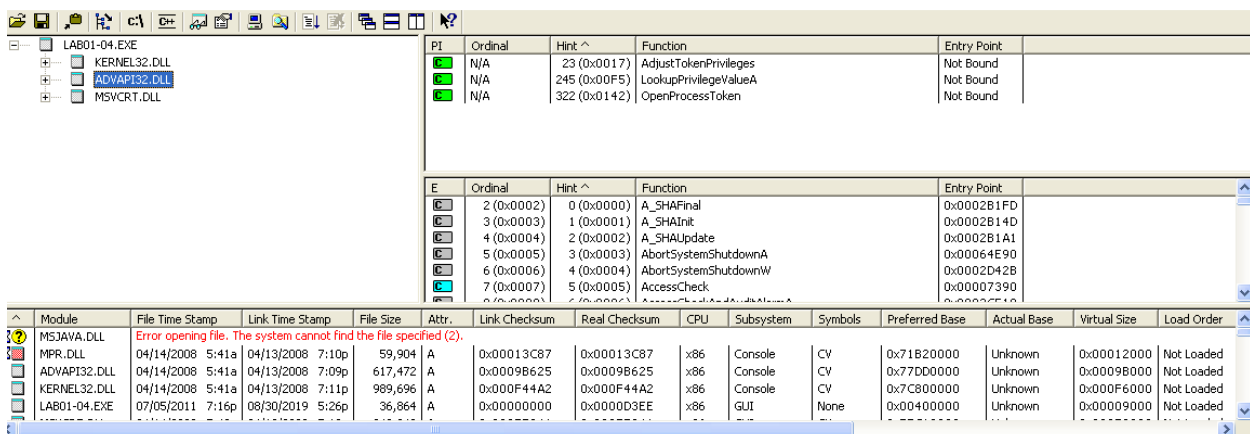
- Yes, there are indicators that the file is not packed, after uploading the Lab-04.exe to PEiD.

3. When was this program compiled?



- After uploading the program to PEView I was able to view when the program was compiled. The program was compiled on 2019/08/30 Fri 22:26:59.

4. Do any imports hint at this program's functionality? If so, which imports are they and what do they tell you?



-After analyzing and discovering the functionalities of file, I was able to also find beneficial functionalities for the files. Some hints with the program's functionality are having privileges, opening a process, and using a Windows executable.

5. What host- or network-based indicators could be used to identify this malware on infected machines?

Address	Length	T...	String
"...".rsrc:00...	0000000D	C	__p_commode
"...".rsrc:00...	0000000B	C	__p_fmode
"...".rsrc:00...	0000000F	C	__set_app_type
"...".rsrc:00...	00000011	C	_except_handler3
"...".rsrc:00...	0000000B	C	_controlfp
"...".rsrc:00...	0000000B	C	\\winup.exe
"...".rsrc:00...	00000005	C	%s%s
"...".rsrc:00...	00000017	C	\\system32\\wuupdate.exe
"...".rsrc:00...	00000005	C	%s%s
"...".rsrc:00...	00000034	C	http://www.practicalmalwareanalysis.com/updater.exe

Line 83 of 83

-In IdaPro I was able to find an indicator that was labeled <http://www.practicalmalwareanalysis.com/updater.exe>. Within this website, I believe that the infected malware is coming from a updater that is an extension file.

5. This file has one resource in the resource section. Use Resource Hacker to examine that resource, and then use it to extract the resource. What can you learn from the resource?

Resource Hacker - C:\Documents and Settings\Administrator\Desktop\Malware Analysis Resources\Practical Malware Analysis Labs\BinaryCollection\Chapter_1\Lab01-0...

File Edit View Action Help

BIN

101

1033

00006FC0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00006FD0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00006FE0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00006FF0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007000	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007010	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007020	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007030	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007040	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007050	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007060	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007070	5C 77 69 6E 75 70 2E 65 78 65 00 00 25 73 25 73	\\winup.exe**s%s
00007080	00 00 00 00 5C 73 79 73 74 65 6D 33 32 5C 77 75	****\\system32\\wu
00007090	70 64 6D 67 72 64 2E 65 78 65 00 00 25 73 25 73	pdmgrd.exe**s%s
000070A0	00 00 00 00 68 74 74 70 3A 2F 2F 77 77 77 2E 70	****http://www.p
000070B0	72 61 63 74 69 63 61 6C 6D 61 6C 77 61 72 65 61	racticalmalwarea
000070C0	6E 61 6C 79 73 69 73 2E 63 6F 6D 2F 75 70 64 61	nalysis.com/upda
000070D0	74 65 72 2E 65 78 65 00 01 00 00 00 00 00 00 00	ter.exe*****
000070E0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000070F0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007100	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007110	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007120	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007130	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007140	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007150	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007160	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007170	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007180	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00007190	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000071A0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000071B0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....

Line: 1 16,384

- After uploading the file to Resource Hacker, I found that you can create a downloadable from the file that has even more malware that could end up ruining your machine.