

## Detecting Adversary Tradecraft with Image Load Event Logging and EQL

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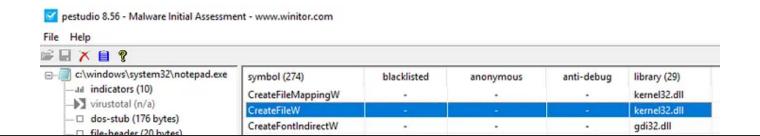
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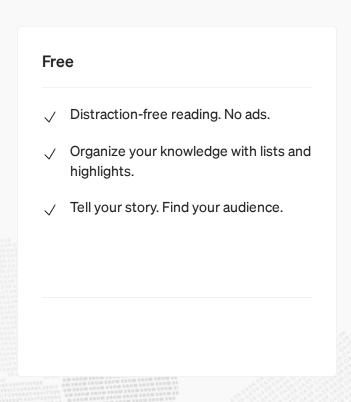
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A Windows process can load a dynamic link library (DLL) in order to use one or more of the DLL's functions to carry out certain actions. For example, notepad.exe loads the DLL, kernel32.dll before it can use the <a href="CreateFileW">CreateFileW</a> function or API call to create or open files. This is an image load event.



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Microsoft <u>Sysmon</u> can be configured to log Image Loaded events to provide visibility into what DLLs are loaded by running processes.

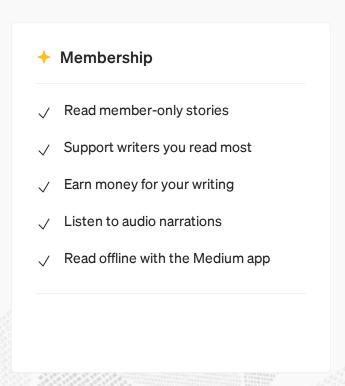
### Event ID 7: Image loaded

The image loaded event logs when a module is loaded in a specific process. This event is disabled by default and needs to be configured with the –l option. It indicates the process in which the module is loaded, hashes and signature information. The signature is created asynchronously for performance reasons and indicates if the file was removed after loading. This event should be configured carefully, as monitoring all image load events will generate a large number of events.

Description of Sysmon Event ID 7

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ProcessId: 4132

Image: C:\Windows\System32\notepad.exe

ImageLoaded: C:\Windows\System32\kernel32.dll

FileVersion: 10.0.14393.206 (rs1\_release.160915-0644)

Description: Windows NT BASE API Client DLL Product: Microsoft® Windows® Operating System

Company: Microsoft Corporation

Hashes:

SHA1=6EE3E2D33012161659609DADEA59A2164C5A5CEB,MD5=6955067712F2F475 2CA12192B08EF860,SHA256=E02A3B57EA8B393408FF782866A1D342DD8C6B5F59 25BA527981DBB21B6A4080,IMPHASH=3CE0779E0F4E275CD51A359A98CCC682

Signed: true

Signature: Microsoft Windows

SignatureStatus: Valid

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Process Monitor output shows vaultcli.dll loaded by vaultcmd.exe

Examining the exports table of vaultcli.dll suggests that this DLL provides the functionality to enumerate or get information from the credential vault.

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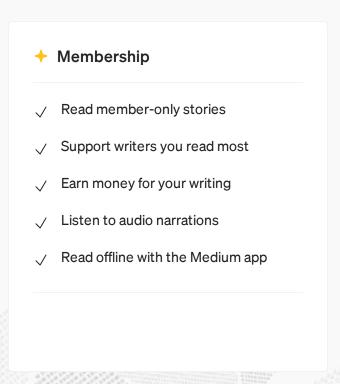
Signature: Microsoft Windows

SignatureStatus: Valid

We can write an <u>Event Query Language (EQL)</u> query to detect unexpected processes loading vaultalidel as follows. If you're not familiar with EQL, you can find the getting started guide <u>here</u>.

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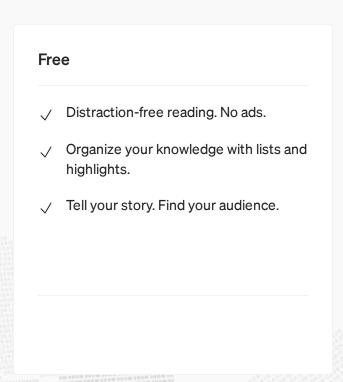


Credential Enumeration via Credential Vault CLI

### **Example 2: Stealthy Scheduled Task Creation via VBA Macro**

A Microsoft Office document can contain <u>VBA code</u> to create a <u>scheduled</u> <u>task for persistence</u> without using the native scheduled tasks (schtasks.exe)

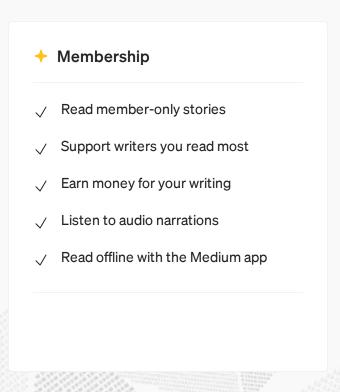
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Signature: Microsoft Windows

SignatureStatus: Valid

We can detect the behavior of Microsoft Office applications loading taskschd.dll with the following EQL query.

Schoduled Task Creation via Microsoft Office Application

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By invoking WMI to execute a malicious powershell.exe command, powershell.exe is spawned with the parent process wmiprvse.exe, not winword.exe or whatever application is used to execute the macro.

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C:\Windows\SysWOW64\wbem\wbemsvc.dll
C:\Windows\SysWOW64\wbem\fastprox.dll

Process Monitor output showing WMI-related DLLs loaded by winword.exe

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What adversary tradecraft can you detect by leveraging image load event logging or by combining these events with other event types such as process, network, or file events? I'd be interested in hearing any feedback, experiences, or findings that you would like to share. For anyone who would like to share any analytics for detection, please see the EQL Analytics Library contribution guide.

**Threat Detection** 

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Information Security

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