

ScyllaHide v1.2 - Documentation

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1 Features

1.1 Anti-Anti-Debug

1.1.1 Process Environment Block (PEB)

The most important anti-anti-debug option. Almost every protector checks for PEB values. There are three important options and one minor option.

- **BeingDebugged**: Very important option, should be always enabled. *IsDebuggerPresent* is using this value to check for debuggers.
- **NtGlobalFlag**: Very important option, a lot of protectors check for this value.
- **HeapFlags**: Very important option. E.g. Themida checks for heap artifacts and heap flags.
- **StartupInfo**: This is not really important, only a few protectors check for this. Maybe Enigma checks it.

1.1.2 NtSetInformationThread

The `THREADINFOCLASS` value `ThreadHideFromDebugger` (17) is a well-known anti-debug measurement. The debugger cannot handle hidden threads. This leads to a loss of control over the target.

1.1.3 NtSetInformationProcess

The `PROCESSINFOCLASS` value `ProcessHandleTracing` (32) can be used to detect a debugger. The `PROCESSINFOCLASS` value `ProcessBreakOnTermination` (19) can be used to generate a Blue Screen of Death on process termination. ScyllaHide protects from both.

1.1.4 NtQuerySystemInformation

The `SYSTEM_INFORMATION_CLASS` value `SystemKernelDebuggerInformation` (35) can be used to detect kernel debuggers. The `SYSTEM_INFORMATION_CLASS` value `SystemProcessInformation` (5) is used to get a process list. A debugger should be hidden in a process list and the debuggee should have a good parent process ID like the ID from `explorer.exe`.

1.1.5 NtQueryInformationProcess

A very important option. Various `PROCESSINFOCLASS` values can be used to detect a debugger:

- **ProcessDebugFlags** (31): Should return 1 in the supplied buffer.

- `ProcessDebugPort` (7): Should return 0 in the supplied buffer.
- `ProcessDebugObjectHandle` (30): Should return 0 in the supplied buffer and the error `STATUS_PORT_NOT_SET` (0xC0000353).
- `ProcessBasicInformation` (0): Reveals the parent process ID.
- `ProcessBreakOnTermination` (29): Please see *NtSetInformationProcess* in Section 1.1.3.
- `ProcessHandleTracing` (32): Please see *NtSetInformationProcess* in Section 1.1.3.

A lot of protectors use this to detect debuggers. The windows API *CheckRemoteDebuggerPresent* uses *NtQueryInformationProcess* internally.

1.1.6 NtQueryObject

The `OBJECT_INFORMATION_CLASS` `ObjectTypesInformation` (3) and `ObjectTypeInformation` (2) can be used to detect debuggers. `ScyllaHide` filters `DebugObject` references.

1.1.7 NtYieldExecution

A very unreliable anti-debug method. This is only used in some `UnpackMe`'s or in some Proof of Concept code. Only activate this if you really need it. Probably you will never need this option.

1.1.8 NtCreateThreadEx

Threads hidden from debuggers can be created with a special creation flag `THREAD_CREATE_FLAGS_HIDE_FROM_DEBUGGER` (4). `ScyllaHide` doesn't allow hidden threads. The anti-debug effect is similar to *NtSetInformationThread* in Section 1.1.2.

1.1.9 OutputDebugStringA

OutputDebugStringW uses *OutputDebugStringA* internally. `ScyllaHide` only hooks the ANSI version and this is therefore enough. This is a very unreliable anti-debug method, so you will not need this option very often.

1.1.10 BlockInput

Very effective anti-debug method. This is used e.g. in Yoda's Protector. "Blocks keyboard and mouse input events from reaching applications."

1.1.11 NtUserFindWindowEx

This is a system call function in user32.dll. The windows APIs *FindWindowA/W* and *FindWindowExA/W* call this internally. The debugger window will be hidden.

Note: Requires a valid relative virtual address in NtApiCollection.ini.

1.1.12 NtUserBuildHwndList

This is a system call function in user32.dll. The windows APIs *EnumWindows* and *EnumThreadWindows* call this internally. The debugger window will be hidden.

Note: Requires a valid relative virtual address in NtApiCollection.ini.

1.1.13 NtUserQueryWindow

This is a system call function in user32.dll. The windows API *GetWindowThreadProcessId* calls this internally. This is used to hide the debugger process.

Note: Requires a valid relative virtual address in NtApiCollection.ini.

1.1.14 NtSetDebugFilterState

ScyllaHide returns always STATUS_ACCESS_DENIED. This anti-debug measurement isn't used very often. Probably you will never need this option in a real world target.

1.1.15 NtClose

This is called with an invalid handle to detect a debugger. ScyllaHide calls *NtQueryObject* to check the validity of the handle. A few protectors are using this method.

1.1.16 Remove Debug Privileges

If a debugger creates the process of the target, the target will have debug privileges. This can be used to detect a debugger.

1.1.17 Hardware Breakpoint Protection (DRx)

Hardware breakpoints can be detected/cleared with exceptions or the windows APIs *NtGetContextThread/NtSetContextThread*. Enable this option only if you need it!

1.1.18 Timing

There are a few windows APIs to measure the time. Timing can be used to detect debuggers, because they slow down the execution. Enable with care and only if you need it!

1.2 Special

1.2.1 DLL Injection

Normal DLL injection or stealth dll injection. You better try the normal injection first...

1.2.2 Prevent Thread Creation

This option prevents the creation of new threads. This can be useful if a protector uses a lot of protection threads. This option can be useful for EXECryptor. Enable with care and only if you need it! You must know what you are doing here!

1.2.3 RunPE Unpacker

This option hooks *NtResumeThread*. If the malware creates a new process, ScyllaHide terminates and dumps any newly created process. If you are unpacking malware, enable and try it. Should be only used inside a Virtual Machine (VM).

A typical RunPE workflow:

1. Create a new process of any target in suspended state (Process flag `CREATE_SUSPENDED`: 0x00000004)
2. Replace the original process PE image with a new (malicious) PE image. This can involve several steps and various windows API functions.
3. Start the process with the windows API function *ResumeThread* (or *NtResumeThread*)

1.2.4 Improved Attach Dialog

Use the integrated window finder to quickly select your attach target. Drag'n'Drop the bullseye/crosshair to your target window or enter the Process ID manually in decimal or hexadecimal notation.

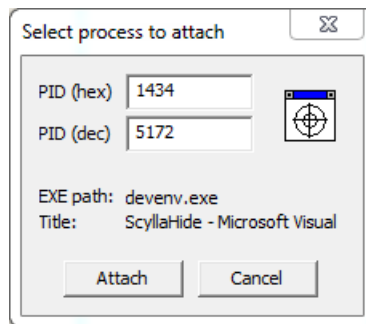


Figure 1: Improved Attach Dialog

1.3 OllyDbg v1 Specific

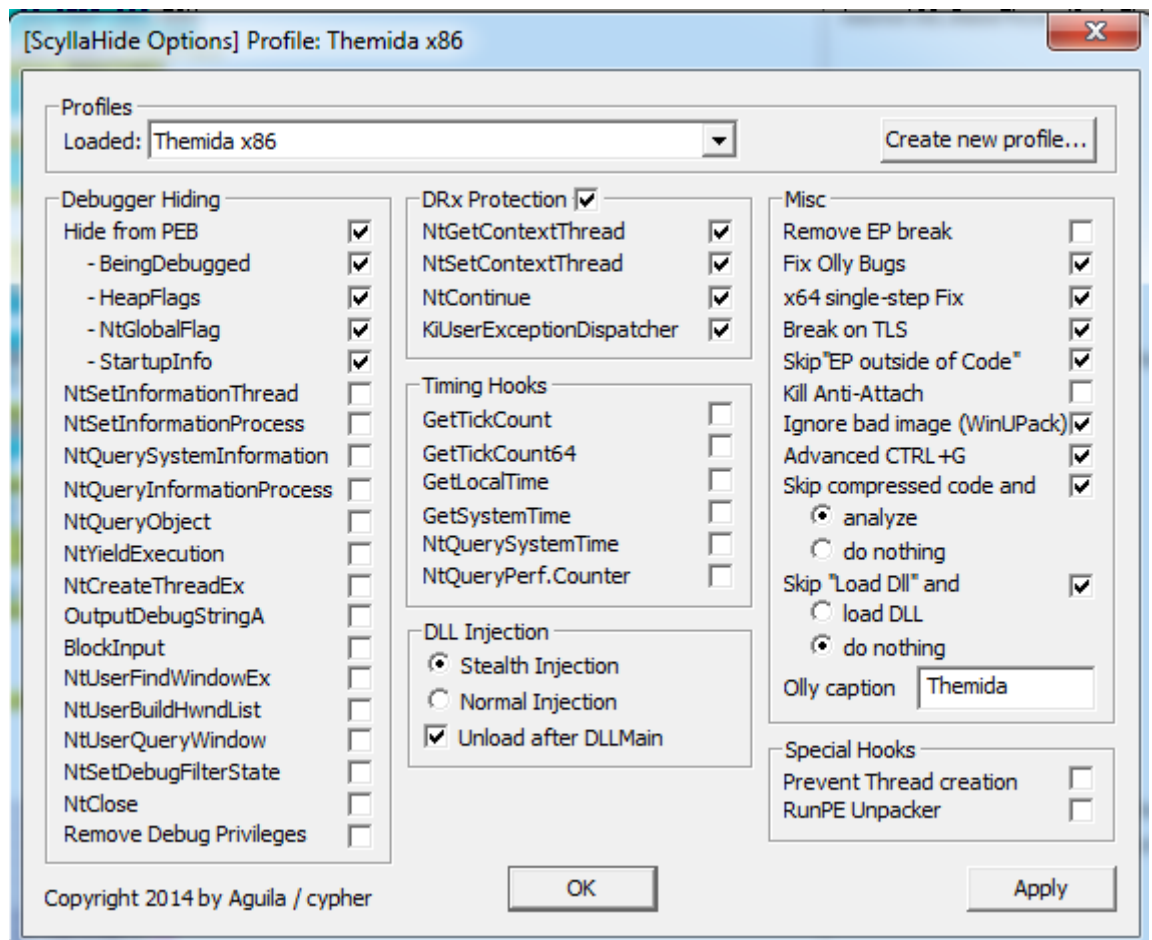


Figure 2: OllyDbg v1 Plugin

1.3.1 Remove entry point breakpoint

Some protectors use Thread-Local-Storage (TLS) as entrypoint and check for breakpoints at the normal PE entrypoint address. You must remove the PE entrypoint to hide your debugger. This option is necessary for VMProtect.

1.3.2 Fix Olly Bugs

This option fixes various OllyDbg bugs:

- PE fix for NumOfRvaAndSizes
- ForegroundWindow fix
- FPU bug
- Format string (sprintf) bug, CVE-2004-0733 <http://www.cvedetails.com/cve/CVE-2004-0733/>
- NT Symbols path bug, patch by blabberer <http://www.woodmann.com/forum/showthread.php?8460-Debug-symbols-information-symbol-server-setup&p=56246&viewfull=1#post56246>
- Faulty handle bug. Sometimes Olly does not terminate, error appears "Operating system reports error ERROR_ACCESS_DENIED"

1.3.3 x64 single-step fix

OllyDbg doesn't work very well on x64 operating systems. This option fixes the most annoying bug. More information here: <http://waleedassar.blogspot.de/2012/03/ollydbg-v110-and-wow64.html>

1.3.4 Skip Entrypoint outside code

Annoying warning can be skipped.

1.3.5 Ignore bad PE image

Annoying warning can be skipped.

1.3.6 Skip compressed code warning

Annoying warning "Compressed code?" can be skipped with a default behaviour.

1.3.7 Skip "load dll" warning

Annoying warning "Request to load DLL" can be skipped with a default behaviour.

1.3.8 Break on TLS

This option sets a breakpoint to any available Thread-Local-Storage (TLS) address. This is necessary for various protectors e.g. VMProtect.

1.3.9 Advanced CTRL+G

Replaces the default OllyDbg "Go to Address" dialog. Now you can enter RVA and offset values. Be sure to select the correct module.

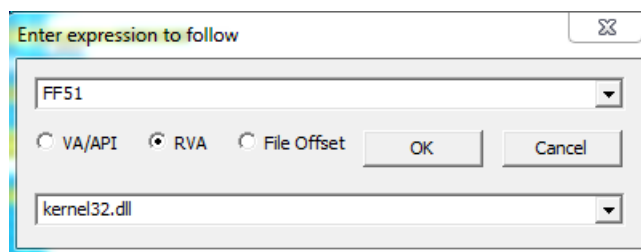


Figure 3: Advanced CTRL+G

1.3.10 Change window caption

Change the OllyDbg window caption. This can be useful against e.g. FindWindow anti-debug tricks. You don't need to enable this, if you have the NtUser* hooks enabled! Hint: You can use it to make the currently used profile visible.

1.4 OllyDbg v2 Specific

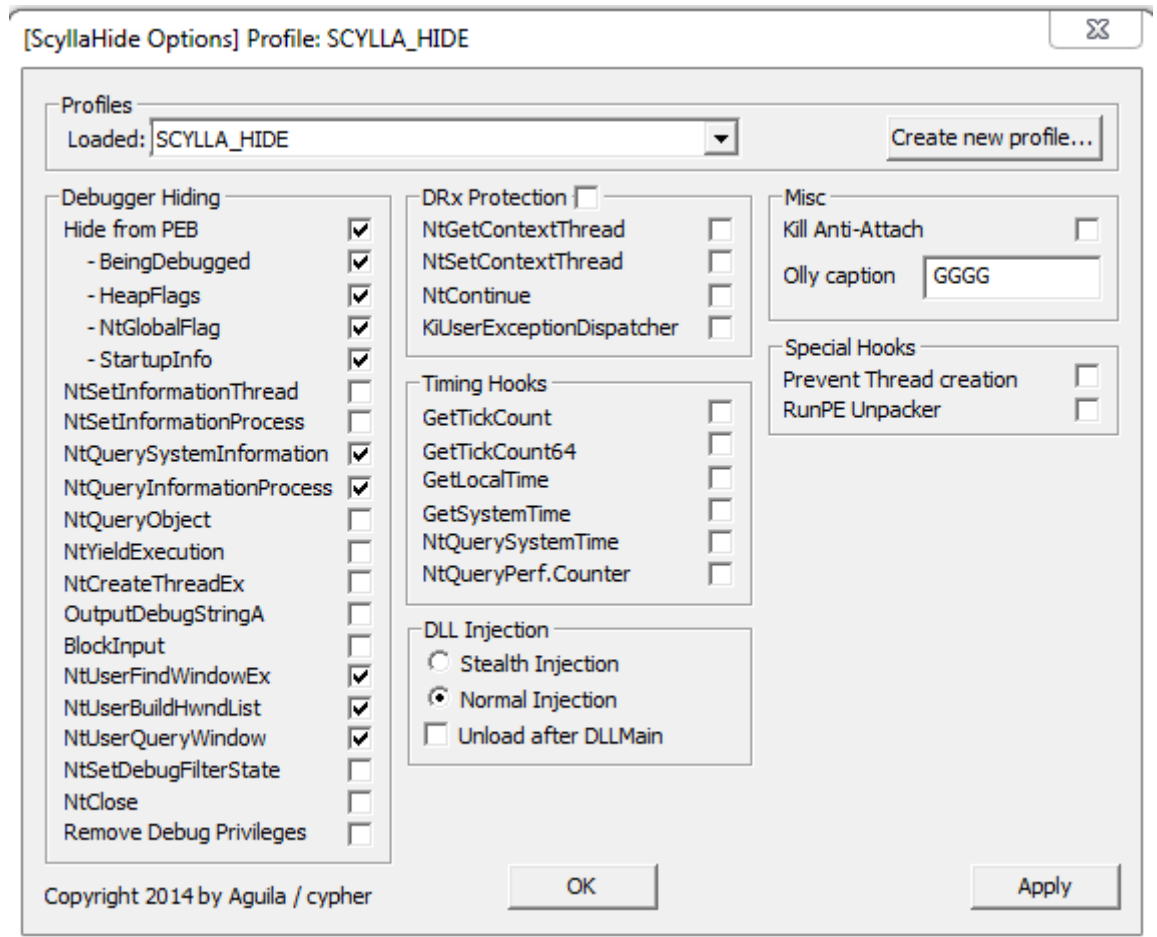


Figure 4: OllyDbg v2 Plugin

1.4.1 Change window caption

Change the OllyDbg window caption. This can be useful against e.g. FindWindow anti-debug tricks. You don't need to enable this, if you have the NtUser* hooks enabled! Hint: You can use it to make the currently used profile visible.

1.5 IDA Specific

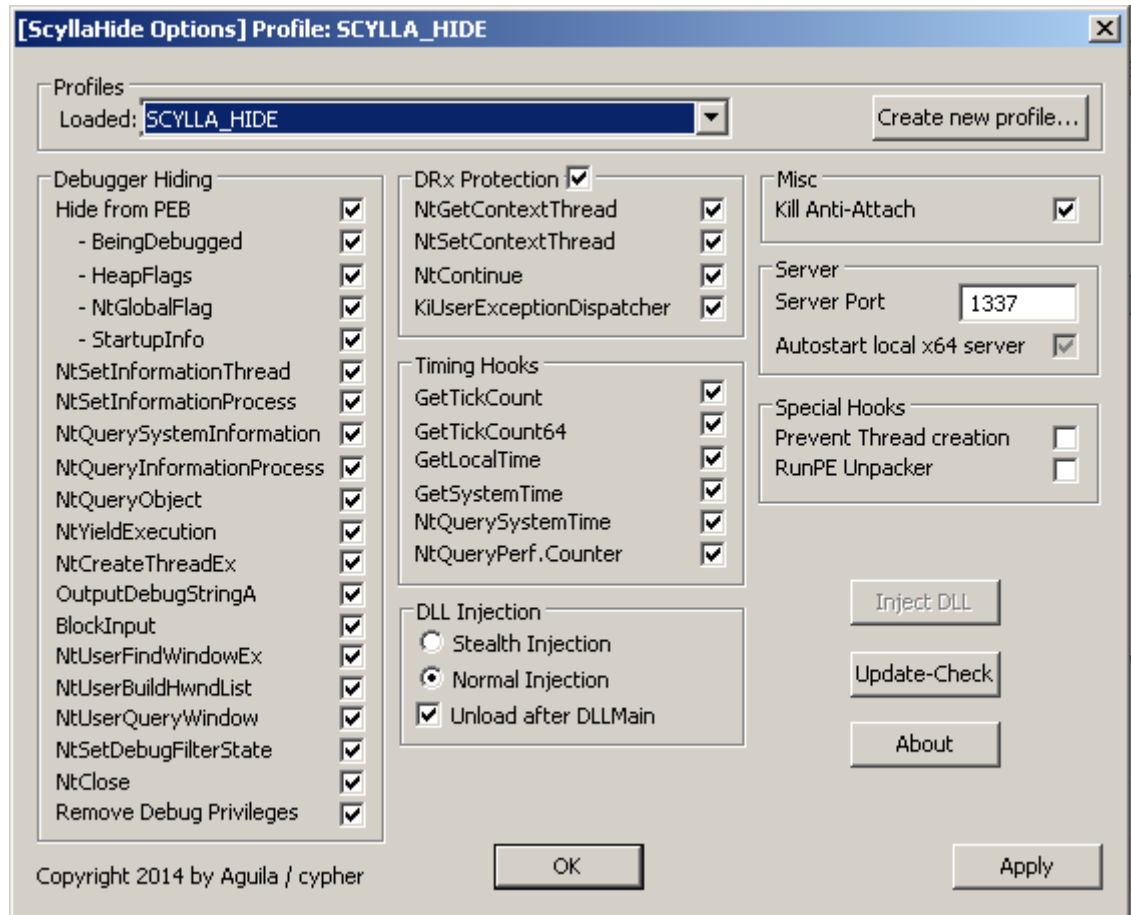


Figure 5: IDA Plugin

1.5.1 Server Option

Remote debugging is fully supported. Define the TCP port for the special IDA Server application. X64 debugging requires remote debugging, because IDA (64-bit) is a 32-bit application.

1.6 x64dbg Specific

1.7 TitanEngine Specific

2 Advanced Information

2.1 Nt* APIs from user32.dll

Listing 1: Special Nt* APIs declaration

```
1  HWND
2  NTAPI
3  NtUserFindWindowEx(
4      IN HWND hwndParent,
5      IN HWND hwndChild,
6      IN PUNICODE_STRING pstrClassName OPTIONAL,
7      IN PUNICODE_STRING pstrWindowName OPTIONAL,
8      IN DWORD dwType);
9
10 NTSTATUS
11 NTAPI
12 NtUserBuildHwndList(
13     IN HDESK hdesk,
14     IN HWND hwndNext,
15     IN BOOL fEnumChildren,
16     IN DWORD idThread,
17     IN UINT cHwndMax,
18     OUT HWND *phwndFirst,
19     OUT PUINT pcHwndNeeded);
20
21 HANDLE
22 NTAPI
23 NtUserQueryWindow(
24     IN HWND hwnd,
25     IN WINDOWINFOCLASS WindowInfo);
```

2.2 Special PEB Fix Information

There is a special piece of code inside the debug loop of the plugins and it seems like there is a bug:

Listing 2: Special PEB Fix Code

```
1  if (pHideOptions.PEBHeapFlags)
2  {
3      if (specialPebFix)
4      {
5          StartFixBeingDebugged(ProcessId, false);
6          specialPebFix = false;
7      }
8
9      if (debugevent->u.LoadDll.lpBaseOfDll == hNtdllModule)
10     {
11         StartFixBeingDebugged(ProcessId, true);
12         specialPebFix = true;
13     }
14 }
```

But this code is correct and very important. This nice trick removes heap artifacts (You can read more about it here: <http://pferrie.tripod.com/papers/unpackers.pdf> "The heap"). Themida and other protectors are checking for heap artifacts. Instead of manually wiping the artifacts, the code prevents the heap artifact creation.

3 Frequently Asked Questions

The error "NT APIs missing" appears, how to solve it?

- You need to put NtApiCollection.ini in the same directory as ScyllaHide.dll or the following hooks will not work: NtUserQueryWindow, NtUserBuildHwndList, NtUserFindWindowEx
- Some Nt* WINAPI functions are not exported by a DLL, so it is necessary to get the function addresses from another source. The other source is the PDB file. The addresses can be resolved with this tool: <https://bitbucket.org/NtQuery/pdb-getProcAddress> It will download the PDB file from the Microsoft server to resolve the missing function addresses. Binaries available here <https://bitbucket.org/NtQuery/scyllahide/downloads/NtApiTool.rar>

4 Developer Contact Information

Carbon *alias* **Aguila** *alias* **NtQuery**

- <https://github.com/NtQuery/>
- <https://bitbucket.org/NtQuery/>
- <https://forum.tuts4you.com/user/22354-aguila/>
- <https://forum.exetools.com/member.php?u=36473>

cypher *alias* **cypherpunk**

- <https://bitbucket.org/cypherpunk/>
- <https://forum.tuts4you.com/user/77269-cypher/>
- <https://forum.exetools.com/member.php?u=36610>

5 Version History

Version 1.2

- All Plugins: New attach dialog with crosshair/bullseye window finder.
- All Plugins: Tooltips with information.
- Olly v1 Plugin: Fix for NT Symbols path

- Olly v1 Plugin: Fix for faulty handle bug

Version 1.1

- Added "thanks" to About
- Added kill anti-attach (for x86 only)
- Olly v1 Plugin: Advanced CTRL+G
- Olly v1 Plugin: Skip "compressed code" message
- Olly v1 Plugin: Ignore bad PE image (WinUPack)
- Olly v1 Plugin: Skip "Load DLL" message

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