

ServiceDLL v1.2 Grasshopper Component User Guide

DRAFT



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1.5(c),(e)
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1 Description

ServiceDLL is a Grasshopper component that provides a way to persist a payload as a Windows Service DLL.

The ServiceDLL component installs a stub Service DLL to the Net Services (netsvcs) Service Host using manual registry modifications. The stub is configured to run the input payload whenever the service starts. The stub is stored at a user specified location on the target file system.

The payload is stored as a resource of the ServiceDLL stub. If the payload adheres to the NOD Persistence Spec v1 Interface, the stub will load and execute the payload from memory if using stub A or stub B. If not, the stub will write the payload to the filesystem and load or run it normally. The payload will be placed adjacent to the stub with a .tlb file extension for default stub A or DLLNAMEhlp.{dll|exe} for stub type stub B, or stub type stub C DLLNAMEext.{dll|exe}.

Due to caching by the Service Control Manager, the service cannot be started directly when first installed. The ServiceDLL component can, optionally, hijack an existing, stopped service DLL's entry in the SCM database to gain immediate execution. This requires that the component write an "Unhijack DLL" to the filesystem, which is deleted by the stub during the first run.

2 Usage

2.1 Builder Command Line

```
add component servicedll -n NAME -p PATH [-d DESC] [-u PATH]

-n/--name NAME          cover name of the service dll
-p/--path PATH          target path of the service dll stub
-d/--description DESC  cover description of the service dll
-u/--unhijack PATH     target path of the unhijack dll

--stubname STUBNAME  alternate stubname to use {A|B|C} [default A]
-k/--killfile PATH   kill file path which causes persistence and payload to be
                    uninstalled [default no kill file]
```

Example

```
(gh) add component servicedll
     -n ExampleService
     -p "c:\windows\system32\example.dll"
     -d "An example of how to create a service dll component."
     -u "%temp%\examplehelper.dll"
```

2.2 Supported Payload Types

ServiceDLL accepts input payloads in EXE or DLL formats for the x86 or x64 architectures. If a payload DLL supports the NOD Persistence Specification, the stub will memory load it during execution. ServiceDLL is a terminating component and does not output a payload.

Input Type	Output Type(s)
x86 DLL nod-persist	None
x64 DLL nod-persist	None

x86 DLL	None
x64 DLL	None
x86 EXE	None
x64 EXE	None

2.3 Supported Variant Stubnames

As part of the ServiceDLL component version 1.2, variant stubs were added. Three stubs are available the default stub A, and stub B, and stub C.

1. The default stub A uses the grasshopper common code base and uses resources data to store configuration information as well as the compressed and obfuscated payload. Stub A uses a payload file name identical to service dll filename except with a .tlb extension. It utilizes the CRT. Stub A also supports NOD-persist dlls and performs memory loading of the payload when NOD persist dlls are specified.
2. Stub B stub uses alternate resource ids, and uses deleteservice function to remove service entries vs. using registry manipulation in standard stub, additionally it does not use grasshopper common code. It stores the configuration data as an obfuscated resource. It stores the payload as an obfuscated resource. Stub B uses a payload file name identical to service dll filename except with a hlp.{exe|dll} suffix and extension. It utilizes the CRT. Stub B also supports NOD-persist dlls and performs memory loading of the payload when NOD persist payload dlls are specified.
3. Stub C stub uses alternate resource ids and, uses Reg.exe utility to remove service entries vs. using registry api in standard stub, additionally it does not use grasshopper common code. It stores the configuration data as an obfuscated resource. It stores the payload as an obfuscated resource. Stub C uses a payload file name identical to service dll filename except with a ext.{exe|dll} suffix and extension. There is no CRT dependency for stub C. Stub C does not support memory loading of NOD-persist dlls.

2.4 Uninstall Procedure

Manual

The manual uninstall procedure consists of the following steps:

1. Stop the service, if it is running.
`sc stop <SERVICE_NAME>`
2. Delete the service from the Service Control Manager.
`sc delete <SERVICE_NAME>`
3. Reboot the target.
4. Delete the stub and payload executables from the filesystem.
`del /F <SERVICE_PATH> <PAYLOAD_PATH>`

Autonomous

The autonomous uninstall procedure consists of the following steps:

1. Delete the payload from the files ystem while the stub is running.

When the stub detects that the payload has been deleted, it will execute the autonomous uninstall. The stub checks for the payload every 5 seconds. The autonomous uninstall will perform the following steps:

1. Remove the service from the Windows registry.
2. Delete itself from the filesystem.

Kill File

The kill file uninstall procedure consists of the following steps:

1. Create a file on the file system at path specified for kill file parameter at build time.

When the stub detects the presence of the kill file, it will execute the kill file uninstall procedure. The stub checks for the kill file every minute. The uninstall proceeds through the following steps:

1. Wait half a minute before starting uninstall.
2. Attempt to signal and/or stop the payload for uninstall.
3. Secure delete the payload. If this fails, arrange to delete on reboot.
4. Remove the service from the SCM.
5. Remove the kill file.
6. Delete itself from the filesystem.

NOTE: If the payload is a DLL, the stub will attempt to free library. If the payload has not performed a "safety load" on itself and does not shutdown, it may crash the host process.

NOTE: If the payload is a NOD-persisted DLL, it will have been memory loaded. On uninstall, the stub will call DLLMain with DLL_DETACH_PROCESS to notify the payload of the uninstall event. However, the memory is leaked and the payload left running to avoid potentially crashing the host process.

NOTE: If payload is an EXE payload, the payload will be terminated using TerminateProcess and securely deleted.

NOTE: If the uninstall fails, the kill file remains and the uninstall function will be attempted again on the next boot.

NOTE: The hijack technique may fail to find a useable service and fail to hijack. If this happens then the service will start normally on next reboot of system.

NOTE: All Stubs perform secure self-deletion of themselves during un-installation.

3 Footprint

File System

- Service Stub Executable, located at a user specified location <STUB_PATH>
- Service Stub Directory, may have been created
- Nodpersist interface payloads are not on disk but are an obfuscated resource in the stub

- Standard Payload Executables are located at (for default Stub A) <STUB_PATH.tlb> or (for default Stub B) <STUB_PATH>hlp.<exe|dll> depending on payload type
- Payload Directory, may have been created
- Unhijack Executable, located at a user specified location <UNHIJACK_PATH>
- Unhijack Directory, may have been created

Registry Keys

Created

- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\ImagePath
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\ObjectName
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\DelayedAutoStart
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\ErrorControl
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\Start
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\Type
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\Parameters
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\Parameters\ServiceDll
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\Description
- HKLM\SYSTEM\CurrentControlSet\Services\<SERVICE_NAME>\DisplayName

Modified

- HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\SvcHost\netsvcs

Modified (during hijack)

- HKLM\SYSTEM\CurrentControlSet\Services\<HIJACKED_SERVICE>\Parameters\ServiceDll
- HKLM\SYSTEM\CurrentControlSet\Services\<HIJACKED_SERVICE>\Parameters\ServiceDll
UnloadOnStop