

Grasshopper Module Guide - Scrub v1.0

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1 Overview

Scrub is a persistence module that uses a Windows registry run key to persist a payload. When a payload is chosen to use this module, Scrub will install a run key and deploy the payload and (if needed) stub executable to the target.

Scrub supports 32- and 64- bit EXE, DLL, and GH1 payloads. A 32-bit Scrub stub and payload may be installed on a 64-bit machine, but not vice versa.

2 Installation

Scrub uses direct registry modifications to create a run key in the Windows registry. The run key is used to run an executable (payload or stub) at user login. If the module fails to install the payload, it will delete any deployed components and remove the registry modifications.

2.1 Configuration

The following fields are configured at build time to specify Scrub's installation behavior.

Field	Default	Description
Payload Path	<i>None</i>	Path to payload EXE or DLL on target; not used for GH1 payloads If the path does not exist, it is created.
Startup EXE Path	<i>None</i>	Path to stub EXE on target installed with run key; not used for EXE payloads If the path does not exist, it is created.
Start Now	<i>True</i>	Whether the payload should be started immediately

3 Payload Execution

Whenever a user logs in, the Windows OS will run all executables listed in the registry under the run key with that user's privileges. What executable is registered and how it behaves depends on the payload type. Scrub supports three kinds of payload: EXE, DLL, GH1.

3.1 EXE

If the payload is an EXE, Scrub installs the run key for payload executable. The Windows OS will start the payload directly, optionally passing command line arguments.

An EXE payload is responsible for deleting itself from the target. The run key will not be removed.

3.2 DLL

If the payload is a DLL, Scrub deploys a stub as the run key executable. During installation, the stub is configured with the path to the payload. Upon execution by the Windows OS, the stub will load the payload DLL.

If the stub is unable to locate or start the payload, it will uninstall. During uninstallation, Scrub will delete the payload and self delete the stub.

A DLL payload is responsible for deleting itself from the target to trigger uninstallation.

3.3 GH1

If the payload supports the GH1 interface, Scrub deploys a stub as the task executable. During installation, Bermuda embeds the payload as a resource in the stub. Upon execution by the Windows OS, the stub will load the payload DLL in memory.

The stub will uninstall the payload on demand or on failure to start the payload. During uninstallation, Scrub will remove the run key and self delete the stub and payload.

4 Footprint

Scrub writes unobfuscated binaries to the target filesystem. If the payload is an EXE, it is written to a user-specified location. If the payload is a DLL, both the payload and a Scrub stub are written to user-specified locations. If the payload implements GH1, the payload is embedded as a resource in a Scrub stub, which is written to a user-specified location.

The process of the run key executable, whether payload or stub, is visible in the Task Manager during execution.

A registry key will be placed at

HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run\<Name>. The name of the run key matches the user-specified name of the run key executable, whether the stub or payload.

5 Receipt XML Format

Scrub's configuration is recorded in the Grasshopper receipt at build time under `build.xml`. An example and description of the xml format is provided below.

5.1 XML Example

```
<PersistModule>
  <UUID>9d03da02ab3a47d7bd28c9a776ba9806</UUID>
  <RunKey>
    <StartupExePath>C:\Target\stub.exe</StartupExePath>
    <PayloadPath>C:\Target\payload.dll</PayloadPath>
    <StartNow />
  </RunKey>
</PersistModule>
```

5.2 Field Definitions

UUID

The universally unique identifier for the module variant used in the build.

StartupExePath

The path to the Scrub Stub DLL on the target filesystem.

PayloadPath

The path to the payload on the target run by the Crab stub.

StartNow

Whether Grasshopper should start the payload immediately after installation.

The presence of the tag indicates that the task will be started immediately.

Note: the payload will be executed at the same privilege level as the Grasshopper or Cricket installer.

Appendix A:

Appendix B: Change Log

Date	Change Description	Authority
05/2012	Document Initialization	235567 9
09/2012	Update for Grasshopper v1.0 Phase 2 Delivery	235567 9
11/2012	Update for Grasshopper v1.0.1 Delivery	235567 9