

Grasshopper Module Guide - WUPS v1.0

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1 Overview

WUPS is a persistence module that uses the Windows Update Service to persist a payload. When a payload is chosen to use this module, WUPS will install a stub into the Windows Update service and deploy the payload to the target.

WUPS supports 32- and 64-bit EXE payloads only.

2 Installation

WUPS uses direct registry modification to register a WUPS stub as a Windows Update component using the user-provided configuration. If the module fails to install the payload, it will delete any deployed components and remove the registry modifications.

WUPS can be configured to start the payload immediately by restarting the Windows Update Service using `sc stop` and `sc start`.

2.1 Configuration

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

Field	Default	Description
WUPS Key Name	<i>None</i>	Overt key value for WUPS Stub stored in registry
WUPS DLL Path	<i>None</i>	Path to WUPS DLL on target If the path does not exist, it is created.
Payload Path	<i>None</i>	Path to Payload EXE on target started by WUPS DLL 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 the system starts and every 22 hours thereafter, the Windows Update Service loads a series of DLLs specified by a list in the registry. When the WUPS stub is loaded and executed by Windows Update, it will start the payload executable with SYSTEM privileges and spawn a process to maintain its place in the list of Windows Update DLLs.

Windows Update continues this same behavior whether or not updates have been disabled by the user.

If the stub is unable to locate the payload, it will uninstall. During uninstallation, WUPS will remove its registry entry and self delete the stub.

The payload EXE is responsible for deleting itself from the target. The payload must be able to handle multiple executions.

4 Footprint

WUPS writes unobfuscated binaries to the target filesystem. The WUPS Stub DLL and payload EXE are both written to user-specified locations.

The process of the payload executable is visible in the Task Manager during execution. A process running the WUPS Stub within RunDll32 is briefly visible in the Task Manager while it re-submits itself to the list of Windows Update DLLs.

WUPS will create a registry key in `HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\WindowsUpdate\Setup\ServiceStartup\<WUPSKeyName>` storing the path to the WUPS Stub DLL.

The WUPS startup will create a log entry in the Windows Update log in the Windows directory. The entry indicates a non-critical error, but such errors are common in the log.

5 Receipt XML Format

WUPS'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>
  <WUPS>
    <WUPSKeyName>Cover Name</WUPSKeyName>
    <WUPSDllPath>C:\Target\stub.dll</WUPSDllPath>
    <PayloadPath>C:\Target\payload.exe</PayloadPath>
    <StartNow />
  </WUPS>
</PersistModule>
```

5.2 Field Definitions

UUID

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

WUPS

The Windows Update configuration information used by the WUPS module.

WUPSKeyName

The overt name of the registry key used to persist the WUPS stub.

WUPSDllPath

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

PayloadPath

The path to the payload EXE on the target filesystem.

StartNow

Whether `sc stop/start` should be used to start the payload immediately after installation. The presence of the tag indicates that the task will be started immediately.

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