

Grasshopper Module Guide - Bermuda v1.0

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1 Overview

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

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

2 Installation

Bermuda uses the Windows COM interface to create tasks in the Windows Task Scheduler. The tasks are used to schedule the execution of a Windows executable based on user-provided configuration. If the module fails to install the payload, it will delete any deployed components and remove the scheduled task.

2.1 Configuration

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

Field	Default	Description
Task Name	<i>None</i>	Overt name of scheduled task; visible in Task Scheduler
Task Description	<i>None</i>	Overt description of scheduled task; visible in Task Scheduler
Task EXE Path	<i>None</i>	Path to EXE on target started by the scheduled task; either a payload executable or stub executable If the path does not exist, it is created.
Payload DLL Path	<i>None</i>	Path to Payload DLL on target loaded and started by Task EXE stub If the path does not exist, it is created. <i>(only used when payload is a DLL)</i>
Max Run Time	<i>infinite</i>	Maximum run time for the task or <i>infinite</i> Task Scheduler will try to terminate the Task EXE when the max run time has elapsed.
Trigger Type	<i>at_logon</i>	Type of trigger used to schedule task execution; must be one of: <ul style="list-style-type: none"> once run the task a single time at_startup run the task at system startup at_logon run the task when a user logs on
Begin Date	<i>today</i>	Date when the trigger activates
End Date	<i>none</i>	Date when the trigger deactivates
Start Time	<i>00:00</i>	Time of day when the task runs <i>(only used for tasks with triggers of type once)</i>
Duration	<i>0 min</i>	Time after task starts that trigger remains active; must

Interval	<i>0 min</i>	be \geq Interval Time between task executions over Duration time period
Kill At End	<i>False</i>	Whether Task Scheduler should terminate task at end of Duration
Start Now	<i>True</i>	Whether the task should be started immediately

3 Payload Execution

Whenever Bermuda's scheduled task is triggered, the Windows Task Scheduler will execute the task executable as SYSTEM. What the task executable is and what it does depends on the payload type. Bermuda supports three kinds of payload: EXE, DLL, GH1.

3.1 EXE

If the payload is an EXE, Bermuda uses the payload as the task executable. The Windows Task Scheduler will start the payload directly, optionally passing command line arguments.

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

3.2 DLL

If the payload is a DLL, Bermuda deploys a stub as the task executable. During installation, the stub is configured with the path to the payload and the name of the task that starts it. Upon execution by the Task Scheduler, the stub will load the payload DLL.

If the stub is unable to locate or start the payload, it will uninstall. During uninstallation, Bermuda will delete the payload, remove the scheduled task, 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, Bermuda deploys a stub as the task executable. During installation, Bermuda embeds the payload as a resource in the stub and configures the stub with the name of the task that starts it. Upon execution by the Task Scheduler, the stub will load the payload DLL in memory.

The stub will uninstall the payload on demand or failure to start the payload. During uninstallation, Bermuda will remove the scheduled task and self delete the stub and payload.

4 Footprint

Bermuda 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 Bermuda stub are written to user-specified locations. If the payload implements GH1, the payload is embedded as a resource in a Bermuda stub, which is written to a user-specified location.

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

Bermuda will create scheduled task visible in the Task Scheduler. A hidden file named '<TaskName>.job' will be created by Windows in '%SYSTEMROOT%\Tasks'.

5 Receipt XML Format

Bermuda'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>
  <SchTaskExe>
    <TaskName>Cover Name</TaskName>
    <TaskDescription>This is a description.</TaskDescription>
    <TaskExePath>C:\Target\stub.exe</TaskExePath>
    <PayloadDllPath>C:\Target\payload.dll</PayloadDllPath>
    <MaxRunTime>infinite</MaxRunTime>
    <TriggerType>at_logon</TriggerType>
    <BeginDate>2012-06-21</BeginDate>
    <EndDate />
    <StartTime>00:00</StartTime>
    <Duration>30m</Duration>
    <Interval>5m</Interval>
    <KillAtEnd />
    <StartNow />
  </SchTaskExe>
</PersistModule>
```

5.2 Field Definitions

UUID

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

SchTaskExe

The scheduled task configuration information used by the Bermuda module.

TaskName

The overt name of the Windows scheduled task created by the module. The name must conform to Windows NT file-naming conventions and cannot include back slashes.

TaskDescription

The overt description of the Windows scheduled task created by the module.

TaskExePath

The path to the executable on the target run by the scheduled task. If the payload is an EXE, it is the path to the payload. If the payload is a DLL, it is the path to the Bermuda stub executable.

PayloadDllPath

The path to the payload on the target run by the Bermuda stub. This field is only present when the payload is a DLL, otherwise it is not necessary.

MaxRunTime

The maximum run time for the task executable or *infinite*. When the max run time has elapsed, the Task Scheduler will attempt to terminate the application. Max run time may be defined with millisecond granularity.

If the task executable fails to exit within three minutes of receiving a `WM_CLOSE` message, or if the executable is unable to handle messages, the Task Scheduler terminates the executable using `TerminateProcess`.

TriggerType

The type of trigger used to schedule execution of the task executable. Bermuda supports three types of triggers, including:

<code>once</code>	Runs the task a single time
<code>at_startup</code>	Runs the task at system startup
<code>at_logon</code>	Runs the task when a user logs on

BeginDate

The date when the trigger activates. Scheduled task triggers are not evaluated by the Task Scheduler until after their begin date has passed.

EndDate

The date when the trigger deactivates. Scheduled task triggers are no longer evaluated by the Task Scheduler after their end date has passed. This field is optional; if no text is given for the tag, the end date will not be set.

StartTime

The time of day when the trigger will run the task executable. This field is ignored for triggers of type `at_logon` and `at_startup`.

Duration

The time after the task starts that the trigger remains active. The trigger duration must be greater than or equal to the trigger interval. Duration may be defined with minute granularity.

For example, if you start a task at 8:00am and want to repeatedly start until 5:00pm, there would be 9 hours in the duration.

Interval

The time between task executions during the period defined by the trigger duration. Interval may be defined with minute granularity.

For example, if you run a task every hour from 8:00am to 5:00pm, there would be 1 hour in the duration.

KillAtEnd

Whether the Task Scheduler should terminate the task executable at the end of the trigger duration. The presence of the tag indicates that the task will be terminated.

StartNow

Whether the Task Scheduler should be used to start the task executable 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