

ASSASSIN v1.1 USER GUIDE

March 2012

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Appendix A: Overview

This document is intended to provide information relevant to the secure and effective use of the Assassin automated implant, including descriptions of system components, instructions for their operation, and potential vulnerabilities to detection or failure.

1 Concept of Operations

Assassin is a stage one automated Implant that provides a simple collection platform on remote computers running the Microsoft Windows operating system. Once the tool is installed on the target, the Implant is injected into and runs within a Windows service process. Assassin will then periodically beacon to its configured listening post(s) to request tasking and deliver results. Communication occurs over one or more transport protocols as configured before or during deployment.

2 System Components

The Assassin system consists of six components: Implant executables, deployment executables, builder, tasker, post processor, and collide handlers.

2.1 Implant Executables

The Implant Executables provide the core functionality of the Assassin implant, including communications and task execution. Implant Executables may be run directly or through one of the Deployment Executables, depending on the needs of the operation.

Assassin includes three types of Implant Executables: Implant DLL, Implant Service DLL, and Implant EXE. The Implant Executables may be run directly, but do not provide their own persistence.

2.2 Deployment Executables

The Deployment Executables provide services to support the deployment of the Implant Executables, such as process injection and persistence. One of the Deployment Executables is selected based on the parameters of the operation and executed on the target computer. The Assassin toolset includes two types of Deployment Executables: Injection Launchers and Service Installers.

Injection Launchers

Injection Launchers provide persistence and process injection for the Assassin Implant. The Launcher carries an Implant DLL embedded as a resource, which it is responsible for deploying.

The Launcher achieves soft persistence by registering itself as a Windows to be started on boot. Whenever the Launcher runs, it drops an instance of the Implant DLL to the disk and injects it into an existing Windows SYSTEM process. Once the Implant has been injected, the Launcher terminates.

Launchers are only capable of injecting Implant DLLs into processes of the same bitness. The Injection Extractor provides deployment flexibility by allowing operators to deploy Assassin without prior knowledge of the target environment. The Extractor carries both the 32- and 64- bit Launchers as resources and runs the correct executable based on the operating system before self deleting.

Service Installers

Service Installers provide persistence for the Assassin Implant. The Installer carries an Implant Service DLL embedded as a resource, which it is responsible for deploying.

The Installer registers the Service DLL as a service that should be run by the netsvcs svchost on startup. Once the Service DLL is installed, the Installer will self delete.

The Service Extractor allows operators to deploy Assassin without prior knowledge of the target environment. The Extractor carries both the 32- and 64-bit Implant Service DLLs and installs the appropriate Implant based on the operating system before self deleting.

2.3 Builder

The Builder configures Implant and Deployment Executables before deployment. The operator may configure the executables from scratch or provide a configuration as a starting point. The Builder provides a custom command line interface for setting the Implant configuration before generating the Implant. A wizard mode is available to walk the operator through the build process.

2.4 Tasker

The Tasker generates the task files used to command the Assassin Implant. The Tasker provides a custom command line interface for creating task files. The Collide Handler provides a similar user interface for task generation and is the preferred method for tasking Assassin.

2.5 Post Processor

The Post Processor parses Assassin files of any type in any state, generating XML-based output files and extracting embedded data files.

2.6 Collide Handlers

The Collide Handlers provide an interface between Assassin and the Collide Automated Implant Command and Control system. Assassin's Collide handlers define the user interface, facilitate Implant communication, and support post processing.

3 System Requirements

3.1 Python

The Assassin scripts are written for Python version 3.1. Their compatibility with other versions has not been tested and is not assured. Unless otherwise stated, the scripts may run on any platform and operating system that runs a Python interpreter.

The Assassin scripts are dependent on the provided Assassin Python package, named 'assassin'. The package must be placed within one of Python's path resolution directories, which includes the directory of the script executed.

The Post Processor daemon is also dependent on the Python package `pyinotify` to monitor incoming files. This package is provided with the Assassin tools.

3.2 Collide

The Assassin toolset requires Collide v1.5 or greater to provide communication between the Implant and the listening post. Handlers and support scripts are provided to facilitate operation of the Assassin Implant via Collide.

Appendix B: Assassin Implant

The Assassin Implant provides the core logic and functionality of the Assassin toolset on the target, including communications and task execution. The configuration of the Implant determines the majority of its behavior, including when it operates, when it beacons, how it communicates, and where it operates on the target.

This section will describe the usage and behavior of the Assassin Implant.

1 Implant Executable Usage

Assassin provides three types of Implant Executables: Implant DLL, Implant Service DLL, and Implant EXE. The Implant Executables may be run directly, but do not provide their own persistence.

The preferred method for running the Implant Executables is through one of the Deployment Executables. Otherwise, the operator must provide a separate persistence mechanism. The Deployment Executables carry embedded, configured Implant Executables as resources that they install on target. However, the Implant Executables may be run directly.

1.1 Implant DLL

The Implant DLL is a Windows Dynamically Loaded Library. The Implant DLL may be run through one of the Deployment Executables or directly, via DIIMain or a provided RunDll32 entry point.

Appendix C: *Running via DllMain*

The Implant may be started by loading the Implant DLL directly. The DllMain function defined by the DLL will start the implant within the host process that loads it.

Appendix D: Running via RunDLL32

A RunDLL32 entry point is provided by the Implant DLL to run the Implant directly. When executed through RunDLL32, the Implant DLL is loaded and executed within a RunDLL32 process, which will be present in the process list.

Usage

For 32-bit target:

```
rundll32.exe Assassin.dll,_EntryPoint@0
```

For 64-bit target:

```
rundll32.exe Assassin.dll,EntryPoint
```

1.1 Implant Service DLL

The Implant Service DLL is a Windows Dynamically Loaded Library that includes a ServiceMain entry point. The Implant Service DLL may be run through one of the Deployment Executables or directly via the ServiceMain or a provided RunDll32 entry point.

Appendix E: Running via RunDLL32

A RunDLL32 entry point is provided by the Implant Service DLL to run the Implant directly. When executed through RunDLL32, the Implant Service DLL is loaded and executed within a RunDLL32 process, which will be present in the process list.

Usage

For 32-bit target:

```
rundll32.exe Assassin.dll,_EntryPoint@0
```

For 64-bit target:

```
rundll32.exe Assassin.dll,EntryPoint
```

Appendix F: *Running via ServiceMain*

The Implant Service DLL may be installed as a valid service executable on a target by hand or through a third-party tool. This process is left as an exercise to the reader.

1.1 Implant EXE

The Implant EXE is a plain Windows Executable that behaves identically to the DLLs as an implant but provides its own process. Unfortunately, this means that the Implant EXE loses the stealth it gets from residing in trusted Windows processes.

To start the Implant, simply start the Implant EXE file as you would any other EXE.

2 Implant Identification

An Assassin ID is a case-sensitive, eight-digit alphanumeric string that uniquely identifies an Assassin Implant. The ID contains two four-digit parts: the parent and the child. The parent identifies groups of implants and is always set by the operator at build time. The child identifies an Implant within the parent group. If the child is not set at build time, it is randomly generated by the Implant on first execution.

Only one Assassin Implant is permitted to run on a target per parent ID.

3 Beacon

Assassin communications are organized around periodic events called beacons. During a beacon event, the Implant will connect to the listening post to send vital information about the Implant state, request tasking from the operator, and respond with results. The beacon transaction, the timing of events, and optional conditional checks are described below.

3.1 Beacon Transaction

The majority of Implant-Listening Post communications occur during beacon events. The beacon transaction is composed of six stages:

1. Decide to Beacon

The Implant decides if it should perform a beacon transaction. Two conditions must be met before the Implant will attempt to beacon.

- Beacon Interval seconds have elapsed since the last beacon transaction.
- Target machine passes the 'Process Check', which is described below.

2. Beacon

The Implant sends a beacon to the Listening Post, initiating the transaction. The beacon includes information about the state of the Implant, including:

- ID of the Implant
- Current Time on the target machine
- Time when the Implant last started execution
- Time when the Implant is scheduled to uninstall, if scheduled
- Index of Transport used to conduct current beacon

3. Download Tasking

The Implant downloads a Tasking file, if any are available, from the Listening Post. The file is saved in the `input` directory with a random name between five and twenty-five alphanumeric characters.

4. Execute Tasking

The Implant executes any tasking files it finds in the `'input'` directory. Results are generated, prepared for upload, and saved in the upload queue. The results of task execution do not affect the success/failure of the beacon.

5. Upload Results

The Implant uploads files to the Listening Post from the upload queue. The Implant will continue to upload files until the upload limit is met or the upload queue is exhausted.

6. Update Beacon Interval

The Implant calculates the duration of the next beacon interval based on the success or failure of the current beacon's communications.

3.2 Beacon Timing

The timing of beacon events is defined by the five beacon configuration fields. The interval between events is dynamic and calculated at the end of each transaction using the following algorithm:

```

if (comms_succeeded):
    interval = default_interval
else:
    interval *= backoff_factor

interval += RandomInteger(-jitter, jitter)

if (interval > max_interval):
    interval = max_interval

```

Default Interval

The `default interval` specifies an integral number of seconds between beacons. The Implant will not beacon more frequently than every `default interval` seconds.

While the beacon period is variable, this is the interval the Implant will maintain while successfully communicating with the listening post.

Max Interval

The `max interval` defines an integral number of seconds as an upper bound for beacon intervals. The Implant will attempt to beacon at least every `max interval` seconds.

Jitter

The `jitter` specifies an integral number of seconds representing the maximum amount of variation in beacon timing.

Whenever the time for the next beacon is calculated, the `jitter` is applied to introduce randomness to the timing of beacons.

Backoff Factor

The `backoff factor` modifies the beacon interval after a failed attempt to beacon, multiplying the current interval by the factor.

The factor is specified by a floating point value greater than or equal to 1.0.

Initial Wait

The `initial wait` defines an integral number of seconds that the Implant must wait after startup before attempting its first beacon.

3.3 Process Check

The Assassin Implant may be configured to check the target's running process list before performing a beacon. The contents of the process list are compared against two sets of processes defined at build time, the `blacklist` and the `whitelist`. These lists are specified by the image names of the processes in question.

The blacklist is a set of processes that prevent the performance of a beacon transaction. If any of the processes in the blacklist is running, the beacon is aborted.

The whitelist is a set of processes that enable the performance of a beacon transaction. If none of the processes in the whitelist is running, the beacon is aborted.

If a beacon is aborted due to a failed process check, it is considered a 'failed beacon' for the purposes of the failure threshold; see section 6.3 on Failure Threshold.

4 Tasking

The Assassin Implant implements an asynchronous command and control design based on the exchange of tasks and results between the Implant and the Listening Post. Tasks are created using either the Collide interface or the stand-alone Tasker utility; see section Appendix I: on the Tasker. Results are assembled and processed using the Post Processor; see section Appendix J: on the Post Processor.

4.1 Task Input

The Assassin Implant monitors its `input` directory for new task files by polling every five seconds. The Implant will process the first task it finds and remove it from the `input` directory. Task files are typically placed in the directory during communication with the Listening Post. However, task files placed in the `input` directory via a non-Assassin mechanism will be processed like any other task.

Startup tasks are stored in the Assassin `startup` directory. All task files in this directory are processed exactly once during Implant start. Task files are typically placed in the directory by the Implant whenever it identifies a task as a startup task. However, task files placed in the `startup` directory via a non-Assassin mechanism will be processed like any other startup task.

4.2 Task Execution

The Assassin Implant will process one task file at a time and blocks during the execution of tasks. Tasks are not executed during hibernation; startup tasks run after the hibernation period but before the initial beacon delay.

4.3 Task Output

The Assassin Implant creates an encrypted result file in the `output` directory for each processed task file. If the task was configured to return its results immediately, the Implant will upload this file to the listening post. Otherwise, the file is placed in the upload queue for eventual transmission to the LP.

5 Communication

The Assassin Implant implements communications mechanisms to fetch and respond to tasking and to support third-party tools.

5.1 Transports

Assassin may be configured to communicate using one or more transports. A transport configuration consists of a listening post, a try value, a communication protocol, and protocol-specific options.

The Implant is configured with an ordered list of transports. The Implant will attempt to beacon using a transport the configured number of tries before switching to the next transport in the list, or the first if the list has been exhausted.

HTTPS

Assassin supports communication over the Hypertext Transfer Protocol Secure (HTTPS). The Implant communicates with the listening post via GET and POST requests using the WinInet API. User agent strings identify the Implant communications as originating from a Mozilla Firefox browser.

Port Customization

The HTTPS transport allows the operator to select the TCP port on the listening post to which the Implant should attempt to connect. HTTPS traffic is typically directed at a web server's port 443.

URL Randomization

The HTTPS transport randomizes the URL used during Implant communications, including both the path and filename components.

The path of the URL is randomized by selecting one of a set of path components provided in the transport configuration. If no path components are provided, a path is randomly generated from between three and eight alphanumeric characters.

The filename of the URL is an encoded string of at least sixteen alphanumeric characters that is composed of the Implant ID and a nonce used to obfuscate the ID.

Proxy Support

The HTTPS transport supports the optional use of proxy credentials for communication. A username and password, when provided to the transport configuration, will be used to validate with the network proxy during communications using the transport.

WebDAV

Assassin supports communication over the Web-based Distributed Authoring and Versioning (WebDAV) protocol. The Implant communicates with the listening post by mounting the server as a share and copying files from the local to the remote file system, or vice versa. The transfer of files between the local and remote file systems is carried out by the Windows WebClient service.

OS Requirement

The WebDAV transport mechanism is only supported on targets with Windows 2000 or later. The target machine must be running the WebClient service which is off by default on Windows 2000 and Windows 2003 Server.

Upload Size Limit

The WebClient service has a file size limit set in its registry key, HKLM\SYSTEM\CurrentControlSet\services\WebClient\Parameters\FileSizeLimitInBytes . The default value for the key is 50 MB. The size limit only affects the upload of files to the implanted target.

Drive Selection

The WebDAV transport will mount the listening post to the drive with the largest available letter, less than or equal to 'U'.

Temporary Directory

To separate the operation of the Implant from the WebClient service, the WebDAV transport will copy upload and download files to and from a temporary directory specified by the user at build time.

There is a small chance that the WebClient service will generate an error message identifying the file in question. By operating out of a temporary directory, these messages will not identify a file in any of the Assassin directories.

Path Randomization

The WebDAV transport randomizes the share path used during Implant communications, including both the share name and filename components.

The share name of the share path is randomized by selecting one of a set of share names provided in the transport configuration. If no share components are provided, a share name is randomly generated from between three and eight alphanumeric characters.

The filename of the share path is an encoded string of at least sixteen alphanumeric characters that is composed of the Implant ID and a nonce used to obfuscate the ID.

5.2 Push Directories

Assassin provides 'push' directories, intended to support third-party tools. Two directories created by the Assassin implant, the `output` and `push` folders, will push files from the target machine to the listening post. Files detected in these directories are immediately packaged with metadata and encrypted for transmission. Metadata collected for pushed files includes the file's name and size, the time it was detected, and the ID of the Implant that collected it.

Files placed in the `output` directory are placed in the upload queue for later transmission. Files placed in the `push` directory are uploaded immediately; if the immediate upload fails, the file is placed in the upload queue with priority status.

5.3 Upload Queue

The Assassin Implant maintains a queue of files that are awaiting upload to the listening post. The Implant uploads files from the queue during the beacon transaction in first-in first-out order. Files in the upload queue may be given priority status, moving them to the front of the queue.

The upload queue is stored in the Implant's `staging` directory. Files are given a random name of between five and twenty-five alphanumeric characters. Files with priority status are prepended with the tilde character, '~'.

The Assassin implant will not store more than 16,384 files in the `staging` directory to prevent overflowing the limitations of the file system.

5.4 Chunking

Assassin's chunking feature allows operators to set limits on the amount of data that is uploaded from the target to the listening post during any beacon transaction. If the Implant is configured with a non-zero chunk size, it will send files from the upload queue until this threshold is met or the queue is empty. The Implant will always send the first file in the queue, regardless of size. Subsequent files are checked for size and are only sent if they will not push the beacon transaction past its upload limit.

Any task results or pushed files (from the `output directory`) that are larger than the current chunk size parameter are broken up to conform to the current upload limits. These chunks are later reassembled by the Post Processor.

Assassin sets a hard limit on the size of files that it uploads at 1 GiB. Any files larger than the limit will be chunked no larger than 1 GiB. This size limit only affects the way files are handled on target, not the upload limit set by the chunk size configuration.

If the operator modifies the chunk size configuration, chunked files in the upload queue are not reprocessed.

6 Operational Window

The Operational Window refers to the period of time during which the Assassin Implant is active on a target machine. This window is defined by the Implant's hibernate, scheduled uninstall, and failure threshold parameters.

6.1 Hibernate

The Assassin Implant may be configured to hibernate for a period of time before going active on a target. During this hibernation period, the Implant is dormant, neither beaconing nor processing tasks.

The hibernation period is defined in the configuration as seconds after the Implant is first run on the target.

6.2 Scheduled Uninstall

The Assassin Implant may be scheduled to autonomously uninstall on a certain date and/or after a certain period of time. The conditions for the uninstallation are provided in the configuration and checked periodically by the Implant.

The uninstall date specifies a date and time at which the Implant should uninstall. If the target clock is equal to or later than the configured date, the Implant uninstalls.

The uninstall timer specifies a period of time after which the Implant should uninstall. This time period is defined as a number of seconds after the Implant is first run on the target.

6.3 Failure Threshold

The Assassin Implant may be configured to end the operation if it passes a defined failure threshold. If the Implant fails during a beacon consecutively more than a configured number of times, it will autonomously uninstall from the target.

7 Configuration

The behavior of the Assassin Implant is widely configurable by the modification of several parameters. Configured Implant Executables are generated using the Builder, the usage for which is documented in section Appendix H:. The Implant configuration is patched into the Implant binary at build time.

7.1 Configuration Sets

The Implant identifies and manipulates three full sets of configurations: running, persistent, and factory. Details about these configuration sets are herein described.

Running

The running configuration is the settings the Implant is currently using to operate. The running configuration is stored solely in memory and is lost whenever the Implant restarts.

During operation, all modifications to the Implant configuration are made to the running configuration. If changes are not explicitly persisted, they will be lost on restart.

Persistent

The persistent configuration is the settings that the Assassin Implant will revert to upon startup, regardless of the running configuration from the previous session.

If the Implant Executable is able to access its original binary, the persistent configuration is stored as a patch in the binary. If not, the persistent configuration is saved to a file in the Implant's `startup` directory with a random filename and extension.

Factory

The factory configuration is the settings that the Implant had when it was built and originally deployed. The operator may easily revert to this configuration at any time.

The persistent configuration is stored as a patch in the Implant Executable binary and is never modified.

8 Crypto

The Assassin toolset uses a modified RC4 stream cipher to provide cryptographic services. Any data stored on the target file system or sent over the wire is encrypted prior to potential exposure.

The Implant carries a sixteen byte key that is generated and patched into the binary by the Builder. A sixteen byte session key is generated by combining a four byte nonce with the key and calculating the MD5 hash. A new session key is calculated per crypto transaction.

The four byte nonce is prepended to the crypt text before being stored or transmitted.

Assassin modifies the RC4 scheme by flushing the crypto state machine with 1024 zeroes during initialization.

9 Footprint

This section documents the footprint of the Implant Executable and its operation on the target environment.

9.1 Implant Executable

The Implant Executable is copied to the target file system before it is run. The name and location of the executable is determined by the operator, either through directly placing the executable or by configuring the Deployment Executable that places it.

9.2 Directories

The Implant Executable will create five directories on the target file system that is used to manage communications and tasking. The Implant will ignore subdirectories, allowing the directories to be nested with other directories, including other Assassin directories, without affecting operation.

Input

Assassin tasking files are downloaded to and stored in the `input` directory until they can be processed by the Implant. Tasking files are given a random filename between five and twenty-five alphanumeric characters.

Startup

Assassin tasking files designated for startup execution are moved to the `startup` directory and processed once whenever the Implant starts. They retain the filename they had/were given in the `input` directory.

The directory may also contain a configuration file of the implant's persisted settings with a random filename and extension.

Output

Files placed in the `output` directory are packaged and placed in the upload queue for transmission during the next beacon.

Third-party tools may use this feature to forward files to the listening post.

Push

Files placed in the `push` directory are packaged and uploaded immediately, ignoring the beacon interval and chunk size. If the Implant is unable to upload the file, it is placed in the upload queue with priority status.

Third-party tools may use this feature to forward files to the listening post.

Staging

The Implant uses the `staging` directory to manage its upload queue. Files created in this directory are given a random filename of eight alphanumeric characters and a numeric counter.

This directory is reserved for Implant use. The behavior of files placed in this directory is undefined.

Appendix G: Assassin Deployment

The Deployment Executables provide services to support the deployment of the Implant Executables, such as process injection and persistence. One of the Deployment Executables is selected based on the concept of operations and executed on the target computer.

The Assassin toolset includes two types of Deployment Executables: Injection Launchers and Service Installers.

1 Injection Launcher

The Injection Launchers provide persistence and process injection for the Assassin Implant. It carries an Implant DLL embedded as a resource, which it is responsible for deploying by injecting into an existing SYSTEM process. Implants are typically injected into the `netsvcs svchost`.

The Launcher is only able to inject the Implant DLL into SYSTEM processes of the same bitness as itself. The Injection Extractor provides deployment flexibility by allowing operators to deploy Assassin without prior knowledge of the target environment. The Extractor carries both the 32- and 64-bit Launchers as resources and deploys the appropriate version based on the operating system.

1.1 Launching Assassin

The Injection Launcher follows the following steps to achieve soft persistence and process injection for the Implant DLL:

1) Register as Windows Service

The Launcher persists itself as a Windows service that starts on boot. If it is not currently persisted, the Launcher will register itself through direct registry modification. The Launcher is setup as a service with a user-provided cover name and description.

2) Inject Implant

If the Launcher has SYSTEM privileges, it will try to inject the Implant DLL into one of the Windows SYSTEM processes. First, the Implant DLL is dropped to the target disk with a user-defined name and location. The Launcher then walks through the target processes until it finds a suitable host process. Once an appropriate SYSTEM process is identified, the Implant DLL is injected using a Windows hook.

3) Cleanup and Exit

The Launcher passes information about itself to the Implant DLL and terminates.

1.2 Extracting Assassin

The Injection Extractor follows the following steps to deploy the Injection Launcher:

1) Detect OS Bitness

The Extractor determines the bitness of the target's operating system

2) Execute Launcher

The Extractor drops the Launcher to a user-defined location on the target file system and executes it directly.

3) Cleanup and Exit

The Extractor is no longer needed and self deletes.

1.3 Configuration

The behavior of the Assassin Injection Launchers and Extractors are customizable by the modification of its configuration. Configured Deployment Executables are generated using the Builder, the usage for which is documented in section Appendix H: The configuration is patched into the Injection binaries at build time.

1.4 Footprint

This section documents the footprint of the Injection executables and their operation on the target environment.

Launcher Executable

The Launcher executable is copied to the target file system before it is run. The name and location of the executable is determined by the operator, either through directly placing the executable or by configuring the Extractor that places it.

Extractor Executable

The Extractor executable is copied to the target file system before it is run. The name and location of the executable is determined by the operator who places it. The Extractor self deletes shortly after being run.

Service Registry

The Launcher adds a key to the registry to set itself up as a service. The key is added at 'HKLM\SYSTEM\CurrentControlSet\Services'. The name and subkeys of this key are selected by the operator at build time.

2 Service Installer

The Service Installers and Extractor provide persistence for the Assassin Implant. The Installer carries an Implant Service DLL embedded as a resource, which it is responsible for deploying. The Extractor carries both the 32- and 64- bit Implant Service DLLs and installs the appropriate version based on the operating system.

2.1 Installing Assassin

The Service Installers and Extractor follow the following steps to achieve soft persistence for the Implant Service DLL:

1) Deploy Implant Service DLL

The Implant Service DLL is dropped to the target disk with a user-defined name and location. If running the Extractor, it will select the bit-appropriate DLL.

2) Install Service DLL

The Installer persists the Implant by registering the service DLL as a service through direct registry modification. The Implant Service DLL is setup as a member of the `netsvcs svchost` with a user-provided cover name and description.

3) Cleanup and Exit

The Installer or Extractor is no longer needed and self deletes.

2.2 Configuration

The behavior of the Assassin Service Installers and Extractor are customizable by the modification of their configuration. Configured Deployment Executables are generated using the Builder, the usage for which is documented in section Appendix H:. The installation configuration is patched into the Installer binaries at build time.

2.3 Footprint

This section documents the footprint of the Service Installation executables and their operation on the target environment.

Installation Executable

The Installation executable is copied to the target file system before it is run. The name and location of the executable is determined by the operator who places it. The executable self deletes shortly after being run.

Service Registry

The Installer adds a key to the registry to set the Implant Service DLL up as a service. The key is added at 'HKLM\SYSTEM\CurrentControlSet\Services'. The name and subkeys of this key are selected by the operator at build time.

Appendix H: Builder

The Builder configures Implant Executables before deployment. The operator may configure the executables from scratch or provide a configuration/receipt file as a starting point. The Builder provides a custom command line interface for setting the Implant and Deployment Executable configurations before generating the executables. A wizard mode is available to walk the operator through the build process.

The Builder outputs configured versions of all Implant Executables and a receipt file recording the parameters used and the build time.

The Builder requires the Assassin Python module, named 'assassin'. The module must be located in the Python search path, which includes the directory with the `implant_builder.py` script. The Builder also needs access to a directory of blank Implant Executables.

1 Usage

```
implant_builder.py <options>
```

Options:

-i INPUT, --in=INPUT	Specify the directory containing blank Implant Executables. <i>Required.</i>
-o OUTPUT, --out=OUTPUT	Specify the directory to output patched executables and receipt. <i>Required.</i>
-c CONFIG, --config=CONFIG	Specify an xml-based Assassin configuration file.
-g, --generate	Generate the executables from the provided configuration immediately; do not enter builder command line.
-h, --help	Show the help message and exit.

2 Configuration and Receipt Files

The Builder uses xml-based files to specify or record the configuration of the Implant executables. The format of these files is nearly identical such that they may be used interchangeably.

Configuration files may be passed to the Builder on the command line and used as a starting point for the build process. The Builder will accept partial configuration files.

During Implant executable generation, the Builder creates a receipt file in the target folder of the output directory. The receipt records the configuration of the Implant and the time and date of the build. The Builder can use the receipt as a configuration file input to rebuild an Implant.

3 Command Line

The Builder provides a command line interface to view and set the Implant Executable configuration. Once the operator has finished tailoring the configuration of the Implant to their needs, the command line is used to generate the executables.

3.1 Builder Commands

The builder commands are used to control the builder. There are commands to view or export configurations, start the wizard, or generate configured Implant Executables.

p [config='all']

Print the current state of the configuration.

config	Portion of configuration to print
	'all' - print all of the configuration
	'implant' - print the Implant DLL configuration
	'launcher' - print the launcher configuration
	'extractor' - print the Extractor configuration

x <xml_file>

Export the current configuration to an xml file.

xml_file	Filename for the exported xml configuration file
----------	--

w

Invoke the builder wizard; see section 6.

Current configuration settings will be presented as defaults in the wizard.

g

Generate the configuration and build the Implant executables.

The Implant executables and build receipt will be placed in the output directory under a folder named 'Assassin-<ImplantID>'.

c

Cancel the build process. Any unsaved progress will be lost.

3.2 Build Option Commands

The build option commands are used to specify the types of Assassin Executables the Builder should generate.

```
build_outputs [options]
```

Set the build outputs for the current build. If no parameters are provided, the command will enter a subshell; see section 4.1 on the Build Outputs subshell.

options

One or more of the following build types

'all' - All available Assassin Executables

'run-dll' - Implant DLLs, 32- and 64-bit

'service-dll' - Implant Service DLLs, 32- and 64-bit

'executable' - Implant EXEs, 32- and 64-bit

'injection' - Injection Launchers, 32- and 64-bit, and

Extractor

'service' - Service Installers, 32- and 64-bit, and Extractor

3.3 Implant Commands

The Implant commands are used to modify the configuration of the Assassin Implant. The Implant configuration determines the behavior of the Implant once it is running on the target machine.

```
beacon [initial=0] [default_int=0] [max_int=0] [factor=0.0] [jitter=0]
```

Set one or more of the beacon parameters.

<code>initial</code>	Initial wait after Implant startup before beacon (<i>default = 0</i>)
<code>default_int</code>	Default interval between beacons (<i>default = 0</i>)
<code>max_int</code>	Maximum interval between beacons (<i>default = 0</i>)
<code>factor</code>	Backoff factor to modify beacon interval (<i>default = 0</i>) If beacon fails, multiply beacon interval by <code>factor</code> . If beacon succeeds, restore beacon interval to default.
<code>jitter</code>	Range to vary the timing of beacons (<i>default = 0</i>)

```
blacklist [programs=[]] [files=[]]
```

Set the target blacklist. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.2 on Program List subshells.

<code>programs</code>	Set of executable names to include in the blacklist, specified as a Python list or tuple
<code>files</code>	Set of blacklist files, specified as a Python list or tuple Blacklist files are whitespace-delimited lists of executable names to include in a target blacklist.

```
chunk_size <size>
```

Set chunk size to restrict network traffic per beacon. The Implant will chunk files to `size` bytes and attempt to limit uploads to `size` bytes.

<code>size</code>	Maximum Implant upload size per beacon Setting the size to 0 will disable upload chunking.
-------------------	---

```
crypto_key
```

Generate a new cryptographic key for secure storage and communication.

```
hibernate <seconds>
```

Set the hibernate time in seconds after first execution. The Implant will lie dormant until the hibernate period has elapsed.

<code>seconds</code>	Number of seconds to hibernate after first execution
----------------------	--

```
id <parent> [child=None]
```

Set the Implant ID.

<code>parent</code>	Parent ID for implant, specified by 4 case-sensitive alphanumeric characters
---------------------	--

`child` Child ID for implant, optionally specified by 4 case-sensitive alpha-numeric characters
If the child ID is not set at build, it will be generated at first execution on target.

`max_fails <count>`
Set the maximum number of sequential beacon failures before uninstalling.
`count` Number of failures before uninstalling

`path_in <path>`
Set the path of the implant's input directory
`path` Windows path specifying location of the directory
Note: Assassin will create multiple directory levels to match `path` but will only remove `path` on uninstall.

`path_out <path>`
Set the path of the implant's output directory
`path` Windows path specifying location of the directory
Note: Assassin will create multiple directory levels to match `path` but will only remove `path` on uninstall.

`path_push <path>`
Set the path of the implant's push directory
`path` Windows path specifying location of the directory
Note: Assassin will create multiple directory levels to match `path` but will only remove `path` on uninstall.

`path_staging <path>`
Set the path of the implant's staging directory
`path` Windows path specifying location of the directory
Note: Assassin will create multiple directory levels to match `path` but will only remove `path` on uninstall.

`path_startup <path>`
Set the path of the implant's startup directory
`path` Windows path specifying location of the directory
Note: Assassin will create multiple directory levels to match `path` but will only remove `path` on uninstall.

`transports [xml_file=None]`

Set the communication transport configuration. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.3 on Transport List subshells.

`xml_file` XML file containing an Assassin transport list configuration

`uninstall_date <date>`

Set the uninstall date for the Implant.

`date` Date-Time or Date, specified in ISO 8601 format
 Date-Time: `yyyy-mm-ddThh:mm:ss`
 Date: `yyyy-mm-dd`

`uninstall_timer <seconds>`

Set the uninstall timer as seconds from first execution.

`seconds` Number of seconds after first execution to uninstall

`whitelist [programs=[]] [files=[]]`

Set the target whitelist. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.2 on Program List subshells.

`programs` Set of executable names to include in the whitelist, specified as a list or tuple

`files` Set of whitelist files, specified as a list or tuple
 Whitelist files are whitespace-delimited lists of executable names to include in a target whitelist.

3.4 Launcher Commands

The Launcher commands are used to modify the configuration of the Assassin Launcher. The Launcher configuration determines behavior regarding the persistence and injection of the Implant.

`dll_path <path> [bits='all']`

Set the path where the launcher will place the Implant DLL

<code>path</code>	Windows path specifying the location of the Implant DLL
<code>bits</code>	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

`persistence <bool> [bits='all']`

Set whether or not a launcher will install its persistence method.

<code>bool</code>	Boolean specifying if persistence will be installed 'T' - install the persistence mechanism 'F' - do not install the persistence mechanism
<code>bits</code>	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

`reg_description <string> [bits='all']`

Set the cover description for the launcher in the registry.

<code>string</code>	String specifying registry description of the launcher
<code>bits</code>	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

`reg_key_path <path> [bits='all']`

Set the registry key name and path for the Launcher.

<code>path</code>	Windows registry path specifying the key used to persist the Launcher. If path is the key name, 'SYSTEM\CurrentControlSet\Services\' is prepended. The launcher key must be in the Services key.
<code>bits</code>	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

`reg_name <string> [bits='all']`

Set the cover display name for the launcher in the registry.

string	String specifying registry display name of the launcher
bits	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

start_now <bool> [bits='all']

Set whether or not the launcher attempts to start immediately or waits for reboot.

bool	Boolean specifying if launcher will start immediately 'T' - attempt to start immediately 'F' - wait for reboot to start
bits	Bitness of launcher to configure 'all' - configure all launchers '32' - configure the 32-bit launcher '64' - configure the 64-bit launcher

3.5 Extractor Commands

The Extractor commands are used to modify the configuration of the Assassin Extractor. The Extractor configuration determines how the Assassin Launcher will be deployed to the target machine.

path_32 <path>

Set the 32-bit launcher extraction path.

path Windows path specifying the location of the 32-bit launcher

path_64 <path>

Set the 64-bit launcher extraction path.

path Windows path specifying the location of the 64-bit launcher

4 Subshells

The Builder uses subshells to provide an interactive interface to modify various configuration fields, including whitelist, blacklist, and transport list.

4.1 Build Outputs

The Build Outputs subshell is used to define what Implant and Deployment executables the Builder should generate. The Build Outputs subshell is accessed through the Builder wizard or by not providing parameters to the `build_outputs` command in the Builder.

Interface

The Build Outputs subshell will repeatedly prompt the user for output types until the build outputs are generated. The subshell accepts two types of input: commands and build types. After each input, the subshell will update and display the state of the outputs list.

Commands

The following commands are used to modify the build outputs:

`d <index>`

Delete a process image name from the program list.

`index` Index of the target program name in the current list

`g`

Generate the program list and build the patch used in the configuration field for Implant executables or tasks.

Build Types

The subshell accepts the following build types:

<code>all</code>	Build all available Implant and Deployment Executables
<code>run-dll</code>	Build the Implant DLLs, 32- and 64- bit
<code>service-dll</code>	Build the Implant Service DLLs, 32- and 64- bit
<code>executable</code>	Build the Implant EXEs, 32- and 64- bit
<code>injection</code>	Build the Injection Launchers, 32- and 64-bit, and Extractor
<code>service</code>	Build the Service Installers, 32- and 64- bit, and Extractor

4.2 Program List

The Program List subshell is used to generate a list of program image names. These are used to update the whitelist or blacklist in the Implant configuration. The Program List subshell is accessed through the Builder wizard or by not providing parameters to a command to update the whitelist or blacklist in the Builder or Tasker.

Interface

The Program List subshell will repeatedly prompt the operator for input until the program list is generated. The subshell accepts two types of input: commands and entries to the program list. After each input, the subshell will update and display the state of the list, including contents and capacity.

For a list of available commands, the operator may enter 'help', 'h', or '?' on the command line.

Commands

The following commands are used to modify the current program list:

f <filename>

Provide a file of program names to add to the current program list.

filename Program list files are whitespace-delimited lists of process image names to include in a program list.

d <index>

Delete a process image name from the program list.

index Index of the target program name in the current list

g

Generate the program list and build the patch used in the configuration field for Implant executables or tasks.

c

Cancel the list creation process. Any unsaved progress will be lost.

4.3 Transport List

The Transport List subshell is used to generate or update a transport configuration for an Assassin Implant. The subshell is accessed through the Builder wizard or by not providing parameters to a command to update the transport list in the Builder or Tasker.

Interface

The Transport List subshell will repeatedly prompt the operator for input until the transport list is generated. The subshell accepts an array of commands used to view and modify the working current transport list.

Commands

The following commands are used to view or modify the current transport list:

`p`

Print the current transport list.

`a`

Add a transport to the list.

The subshell will prompt the operator for each of the parameters required to create a new transport and add it to the end of the list.

`i <index>`

Insert a transport into the list.

The subshell will prompt the operator for each of the parameters required to create a new transport and insert it into the list at the specified index.

`index` Zero-based index into the transport list identifying the location of the new transport

`d <index>`

Delete a transport from the list.

`index` Zero-based index into the transport list identifying the target transport

`m <index> <new_index>`

Move a transport from one position within the transport list to another.

`index` Zero-based index into the transport list identifying the target transport

`new_index` Zero-based index into the transport list identifying the new location of the transport within the list

`f <filename>`

Provide a file of containing the xml-based specification of a transport list to add to the transport list.

filename XML-based transport configuration file, starting with the TransportList tag

v

Validate the configuration of the transport list, printing any generated warnings or errors.

g

Generate the transport list and build the patch used in the configuration field for Implant executables or tasks.

c

Cancel the transport list creation process. Any unsaved progress will be lost.

5 Complex Numbers

The Builder implements a system of complex numbers to provide easier reading and writing of integer values. Complex numbers use context-specific notation to modify the magnitude of each integer in the number. The complex numbers adhere to the format [`<integer><modifier_char>`]+ and are evaluated as $\sum(\text{integer} \times \text{modifier_value})$.

5.1 File Size and Offset Modifiers

The following notation is used to modify integers related to file sizes and offsets:

<u>Notation</u>	<u>Meaning</u>	<u>Value</u> (bytes)
b	byte	1
k	kibibyte (KiB)	$2^{10} = 1.024 \times 10^3$
m	mebibyte (MiB)	$2^{20} \approx 1.049 \times 10^6$
g	gibibyte (GiB)	$2^{30} \approx 1.074 \times 10^9$
t	tebibyte (TiB)	$2^{40} \approx 1.100 \times 10^{12}$
p	pebibyte (PiB)	$2^{50} \approx 1.126 \times 10^{15}$
e	exbibyte (EiB)	$2^{60} \approx 1.153 \times 10^{18}$

5.2 Time Modifiers

The following notation is used to modify integers related to time:

<u>Notation</u>	<u>Meaning</u>	<u>Value</u> (seconds)
s	second	1
m	minute	60
h	hour	3,600
d	day	86,400
w	week	604,800

6 Wizard

The Builder includes a configuration wizard to guide an operator through the process of configuring the Assassin Executables specified as Build Outputs. The wizard can be invoked by running the Builder without a configuration file or by using the 'w' command on the Builder command line.

The wizard walks through each configuration field in sequence, prompting the operator for a value. Any default or previously set values are represented on the prompt in square brackets and used when no value is entered. If a value is expected in a particular format, whether from a set of values, smallest unit of measurement, or date-time format, the details are provided parenthetically.

The operator can request help information about a configuration field by entering '?'.
'?'

7 Output Directory Layout

- ↳ assassin_<id> - Used to group files built for the same target ID
<> = ID of target specified in Builder
 - ↳ injection - Contains all executables using the injection persistence method
 - assassin_extractor.exe - Assassin Injection Extractor
 - assassin_launcher_32.exe - Assassin Injection Launcher 32-bit
 - assassin_launcher_64.exe - Assassin Injection Launcher 64-bit
 - ↳ service - Contains all executables using the service persistence method
 - assassin_svc_extractor.exe - Assassin Service Extractor
 - assassin_svc_installer_32.exe - Assassin Service Installer 32-bit
 - assassin_svc_installer_64.exe - Assassin Service Installer 64-bit
 - ↳ non-persistent - Contains all executables that do not self-persist
 - assassin_executable_32.exe - Assassin Executable 32-bit
 - assassin_executable_64.exe - Assassin Executable 64-bit
 - assassin_run_dll_32.dll - Assassin DLL 32-bit
 - assassin_run_dll_64.dll - Assassin DLL 64-bit
 - assassin_svc_dll_32.dll - Assassin Service DLL 32-bit
 - assassin_svc_dll_64.dll - Assassin Service DLL 64-bit
 - assassin_<id>.xml - Build receipt for the Assassin executables and build process

Appendix I: Tasker

The Tasker generates the task files used to command the Assassin Implant. The Tasker provides a custom command line interface for creating task files. The Collide Handler provides a similar user interface for task generation and is the preferred method for tasking Assassin.

When provided an Implant receipt, the Tasker will create encrypted implant-ready tasking files; without a receipt, the tool generates an unencrypted tasking file that may be reused as a template and encrypted later using the Crypto Tool.

The Tasker requires the Assassin Python module, named 'assassin'. The module must be located in the Python search path, which includes the directory with the `task_creator.py` script.

1 Usage

`task_creator.py <options>`

Options:

`-r RECEIPT,`
`--receipt=RECEIPT`

Specify the xml-based Assassin receipt file for the implant, used for encryption.

`-h, --help`

Show the help message and exit.

2 Run Modes

All tasks are assigned a run mode that specifies when the Implant should execute the task and how the Implant should handle the task results. Run modes may be combined to create compound modes.

2.1 Run on Receipt

When set to 'run on receipt', the Implant will process the task file immediately after it is received.

If the task's run mode is not set to 'push results', the results of the task will be uploaded as part of the same beacon, unless the upload queue has grown too large.

The 'run on receipt' mode is designated using the character 'r' during task creation.

2.2 Run on Startup

When set to 'run on startup', the Implant will process the task file every time the Assassin starts.

The task file is saved in the `startup` directory with the same filename it had when placed in the `input` directory.

The 'run on startup' mode is designated using the character 's' during task creation.

2.3 Push Results

When set to 'push results', the Implant will upload the result file generated by processing the task file immediately after completion.

The pushed result file bypasses the upload queue and does not influence the upload limits set by the Implant chunk size.

The 'push results' mode is designated using the character 'p' during task creation.

3 Batch Tasking

Assassin allows operators to combine multiple tasks into batches that are uploaded to and processed by the Implant as a unit. Batches are created using the Generate Batch subshell of the Tasker and may be exported to or imported from XML.

Tasks within the batch are executed in sequence. If a task fails, the batch aborts and the remaining tasks are not executed. Batches are assigned a run mode at creation which is shared by all tasks in the batch. The results of the tasks are returned in one result file.

3.1 Interface

The Generate Batch subshell will repeatedly prompt the operator for input until the batch is generated. The subshell accepts a variety of commands used to view and modify the batch task.

The subshell may be accessed by calling the `generate_batch` command to build a task from scratch or calling the `import_xml` command to start from a previously exported batch.

3.2 Batch Commands

The following batch commands are used to view or modify the current transport list:

p

Print the current batch state.

i <index> <command>

Insert a command into the batch at a specific location.

The subshell will prompt the operator for each of the parameters required to create a new transport and insert it into the list at the specified index.

index Zero-based index into the batch identifying the location of the new task

d <index>

Delete a task from the batch.

index Zero-based index into the batch identifying the target task

m <index> <new_index>

Move a task from one position within the batch to another.

index Zero-based index into the batch identifying the target task

new_index Zero-based index into the batch identifying the new location of the task

f <filename>

Provide a file of containing the xml-based specification of a batch task to add to the batch.

filename XML-based task batch file

x <filename>

Export the current batch to an xml file

g

Generate the batch task and send to file (Tasker) or to the target (Collide).

c

Cancel the batch creation process. Any unsaved progress will be lost.

3.3 Supported Tasks

Tasks are specified in the same format in the Generate Batch subshell as in the Tasker. See section 4 for Task usage.

Assassin supports the following tasks in batched tasking:

get	put	file_walk	get_walk
delete_file	delete_secure	execute_bg	execute_fg
persist_settings	restore_defaults	set_beacon_params	set_blacklist
set_whitelist	set_transport	set_chunk_size	set_hibernate
set_uninstall_date	set_uninstall_timer	set_beacon_failure	get_status
clear_queue	upload_all	unpersist	uninstall

4 Tasks

Assassin provides tasks to operate on the file system, to execute programs, and to configure and maintain the Implant. All integer-based task parameters accept complex numbers; see section Appendix H:5 on Complex Numbers.

4.1 File System Tasks

The following tasks are used to manipulate the file system of the implanted target computer. Assassin provides tasks for uploading files to and downloading files from a target, deleting files from the file system, and walking the directories to survey and collect file data.

```
get <run_mode> <r_file> [offset=0] [bytes=0]
```

Get a file from the target.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_file	Remote file to get
offset	Byte offset into file to begin collection (<i>default = 0</i>) <i>"Get from <x> bytes into file."</i>
bytes	Number of bytes to collect from file (<i>default = 0,all</i>) <i>"Get <x> bytes from file."</i>

```
put <run_mode> <l_file> <r_file> [mode='always']
```

Put a local file on the target.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
l_file	Local file to put
r_file	Remote file location for put
mode	Mode for put operation, one of the following: 'always' - always put the file on the target, overwrite (<i>default</i>) 'only_new' - only put the file on the target if it does not yet exist 'append' - append to the end of the file if it exists, otherwise create

```
file_walk <run_mode> <r_dir> <wildcard> <depth> [time_check='no_check'] [date]
```

Walk the directories on the target, collecting information on files specified by the provided parameters.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_dir	Root directory of file walk on remote file system
wildcard	Filter used to limit the walk collection based on filename The '*' wildcard will match any string in the filename.
depth	Number of directory levels to descend, where 0 will only collect on the root level
time_check	Type of filter used to limit the walk collection based on the files' modified timestamp: 'no_check' - do not check the file timestamp (<i>default</i>) 'less' - match timestamps less than the given time and date 'greater' - match timestamps greater than the given time and date
date	Date-Time or Date for time check, specified in ISO 8601 format Required if time_check is not set to no_check Date-Time: yyyy-mm-ddThh:mm:ss Date: yyyy-mm-dd

```
get_walk <run_mode> <r_dir> <wildcard> <depth> [time_check='no_check'] [date]
[offset=0] [bytes=0]
```

Walk the directories on the target, collecting files specified by the provided parameters.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_dir	Root directory of get walk on remote file system
wildcard	Filter used to limit the walk collection based on filename The '*' wildcard will match any string in the filename.
depth	Number of directory levels to descend, where 0 will only collect on the root level
time_check	Type of filter used to limit the walk collection based on the files' modified timestamp: 'no_check' - do not check the file timestamp (<i>default</i>) 'less' - match timestamps less than the given time and date 'greater' - match timestamps greater than the given time and date

date	Date-Time or Date for time check, specified in ISO 8601 format Required if <code>time_check</code> is not set to <code>no_check</code> Date-Time: yyyy-mm-ddThh:mm:ss Date: yyyy-mm-dd
offset	Byte offset into files to begin collection (<i>default = 0</i>) "Get from <x> bytes into file."
bytes	Number of bytes to collect from files (<i>default = 0,all</i>) "Get <x> bytes from file."

`delete_file <run_mode> <r_file>`

Delete a file from the target.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_file	Remote file to delete

`delete_secure <run_mode> <r_file>`

Securely delete a file from the target.

The file is overwritten with zeroes before being removed from the target file system.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_file	Remote file to securely delete

4.2 Program Execution Tasks

The following tasks are used to execute programs on the implanted computer. Programs are executed directly from Assassin and will have the same permissions as the Implant.

Tasks are provided to run programs either in the Implant foreground or background.

```
execute_bg <run_mode> <r_file> [args='']
```

Execute a program on the target in the background.

By running in the background, the Implant will continue to operate. The standard output and return code of the program are ignored.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_file	Remote program file to execute
args	Command line arguments to the program

```
execute_fg <run_mode> <r_file> [args='']
```

Execute a program on the target in the foreground.

By running in the foreground, the Implant will wait for the program to exit. The standard output and return code of the program are captured and returned.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
r_file	Remote program file to execute
args	Command line arguments to the program

4.3 Configuration Tasks

The following tasks are used to modify the configuration of the implant, which determines when and how the Implant communicates, and the duration of the operation.

Configuration Set Tasks

The configuration set tasks are used to manipulate the configuration sets. There are three sets of configurations: running, persistent, and factory. The running configuration is the settings under which the Implant currently operates. The persistent configuration is the settings that Assassin reverts to upon Implant startup. The factory configuration is the settings that the Implant had when it was built.

```
persist_settings <run_mode>
```

Save the current settings as the default configuration that will be loaded at Implant startup.

All configuration changes must be explicitly persisted, or they will revert on next startup.

```
run_mode
```

Code specifying the run mode, represented by combining the following keys:

- 'r' - run the task on receipt
- 's' - run the task on every Implant startup
- 'p' - push the task results to the LP immediately

```
restore_defaults <run_mode> <options>
```

Restore the Implant configuration to factory settings. Any changes must be persisted explicitly.

```
run_mode
```

Code specifying the run mode, represented by combining the following keys:

- 'r' - run the task on receipt
- 's' - run the task on every Implant startup
- 'p' - push the task results to the LP immediately

```
options
```

Type of configuration settings that will be restored:

- 'all' - all configuration settings
- 'basic' - basic configuration settings, including:
 - * hibernate configuration
 - * uninstallation time and date
- 'beacon' - beacon configuration settings, including:
 - initial wait, default interval, jitter, maximum interval, backoff multiple, maximum failures
- 'comms' - comms configuration, including:
 - chunk size and transport list
- 'list' - whitelist and blacklist configurations

Beacon Configuration Tasks

The beacon configuration tasks are used to modify the settings related to when Assassin beacons. This includes both beacon timing parameters and blacklist and whitelist checks against the process list.

```
set_beacon_params <run_mode> [initial=0] [default_int=0] [max_int=0] [factor=0.0] [jitter=0]
```

Set one or more of the beacon parameters. Note that 0 indicates 'do not alter this value'.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
initial	Initial wait after Implant startup before beacon (<i>default = 0</i>)
default_int	Default interval between beacons (<i>default = 0</i>)
max_int	Maximum interval between beacons (<i>default = 0</i>)
factor	Backoff factor to modify beacon interval (<i>default = 0</i>) If beacon fails, multiply beacon interval by factor. If beacon succeeds, restore beacon interval to default.
jitter	Range to vary the timing of beacons (<i>default = 0</i>)

```
set_blacklist <run_mode> [programs=[]] [files=[]]
```

Set the target blacklist. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.2 on Program List subshells.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
programs	Set of executable names to include in the blacklist, specified as a Python list or tuple
files	Set of blacklist files, specified as a Python list or tuple Blacklist files are whitespace-delimited lists of executable names to include in a target blacklist.

```
set_whitelist <run_mode> [programs=[]] [files=[]]
```

Set the target whitelist. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.2 on Program List subshells.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
----------	---

programs	Set of executable names to include in the whitelist, specified as a Python list or tuple
files	Set of whitelist files, specified as a Python list or tuple Blacklist files are whitespace-delimited lists of executable names to include in a target blacklist.

Comms Configuration Tasks

The comms configuration tasks are used to modify the settings related to how Assassin communicates. This includes both the transports used for communication and the size of upload chunks.

```
set_transport <run_mode> [xml_file=None]
```

Set the communication transport configuration. If no parameters are provided, the command will enter a subshell; see section Appendix H:4.3 on Transport List subshells.

run_mode	Code specifying the run mode, represented by combining the following keys: <ul style="list-style-type: none"> 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
xml_file	XML file containing an Assassin transport list configuration

```
set_chunk_size <run_mode> <chunk_size>
```

Set chunk size to limit network traffic per beacon.

run_mode	Code specifying the run mode, represented by combining the following keys: <ul style="list-style-type: none"> 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
chunk_size	Maximum Implant upload size per beacon Files larger than <code>chunk_size</code> bytes will be broken up to fit the limit. Setting the size to 0 will disable upload chunking.

Operation Window Configuration Tasks

The operation window tasks are used to modify the settings related to the time window during which the Implant will operate. This includes hibernate, scheduled uninstall, and failure threshold settings.

```
set_hibernate <run_mode> <seconds>
```

Set the hibernate time in seconds after first execution. The Implant will lie dormant until the hibernate period has elapsed.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
seconds	Number of seconds to hibernate after first execution

set_uninstall_date <run_mode> <date>

Set the uninstall date for the implant

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
date	Date-Time or Date, specified in ISO 8601 format, or None to disable Date-Time: yyyy-mm-ddThh:mm:ss Date: yyyy-mm-dd

set_uninstall_timer <run_mode> <seconds>

Set the uninstall timer to seconds from time the task is processed by the Implant.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
seconds	Number of seconds after task execution to uninstall, or None to disable

set_beacon_failure <run_mode> <count>

Set the maximum number of sequential beacon failures before uninstalling.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
count	Number of failures before uninstalling

Safety Tasks

The safety tasks are used to modify the settings related to how the Implant should act when no tasks are available from the listening post.

safety <run_mode> <seconds>

Set the Implant beacon interval during idle beacons. This task will not generate a result.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
seconds	Number of seconds between beacons

set_interval <run_mode> <seconds>

Set the Implant beacon interval. This task will not generate a result.

Note that this command is used by the 'safety' command and is required by Collide. It is not recommended for use by operators; see the set_beacon_params task.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
seconds	Number of seconds between beacons

4.4 Maintenance Tasks

The following tasks are used to maintain the health of the Implant and clean up the Implant at the close of its operation. Tasks are provided to check Implant status, manage the upload queue, modify persistence, or uninstall completely.

```
get_status <run_mode> <status_mode> <options>
```

Request the current Implant configuration and status information.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
status_mode	Type of configuration/status requested from target implant, one of the following: 'running' - config currently used by the implant, may not be persistent 'persistent' - config loaded and used by Implant at startup 'factory' - config Implant had at installation
options	Type of information requested from target implant, one or more of the following: 'all' - all of the status information available 'basic' - basic Implant information, including: * configuration block magic number * hibernate configuration * predicted time and date Implant will uninstall * time and date that Implant was installed/first run * time and date that Implant started 'beacon' - beacon configuration settings, including: initial wait, default interval, jitter, maximum interval, backoff multiple, maximum failures 'comms' - comms configuration, including: chunk size and transport list 'dirs' - directories created and used by Assassin 'dirs_files' - files stored in Assassin directories 'list' - whitelist and blacklist configurations

```
clear_queue <run_mode>
```

Clear all files from the Implant upload queue.

The `clear_queue` task will delete all files from the `output`, `push`, and `staging` directories on target. This may include chunks of files that have been partially uploaded.

run_mode	Code specifying the run mode, represented by combining the following keys: 'r' - run the task on receipt 's' - run the task on every Implant startup 'p' - push the task results to the LP immediately
----------	---

upload_all <run_mode>

Upload all files currently in the upload queue.

The `upload_all` task will upload all files in the output, push, and staging directories to the listening post as quickly as possible, ignoring the chunk size setting.

Warning: This is a dangerous task and may have adverse effects if the upload queue has a significant backlog. Please use the `get_status` command with the `dir_files` option to decide if the risk is acceptable.

`run_mode` Code specifying the run mode, represented by combining the following keys:

- 'r' - run the task on receipt
- 's' - run the task on every Implant startup
- 'p' - push the task results to the LP immediately

unpersist <run_mode>

Stop the Implant persistence mechanism on the target.

Side effects of this command vary depending on the mechanism used.

Injection Launcher - remove Launcher's service registry key

`run_mode` Code specifying the run mode, represented by combining the following keys:

- 'r' - run the task on receipt
- 's' - run the task on every Implant startup
- 'p' - push the task results to the LP immediately

uninstall <run_mode>

Uninstall the Implant from the target immediately.

`run_mode` Code specifying the run mode, represented by combining the following keys:

- 'r' - run the task on receipt
- 's' - run the task on every Implant startup
- 'p' - push the task results to the LP immediately

Appendix J: Post Processor

The Post Processor parses and extracts data from Assassin files of any type in any state. It operates by ingesting files from an input directory, performing various operations on the files to generate XML-based output files and extract embedded data files, and saving them in an output directory.

The Post Processor requires the Assassin Python module, named 'assassin'. The module must be located in the Python search path, which includes the directory with the `post_processor.py` script.

1 Usage

```
post_processor.py <options>
```

Options:

-i INPUT, --in=INPUT	Specify the directory containing files for processing. <i>Required.</i>
-o OUTPUT, --out=OUTPUT	Specify the directory to output processed files. <i>Required.</i>
-r RECEIPT, --receipt=RECEIPT	Specify an xml-based Assassin receipt file or a directory of receipt files, used for decryption.
-d, --daemon	Run the post processor continually; only available on Linux.
-a, --archive	Save decrypted copies of raw input files in output directory.
-h, --help	Show the help message and exit.

2 Operating Modes

The post processor has multiple modes of operation, determined by the command line arguments.

2.1 Standard Mode

When running in standard mode, the post processor will process all of the files currently in the input directory and output the results to the output directory. It will assume that all files in the directory are complete and not currently being modified. If files are being modified the results will be unpredictable. Once a file has been processed it will be removed from the directory. Once the processing has been completed the post processor will exit and return to the command prompt.

2.2 Daemon Mode

While in daemon mode, the post processor will enter a processing loop, monitoring the input directory and processing all files that are placed there. The post processor uses the Python `pyinotify` package, which is currently only available on Linux, to monitor the input directory and track when files have been moved or copied into the directory. Once the new files have been fully copied/moved, the post processor will process the file as normal. Archive mode is entered using the `'-d'` or `'--daemon'` argument on the command line.

2.3 Archive Mode

While in archive mode, the post processor will save copies of input files in the output directory. The post processor only stores files once they have been assembled and decrypted into beacon, result, or push files. Archive mode can be used in conjunction with both Standard and Daemon mode operation. Archive mode is entered using the '-a' or '--archive' argument on the command line.

3 Input Types

The post processor is able to parse any Assassin generated files. If receipts are provided, the post processor can decrypt the input files when necessary. The acceptable types of input files are as follows:

- Encrypted: Assassin files that have been encrypted are decrypted and placed back in the input directory. The post processor can only decrypt files from implants for which a receipt has been provided.
- Chunk: Assassin files that have been divided into chunks are reassembled in a directory called 'staging', created within the input directory. Once assembled, the file is placed back in the input directory.
- Beacon: Assassin beacon files are parsed into XML and stored in the output directory. In archive mode, a copy of the raw beacon file is saved.
- Result: Assassin result files are parsed into XML and stored in the output directory alongside any files generated by the result. In archive mode, a copy of the raw result file is saved.
- Push: Assassin push files are parsed into XML and extracted into the output directory. In archive mode, a copy of the raw push file is saved.
- Task: Assassin task files are parsed into XML and stored in the output directory alongside any files embedded in the task.

4 Status Information

The post processor generates messages and tables to provide feedback to the user during operation. The post processor provides additional information when running in daemon mode. Some status information is provided as complex numbers; see section Appendix H:5 on Complex Numbers.

4.1 Activity Updates

The post processor will display status information about each file as it is processed. This information includes whether the file was encrypted, which type of Assassin file it was, and whether or not it was processed successfully. The daemon-mode post processor will also display a timer that tracks the time since it last received a file in the input directory.

4.2 Tracking Tables

The daemon-mode post processor generates tables at the end of each processing loop to provide status on chunk files that represent part of a larger input file.

Chunk File Tracking Table

The chunk file tracking table provides a list of all partial files that are in the process of being assembled from chunk files. The table consists of the following columns:

Target ID	Implant ID of the target that sent the chunk files Only available after the first chunk of the assembled file is received
File Name	Name of the assembled file in the <code>staging</code> directory as it is constructed
Chunks Rcvd	Number of chunks received by the post processor (approximate)
Total Chunks	Expected number of chunks in the assembled file (approximate)
File Size	Total size of the assembled file (approximate)
Last Received	Last time a chunk was received for the assembled file

Chunk File Gap Table

The chunk file gap table is displayed when chunks have been received out of order for an assembled file and identifies gaps in the received chunks. The table consists of the following columns:

Target	Implant ID of the target that sent the chunk files Only available after the first chunk of the assembled file is received
File Name	Name of the assembled file in the <code>staging</code> directory as it is constructed
Start	Starting offset of the gap found in the assembled file (approximate)
End	Ending offset of the gap found in the assembled file (approximate)
Chunks	Number of chunks that make up the gap (approximate)

5 Output Directory Layout

- ↳ <target_id> - Used to group files from the same target
 - ↳ => ID of target or 'unidentified'
- ↳ beacon - Contains all beacons received from target
 - ↳ <beacon_id> - Contains files generated from one beacon
 - ↳ => Time beacon processed as 'yyyy-mm-ddThh.mm.ss_beacon'
 - beacon.xml - XML file of beacon information
 - beacon.archive - Copy of unencrypted beacon file, created if '-a' flag set
- ↳ result - Contains all task results received from target
 - ↳ <result_id> - Contains files generated from one task result
 - ↳ => Time result processed as 'yyyy-mm-ddThh.mm.ss_result'
 - result.xml - XML file of result information
 - result.archive - Copy of unencrypted result file, created if '-a' flag set
 - ↳ data - Contains extra data generated by result
- ↳ push - Contains all files sent from target's push and output directories
 - ↳ <push_id> - Contains files generated from one push event
 - ↳ => Time push processed as 'yyyy-mm-ddThh.mm.ss_<filename>'
 - push.xml - XML file of push information
 - push.archive - Copy of unencrypted push file, created if '-a' flag set
 - <push_file> - File that was placed in push or output directory on target
- ↳ task - Contains all processed task files (never associated with a target)
 - ↳ <task_id> - Contains files generated by parsing task file
 - task.xml - XML file of task information
 - task.archive - Copy of unencrypted task file, created if '-a' flag set
 - ... - Other files generated by task (e.g. contents of put command)
- ↳ unidentified - Contains all unidentified files from target

Appendix K: Collide Handlers

The Collide Handlers are Python packages used to interface between Assassin and the Collide Automated Implant Command and Control system. Assassin provides handlers that define the user interface, facilitate Implant communication, and support post processing. Different sets of handlers are used for the Collide high-side and low-side to limit the exposure of code on the unclassified, internet-facing low-side.

For information on installing and running Collide, see the Collide User's Guide. This guide will only cover the use of the handlers developed for Assassin.

1 High-side Handlers

The high-side Collide handlers are responsible for defining the user interface, providing crypto services, and supporting the post processing of Implant communications.

1.1 Payload

Assassin's Collide Payload defines the user interface required to task implants. The UI provided through Collide is similar to that provided in the Tasker. The only distinction is that the Collide consumes tasks directly while the Tasker saves tasks to a file.

The high-side payload consists of one file, the payload init file. The high-side payload requires the Assassin Python module, named 'assassin'. The module should be located within the Assassin payload on the Collide high-side.

1.2 Post Processing Rule

Assassin includes one Collide rule intended to support the post processing of result files, called 'assassin_meta_extraction_rule.py'. The rule simply sends copies of files received from any Assassin Implant to the input directory of the Post Processor.

The path of the directory may be specified in the body of the rule by modifying the value of `_POST_PROCESSOR_INPUT_DIR`; it defaults to `'/tmp/assassin_input/'`.

2 Low-side Handlers

The low-side handlers are responsible for Assassin communications via the Collide listening post.

The low-side payload consists of the payload init file and handlers for the HTTPS and WebDAV transports. Unlike the high-side, the low-side payload does not require the Assassin Python module.

Appendix L: XML Formats

1 Assassin Beacon XML File Format

During the Assassin beacon cycle, the initial communication with the LP is always a beacon. The beacon includes some basic information about the target and can be useful when debugging communications issues with a target. The section below describes the beacon XML format that Assassin uses.

XML Example

```
<Beacon version="1.0">
  <TargetID>assn2Rlv</TargetID>
  <TransportID>1</TransportID>
  <CurrentDate>2011-12-12T18:21:22</CurrentDate>
  <ExecuteDate>2011-12-12T17:29:49</ExecuteDate>
  <UninstallOnDate />
</Beacon>
```

Attribute Definitions

version

The version attribute specifies the version of the beacon data format.

Field Definitions

TargetID

The TargetID field contains the target ID of the target uploading the file. It will consist of an eight character string that consists of both the parent and child IDs.

In the example above, the ID provided by the target is “assn2Rlv”, which means the target has a parent ID of “assn.” and a child ID of “2Rlv”.

TransportID

The TransportID field contains the index of the current transport being used to communicate with the LP. Cross referencing this with the current transport list definition will provide the operator with all of the information used to communicate with the LP.

In the example above, the transport ID is 1, which means the second configuration in the transport list is being used, due to the list indexing being zero-based.

CurrentDate

The CurrentDate field provides the target system time and date at the time the beacon occurred.

In the example above, the target systems current date is “2011-12-12T18:21:22”, or December 12th, 2011 at 6:21:22 PM.

ExecuteDate

The ExecuteDate field provides the target system time when the Implant last started.

In the example above, the target systems current date is “2011-12-12T17:29:49”, or December 12th, 2011 at 5:29:49 PM.

UninstallOnDate

The UninstallOnDate field provides the target system time when the Implant is set to uninstall. This field is optional and may be blank.

In the example above, the uninstall-on field is blank.

2 Assassin Configuration / Receipt XML File Format

The Assassin configuration and receipt files follow a similar format and can be used interchangeably. The receipt file consists of all configuration files required to customize a full Assassin build. This includes a combination of implant, extractor, launcher, and service installer configuration values and the build outputs requested/created. This appendix will explain the formatting for each section of the file and provide an examples of each section.

The configuration of the build is stored in a root `<Config>` tag, containing the `<BuildOutputs>`, `<Implant>`, `<Extractor>`, `<Launcher>`, and `<ServiceInstaller>` tags described below.

XML Example

```
<Config build_time="2012-03-07T11:22:25" version="1.0">
  <BuildOutputs>...</BuildOutputs>
  <Implant>...</Implant>
  <Extractor>...</Extractor>
  <Launcher>...</Launcher>
  <ServiceInstaller>...</ServiceInstaller>
</Config>
```

Attribute Definitions

build_time

The `build_time` attribute specifies the time at which the build was executed and the Assassin executables generated. The time is represented in ISO 9601 format.

version

The `version` attribute specifies the version of the configuration data format.

2.1 Build Outputs

This section will describe the xml format of the <BuildOutputs> tag. This tag is used to set which Assassin types are generated by the Builder or record which types were generated.

XML Configuration Example

```
<BuildOutputs>
  <Param>service</Param>
  <Param>injection</Param>
  <Param>executable</Param>
  <Param>run_dll</Param>
  <Param>service_dll</Param>
</BuildOutputs>
```

Field Definitions

The <BuildOutputs> tag takes a list of <Param> tags that specify Assassin types or groups of Assassin types. The valid keywords for the <Param> tags are described below.

service

The service keyword designates that the Builder will/did generate the service installer executables, including the service extractor and both 32- and 64-bit service installers.

injection

The injection keyword designates that the Builder will/did generate the injection executables, including the injection extractor and both 32- and 64-bit injection launchers.

executable

The executable keyword designates that the Builder will/did generate the Assassin implant-only executables, including both 32- and 64-bit.

run_dll

The run_dll keyword designates that the Builder will/did generate the Assassin implant-only dynamic-link libraries (with RunDll32 entry point), including both 32- and 64-bit.

service_dll

The service_dll keyword designates that the Builder will/did generate the Assassin service dynamic-link libraries, including both 32- and 64-bit.

all

The all keyword designates that the Builder will/did generate every type of Assassin executable.

2.2 Implant Configuration

This section will describe the xml formats for all of the configuration values contained under the <Implant> XML tag. An example of a complete Implant configuration is below:

XML Configuration Example

```
<Implant>
  <ID>
    <Parent>assn</Parent>
    <Child />
  </ID>
  <CryptoKey>00000000000000000000000000000000</CryptoKey>
  <Paths>
    <InputPath>c:\temp\input</InputPath>
    <OutputPath>c:\temp\output</OutputPath>
    <StartupPath>c:\temp\startup</StartupPath>
    <StagingPath>c:\temp\staging</StagingPath>
    <PushPath>c:\temp\push</PushPath>
  </Paths>
  <Blacklist>
    <Prog>avira.exe</Prog>
    <Prog>avg.exe</Prog>
  </Blacklist>
  <Whitelist>
    <Prog>iexplore.exe</Prog>
    <Prog>firefox.exe</Prog>
    <Prog>chrome.exe</Prog>
  </Whitelist>
  <TransportList>
    <Transport type="WebDAV" tries="2">
      <Host>assassin_lp</Host>
      <TempDir>c:\temp</TempDir>
      <ShareList>
        <Share>share1</Share>
      </ShareList>
    </Transport>
    <Transport type="HTTPS" tries="2">
      <Host>assassin_lp</Host>
      <Port>443</Port>
      <PathList>
        <Path>path1</Path>
      </PathList>
    </Transport>
  </TransportList>
</Implant>
```

```

        <Path>path2</Path>
    </PathList>
    <ProxyCredentials />
</Transport>
</TransportList>
<ChunkSize>1m</ChunkSize>
<Beacon>
    <BackoffMultiple>1.5</BackoffMultiple>
    <InitialWait>1m</InitialWait>
    <DefaultInterval>1m</DefaultInterval>
    <MaxInterval>5m</MaxInterval>
    <Jitter>10s</Jitter>
</Beacon>
<HibernateSeconds>1m</HibernateSeconds>
<Uninstall>
    <UninstallTimer />
    <UninstallDate />
</Uninstall>
<MaxConsecutiveFails>10</MaxConsecutiveFails>
</Implant>

```

Field Definitions

Beacon

Assassin provides a series of settings to control the beacon timing. Those settings are, the back off multiple, initial wait, default interval, maximum interval, and jitter. The back off multiple is the value to multiply the current beacon interval by when a failure occurs. Generally this value is greater than 1, so the interval will increase with each consecutive failure. The initial wait is the time to wait upon boot before attempting to beacon. The default interval is the standard beacon wait time used when no failures have occurred. This time is also used when a successful communication occurs after a series of failures. The maximum interval defines the absolute maximum value the beacon interval can be set to at any point. Jitter defines the amount of variance to use for each beacon. This value must be less than the default interval.

In the example above, the back off multiple has been set to 1.5, the initial wait is defined as 1 minute, the default interval is 1 minute, the maximum interval is 5 minutes, and the jitter is 10 seconds.

Blacklist

The Assassin Implant allows for an optional blacklist of programs to be set. During a beacon attempt, if any of the programs listed in the blacklist are running, and listed in the process list, the beacon will be stopped, and the beacon failure count will be incremented. This will not affect the transport failure count, since the transport was never attempted.

In the example above, the blacklist has the two programs, “avira.exe” and “avg.exe”, added to the list. If either of these shows up in the process list, the beacon will not occur.

Chunk Size

The Assassin chunk size is defined as the maximum size of each data file to be sent back to the LP. Any files that are larger than this size will be broken into chunks to meet this requirement. If the chunk size is changed, only new data will be chunked using the new size, existing files will not be re-chunked.

In the example above, the chunk size has been set to 1 mebibyte, using the Assassin complex numbering system.

Crypto Key

The Assassin Implant uses RC4 128-bit encryption utilizing a 4-bit nonce to further obfuscate the key. In the example above, the crypto key will be set to all null values. The value stored in XML is a 16-byte hex representation of the key.

In the example above, the crypto key is set to “00000000000000000000000000000000”.

Hibernate

Assassin allows for an initial hibernation time to be set at build time. This time define the time which the Implant will remain inactive. Once the time has expired, the Implant will begin processing tasks and attempting to communicate with the defined LP.

In the example above,hibernate time has been set to 1 minute using the Assassin complex numbering system.

ID

The ID tag contains information describing what the target ID for the configured Implant will be. The ID consists of a parent and child ID, each of which consists of 4 alpha-numeric characters. The parent ID is required and the child ID can be set to be generated automatically at build time if it is left blank.

In the example above, the parent ID will be set to ‘assn’ and the child ID will be generated on target. The example below shows the XML for a defined child ID:

```
<ID>
    <Parent>assn</Parent>
    <Child>0001</Child>
</ID>
```

In the example above, the child ID is defined as ‘0001’ so the complete ID that will be displayed in the LP is ‘assn0001’.

Paths

The Assassin Implant uses a series of directories to receive, store, and send data to the assigned LP. The directories required for every Assassin installation are: input, output, startup, staging, and push. The input directory is where all files

received from the LP are stored. The output directory is where the task results are stored. The startup directory is where all startup tasks are stored. The staging directory is where all chunked result files are stored, awaiting transport to the LP. The push directory is a special directory provided as a way to push data files from any other source to the LP using the Assassin transport setup.

In the example above, the input directory is set to "c:\temp\input", the output directory is set to "c:\temp\output", the startup directory is set to "c:\temp\startup", the staging directory is set to "c:\temp\staging" and the push directory is set to "c:\temp\push".

Max Consecutive Fails

In Assassin, the maximum consecutive failures are the number of consecutive beacon attempts that have not resulted in a successful beacon. These failures can be due to a blacklist / whitelist failure or a failed transport attempt. Once this count is reached the Implant will uninstall.

In the example above, the maximum consecutive failures has been set to 10.

Transport List

The TransportList tag contains an ordered list of Transport tags defining the members of the list.. The Assassin transports list size is limited to a compiled size of 768 bytes.

Transport

The Transport tag specifies the configuration of one transport in the transport list.

Attribute Definitions

type

The type attribute defines the type of transport being defined. Assassin v1.1 supports HTTPS and WebDAV transports.

tries

The tries attribute specifies the number of times the transport will be attempted for communication before failing over to the next configured transport in the list.

Field Definitions

Host

The host tag specifies the domain name or IP address of the Collide listening post or redirector to which the transport should send comms traffic. This tag is used for both HTTPS and WebDAV transport types.

Port

The port tag defines the TCP port to which the transport should send comms traffic. This tag is only used for HTTPS transport types.

ProxyCredentials

The proxy credentials tag is used to define credentials to pass to an authenticating proxy during communication. If configured, the tag will include two sub-tags, Username and Password. This tag is only used for HTTPS transport types.

PathList

The path list tag defines path elements that will be used to generate random URL paths. During communication, the text of one of the Path tags will be randomly selected and inserted into the randomized path to the listening post or redirector. If no path elements are provided, they are randomly generated on target as needed. This tag is only used for HTTPS transport types.

ShareList

The share list tag defines share names that will be used to identify the listening post. During communication, the LP is mounted as a share and randomly named by the text of one of the Share tags. If no share names are provided, they are randomly generated on target as needed. This tag is only used for WebDAV transport types.

TempDir

The temp directory tag defines a location on target where comms payloads can be copied before upload. The temp dir is used to remove the file being uploaded from the Assassin directories in case of a failure during communication that could bring scrutiny on the file in question. This tag is only used for WebDAV transport types.

In the example above, we have defined two transports, WebDAV and HTTPS. The WebDAV configuration allows for two failures, and will attempt to connect to the host "assassin_lp", which can be either a defined host name or an IP. When connecting, it will copy the data to transfer to the "c:\temp" directory to further obfuscate the source of the data. It will then use the provided share name to attempt the communications. The HTTPS configuration also allows for two failures, and it will attempt to communicate to the same LP. It will attempt this communication on port 443, using one of the provided path elements, and it doesn't have any proxy credentials provided.

Uninstall

Assassin provides two methods for defining when to uninstall the target. The uninstall time can be defined with a specific time and date, or with a set number of seconds. The shorter of the two will be used. Both of these values are optional, and can be changed later using a task.

In the example above, the number of seconds before uninstall has been defined as 5 days using the Assassin complex numbering system, and the uninstall date has been set to the 12th of December 2012.

Whitelist

The Assassin Implant allows for an optional whitelist of programs to be set. During a beacon attempt, at least one program in the whitelist must be running and listed in the process list for a beacon to occur. If a required program isn't running, the beacon will not occur, and the beacon failure count will be incremented. This will not affect the transport failure count, since the transport was never attempted. An example of the XML for the blacklist is shown below:

In the example above, there are no values defined for the list, disabling the whitelist. The example below shows the XML for a populated whitelist:

```
<Whitelist>  
    <Prog>iexplore.exe</Prog>  
    <Prog>firefox.exe</Prog>  
    <Prog>chrome.exe</Prog>  
</Whitelist >
```

In the example above, the blacklist has the three programs, "iexplore.exe", "firefox.exe", and "chrome.exe", added to the list. If either of these shows up in the process list, the beacon will not occur.

2.3 Launcher Configuration

This section will describe the xml formats for all of the configuration values contained under the <Launcher> XML tag. An example of a complete launcher configuration is shown below:

XML Configuration Example

```
<Launcher bits="32">
  <StartNow />
  <InstallPersistence />
  <RegKeyPath>SYSTEM\CurrentControlSet\Services\TestPath</RegKeyPath>
  <RegistryDescription>Assassin 32-bit</RegistryDescription>
  <RegistryName>Implanted</RegistryName>
  <DllPath>c:\temp\32\32assn.dll</DllPath>
</Launcher>
```

Attribute Definitions

bits

The bits attribute defines the bitness of the launcher being configured, either 32 or 64. If the attribute is omitted, the configuration is assumed for all bitnesses.

Field Definitions

Start Now

The start now flag tells the builder to configure the Implant to automatically start if the permissions at install time are at SYSTEM level.

The start now flag has no parameters, and if found in the configuration file, the Implant will be configured to start immediately.

Install Persistence

The install persistence flag tells the builder to configure the Extractor to install the associated injection persistence method at install time. If this flag is not set, the Implant will have no persistence mechanism, and it will not start on reboot.

The install persistence flag has no parameters, and if found in the configuration file, the Implant will be configured to install the persistence mechanism.

Registry Key Path

The registry key path field describes the registry entry that will be used to store the values required for persistence. The default is to store the entries under "SYSTEM\CurrentControlSet\Services". However, if the user provides the full path, any other path can be set.

In the example above, the registry key path value will be set to "SYSTEM\CurrentControlSet\Services\TestPath".

Registry Description

The registry description field defines the overt description of the service that will be used to start the Launcher. This value can be seen by the user and should be set taking that into account.

In the example above, the registry description field will be set to "Assassin 32-bit"

Registry Name

The registry name field defines the overt name that will show up in the services list in windows. This value can be easily seen by the user and should be set taking that into account.

In the example above, the registry name field will be set to "Implanted".

DLL Path

The DLL path field defines the path that the launcher specific DLL will be copied to. If the directory doesn't exist, it will be created, however it will not be deleted during uninstall. Therefore, it is recommended that an existing directory is used for this value.

In the example above, the DLL will be copied to "c:\temp\32\32assn.dll".

2.4 Extractor Configuration

This section will describe the xml formats for all of the configuration values contained under the <Extractor> XML tag. The extractor configuration is used for the Injection Extractor. An example of a complete Extractor configuration is shown below:

XML Configuration Example

```
<Extractor>
  <Path32>c:\temp\launcher32.exe</Path32>
  <Path64>c:\temp\launcher64.exe</Path64>
</Extractor>
```

Field Definitions

32-bit Launcher Path

The 32-bit launcher path is the path where the launcher will be copied to once the Extractor runs. It will only be used if the Extractor is running on a 32-bit system, and if the directories don't exist, they will be created. However, during uninstall; only the launcher file will be deleted, so it is recommended that a directory that already exists on target is used

In the example above, the 32-bit launcher path will be copied to "c:\temp\launcher32.exe".

64-bit Launcher Path

The 64-bit launcher path is the path where the launcher will be copied to once the Extractor runs. It will only be used if the Extractor is running on a 64-bit system, and if the directories don't exist, they will be created. However, during uninstall; only the launcher file will be deleted, so it is recommended that a directory that already exists on target is used.

In the example above, the 64-bit launcher path will be copied to "c:\temp\launcher64.exe".

2.5 ServiceInstaller Configuration

This section will describe the xml formats for all of the configuration values contained under the <ServiceInstaller> XML tag. An example of a complete service installer configuration is shown below:

XML Configuration Example

```
<ServiceInstaller bits="64">
  <RegKeyPath>SYSTEM\CurrentControlSet\Services\TestPath</RegKeyPath>
  <RegistryDescription>Assassin 64-bit</RegistryDescription>
  <RegistryName>Implanted</RegistryName>
  <DllPath>c:\temp\64\64assn.dll</DllPath>
</ServiceInstaller>
```

Attribute Definitions

bits

The bits attribute defines the bitness of the installer being configured, either 32 or 64. If the attribute is omitted, the configuration is assumed for all bitnesses.

Field Definitions

Registry Key Path

The registry key path field describes the registry entry that will be used to store the values required for persistence. The default is to store the entries under "SYSTEM\CurrentControlSet\Services". However, if the user provides the full path, any other path can be set.

In the example above, the registry key path value will be set to "SYSTEM\CurrentControlSet\Services\TestPath".

Registry Description

The registry description field defines the overt description of the service that will be used to start the Launcher. This value can be seen by the user and should be set taking that into account.

In the example above, the registry description field will be set to "Assassin 64-bit"

Registry Name

The registry name field defines the overt name that will show up in the services list in windows. This value can be easily seen by the user and should be set taking that into account.

In the example above, the registry name field will be set to "Implanted".

DLL Path

The DLL path field defines the path that the launcher specific DLL will be copied to. If the directory doesn't exist, it will be created, however it will not be deleted during uninstall. Therefore, it is recommended that an existing directory is used for this value.

In the example above, the DLL will be copied to "c:\temp\64\64assn.dll".

3 Assassin Metadata XML Formats

All Assassin files uploaded to the LP contain metadata information. The metadata contains information about both the target uploading the data and the file that was sent. This section will explain the formatting for the metadata XML block. The metadata XML block will be the first information contained in the XML data for all result and push files.

XML Example

```
<Metadata version="1.0">
  <ID>assn2Rlv</ID>
  <MetadataSize>102</MetadataSize>
  <FileSize>1596</FileSize>
  <InputTime>2011-12-12T18:26:26</InputTime>
  <FileName>c:\temp\output\eQX4Br0EtBJ.9JUaU1</FileName>
  <FromImplant />
</Metadata>
```

Attribute Definitions

version

The version attribute specifies the version of the metadata data format.

Field Definitions

ID

The ID field contains the target ID of the target uploading the file. It will consist of eight character string that consists of both the parent and child ids.

In the example above, the ID provided by the target is “assn2Rlv”, which means the target has a parent ID of “assn.” and a child ID of “2Rlv”.

MetadataSize

The metadata size is the size of the metadata that was provided in the uploaded file.

In the example above, the metadata size provided by the target is 102 bytes.

FileSize

The FileSize field provided the size of the file that was uploaded to the LP.

In the example above, the size of the uploaded data file was 1596 bytes.

InputTime

The InputTime field provided the time and data on the target system that the file was uploaded to the LP.

In the example above, the input time was set to: “2011-12-12T18:26:26”, aka December 12th, 2011 at 6:26:26 PM.

FileName

The FileName field contains the full path of the file uploaded from the target. The path is the path on the remote system, and has no relation to where the file will be located on the LP.

In the example above, the file name is "c:\temp\output\eQX4BrOEtBJ.9JUaU1"

FromImplant

The FromImplant field is an optional field that denotes whether or not the file originated from the target implant, or from the push directory. If the field exists in the XML, it is from the Implant.

In the example above, the file uploaded to the LP originated from the Implant.

4 Assassin Push File XML Formats

All files that are discovered in the push directory will be uploaded to the LP at the Implant cycle, currently every five seconds. The files are only chunked if they are larger than the maximum size allowed by the supported transport method. In addition, unlike files send during the beacon transaction, all of the files will be sent up in one communication session. The only XML data that is provided with a push file is the metadata, which is described above in the Assassin Metadata XML Formats section.

5 Assassin Result XML File Formats

All Assassin results consist of a result file header, with one or more sets of result XML data stored within. Each result XML field will consist of, at a minimum, a basic result object, the original task information, and all additional information generated from running the task. This section will explain the formatting for each section of the result XML files including examples of the result file and all of the result formats.

5.1 Result File

The ResultFile tag contains all of the results created by a single task file.

XML Example

```
<Assassin>
  <ResultFile version="1.0">
    <TaskFileName>FP5vTzGoPN0hj9bSWjq07Y84o</TaskFileName>
    <Result>
      ...
    </Result>
    <Result>
      ...
    </Result>
  </ResultFile>
</Assassin>
```

Attribute Definitions

version

The version attribute specifies the version of the result data format.

Field Definitions

Task File Name

The task file name field contains the file name that the result data was stored in on the target before being transported to the LP.

In the example above, the file name for the result that was transported was "FP5vTzGoPN0hj9bSWjq07Y84o".

Result

The result field contains the basic result object for a specific task, the original task data, and any other corresponding data. It will be defined in a later section.

5.2 Basic Result

The basic result field contains result data that is included in every result sent from the target. It contains a standard set of fields, and then it can optionally contain additional custom result objects that will be defined in a later section.

XML Example

```
<Result>
  <Command>SetChunkSize</Command>
  <Task>
    . . .
  </Task>
  <ResultCode>ASN_SUCCESS</ResultCode>
  <ExecuteTime>2011-12-16T16:49:44</ExecuteTime>
</Result>
```

Field Definitions

Command

The command field is a text description of the command that was executed on the target. It can be any of the commands supported by the Assassin Implant.

In the example above, the “Unpersist” command was executed on the target.

Result Code

The result code field defines the result of the task execution. This is a text description of a numeric result code sent from the Implant.

In the example above, the result of the executed task was “ASN_SUCCESS” which denotes successful execution of the task. Any other value in this field denotes that the task was unsuccessful for one reason or another.

Task

The task field contains the original task data that was used to generate the result. This will be further explained in a later section.

Execute Time

The execute time field is the time on the target that the task was executed. The field is outputted in ISO 9601 format.

In the example above, the command was executed on the 16th of December, 2011 at 4:49:44 PM.

5.3 Windows Result

The windows result object contains the result code provided by running the windows “GetLastError” command. This value can be useful in debugging how a task executed, but is often times not related to the execution of the task. A mapping of the result code to a description can be found using Visual Studio or online.

XML Example

```
<WindowsResult>  
  <WindowsResultCode>2</WindowsResultCode>  
</WindowsResult>
```

Field Definitions

Windows Result Code

The windows result code field contains the result code provided by running the windows “GetLastError” command.

In the example above, the result code is “2” which translates to “ERROR_FILE_NOT_FOUND” which can result from an invalid path being provided to a task.

5.4 Execute File Result

The execute file result tag contains the additional data provided by the Implant all execute file tasks.

XML Example

```
<ExecuteFileResult>
  <WinResult>87</ WinResult>
  <OutputDataSize>5m</OutputDataSize>
  <LocalFileName>data\execute_data.txt</LocalFileName>
</ ExecuteFileResult>
```

Field Definitions

Win Result

This is an embedded windows result object that will contain the windows "GetLastError" code after the task is executed. For more information see the earlier section describing the windows result field.

Output Data Size

When running an execute file in the foreground, the Implant will capture everything sent to standard out and standard error and return that data to the LP. This field contains the size of the data that is returned.

In the example above, 5 mebibytes of data was returned from the execution of the task.

Local File name

When the result file is received by the LP, the Assassin post processor will generate the result XML and then output any data files that are included in the result. The local file name field will contain the relative local file path to the data file that has all of the execute file output information. It will only be created if there is output data in the result.

In the example above, the local file name field was set to "data\execute_data.txt". This is a local relative path from the location of the XML file.

5.5 Get Walk Result

The get walk result tag contains all of the additional data provided by get, file walk, and get walk requests.

XML Example

```
<FileWalkResult>
  <FileWalkRecord>
    <FileName>c:\temp\test1.txt</FileName>
    <FileSize>1m</FileSize>
    <CreateTime>2011-12-05T12:11:23</CreateTime>
    <ModifiedTime>2011-12-05T12:11:23</ModifiedTime>
    <AccessedTime>2011-12-05T16:24:11</AccessedTime>
    <GetWalkResult>
      <FileDataSize>1m</FileDataSize>
      <GetResult>ASN_SUCCESS</GetResult>
      <GetWinResult>0</GetWinResult>
      <LocalFileName>data\test1.txt</LocalFileName>
    </GetWalkResult>
  </FileWalkRecord>
  <FileWalkRecord>
    <FileName>c:\temp\test2.txt</FileName>
    <FileSize>5m</FileSize>
    <CreateTime>2011-12-05T12:11:23</CreateTime>
    <ModifiedTime>2011-12-05T12:11:23</ModifiedTime>
    <AccessedTime>2011-12-05T16:24:11</AccessedTime>
    <GetWalkResult>
      <FileDataSize>5m</FileDataSize>
      <GetResult>ASN_SUCCESS</GetResult>
      <GetWinResult>0</GetWinResult>
      <LocalFileName>data\test2.txt</LocalFileName>
    </GetWalkResult>
  </FileWalkRecord>
  . . .
</FileWalkResult>
```

Field Definitions

File Name

This is the original file name, including the full path, on the target.

In the example above, the full path of the file scanned on the target is "c:\temp\test1.txt".

File Size

This is the size of the file scanned on the target as reported by Windows.
In the example above, the size of the file scanned is 1 mebibyte.

Create Time

The create time is the value stored in the windows file meta data describing the date and time that the file was originally created.

In the example above, the scanned file was created on December 5th, 2011 at 12:11:23.

Modified Time

The modified time is the value stored in the Windows file meta data describing the data and time that the scanned file was last modified.

In the example above, the scanned file was last modified on December 5th, 2011 at 12:11:23.

Accessed Time

The accessed time is the value stored in the Windows file meta data describing the data and time that the scanned file was last opened for any reason.

In the example above, the scanned file was last accessed on December 5th, 2011 at 04:24:11 PM.

Get Walk Result

The get walk result tag will only exist in results for either get or get walk requests. The tag contains information gathered while copying the file data for transmission to the LP. Examples and descriptions of the get walk result fields are below.

XML Example

```
<GetWalkResult>
  <FileDataSize>5m</FileDataSize>
  <GetResult>ASN_SUCCESS</GetResult>
  <GetWinResult>0</GetWinResult>
  <LocalFileName>data\test2.txt</LocalFileName>
</GetWalkResult>
```

Field Definitions

File Data Size

File data size is the size of the data captured by the request. This value can be different than the file size captured by the scan for multiple reasons, to include offsets, byte size limits, and read errors.

In the example above, the file data size was provided as 5 mebibytes.

Get Result

The get result field is the Assassin result code for the file get on the scanned file listed in the file walk record. This field can be any of the standard Assassin result codes.

In the example above, the get result field shows that the retrieval of the file was a success.

Get Win Result

The get win result field contains the Windows "GetLastError" value immediately after the scanned file was retrieved.

In the example above, the result code is "0" which translates to "ERROR_SUCCESS" which means no errors occurred during the retrieval.

Local File name

When the result file is received by the LP, the Assassin post processor will generate the result XML and then output any data files that are included in the result. The local file name field will contain the relative local file path of the retrieved file.

In the example above, the local file name field was set to "data\test2.txt". This is a local relative path from the location of the XML file.

5.6 Get Status Result

The get status result tag contains all of the additional data provided by all get status requests. The results contain a standard set of values and then zero or more custom status results defined in the tasking.

XML Example

```
<StatusResult>
  <TargetID>assne1jz</TargetID>
  <TargetVersion>1.1</TargetVersion>
  <TargetCurrentTime>2011-12-21T16:15:11</TargetCurrentTime>
  <StatusResultBasic>
    <HibernateSeconds>1m</HibernateSeconds>
    <UninstallOnDate>2012-12-31T12:00:00<UninstallOnDate />
    <InstalledOnDate>2011-12-21T16:03:17</InstalledOnDate >
  <ExecuteStartedDate>2011-12-21T16:03:17</ExecuteStartedDate >
</StatusResultBasic>
  <StatusResultBeacon>
    <BeaconInitialWait>1m</BeaconInitialWait>
    <BeaconDefaultInterval>1m</BeaconDefaultInterval>
    <BeaconMaxInterval>5m</BeaconMaxInterval>
  <BeaconBackoffMultiple>1.0</BeaconBackoffMultiple>
  <BeaconConsecutiveFails>10</BeaconConsecutiveFails >
  <BeaconJitter>10s</BeaconJitter >
</StatusResultBeacon>
  <StatusResultPath>
    <InputPath>c:\temp\input\<</InputPath >
    <OutputPath>c:\temp\output\<</OutputPath >
    <StartupPath>c:\temp\startup\<</StartupPath >
    <StagingPath>c:\temp\staging\<</StagingPath >
    <PushPath>c:\temp\push\<</PushPath >
</StatusResultPath>
  <StatusResultDirFiles>
    <FileWalkRecord>
      <FileName>c:\temp\input\zvC3VP</FileName>
      <FileSize>32b</FileSize>
      <CreatedTime>2011-12-21T16:15:06</CreatedTime>
      <ModifiedTime>2011-12-21T16:15:11</ModifiedTime>
      <AccessedTime>2011-12-21T16:15:06</AccessedTime>
    </FileWalkRecord>
    <FileWalkRecord>
      <FileName>c:\temp\output\zvC3VP.WqTCxg</FileName>
```

```

    <FileSize>3k231b</FileSize>
    <CreatedTime>2011-12-21T16:15:11</CreatedTime>
    <ModifiedTime>2011-12-21T16:15:11</ModifiedTime>
    <AccessedTime>2011-12-21T16:15:11</AccessedTime>
  </FileWalkRecord>
  <FileWalkRecord>
    <FileName>c:\temp\startup\~ffjas~1.urm</FileName>
    <FileSize>1k988b</FileSize>
    <CreatedTime>2011-12-21T16:04:17</CreatedTime>
    <ModifiedTime>2011-12-21T16:14:07</ModifiedTime>
    <AccessedTime>2011-12-21T16:04:17</AccessedTime>
  </FileWalkRecord>
</StatusResultDirFiles>
<StatusResultComms>
  <ChunkSize>1m</ChunkSize>
  <TransportList>
    <Transport type="WebDAV" tries="2">
      <Host>assassin_lp</Host>
      <TempDir>c:\temp</TempDir>
      <ShareList>
        <Share>share1</Share>
      </ShareList>
    </Transport>
  </TransportList>
</StatusResultComms>
<StatusResultList>
  <Blacklist>
    <Prog>avira.exe</Prog>
    <Prog>avg.exe</Prog>
  </Blacklist>
  <Whitelist />
</StatusResultList>
</StatusResult>

```

Field Definitions

Target ID

The ID tag contains information describing what the target ID for the configured Implant will be. The ID consists of a parent and child ID, each of which consists of 4 alpha-numeric characters. The parent ID is required and the child ID can be set to be generated automatically at build time if it is left blank.

In the example above, the D is defined as 'assne1jz'.

Target Version

The target version field specifies the version of the Assassin Implant that provided the results.

In the example above, the code version returned from the Implant is Assassin version 1.1

Target Current Time

The target current time defines the exact time on the target when the task was executed.

In the example above, the current time of the target when the task ran was December 21st, 2011 at 4:15:11 PM.

Status Result Basic

The status result basic field is a custom status result that provides some of the generic Implant settings as described below.

XML Example

```
<StatusResultBasic>
    <HibernateSeconds>1m</HibernateSeconds>
    <UninstallOnDate>2012-12-31T12:00:00</UninstallOnDate/>
    <InstalledOnDate>2011-12-21T16:03:17</InstalledOnDate>
    <ExecuteStartedDate>2011-12-21T16:03:17</ExecuteStartedDate>
</StatusResultBasic>
```

*Field Definitions**Hibernate Seconds*

Hibernate seconds field shows the amount of time that the target hibernated before starting communication with the LP.

In the example above, the target would have remained inactive for one minute before beginning the beacon cycle.

Uninstall On Time

The uninstall on time field describes the time which the target Implant is set to uninstall. This may be blank depending if the value has been set or not.

In the example above, the target Implant is set to uninstall at noon on December 12th, 2012.

Install On Time

The install on time field describes the time that the target Implant was first executed.

In the example above, the target Implant began execution for the first time on December 12th, 2011 at 4:03:17 PM.

Execute Started Time

The execute started time is the last time that the target began executing. This value is reset every time the target reboots.

In the example above, the target Implant began execution on December 12th, 2011 at 4:03:17 PM.

Status Result Beacon

The status result beacon field is a custom status result that provides all of the current beacon settings.

XML Example

```
<StatusResultBeacon>
    <BeaconInitialWait>1m</BeaconInitialWait>
    <BeaconDefaultInterval>1m</BeaconDefaultInterval>
    <BeaconMaxInterval>5m</BeaconMaxInterval>
    <BeaconBackoffMultiple>1.0</BeaconBackoffMultiple>
    <BeaconConsecutiveFails>10</BeaconConsecutiveFails>
    <BeaconJitter>10s</BeaconJitter>
</StatusResultBeacon>
```

Field Definitions

Beacon Initial Wait

The initial wait is defined as the time the beacon will wait after execution before starting the beacon process.

In the example above, the initial wait of the target is set to one minute.

Beacon Default Interval

The default interval is defined as the default time between beacon attempts. This value will be used after every successful beacon.

In the example above, the default interval of the target is set to one minute.

Beacon Max Interval

The max interval is the maximum amount of time between beacons.

In the example above, the max interval of the target is set to five minutes.

Beacon Backoff Multiple

The backoff multiple is the multiplier used to increase the beacon interval time after a communications failure

In the example above, the backoff multiple has been set to one. This will cause the beacon interval to stay the same after a failure.

Beacon Consecutive Fails

The beacon consecutive fails is the maximum consecutive beacon failure count for the target. If this number is reached the target Implant will uninstall.

In the example above, the count value has been set to 10.

Beacon Jitter

The jitter is the maximum variance that will be applied to the current beacon interval. The variance will be a random number between 0 and the maximum.

In the example above, the jitter has been set to ten seconds.

Status Result Path

The status result path field is a custom status result that provides a listing of all of the target implants directories.

XML Example

```
<StatusResultPath>
    <InputPath>c:\temp\input\</InputPath>
    <OutputPath>c:\temp\output\</OutputPath>
    <StartupPath>c:\temp\startup\</StartupPath>
    <StagingPath>c:\temp\staging\</StagingPath>
    <PushPath>c:\temp\push\</PushPath>
</StatusResultPath>
```

Field Definitions

Paths

The paths field is a listing of all of the target implants directories. For a more detailed description see the paths entry in the Assassin receipt file description.

Status Result Dir Files

The status result dir filesfield is a custom status result that provides a file walk of all of the files in the target implants directories.

XML Example

```
<StatusResultDirFiles>
    <FileWalkRecord>
        <FileName>c:\temp\input\zvC3VP</FileName>
        <FileSize>32b</FileSize>
    </FileWalkRecord>
</StatusResultDirFiles>
```

```

    <CreatedTime>2011-12-21T16:15:06</CreatedTime>
    <ModifiedTime>2011-12-21T16:15:11</ModifiedTime>
    <AccessedTime>2011-12-21T16:15:06</AccessedTime>
  </FileWalkRecord>
  <FileWalkRecord>
    <FileName>c:\temp\output\zvC3VP.WqTCxg</FileName>
    <FileSize>3k231b</FileSize>
    <CreatedTime>2011-12-21T16:15:11</CreatedTime>
    <ModifiedTime>2011-12-21T16:15:11</ModifiedTime>
    <AccessedTime>2011-12-21T16:15:11</AccessedTime>
  </FileWalkRecord>
  . . .
</StatusResultDirFiles>

```

Field Definitions

File Walk Record

The file walk record entries are the results of a file walk command ran on the target Implant directories. For a definition of the file walk record entries see the section on get walk results.

Status Result Comms

The status result commsfield is a custom status result that provides the target implant's communication settings.

XML Example

```

<StatusResultComms>
  <ChunkSize>1m</ChunkSize>
  <TransportList>
    <Transport type="WebDAV" tries="2">
      <Host>assassin_lp</Host>
      <TempDir>c:\temp</TempDir>
      <ShareList>
        <Share>share1</Share>
      </ShareList>
    </Transport>
  </TransportList>
</StatusResultComms>

```

Field Definitions

Chunk Size

The chunk size field sets the maximum file size that will be uploaded to the LP at a time. Any file that is larger than the chunk size will be broken up into multiple parts, and then reassembled at the post processing step.

In the example above, the chunk size value is set to one mebibyte.

Transport List

The transport list field contains all of the transport settings for the target Implant. For a more detailed definition of the transport list field see the Assassin Receipt file description of the transport list field.

Status Result List

The status result list field is a custom status result that provides both the target implant's blacklist and whitelists.

XML Example

```
<StatusResultList>
    <Blacklist>
        <Prog>avira.exe</Prog>
        <Prog>avg.exe</Prog>
    </Blacklist>
    <Whitelist />
</StatusResultList>
```

Field Definitions

Blacklist

The blacklist is a list of programs that, if running, will cause the beacon to not attempt communication. For a more detailed description of the blacklist see the Assassin Receipt file description of blacklist.

Whitelist

The whitelist is a list of programs that must be running for the target to attempt a beacon. For a more detailed description of the blacklist see the Assassin Receipt file description of whitelist.

6 Assassin Task XML File Formats

All Assassin task files consist of a task file header, with one or more sets of task XML data stored within. This section will explain the formatting for each section of the task XML files including examples of the task file and all of the task formats.

6.1 Task File

The task file tag contains all of the tasks that make up a batch

XML Example

```
<Assassin>
  <TaskFile runmode="r" filename="c:\temp\test.tsk" >
    <Task>
      . . .
    </ Task >
    < Task >
      . . .
    </ Task >
  </ TaskFile>
</Assassin>
```

Attribute Definitions

runmode

The runmode attribute defines the runmode for the batch and how it will be executed on target.

filename

The filename attribute specifies where the task will be stored after it is generated by the Tasker.

Field Definitions

Task

The task fields displayed in this example can be any of the custom tasking tags that are defined in the following section. The task file will always have one or more of these tasks per file.

6.2 Clear Queue

The clear queue command tells the target Implant to delete all of the files currently waiting to be transported. This command takes no arguments and is a Boolean field.

XML Example

```
<ClearQueue />
```

6.3 Delete File

The delete file command will cause the target Implant to delete a file on the target system. The file can be deleted normally or securely, which overwrites the files memory with zeros.

XML Example

```
<DeleteFile>  
  <RemoteFile>c:\temp\test.delete.txt</RemoteFile>  
  <Secure />  
</DeleteFile>
```

Field Definitions

Remote File

The remote file field defines the full path of the file to be deleted on the target system. In the example above, the file targeted for deletion is "c:\temp\test.delete.txt".

Secure

The secure field is a Boolean field. If the field is present in the XML, the task will tell the target to securely delete the file.

6.4 Execute

The execute command will cause the target Implant to run a specified command with arguments on the target system. The command can be run either in the foreground or the background. If executed in the foreground, all of the data sent to both standard out and standard error will be captured and returned in the Assassin result file.

XML Example

```
<Execute>
  <RemoteFile>c:\windows\system32\ping.exe</RemoteFile>
  <Args>candlestick.devlan.net</Args>
  <Foreground/>
</Execute>
```

Field Definitions

Remote File

The remote file field defines the full path of the file to execute. In the example above, the file to be executed will be "c:\windows\system32\ping.exe".

Args

The args field defines the arguments, if any, to provide to the file being executed. In the example above, the arguments have been set to "candlestick.devlan.net".

Foreground

The foreground field is a Boolean field. If the field is present in the XML, the task will tell the target Implant to capture all of the execute output and return it in the results.

6.5 Get Status

The get status command will cause the target to provide a series of settings based on the provided command options.

XML Example

```
<GetStatus>
  <Mode>persistent</Mode>
  <Params>
    <Param>basic</Param>
    <Param>beacon</Param>
    <Param>comms</Param>
    <Param>dir_files</Param>
  </Params>
</GetStatus>
```

Field Definitions

Mode

The mode field tells the target Implant where to retrieve the settings from. The available options are: persistent, factory, and running. In the example above, the target Implant will return settings in the persistent store.

Params

The params field contains all of the optional get status parameters. The get status command supports the following parameter types: all, basic, beacon, comms, dirs, dir_files, and list. The all parameter will cause the target Implant to return all of the available values.

In the example above, the target Implant will return the values for the parameters: basic, beacon, comms, and dir_files. See the get status result section of the XML guide for a more detail listing of the values returned by the various parameters.

6.6 Get Walk

The get walk command will cause the target to scan the targets directory structure and return results based on the parameters provided to the command.

XML Example

```
<GetWalk>
  <RemoteDirectory>c:\temp</RemoteDirectory>
  <Wildcard>*</Wildcard>
  <Depth>10</Depth>
  <TimeCheckType>greater</TimeCheckType>
  <Date>2010-01-01T12:00:00</Date>
  <GetFile>
    <Bytes>1m</Bytes>
    <Offset>5m</Offset>
  </GetFile>
</GetWalk>
```

Field Definitions

Remote Directory

The remote directory field defines the full path to the directory that the target Implant is to begin the scan in.

In the example above, the starting directory is “c:\temp”.

Wildcard

The wildcard field defines the expression to use when searching through the file structure. The more refined the expression, the smaller the results will be.

In the example above, the wildcard is set to “*”, which will return data for every file found in the scan.

Depth

The depth field tells the Implant how many directories down from the starting directory to search. A depth of 0 will only scan the starting directory.

In the example above, the depth is set to 10, which, depending on the search string, could yield a very large result

Time Check Type

The time check type field defines what type of comparison to use when checking files. This field is used in conjunction with the Date field and can be any one of the following values: no_check, greater, and less.

In the example above, the time check type field is set to “greater”, meaning only files that have a modified date greater than the date provided in the date field will be included in the results.

Date

The date field provides the date value to use in conjunction with the time check type field.

In the example above, only files that have a modified date greater than January 1st, 2010 at noon will be included in the results.

Get File

The get file group of values are only included if the target Implant should retrieve the file data in addition to the metadata. If this tag exists, then the file data will be retrieved.

Bytes

The bytes flag is part of the get file group of values and defines a maximum number of bytes to read from each file.

In the example above the bytes field is set to 1 mebibyte. If the value was 0 the target would retrieve the complete file

Offset

The offset flag is part of the get file group of values and defines an offset into the file to use before retrieving the file data.

In the example above, the offset field is set to 5 mebibytes, meaning data gathered will begin at the 5 mebibyte point in the file. If a file is smaller than the offset, no data will be collected.

6.7 Persist Settings

The persist settings command tells the target Implant to store all of the current settings in memory to the persistent store. This command takes no arguments and is similar to a Boolean XML field.

XML Example

```
<PersistSettings />
```

6.8 Put

The put command will take a local file and place it in a specified directory on the target system using whatever name is provided.

XML Example

```
<Put>
  <LocalFile>c:\temp\test.x.txt</LocalFile>
  <RemoteFile>c:\temp\test.put.txt</RemoteFile>
  <Mode>append</Mode>
</Put>
```

Field Definitions

Local File

The local file field describes the local full path to the local file that is going to be uploaded to the target.

In the example above, the local file “c:\temp\test.x.txt” will be uploaded to the target.

Remote File

The remote file field describes the remote full file path that the local file will be copied to.

In the example above, the file will be copied to “c:\temp\test.put.txt”.

Mode

The mode field defines the write mode for the request. The field only accepts the following options: *only_new*, *always*, and *append*.

In the example above, the data will be appended to the existing file. If the file doesn't exist, the file will be created, and the data will be added.

6.9 Restore Defaults

The restore defaults command sets the running settings to the original build values. The command takes a series of options that control which settings will be restored.

XML Example

```
<RestoreDefaults>  
  <Param>list</Param>  
  <Param>comms</Param>  
</RestoreDefaults>
```

Field Definitions

Param

The param field contains all of the parameters defining which settings will be restored. One or more param value must be provided. The param field supports the following values: all, basic, beacon, comms, and list. The all settings parameter will cause the target Implant restore all available settings values.

In the example above, only the list and comms values will be restored. See the user guide for a description of the specific values that will be restored with each parameter type.

6.10 Safety

The safety command changes the default beacon interval to the value provided. This command is mapped to the Collide built in safety feature, and is not intended to be executed manually. In addition, this command is the only Assassin command that will not have a response. This was intentionally done to avoid the transport queue and LP getting clogged with automated safety commands.

XML Example

```
<Safety>  
  <Seconds>1h</Seconds>  
</Safety>
```

Field Definitions

Seconds

The seconds field defines the value that the beacon default interval will be set to. In the example above the beacon default interval will be set to 1 hour.

6.11 Set Beacon Failure

The set beacon failure command will change the target implants running maximum beacon failure limit to the number provided.

XML Example

```
<SetBeaconFailure>  
  <Count>999</Count>  
</SetBeaconFailure>
```

Field Definitions

Count

The count field contains the value that the maximum consecutive beacon failure count value will be set to. In the example above the count will be set to 999

6.12 Set Beacon Params

The set beacon params command will change one or more of the target implants running beacon interval settings.

XML Example

```
<SetBeaconParams>
  <InitialWait>10m</InitialWait>
  <MaxInterval>60</MaxInterval>
  <DefaultInterval>15</DefaultInterval>
  <BackoffMultiple>1.35</BackoffMultiple>
  <Jitter>5</Jitter>
</SetBeaconParams>
```

Field Definitions

Initial Wait

The initial wait field defines the length that the Implant will wait after startup before it begins the beacon cycle. In the example above, the length is set to ten minutes.

Max Interval

The max interval field defines the maximum length that the target Implant will wait between beacons. In the example above, the max interval is set to sixty seconds.

Default Interval

The default interval field defines the default time the Implant will wait between beacons. In the example above, the default interval is set to fifteen seconds.

Backoff Multiple

The backoff field multiple defines the multiplier that is applied to the current beacon interval after a failure. In the example above, the backoff multiple is set to 1.35.

Jitter

The jitter field defines the maximum variance that is applied to the current beacon interval. In the example above, the jitter is set to five seconds.

6.13 Set Blacklist

The blacklist field defines a set of process names that if running will cause the beacon to not attempt to communicate.

XML Example

```
<SetBlacklist>  
  <Prog>norton.exe</Prog>  
  <Prog>msse.exe</Prog>  
</SetBlacklist>
```

Field Definitions

Prog

The prog field defines one of the program names in the blacklist. The set blacklist command can have zero or more of these entries. No programs defined disable the blacklist function. In the example above, the target implants running blacklist will include "norton.exe" and "msse.exe".

6.14 Set Chunk Size

The set chunk size command sets the target implants running chunk size value. This value controls the maximum file size that the target will upload to the LP at any one time.

XML Example

```
<SetChunkSize>  
  <Bytes>512</Bytes>  
</SetChunkSize>
```

Field Definitions

Bytes

The bytes field defines the number of bytes the target implants running chunk size will be set to. In the example above, the chunk size will be set to 512 bytes.

6.15 Set Hibernate

The set hibernate command will change the initial Implant hibernation time to the new value. The new value, if greater than the current time from install, will cause the target Implant to go into hibernation until the time has passed.

XML Example

```
<SetHibernate>  
  <Seconds>5d</Seconds>  
</SetHibernate>
```

Field Definitions

Seconds

The seconds field describes the number of seconds from initial install that the target Implant will remain inactive before beginning the beaconing process. In the example above, the hibernation time will be set to 5 days from install.

6.16 Set Interval

The set interval command is a short cut to the safety command. It was added due to Collide requiring a command with this exact name for the safety functionality to work. See the safety command description for more information.

6.17 Set Transport

The set transport command will change the transport configuration of the implant.

XML Example

```
<TransportList>
  <Transport type="WebDAV" tries="4">
    <Host>google.com</Host>
    <ShareList>
      <Share>share1</Share>
      <Share>share2</Share>
    </ShareList>
  </Transport>
</TransportList>
```

Field Definitions

Transport List

The transport list defines the order and settings for the target implant's transport. For further information on the transport list, see the transports section of the Assassin XML receipt definitions section.

6.18 Set Uninstall Date

XML Example

```
<SetUninstallDate>  
  <Date>2021-01-01T01:01:01</Date>  
</SetUninstallDate>
```

Field Definitions

Date

The date field defines the date and time that the target will uninstall. In the example above, the target Implant will uninstall on January 1st, 2021 at 1:01:01 AM.

6.19 Set Uninstall Timer

XML Example

```
<SetUninstallTimer>  
  <Seconds>1w</Seconds>  
</SetUninstallTimer>
```

Field Definitions

Seconds

The seconds field defines the length of time, after task execution, that the target Implant will uninstall. In the example above, the target Implant will uninstall 1 week after the task is executed.

6.20 Set Whitelist

The `whitelistfield` defines a set of process names that, at least one must be running for the beacon attempt to occur.

XML Example

```
<SetWhitelist>  
  <Prog>iexplore.exe</Prog>  
  <Prog>firefox.exe</Prog>  
</SetWhitelist>
```

Field Definitions

Prog

The `prog` field defines one of the program names in the whitelist. The set whitelist command can have zero or more of these entries. No programs defined disable the whitelist function. In the example above, the target implants running whitelist will include “iexplore.exe” and “firefox.exe”.

6.21 Uninstall

The uninstall command tells the target Implant to uninstall itself on its next tasking cycle, or 5 seconds after finishing the task processing. This command takes no arguments and is similar to a Boolean XML field.

XML Example

```
<Uninstall />
```

6.22 Unpersist

The unpersist command tells the target Implant to remove its persistence mechanism. Once this command has executed, if the target device reboots, the target will no longer start. This command takes no arguments and is similar to a Boolean XML field.

XML Example

```
<Unpersist/>
```

6.23 Upload All

The upload all command tells the target Implant to upload all remaining files awaiting upload. Based on the amount of data to transmit, this can cause a load on the target device and it will render the target Implant unresponsive until the command has completed, so this command should be used sparingly. This command takes no arguments and is similar to a Boolean XML field.

XML Example

```
<UploadAll />
```

Appendix M: Frequently Asked Questions

What is the right way to change the beacon interval?

Run both `set_beacon_params` and `safety` in Collide with the updated interval. If the change is meant to survive reboot, run `persist_settings` as well. If the safety is not set, the next time there is no implant tasking, the interval will be reset to the current safety value.

What can I do to get my results faster?

- Generate commands with a 'push' run mode. The implant will immediately upload the result, bypassing any files in the output queue and ignoring chunk size.
- Lower the beacon interval. This will increase the frequency at which the implant communicates with the listening post.
- Set a larger chunk size (using `set_chunk_size`).
Note: This can be done after a large command, resulting in the implant uploading multiple smaller chunks during every beacon.
- Send an `upload_all` command to the implant.
Warning: This may result in a large amount of bandwidth usage over a short period of time.

The implant is uploading too much data; how can I slow it down?

- Avoid running large commands with a 'push' run mode or placing large files in the push directory.
- Raise the beacon interval to space out upload operations.
- Set a smaller chunk size (using `set_chunk_size`).
Note: Any file in the output queue will not be re-chunked to a smaller size; since at least one chunk is sent every beacon, this may not actually slow down the rate. Use `clear_queue` and re-run lost commands if the implant absolutely, positively must slow down.

How can I get the output of a third-party tool on target?

- Configure the tool to write result files to Assassin's output directory. The implant will automatically ingest the file and add it to the upload queue.
- Configure the tool to write result files to Assassin's push directory. The implant will automatically ingest the file and upload it immediately.
- Run the tool using `execute_fg`. The implant will collect the tool's stdout and exit code before saving the result for upload. Note: Assassin blocks on `execute_fg` tasks.
- Run the `get` or `get_walk` commands on the tool's output file or directory.

How can I tell if the implant DLL is running?

If the DLL implant is running, the DLL will be present at the configured location on the file system and be undeletable. If you run `'tasklist /m <DLL name>'` from the command prompt, the module should be present in the appropriate process, typically `svchost.exe`.

If I put an upload_all at the end of a batch, why don't I get all my results right away?

All results of a batch are placed in a single result file. When the `upload_all` portion of the batch runs, the file is still open and unfinished, therefore it is not uploaded. Only results in the upload queue that existed prior to the batch execution are uploaded.

In order to immediately receive the results of a batch, run the `generate_batch` command with the push run mode flag.

If I set both an uninstall_timer and an uninstall_date, when will the implant actually uninstall?

Whichever happens first, the uninstall timer counts down to zero or the uninstall date arrives.

I ran a command that says it succeeded in the results, but it has a Windows Error Code; did the command actually succeed?

Yes. The Windows error code is the result of Windows `GetLastError` function and does not necessarily mean something unexpected happened. If the implant reports success, either the `GetLastError` result was expected or not critical.

The Windows error code is most useful for determining the cause of a reported failure from the implant.

I have a large file in the implant output directory that is not being uploaded; why?

Assassin will not store more than 16,384 files in its staging directory. The combination of a very large file and/or very small chunk size may overflow this directory limit. Assassin will leave the file in the output directory, but it will not process or upload it.

In order to retrieve the file, you can:

- Increase the chunk size such that the file will not overflow the staging directory.
- Manually break up the file such that it will be chunked piecewise.
- Use the `get` command in push mode to manually upload the file to the listening post directly.

Can I run multiple Assassin Implants on a target at the same time?

Only one Assassin Implant can run on a target per unique parent ID. If you must run multiple Implants on a single target, make sure they each have different four-byte parent IDs.

How can I export a commonly used task for later use?

In the Tasker, run `generate_batch` to create your task. Before generating the task, use the `export` command as follows: `x <xml_filename> <task_filename>` to export the task to xml.

The xml file can be imported using the `import_xml` command in the tasker.

The post processor is telling me I have gaps in my results; is that bad?

It depends. It is normal for files to be processed somewhat out of order and transient gaps should be of no concern.

However, if a gap appears and persists over time, it is possible that a chunk has been lost. The chunk may have been dropped by the one-way-throw and can be found on the Collide LP. If the chunk is unrecoverable, the post processor will never finish the file.

After the post processor finishes processing the current data, the partial file may be viewed in the input directory's staging sub-directory (/tmp/assassin_input/staging by default).

Appendix N: MD5 Hashes

5865baaffe03c645e6600e2d1cef9d93	assassin_python/assassin/ui/transport.py
00648bd3294ab5bd698c437783e8ace2	assassin_python/assassin/ui/task.py
677a06b6475df36fd3e39f66249a0e74	assassin_python/assassin/ui/__init__.py
80c8e7db58a39f7a101b8c8e94892f03	assassin_python/assassin/ui/builder.py
f879577ec8aa8278eccc57cca6ef90d2	assassin_python/assassin/codes.py
21fb3cd073e273ac22843383aac8cd39	assassin_python/assassin/build/rc4_s.h
9cfbe2c09467ca18a6d6d95ad615f6e7	assassin_python/assassin/build/transport.py
d5fa64f8d68574b7c34fb0499b175e24	assassin_python/assassin/build/rc4_s.py
d82eb52b91bcb7190c037a7f27608579	assassin_python/assassin/build/crypto.py
fb64faae3b7852aca467364e05637f21	assassin_python/assassin/build/config.py
18fbe1147f80fefbc8da004c8a1530a6	assassin_python/assassin/build/__init__.py
a010477050e32ec11843006fb5c49dac	assassin_python/assassin/build/builder.py
c18e95229b29522d49a8ce3668a2c8c4	assassin_python/assassin/build/rc4_s.c
afc27568d8e3af7bb3b503d841c6cf23	assassin_python/assassin/fields.py
249b721144c765a4f6df1cea013ee044	assassin_python/assassin/tasking/result.py
b4a359e28db7618d06267883e6832efd	assassin_python/assassin/tasking/task.py
d41d8cd98f00b204e9800998ecf8427e	assassin_python/assassin/tasking/__init__.py
96d16dfa2a15ee2cf7aab7a4da4f4574	assassin_python/assassin/magic_number.py
d41d8cd98f00b204e9800998ecf8427e	assassin_python/assassin/__init__.py
63f74d43df28d5658c88c52675723c38	assassin_python/assassin/comms/parcel.py
920e6ba50e60c82bf821a5a3e1b93b06	assassin_python/assassin/comms/beacon.py
d41d8cd98f00b204e9800998ecf8427e	assassin_python/assassin/comms/__init__.py
0a87f9782be1f73caf05e53e01618052	assassin_python/implant_builder.py
7f51ec2f9cc0b27bcf24b1bea5f1620d	assassin_python/task_creator.py
70db86b2a3c36716919620b8d1d56ee4	assassin_python/post_processor.py
0a4fd1017ff5582a4024fbc7d9e30598	assassin_python/pyinotify.py
5efd7d022129104b328d03af9e080379	assassin_release/assassin_executable_32.exe
4e3e31a77b17cc95015829a7769a3c91	assassin_release/assassin_executable_64.exe
76ae7ff8b08a25e4b3959a15a6773ed2	assassin_release/assassin_launcher_32.exe
0c762549401af8a943ae8a1c0c2330f4	assassin_release/assassin_launcher_64.exe
707f0de083193747233120291176e80e	assassin_release/assassin_svc_dll_64.dll
c22a1e1894c28231df733abaf1bb2329	assassin_release/assassin_run_dll_64.dll
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b431eebcf78007d48ddf6729c493ac	assassin_release/assassin_run_dll_32.dll
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eb4c0dc06b00144ffe37cf012bc6a102	assassin_release/assassin_svc_installer_64.exe
832931c4a12a8861c6fdcbba4fbd2228	assassin_release/assassin_extractor.exe
76000c094934be25718f4f492519b44a	assassin_release/assassin_svc_extractor.exe
5865baaffe03c645e6600e2d1cef9d93	collide_highside/assassin/assassin/ui/transport.py
00648bd3294ab5bd698c437783e8ace2	collide_highside/assassin/assassin/ui/task.py
677a06b6475df36fd3e39f66249a0e74	collide_highside/assassin/assassin/ui/__init__.py

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 67b9c517fb417a647ea356791906e939 collide_lowside/assassin/https.py
 63f08604d3916271367df8231c412c56 collide_lowside/assassin/dav.py
 d96486e560d69365c90c90d79defdcce collide_lowside/assassin/__init__.py

Appendix O: Change Log

Date	Change Description	Authority
01/11/2012	Document Initialization	2355679
01/26/2012	Removal of Appendix re: PSP Profile	2355679
03/14/2012	Update of documentation for 1.1.1 Release	2355679