

MRC Module Format for Userspace Injection by Archangel

File Type

MRC modules are relocatable portable executable files (normally DLL files) that expose a function exported by ordinal. An Archangel MRC module is referred to as "fire-and-forget" (FAF) module as Archangel simply loads the module file and creates a thread that calls the exported function. Archangel does not directly interact with the module after it has been loaded.

Flow of Events

1. Archangel maps a module into a memory, performing fixups as appropriate, and recursively loads any dependencies.
2. Archangel spawns a new thread in the injected process.
3. This thread calls `DllMain` and then the exported function as described below.
 - If `DllMain` or the exported function are not present, then Archangel unloads the module.
4. Upon the exported function's return, the module and any dependencies are unloaded. This behavior can be overridden if desired.

Exported Function

Definition

An MRC module exposes an exported function with the prototype:

```
// ordinal 1
HRESULT WINAPI MRC_FireAndForget(__in LPVOID run_arg_struct);
```

It is exported by ordinal only. The MRC loaders **do not** use the name of the function when resolving exports.

A typical MRC `.def` file:

```
LIBRARY module
EXPORTS
    MRC_FireAndForget @1 NONAME
```

Arguments

An MRC fire-and-forget (FAF) module provides the ability to simply run a module with an `argc/argv` as if it was run from the command line. The module's `MRC_FireAndForget` function is called and the `run_arg_struct` parameter points to a `MODULE_REMOTE_ARGS` structure as defined below:

```

// Ensure proper structure member alignment
#pragma pack(push)
#pragma pack(1)

// argument structure
#define MODULE_ARGS_CMDLINE_LEN (MAX_PATH * 4)
typedef struct _MODULE_REMOTE_ARGS
{
    // MRC_FIREANDFORGET_HDR
    DWORD version; // Current version is 2
    LPVOID hModule; // pointer to the beginning of the module in memory
    DWORD moduleSize; // module size in memory

    // MRC_MODULE_USERARGS
    // argv[0] will be set to placeholder value for option parsing compatibility
    wchar_t cmdline[MODULE_ARGS_CMDLINE_LEN];
}
MODULE_REMOTE_ARGS, *PMODULE_REMOTE_ARGS;

#pragma pack(pop)

```

The `MODULE_REMOTE_ARGS` structure is designed for future extensibility by including a version number, reported via the structure's `version` field. The current version of the structure is two (2). If the structure is modified, additional fields will be added to the end of the structure and the version number will be incremented. Existing fields will be retained and will remain valid for backwards compatibility with existing modules.

Return Values

After an FAF module's `MRC_FireAndForget` function returns, the loader assumes the module is done executing and will unload the module and its dependencies.

If a module desires to remain loaded (e.g., a module that installs hooks in the usermode process but does not execute code itself), the `MRC_FireAndForget` function should return the special error code `HRESULT_FROM_WIN32(ERROR_UNABLE_TO_UNLOAD_MEDIA)`. In this case the MRC module and any dependencies it triggered can no longer be unloaded and will remain in memory until the process exits.