TMcraft Service Tutorial Basic Development

Original Instructions

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Table of Contents

Revision History

Revision	Date	Description
1.0	2023-06-28	Original release
1.01	2023-10-20	Minor details revised
1.02	2024-06-22	Minor details revised

1. Overview

TMcraft Service is a program that operates in the background. Items from TMflow, such as Projects, Services, or TMcraft plugins, can actively send requests to TMcraft Service, typically via socket. Generally, it functions as a local service for tasks like advanced calculations or as a mediator between the robot and other devices. Refer to the diagram below summarizing the development process.

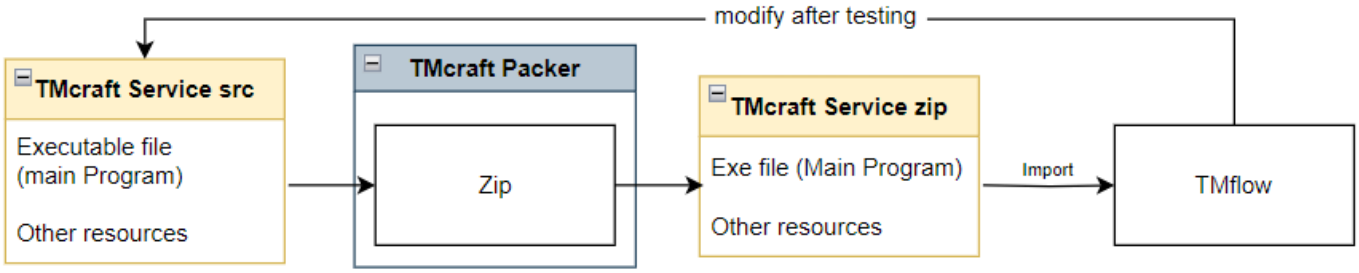

Figure 1: Development of TMcraft Service

To determine whether the TMcraft Service is the right fit, consider these questions:

Are users familiar with script programming?

Developing TMcraft Service requires significant knowledge and experience in script programming, as it utilizes general programming languages such as C++, C#, and others.

Is TMflow functions not enough?

TMflow offers a variety of convenient nodes and expressions, but it may not meet all needs, such as communication security or advanced calculations. In these situations, developers are encouraged to create TMcraft Service, which allows access to a wide range of programming resources from the community.

Is GUI not necessary?

TMcraft Service operates as a background program without a GUI, interacting solely through other programs like flow, nodes, and TMcrafts. It is ideal for developers who need a program to perform specific tasks without any GUI for settings.

This tutorial explains how to package a C# Program as a TMcraft Service, and how to enable it on TMflow.

2. Package the TMcraft Service

After developing the exe file for TMcraft Service, it require a packaging process before importing to TMflow. To do this, developers have to use the tool, TMcraft Packer.exe, within the TMcraft Development Kit.

First, prepare a source folder with the exe file and other related files.

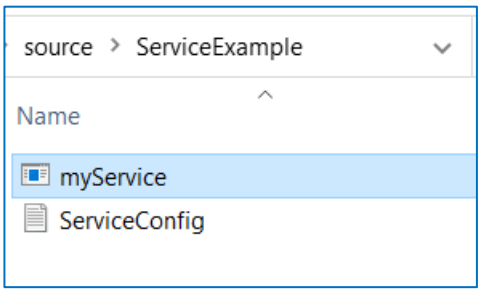

Figure 2: source folder

NOTE:
Suggest putting all files from the …\bin\Debug folder into the source folder

Next, open TMcraft Packer and create a project. Select **Service** as the target TMcraft item and complete the Project Settings. The system saves the project as a .tmcraft file at file path defined on **Location**.

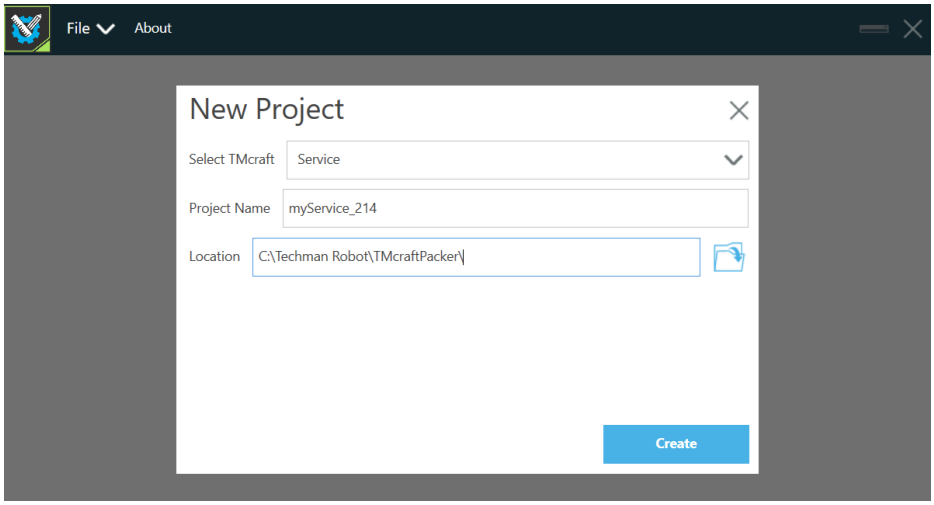

Figure 3: Create a TMcraft Packaging Project

After opening the project, users can see a form of parameters required to build and package the TMcraft Service. Refer to the following explanation.

Parameters	Description	Requisite
Source folder	Path of the source folder	○
Target folder	Path of the target folder. For any new projects, the default target folder is …\TMcraft Packer\USB\TM_Export*[PC Name]*\TMcraft\Service	○
Provider	Name of the developer or the company providing this service will be shown on the TMcraft Management Page	
Version	Version of the TMcraft Service will be shown on the TMcraft Management Page	○
Exe Name	The major program (exe) used as the TMcraft Service	○
Zip Password	Developers can define the password of the zip file. Length between 6 and 256 characters, using only the non-case-sensitive Latin alphabet and numbers	

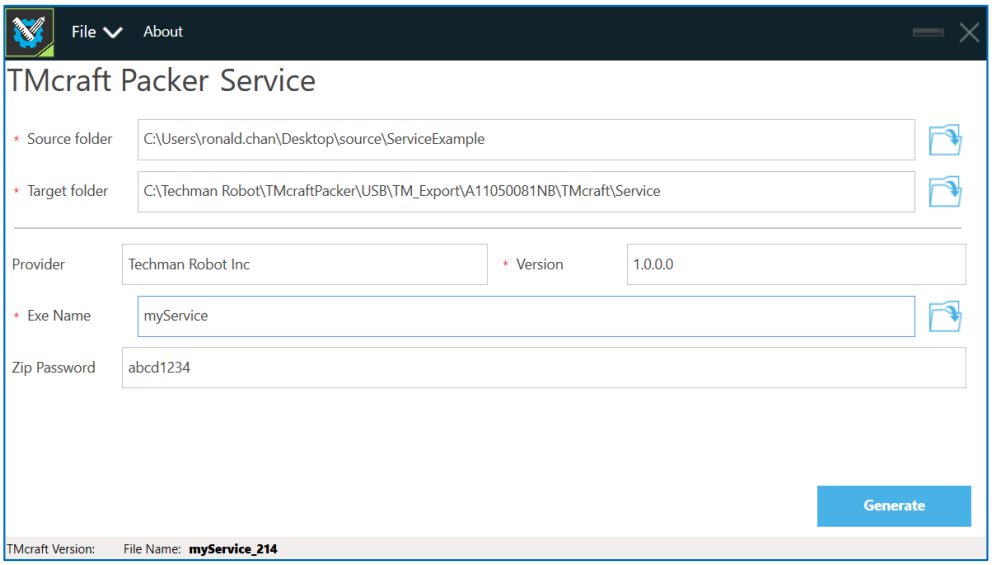

Figure 4: Set up the packaging of TMcraft Service

Once all requirements are ready, click **Generate**. It might take several minutes to package, and users can check the current progress on the Page (Users will see an error message if anything goes wrong). After packaging TMcraft Service successfully, users should see **succeed** at Status.

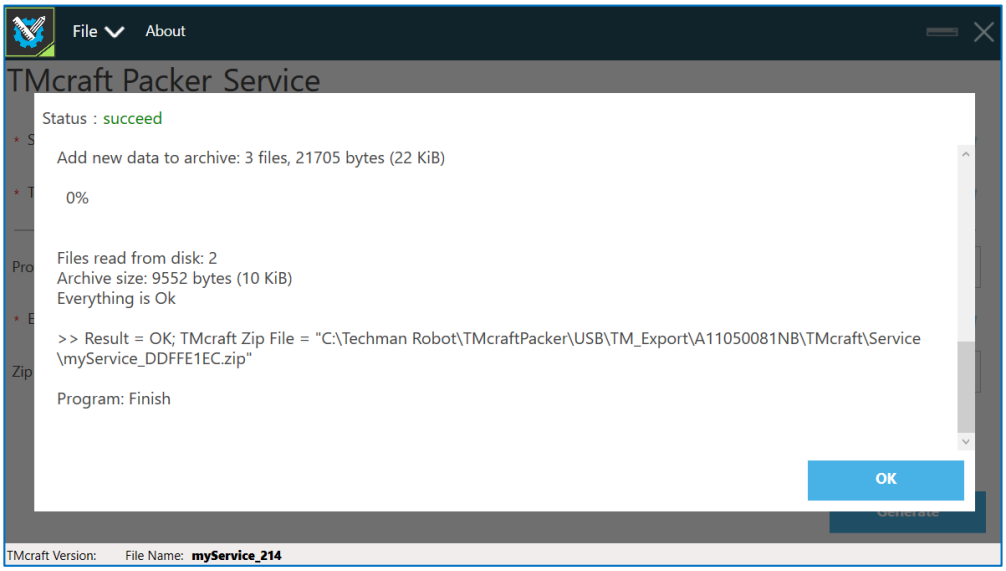

Figure 5: The Message Shown After Packaging successfully

Users can find the TMcraft Service zip file named after *[Exe Name]_[Checksum]* in the target folder.

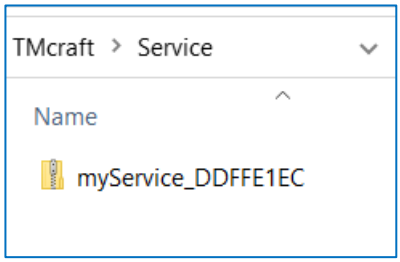

Figure 6: TMcraft Service zip at Target folder.

3. Installation Code and Checksum

To protect the rights and interests of developers, each TMcraft Packer Project has its own encrypted Installation Code (GUID-based). Any TMcraft Services generated by this project will share the same Installation Code and be able to replace one another on the same robot. In addition, if there are two Services generated from two different TMcraft Packer Projects (different Installation Codes), even though they might share the same name and configuration, they cannot replace each other. Therefore, developers should keep their packer project safe.

On the other hand, TMcraft Packer will also generate a checksum for each TMcraft Service based on the binary footprint of the files (exe and dll) within the source folder and the Installation Code. The TMcraft Service saves it onto the configuration file. When importing the TMcraft Service, TMflow will calculate a checksum by the same method; if these two checksums are not identical, TMflow will block the importing.

4. Using TMcraft Service on TMflow

To import a TMcraft Service Package to a robot, place the zip file under the following path:

[Storage Drive]\TM_Export\[Folder]\TMcraft\Service

Plug the storage device onto the robot and navigate to **System >Import/Export > Import**. Note that there is a new category: **TMcraft**. Select **TMcraft >Service**, choose the required TMcraft Service Package, and click **Import**.

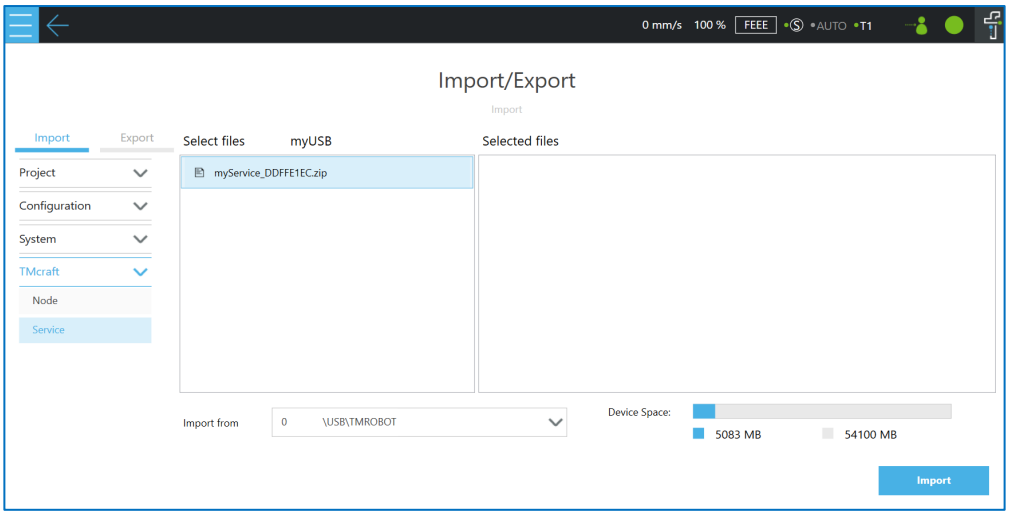

Figure 7: Import TMcraft Service Package

Next, go to **Configuration > TMcraft Management > Service**. Users can see the imported TMcraft Service shown in the table with the following information:

- **Name**: the executable name of the TMcraft Service
- **Provider**: parameter as defined in Chapter 2
- **Version**: parameter as defined in Chapter 2
- **Checksum**: calculated based the binary footprint of the files (exe and dll) within the TMcraft Service folder. For identification, developers may publish it to their end-users.
- **Executing**: state if the TMcraft Service is working or not.

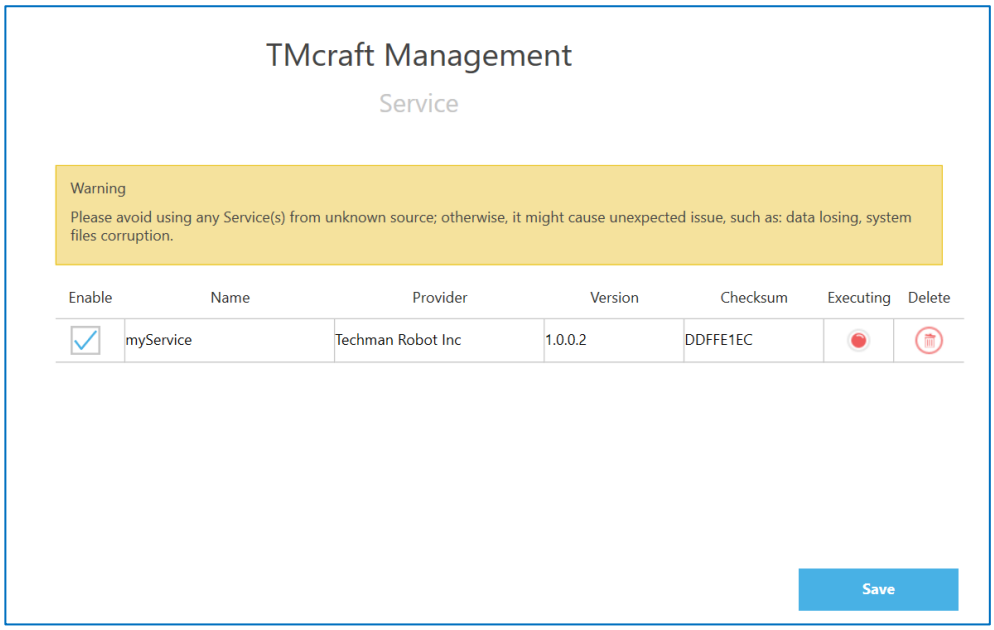

Figure 8: Enable the TMcraft Service on TMcraft Management

To start the TMcraft Service, check **Enable** and click **Save**. Be reminded that it requires a power cycle after enabling the TMcraft Service. Once on, the light icon below **Executing** is in green; otherwise, it is in red.

NOTE:

- To enable the TMcraft Service, users must reboot the robot after ticking the checkbox in the list. There is no need to reboot for disabling.
- Users can check the CPU and memory usage of the TMcraft Service by navigating to **View > Status**.

5. Dos & Don'ts

- About program languages:

  Developers can build TMcraft Service with either C# (.NET) or C++. Consider the following development conditions:

  - For C#, TM robot controller supports C# program based on .NET versions 3.5~4.8, 5.0, and 6.0. Here are the relevant files in the system:

Items	Version
Microsoft .NET 5.0.17 - Windows Server Microsoft ASP.NET Core 5.0.17 - Shared Framework (x64/x86) Microsoft ASP.NET Core 5.0.17 Hosting Bundle Options	5.0.17.22215
Microsoft .NET 6.0.16 - Windows Server Microsoft ASP.NET Core 6.0.16 - Shared Framework (x64/x86) Microsoft ASP.NET Core 6.0.16 Hosting Bundle Options	6.0.16.23174
Microsoft .NET Host - 5.0.17 (x64/x86) Microsoft .NET Host FX Resolver - 5.0.17 (x64/x86)	40.68.31213
Microsoft .NET Host - 6.0.16 (x64/x86) Microsoft .NET Host FX Resolver - 6.0.16 (x64/x86) Microsoft .NET Runtime - 6.0.16 (x86)	48.67.58427
Microsoft .NET Runtime - 5.0.17 (x64/x86)	5.0.17.31213
Microsoft .NET Runtime - 6.0.16 (x64)	6.0.16.32323
Microsoft Windows Desktop Runtime - x64	5.0.17
Microsoft Windows Desktop Runtime - x64	6.0.16

  - For C++, TM robot controller is installed with the following C++ related files:

Items	Version
Microsoft Visual C++ 2008 Redistributable (x64/x86)	9.0.30729.6161
Microsoft Visual C++ 2010 x64 Redistributable (x64/x86)	10.0.30319
Microsoft Visual C++ 2012 Redistributable (x64/x86) Microsoft Visual C++ 2012 Minimum Runtime (x64/x86) Microsoft Visual C++ 2012 Additional Runtime (x64/x86)	11.0.61030
Microsoft Visual C++ 2013 Redistributable (x64/x86) Microsoft Visual C++ 2013 Minimum Runtime (x64/x86) Microsoft Visual C++ 2013 Additional Runtime(x64/x86)	12.0.40664
Microsoft Visual C++ 2015-2022 Redistributable Microsoft Visual C++ 2022 Minimum Runtime	14.31.31103

Microsoft Visual C++ 2022 Additional Runtime	

Please ensure that the program runs in the specified environment as above.

- About writing files into Control Box through TMcraft items

  Robot System will deny the following access from TMcraft executable, including: (1) system shutdown and (2) accessing to drives C and D, except for the following folders:

  - D:\...TMflow\TMcraft\
  - D:\...TMflow\XmlFiles\
  - D:\...TMflow\TextFiles\

- Log

  The TMcraft Program should save log files within its folder, which allows end-users to export the TMcraft zip, including the log files, for developer analysis.

TECHMAN ROBOT INC.