Mpm-Smart Documentation

Our very smart smart-home app

Team-Mpm 2024

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The Team

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The idea

Creating a fully wireless smart-home/IOT automation system with a central management controller. We implement an open standard built on plugins and an extensible architecture. The entire Project is fully open source, and contributions from the community are highly welcome. We collect metrics and telemetry from multiple sources and display them in custom configurable dashboards. We also plan to support actor devices that can be controlled via the dashboard in real time or automatically controlled via dynamic workflows.

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Plugins

Overview

Plugins are a way to extend the functionality of the Core Application Layer provided by the Mpm-Smart ecosystem. Plugins are usually provided by a Plugin Server or loaded from a local directory on the controller. Plugins are exclusive to the backend layer. In the UI, all plugins can implement a set of options and views providing user interactivity for plugin-specific settings and exposed data.

How plugins get loaded

Plugins are loaded by the Plugin Manager. The Plugin Manager is responsible for loading, unloading, and managing the lifecycle of plugins. All Plugins are loaded at startup and are initialized in no specific order. Currently, there is no way of reloading plugins while the backend service is running. In deployment, this update workflow is automated by the control process shipping with the backend.

Creating your first Plugin

Introduction

Create an empty C# dotnet 9.0 class library and adapt the **Plugin.csproj** file to the following:

```xml
<Project Sdk="Microsoft.NET.Sdk">

    <PropertyGroup>
        <TargetFramework>net9.0</TargetFramework>
        <ImplicitUsings>enable</ImplicitUsings>
        <Nullable>enable</Nullable>
    </PropertyGroup>

    <PropertyGroup>
        <OutputPath>your/plugin/output/path</OutputPath>

<AppendTargetFrameworkToOutputPath>false</AppendTargetFrameworkToOutputP
ath>
    </PropertyGroup>

    <ItemGroup>
        <ProjectReference Include="..\plugin_base\PluginBase.csproj"
Private="False"/>
        <ProjectReference Include="..\..\Shared\Shared.csproj"
Private="False"/>
    </ItemGroup>

    <ItemGroup>
        <FrameworkReference Include="Microsoft.AspNetCore.App"/>
    </ItemGroup>

    <ItemGroup>
        <None Update="plugin.json">
            <CopyToOutputDirectory>Always</CopyToOutputDirectory>
        </None>
    </ItemGroup>

</Project>
```

Note: In the future, the PluginBase and Shared references will be replaced by NuGet packages.

The **plugin.json** metadata file is a simple JSON file that contains some general information about the plugin. It should look like this:

```
{
    "name": "Test Plugin",
    "version": "1.0.0",
    "description": "This is a test plugin",
    "author": "Your Name",
    "dependencies": []
}
```

Plugin Class

Create a new class that implements the `IPlugin` interface. Alternatively, one can also make use of the `PluginBase` class that provides some default implementations.

```
public class TestPluginClass : PluginBase<TestPluginClass>
{
    protected override void Initialize()
    {

    }

    protected override void BuildEndpoints(IEndpointRouteBuilder
routeBuilder)
    {

    }

    protected override void ConfigureServices(IServiceCollection
services)
    {

    }

    protected override void SystemStart()
    {

    }
}
```

Additional Considerations

- Make sure to include all static assets in the output folder of the plugin.
- Make sure there are now overlapping .dll file dependencies with the backend application for shared types.
- Make sure to include all necessary files in the .csproj file.
- Make sure to include all necessary dependencies in the `plugin.json` file.

Managing Plugin Services