# Fabric-ISV-Playbook Developer Sample

This GitHub repository contains the source code for a developer sample named **FabricIsvPlaybook**. The **FabricIsvPlaybook** developer sample is a .NET 8 console application project written in C# that can be open and run using Visual Studio 2022 or Visual Studio Code. The main purpose of the **FabricIsvPlaybook** project is to give Fabric developers a jumpstart into designing and implementing code to automate creating and configuring Fabric workspaces and workspace items including semantic models, reports, lakehouses, notebooks, warehouses, data pipelines and shortcuts.

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## Assumptions, Limitations and Temporary Workaround

While the core elements of the Fabric REST API reached GA in the first half of 2024, full support for executing API calls as a service principal and other essential functionality such as the forthcoming Connections API will be incrementally released throughout the 2024 calendar year. The June 2024 release of the **FabricIsvPlaybook** project is based on the following assumptions and workarounds.

* Fabric User API calls are executed with a user identity, not a service principal identity
* User authentication is configured with the **Microsoft** **Azure PowerShell** first-party application
* Setting credentials for DirectLake semantic models uses a Power BI REST API workaround

You can expect that the **FabricIsvPlaybook** project will be updated as incremental enhancements on Fabric platform become available to customers. In the meantime, developers can use this project as a starting point to begin writing and testing the programming logic for multitenant solutions which leverage Fabric building blocks such as lakehouses, warehouse and eventhouses. The logic that developers write today to extend **FabricIsvPlaybook** project will be relatively easy to adapt to use best practices once the Connections API and full support for service principals becomes available.

## Configuring Application Settings

All configuration data for the **FabricIsvPlaybook** application are maintained in a file named [AppSettings.cs](https://github.com/PowerBiDevCamp/Fabric-ISV-Playbook/blob/main/FabricIsvPlaybook/AppSettings.cs).

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## User Authentication with Entra Id

The **FabricIsvPlaybook** project has been designed to provide Fabric developers with a quick way to get up and running to write and test code using the Fabric REST API which creates and configures Fabric workspaces and workspace items. When running and testing the **FabricIsvPlaybook** project, there’s no need to create your own custom Entra Id application. Instead, the **FabricIsvPlaybook** project is configured to authenticate users with a Microsoft first-arty application named **Microsoft** **Azure PowerShell** which as an application Id of **1950a258-227b-4e31-a9cf-717495945fc2**.

Microsoft originally released the **Microsoft** **Azure PowerShell** application to provide PowerShell programmers with the ability to acquire access tokens by calling **Get-AzAccessToken**. This infrastructure provides PowerShell script authors with the ability to implement an authentication flow to acquire an access token in a single line of code.

$token = Get-AzAccessToken -Resource URL "https://graph.microsoft.com/"

Over time, the Microsoft developer community has discovered that the **Microsoft** **Azure PowerShell** application can be leveraged when developing custom applications that do not use PowerShell. The primary value of using the **Microsoft** **Azure PowerShell** application is convenience. It removes the need to create a custom application in Entra Id and it simplifies configuring delegated permission scopes. You should also take note that this convenience is more appropriate for development environments and far less appropriate for most production environments.

The **Microsoft** **Azure PowerShell** application simplifies token acquisition by defining a single delegated permission scope named **user\_impersonation**. This is a special permission scope that grants your application code with all the permissions that have been granted to the current user. When the **FabricIsvPlaybook** project calls Entra Id to acquire an access token for the Fabric REST API, it just needs to pass a single delegated scope.

public static readonly string[] Fabric\_User\_Impresonation = new string[] {

"https://api.fabric.microsoft.com/user\_impersonation"

};

The **user\_impersonation** permission scope is only supported in Microsoft first-party applications. When you create a custom Entra Id application, you cannot rely on the convenience of the **user\_impersonation** permission scope. Instead, your application must acquire access tokens by passing a far more granular set of permission scopes defined by the Fabric REST API.

public static readonly string[] TenantProvisioning = new string[] {

"https://api.fabric.microsoft.com/Capacity.ReadWrite.All",

"https://api.fabric.microsoft.com/Workspace.ReadWrite.All",

"https://api.fabric.microsoft.com/Item.ReadWrite.All",

"https://api.fabric.microsoft.com/Item.Read.All",

"https://api.fabric.microsoft.com/Item.Execute.All",

"https://api.fabric.microsoft.com/Content.Create",

"https://api.fabric.microsoft.com/Dataset.ReadWrite.All ",

"https://api.fabric.microsoft.com/Report.ReadWrite.All",

"https://api.fabric.microsoft.com/Workspace.GitCommit.All"

};

As you have seen, the **FabricIsvPlaybook** project is configured to use the **Microsoft** **Azure PowerShell** application to simplify and speed up the process of getting developers up and running with the Fabric REST API in a development environment.

The **FabricIsvPlaybook** project contains a C# class named **EntraIdTokenManager** which encapsulates the code and logic to interact with the Entra Id service and acquire access tokens. When you press the {F5} key to run the **FabricIsvPlaybook** project in the Visual Studio debugger, there is code in the **EntraIdTokenManager** class which starts an authentication flow to acquire an access token. The first time you run the **FabricIsvPlaybook** project, you will be redirected to a browser and prompted to sign in using your Entra Id user account.

Once you sign in interactively, the Entra Id service returns to your application with an access token and a refresh token. There is code in the **EntraIdTokenManager** class that implements token caching. This eliminates the need to perform an interactive sign in each time you run the application.

[TODO] Finish authentication section

## Code Structure

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## Demonstration Provisioning Flows

Here is what we have

* Demo01: Create Customer Tenant with User
* Demo02: Create Tenant with Imported Semantic Model
* Demo03: Create Tenant with Lakehouse and Notebook
* Demo04: Create Tenant with Warehouse and Data Pipelines
* Demo05: Create Tenant with Shortcut and Load Table API
* Demo06: Create Tenant with Warehouse and SqlClient
* Demo07: Create Tenant with ADLS Gen2 API