**FileGenerationService Class**

**1. Introduction**

The **FileGenerationService** class is responsible for generating Excel files from data stored in a DataTable. This document outlines the architecture, design decisions, and implementation details of the FileGenerationService class.

**2. Goals**

* Provide a reusable and extensible service for generating Excel files.
* Support generation of Excel files from data stored in DataTables.
* Utilize the EPPlus library for creating and manipulating Excel files.

**3. Architecture**

The FileGenerationService class follows a layered architecture, consisting of the following components:

* **Presentation Layer**: This class resides in the FileGeneration namespace and is responsible for providing the public interface for generating Excel files.
* **Business Logic Layer**: The core logic for generating Excel files is implemented in the FileGenerationService class.
* **Data Access Layer**: No explicit data access layer is required as data is provided directly to the service.

**4. Design Decisions**

**4.1. Use of EPPlus Library**

* EPPlus is chosen for its simplicity and broad range of features in creating and editing Excel files. It effectively addresses compatibility issues with COM components when integrating with both .NET 7 and .NET Framework 4.7.
* The ExcelPackage class from EPPlus is utilized to create and save Excel files.

**4.2. Exception Handling**

* While Exporting data to Excel it throws an exception if an error occurs during data generation, while its most unlikely for an error to occur in this case.
* Exceptions thrown during the generation process, such as errors encountered while exporting data to Excel or generating the Excel file, are appropriately caught, and handled within the FileGenerationService class.
* In case of an exception, a custom AggregateException is thrown, containing relevant error messages, to propagate exceptions up to the caller.
* Implemented minimalistic exception handling approach, providing flexibility for custom error handling at higher application levels to meet specific requirements.

**5. Class Structure**

**5.1. FileGenerationService Class**

* **Description**: Responsible for generating Excel files from data stored in DataTables.
* **Methods**:
  1. **ExportToExcel**: Creates a DataTable containing sample data.
  + **Description**: Creates a DataTable containing sample data to be exported to an Excel file.
  + **Returns**: A DataTable object containing sample data.
  + **Exception** **Handling**: Any exceptions that occur during the creation of the DataTable are propagated up to the caller.
  1. **GenerateFile**: Generates an Excel file from the data obtained from the ExportToExcel method.
  + **Description**: Generates an Excel file containing data obtained from the ExportToExcel method.
  + **Returns**: A Task<MemoryStream> representing the generated Excel file as a memory stream.
  + **Exception** **Handling**: Any exceptions that occur during the generation process are propagated up to the caller.
* **Dependencies :** This class relies on the EPPlus library for creating and manipulating Excel files.
* **ColumnClassConstant** **class** serves the purpose of centralizing column names or identifiers that are used in the application specifically with DataTable.
* **ExceptionMessages** class serves the purpose of centralizing error messages related to the Excel file generation process.

**6. Dependencies**

* **EPPlus Library**: Utilized for creating and manipulating Excel files.
* **System.Data** **Namespace**: Used for working with DataTables.

**7. Usage**

// Instantiate the FileGenerationService class

var fileGenerationService = new FileGenerationService();

// Generate an Excel file

var excelFileStream = await fileGenerationService.GenerateFile();

// Do something with the generated Excel file stream

**8. Conclusion**

The FileGenerationService class provides a robust and flexible solution for generating Excel files from DataTables. By leveraging the EPPlus library, it offers extensive functionality and ease of use for working with Excel files.