

Architecture Design

For MVC Reporting Website Framework

(MVC RWF)

Version 1.0

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Change Log

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1. Introduction

The purpose of this document is to provide the component design of the MVC Reporting Framework project. This documentation presents the class diagrams and tables documenting the description of attributes and methods of the MVC Reporting Framework.

1.1 Background

The purpose of this framework is developed to fulfill the need for a development team of varying web-development experience to be able to implement, deploy, and maintain an Enterprise level web project while respecting best-practices and standardized implementations for features.

1.2 References

[1] Tuck, T. Vision Plan 2.0 Retrieved 05/12/2018, from Thaddeus Tuck's Project Page Web Site:

<http://thaddeustuckmastersproject.azurewebsites.net>

[2] Naga Sowjanya Karumuri, Component Design Retrieved 10/31/2018, from Sowjanya's Project Page Web Site:

<http://people.cis.ksu.edu/~sowji/100jiMSE/>

2. MVC Reporting Website Framework

2.1 Package View

Based on the Vision Document the framework uses a View, Controller, Service, and Repository architectural pattern. The architecture is an extensible pattern that builds standardized view components from standard extensible models. The class diagram below shows a partial view for the base class interaction of the framework excluding the models. However, it should be noted that since most of benefit of using this framework is the automated view element generation the model and controller setups are the base requirement.

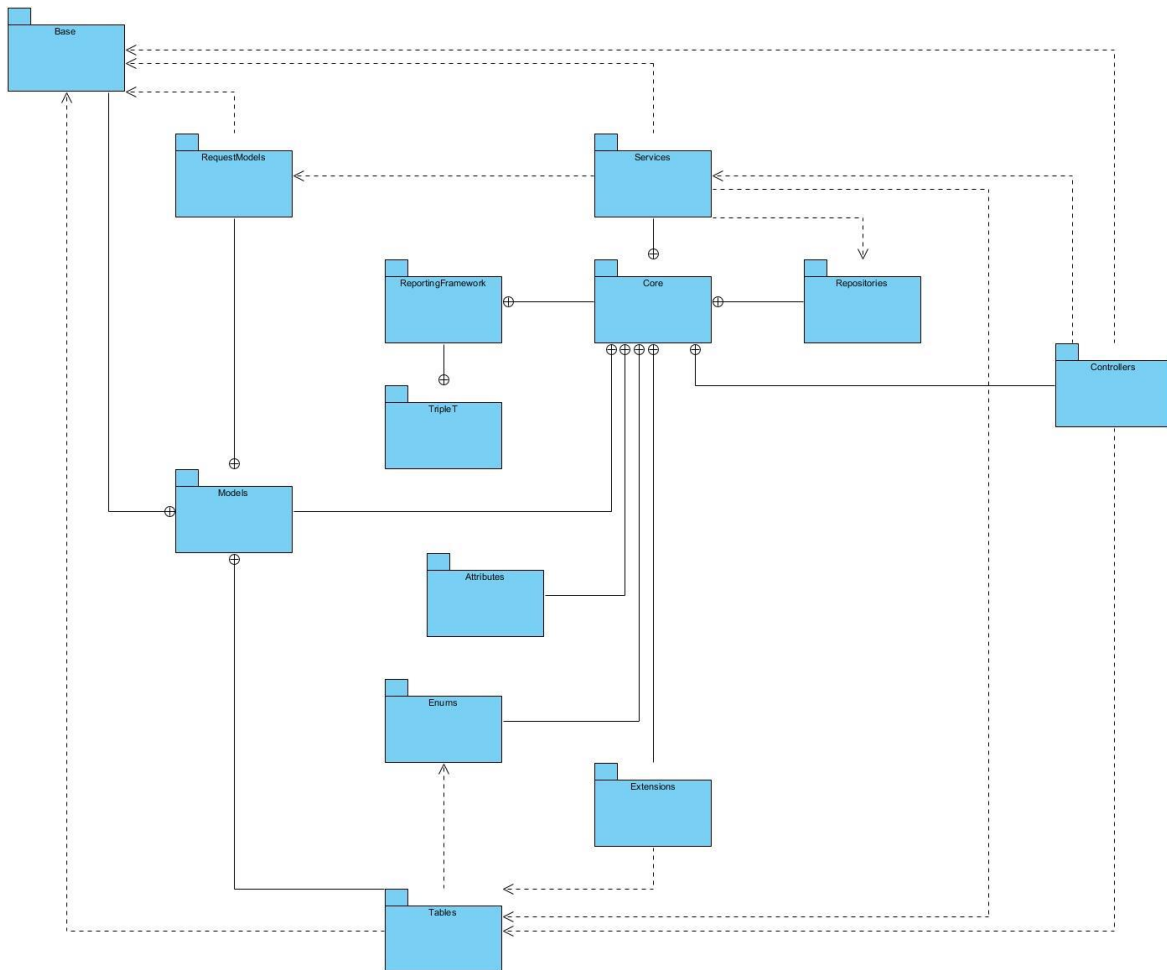


Figure 1: Package View

2.2 TripleT.ReportingFramework.Core Package

The architecture is an extensible pattern that builds standardized view components from standard extensible models. The class diagram provides the overall view of the framework. The central component of the framework for table-based reporting is the model architecture shown in the center of the following diagram. A separate image will be available on the project website for easier viewing.

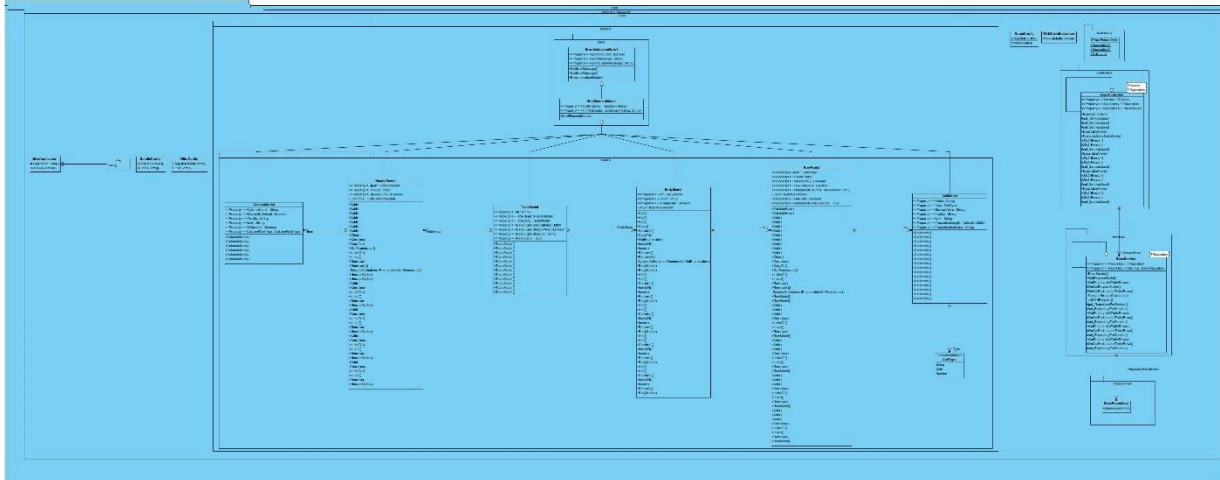


Figure 2:Overall Class Diagram for the Framework

2.2.1 Class Description

- **BaseController:** This class implements the overarching architecture of the pattern supported by the MVC Reporting Framework.

| Class | Visibility | Extends | Implements | Description |
|------------------|-------------------|----------------|---|--|
| BaseController | public | Controller | none | Implementation of the Controller that implements the foundation of the architecture of the pattern supported by the reporting framework. |
| Attribute | Visibility | Type | Description | |
| t_serviceBase | private | BaseService | The instance of BaseService that is the primary service for the controller. | |
| ServiceBase | public | BaseService | The public accessor for the BaseService that is the primary service for the controller. | |

Table 1: Detailed Description of the BaseController Class

- **BaseController<TService,TRepository>**: This class implements the overarching architecture of the pattern supported by the reporting framework.

| Class | Visibility | Extends | Implements | |
|---------------------------------------|-------------------|--------------------------------------|--|---|
| BaseController<TService, TRepository> | public | BaseController | none | |
| Attribute | Visibility | Type | Description | |
| Service | public | BaseService | Instance of the implementation and/or override of the BaseService to be used for the implementation of the this controller. | |
| Repository | public | BaseRepository | Instance of the implementation and/or override of the BaseRepository to be used for the implementation of the this controller. | |
| Method | Visibility | Parameters | Returns | Actions |
| DataTableView | public | TableModel | ActionResult | Action that returns the view for a single datatable for the given TableModel. |
| PostLoadDataTableRows | public | void | ActionResult | Action that returns JSON representing the data contained in JsonResultModel retrieved from the GetPostLoadedTableRows method of the BaseService<TRepository>. |
| JSONResult | public | JSONResultModel | ActionResult | An accessor method to an implementation of the standard Json method to allow for larger JSON content to be communicated to the browser. |
| JSONResult | protected virtual | JSONResultModel, JsonRequestBehavior | ActionResult | Implementation of the standard Json method to allow for larger JSON content to be communicated to the browser. |

Table 2: Detailed Description of the BaseController<TService,TRepository> Class

- **EnumExtensions**: Static class for extending the functionality of Enum.

| Class | Visibility | Extends | Implements | |
|----------------|-------------------|-------------------|-------------------|--|
| EnumExtensions | public | Enum | none | |
| Method | Visibility | Parameters | Returns | Actions |
| Description | public | Enum | String | Static method that extends Enum to return the value of a description attribute on an enum value. |
| ToEnum | public | String, Enum | Enum | Static method that extends the Enum to convert a string value to an enum. |

Table 3: Detailed Description of the EnumExtensions Class

- **HtmlBuildingExtensions**: Static class for extending the functionality of HtmlHelper

| Class | Visibility | Extends | Implements | |
|------------------------|-------------------|--|-------------------|--|
| HtmlBuildingExtensions | public | HtmlHelper | none | |
| Method | Visibility | Parameters | Returns | Actions |
| Table | public | HtmlHelper, TableModel, int | String | Method to retrieve the html string representation of the given TableModel. |
| Row | public | HtmlHelper, RowModel | String | Method to retrieve the html string representation of a RowModel. |
| Rows | public | HtmlHelper, IList<RowModel>, int, Nullable<int> | String | Method to retrieve the html string representations of a list of RowModel. |
| Link | public | String | String | Method to retrieve the html string representation of the given url as a link. |
| Link | public | String, String | String | Method to retrieve the html string representation of the given url as a link with a given display value. |

Table 4: Detailed Description of the HtmlBuildingExtensions Class

- **ViewExtensions:** Static class for extending the functionality of PartialViewResult and ViewResult.

| Class | Visibility | Extends | Implements | |
|----------------|-------------------|-------------------|-------------------|---|
| ViewExtensions | public | PartialViewResult | none | |
| Method | Visibility | Parameters | Returns | Actions |
| RenderToString | public | PartialViewResult | String | Method to render a PartialViewResult to a string. |

Table 5: Detailed Description of the ViewExtensions Class

- **ErrorIndicationModel:** Class that represents a model for indicating and containing errors that occur during framework processes.

| Class | Visibility | Extends | Implements | |
|----------------------|-------------------|-------------------|--|--|
| ErrorIndicationModel | public | none | none | |
| Attribute | Visibility | Type | Description | |
| _errorOccured | private | Boolean | | |
| _errorMessage | private | String | | |
| _errorDisplayMessage | private | String | | |
| ErrorOccured | public | Boolean | Whether or not an error has occurred. If property is set to false Error Message and Error Display Message will be set to String.Empty. | |
| ErrorMessage | public | String | The message of the error the model represents. | |
| ErrorDisplayMessage | public | String | The display message for the error, will return the value of the ErrorMessage property if not set. | |
| Method | Visibility | Parameters | Returns | Actions |
| SetErrorMessage | public | String | void | Function to set the error message for the model. |
| SetErrorMessage | public | String | void | Function to set the error message and the message to be displayed for the error. |

Table 6: Detailed Description of the ErrorIndicationModel Class

- **HtmlElementModel**: Class that represents a model to represent an html element.

| Class | Visibility | Extends | Implements | |
|------------------|-------------------|----------------------------|---|--|
| HtmlElementModel | public | ErrorIndicationModel | none | |
| Attribute | Visibility | Type | Description | |
| _CSSClasses | private | HashSet<String> | | |
| _htmlAttributes | private | Dictionary<String, String> | | |
| CSSClasses | public | HashSet<String> | Unique collection of css classes to be rendered in the "class" attribute of the html element. | |
| HtmlAttributes | public | Dictionary<String, String> | Dictionary of attributes to be rendered for the html element where the key is the attribute name and the value is the value for the html attribute. | |

Table 7: Detailed Description of the HtmlElementModel Class

- **JSONResultModel**: Class that represents a model to represent a JsonResult to facilitate the JSON object being returned and a server status code/message.

| Class | Visibility | Extends | Implements | |
|------------------|-------------------|----------------|---|--|
| JSONResultModel | public | none | none | |
| Attribute | Visibility | Type | Description | |
| _data | private | Object | | |
| _statusCode | private | HttpStatusCode | | |
| _statusMessage | private | String | | |
| Data | public | Object | The data object to be returned as the data object in the JSON result. | |
| StatusCode | public | int | The status code for the JSON result. | |
| StatusMessage | public | String | The status message for the JSON result. | |

Table 8: Detailed Description of the JsonResultModel Class

- **BaseRequestModel**: Class that represents a model that is the foundation of the request model pattern/framework.

| Class | Visibility | Extends | Implements | |
|------------------|------------|----------------------|------------|--|
| BaseRequestModel | public | ErrorIndicationModel | none | |

Table 9: Detailed Description of the BaseRequestModel Class

- **PostLoadDataTableRequestModel**: Class that represents a request model for post loading rows for a JQuery DataTable.

| Class | Visibility | Extends | Implements | |
|-------------------------------|------------|------------------|---|--|
| PostLoadDataTableRequestModel | public | BaseRequestModel | none | |
| Attribute | Visibility | Type | Description | |
| Id | public | Guid | The Id of the TableModel stored in the Session to be postloaded. | |
| StartingIndex | public | Nullable<int> | The index to begin selecting rows from the TableModel to post load. | |
| NumberOfRowsToRender | public | Nullable<int> | The number of rows from the TableModel to post load. | |

Table 10: Detailed Description of the PostLoadDataTableRequestModel Class

- **BodyModel:** Class that represents a model that represents a table body which is a collection of RowModel.

| Class | Visibility | Extends | Implements | |
|-----------------|------------|------------------------|--|---|
| BodyModel | public | HtmlElementModel | ICollection<RowModel> | |
| Attribute | Visibility | Type | Description | |
| _rows | private | ICollection<RowModel> | | |
| this[int index] | public | RowModel | Gets or sets the RowModel at the specified index. | |
| Count | public | int | Gets the number of RowModel contained in the table body. | |
| IsReadOnly | public | Boolean | Gets a value indicating whether the table body is read-only. | |
| Method | Visibility | Parameters | Returns | Actions |
| Add | public | void | void | Adds a RowModel to the table body model using the default constructor of the RowModel. |
| Add | public | RowModel | void | Adds a given RowModel to the table body model. |
| Add | public | ICollection<CellModel> | void | Adds a RowModel to the table body model using the corresponding constructor for the RowModel class. |
| Clear | public | void | void | Removes all RowModels from the table body model. |
| Contains | public | RowModel | Boolean | Determines whether the table body contains a specific RowModel. |
| CopyTo | public | RowModel[], int | void | Copies the elements of the table body to an array, starting at a particular array index. |
| GetEnumerator | public | void | IEnumerator<RowModel> | Exposes the enumerator, which supports a simple iteration over the table body. |
| IndexOf | public | RowModel | int | Determines the index of a specific RowModel in the table body. |
| Insert | public | int, RowModel | void | Inserts a RowModel into the table body at the specified index. |

| | | | | |
|---------------------------|--------|----------|-------------|--|
| Remove | public | RowModel | Boolean | Removes the first occurrence of a specific RowModel from the table body. |
| RemoveAt | public | int | void | Removes the RowModel at the specified index. |
| IEnumerable.GetEnumerator | | void | IEnumerator | Returns an enumerator that iterates through the table body. |

Table 11: Detailed Description of the BodyModel Class

- **CellModel:** Class that represents a model that represents a table cell.

| Class | Visibility | Extends | Implements | |
|----------------------|------------|------------------|--|--|
| CellModel | public | HtmlElementModel | none | |
| Attribute | Visibility | Type | Description | |
| _value | private | String | | |
| _type | private | CellType | | |
| _link | private | String | | |
| _truncationLength | private | Nullable<int> | | |
| _truncationIndicator | private | String | | |
| Value | public | String | Value of the table cell. | |
| Type | public | CellType | Type of cell for the reporting framework. | |
| SortingValue | public | String | Sorting value for the cell for use in order a table by the column this cell is in. | |
| Tooltip | public | String | The tooltip to display on hover over the table cell. | |
| Link | public | String | The url to navigate to for the cell. | |
| TruncationLength | public | Nullable<int> | Maximum length of the value of the cell before truncation. | |
| TruncationIndicator | public | String | String to denote truncation defaults to "... " if not set. | |

Table 12: Detailed Description of the CellModel Class

- **ColumnModel**: Class that represents a model that represents a table column rendered in html as <th></th>.

| Class | Visibility | Extends | Implements | |
|-------------------|-------------------|------------------|---|--|
| ColumnModel | public | HtmlElementModel | none | |
| Attribute | Visibility | Type | Description | |
| _columnName | private | String | | |
| _displayByDefault | private | Boolean | | |
| _filterType | private | ColumnFilterType | | |
| _tooltip | private | String | | |
| _link | private | String | | |
| _orderable | private | Boolean | | |
| ColumnName | public | String | Name to display for the table column. | |
| DisplayByDefault | public | Boolean | Whether or not to display the column by default (when the table is first rendered). | |
| ColumnFilterType | public | ColumnFilterType | The type of filter to be used for the column. | |
| Tooltip | public | String | The tooltip to display on hover over the table column header. | |
| Link | public | String | The URL to navigate to for the table column header. | |
| Orderable | public | Boolean | Whether or not to the column is orderable. | |

Table 13: Detailed Description of the ColumnModel Class

- **HeaderModel**: Class that represents a table header which is a collection of ColumnModel.

| Class | Visibility | Extends | Implements | |
|------------------|-------------------|---------------------------------|--|---|
| ColumnModel | public | HtmlElementModel | ICollection<ColumnModel> | |
| Attribute | Visibility | Type | Description | |
| _columns | private | ICollection<ColumnModel> | | |
| this[int index] | public | ColumnModel | Gets or sets the ColumnModel at the specified index. | |
| Count | public | int | Gets the number of ColumnModel contained in the table body. | |
| IsReadOnly | public | Boolean | Gets a value indicating whether the table body is read-only. | |
| Method | Visibility | Parameters | Returns | Actions |
| Add | public | void | void | Adds a ColumnModel to the table header model using the default constructor of the ColumnModel. |
| Add | public | ColumnModel | void | Adds a given ColumnModel to the table body model. |
| Add | public | String | void | Adds a ColumnModel to the table header model using the corresponding constructor for the ColumnModel class. |
| Add | public | String, Boolean | void | Adds a ColumnModel to the table header model using the corresponding constructor for the ColumnModel class. |
| Add | public | String, Boolean, String | void | Adds a ColumnModel to the table header model using the corresponding constructor for the ColumnModel class. |
| Add | public | String, Boolean, String, String | void | Adds a ColumnModel to the table header model using the corresponding constructor for the ColumnModel class. |

| | | | | |
|---------------------------|--------|---|----------------------------|---|
| Add | public | String, Boolean, String, String, Boolean | void | Adds a ColumnModel to the table header model using the corresponding constructor for the ColumnModel class. |
| Clear | public | void | void | Removes all ColumnModels from the table header model. |
| Contains | public | ColumnModel | Boolean | Determines whether the table header contains a specific ColumnModel. |
| CopyTo | public | ColumnModel [], int | void | Copies the elements of the table body to an array, starting at a particular array index. |
| GetEnumerator | public | void | IEnumerator< ColumnModel > | Exposes the enumerator, which supports a simple iteration over the table header. |
| IndexOf | public | ColumnModel | int | Determines the index of a specific ColumnModel in the table header. |
| Insert | public | int, ColumnModel | void | Inserts a ColumnModel into the table header at the specified index. |
| Remove | public | RowModel | Boolean | Removes the first occurrence of a specific ColumnModel from the table header. |
| RemoveAt | public | int | void | Removes the ColumnModel at the specified index. |
| IEnumerable.GetEnumerator | | void | IEnumerator | Returns an enumerator that iterates through the table header. |

Table 14: Detailed Description of the HeaderModel Class

- **RowModel:** Class that represents a model that represents a table body which is a collection of CellModel.

| Class | Visibility | Extends | Implements | |
|------------------------|-------------------|------------------------|---|--|
| RowModel | public | HtmlElementModel | ICollection<CellModel> | |
| Attribute | Visibility | Type | Description | |
| _cells | private | ICollection<CellModel> | | |
| _numberOfCellsExpected | private | int | | |
| this[int index] | public | CellModel | Gets or sets the CellModel at the specified index. | |
| Count | public | int | Gets the number of CellModel contained in the table body. | |
| IsReadOnly | public | Boolean | Gets a value indicating whether the table body is read-only. | |
| HasCells | public | Boolean | Gets a value indicating whether the row has CellModels in it. | |
| NumberOfCellsExpected | public | int | Gets the number of CellModels expected for validation. | |
| Method | Visibility | Parameters | Returns | Actions |
| ValidateRow | public | int | Boolean | Validates if the number of cells in the row is equal to the given number of columns. |
| Add | public | void | void | Adds a CellModel to the table row model using the default constructor of the RowModel. |
| Add | public | CellModel | void | Adds a given CellModel to the row model. |
| Add | public | Object | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Add | public | Object, String | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Add | public | Object, String, String | void | Adds a CellModel to the table row model using the |

| | | | | |
|---------------|--------|---|-----------------------|--|
| | | | | corresponding constructor for the CellModel class. |
| Add | public | Object, String, String, String | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Add | public | Object, String, String, String, int, String | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Add | public | Object, String, String, String, int, String, HashSet<String>, Dictionary<String,String> | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Add | public | Object, HashSet<String>, Dictionary<String,String> | void | Adds a CellModel to the table row model using the corresponding constructor for the CellModel class. |
| Clear | public | void | void | Removes all CellModels from the table row model. |
| Contains | public | CellModel | Boolean | Determines whether the table row contains a specific CellModel. |
| CopyTo | public | CellModel[], int | void | Copies the elements of the table row to an array, starting at a particular array index. |
| GetEnumerator | public | void | IEnumerator<RowModel> | Exposes the enumerator, which supports a simple iteration over the table row. |
| IndexOf | public | CellModel | int | Determines the index of a specific CellModel in the table row. |

| | | | | |
|---------------------------|--------|----------------|-------------|--|
| Insert | public | int, CellModel | void | Inserts a CellModel into the table row at the specified index. |
| Remove | public | CellModel | Boolean | Removes the first occurrence of a specific CellModel from the table row. |
| RemoveAt | public | int | void | Removes the CellModel at the specified index. |
| IEnumerable.GetEnumerator | | void | IEnumerator | Returns an enumerator that iterates through the table row. |

Table 15: Detailed Description of the RowModel Class

- **TableModel**: Class that represents a model that represents a table that can be used to render an html table.

| Class | Visibility | Extends | Implements | |
|--------------------------|------------|------------------|--|--|
| TableModel | public | HtmlElementModel | none | |
| Attribute | Visibility | Type | Description | |
| _id | private | String | | |
| _tableHead | private | HeaderModel | | |
| _tableBody | private | BodyModel | | |
| _defaultSortColumnIndex | private | int | | |
| _defaultSortDirectionAsc | private | Boolean | | |
| _postLoadId | private | Guid | | |
| Id | public | String | The id to be used for the table in the html element. | |
| TableHead | public | HeaderModel | The HeaderModel that represents the thead section of an html table containing the columns for the table. | |
| TableBody | public | BodyModel | The BodyModel that represents the tbody section of an html table containing the rows for the table. | |
| DefaultSortColumnIndex | public | int | The index of the column to use for sorting for the table by default. | |
| DefaultSortDirectionAsc | public | Boolean | Whether or not to use the default sort direction of ascending. | |
| DefaultSortDirection | public | String | The string indicator for sort direction. | |
| PostLoadId | public | Guid | Unique identifier to be used by the post loading process. | |

Table 16: Detailed Description of the TableModel Class

- **BaseRepository**: Class that represents base repository for model construction and loading that implements the foundation of the architecture of the pattern supported by the reporting framework.

| Class | Visibility | Extends | Implements | |
|----------------|------------|---------|------------|--|
| BaseRepository | public | none | none | |

Table 17: Detailed Description of the BaseRepository Class

- **BaseService:** Class that is the BaseService class that implements the foundation of the architecture of the pattern supported by the reporting framework.

| Class | Visibility | Extends | Implements | |
|---------------------------|----------------------|---|--|--|
| BaseService | public | none | none | |
| Attribute | Visibility | Type | Description | |
| t_repository | private | BaseRepository | | |
| RepositoryForService | public | BaseRepository | Instance of the implementation and/or override of the BaseRepository to be used for the implementation of the service (recommended to be for a feature set). | |
| Method | Visibility | Parameters | Returns | Actions |
| GetRequestModel | public | T | T | Method to get a model from the current http request. |
| GetPostLoadedTableRows | public | PostLoadDataTableRequestModel, TableModel | JSONResultModel | Method to handle post loading rows for a table. |
| OnGetRequestModel<T> | protected virtual | T | T | Method to get a model from the current http request. |
| OnGetPostLoadedTableRows | protected virtual | PostLoadDataTableRequestModel, TableModel | JSONResultModel | Method to handle post loading rows for a table. |
| EvaluateRequestValidation | private | HttpRequest | Boolean | Method to determine whether or not to validate the http request base on the ValidateInputAttribute for the action of the http request. |
| IsJSONRequest | private | HttpRequest | Boolean | Method to determine if a given Http Request is a JSON request |

Table 18: Detailed Description of the BaseService Class

- **BaseService<TRepository>**: Class that is the implementation of the BaseService that implements the overarching architecture of the pattern supported by the reporting framework.

| Class | Visibility | Extends | Implements |
|--------------------------|-------------------|-----------------------------|--|
| BaseService<TRepository> | public | BaseService | none |
| Attribute | Visibility | Type | Description |
| Repository | public | Inheritor of BaseRepository | Instance of the implementation and/or override of the BaseRepository to be used for the implementation of the service. |

Table 19: Table 18: Detailed Description of the BaseService<TRepository> Class