

Table Views User Guide

8.1.3 Release

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Table Views Spreadsheet and Excel Add-In

The primary purpose of Table Views is to provide a method for accessing or updating relational data. This data is presented in a dashboard or inside the Excel Add-In. The use of Table Views enables the designer to work in a more flexible environment to design a form or data collection tool.

Table Views are not alternatives to other tools, such as the SQL Table Editor or Grid Viewer, Dashboard Components.

Key Use:

- · Designed to collect records from relational tables, or other sources
- · Present the information in the Spreadsheet format
- Utilize client-side functionality, found in the Spreadsheet tool, such as calculations and pick-list validation lists
- Table View Business Rules can be designed to manage the column field records, such as updates, inserts and deletes.

Design Considerations:

- The current functionality is designed to update records in target tables
- Controlling elements must be designed into the Table View Business Rule by the creator to ensure data integrity, security and performance

Table View Size Considerations:

- Table Views depends upon the number of rows and row content
- · Paging is not supported. Therefore, all rows and content must be returned
- Performance testing and design expectations is to support approximately 8000 KB of data per Table View.

Overview

A Table View definition for the Windows Application Spreadsheet Tool or Excel Add-In is defined in a Business Rule. The Administrator designing the rule can define the rows and columns which should be returned to the worksheet from the source table presented in the **Table View**.

The Table View Business Rule can collect data from multiple data sources. For example, a single worksheet can display a Table View which collects data from two or more sources.

The Administrator has full control over the write back "save" process through Business Rules. When designing the Table View Business Rule, the BRAPI Authorization functions should be designed into the Business Rule to control access to the viewing or modifying the data. This can be applied to the entire table or to specific cells. A workbook can contain multiple Table Views. These can be on the same worksheet or across worksheet pages.

A single Business Rule file can be used to define multiple Table Views by calling the Business Rule argument, **TableViewName**. Additionally, a single named range can be used to manage table data cells within the Spreadsheet and Excel Add-In using user defined named ranges (**XFTV_***).

Technical Features and Setup

This section will review the various functional elements of the **Table Views** feature. The design of Table Views involves having a thorough understanding of the source and target tables to be viewed or modified. The **Administrator** developing the Table View will also be required to understand the requirements needed for the final Spreadsheet form to design the Business Rule at its most granular level. This will allow the Business Rules to be designed to the most restrictive level which will maximize security and gain the highest performance.

Restrictions

Table Views should never read or write to OneStream Application controlling tables, such as Data Tables, Cube Tables or Log Tables.

- AppProperty*
- Attachment*
- Audit*
- Data*
- CalcStatus*
- Certify*
- Confirm*
- Cube*
- Dashboard*
- DataAttachment*
- DataCellDetail*
- DataEntry*
- DataMgmt*
- DataRecord*

- DataUnit*
- Dim*
- FileContents*
- FileInfo*
- Folder*
- Form*
- FxRate*
- ICMatchStatus*
- Journal*
- Member*
- Parser*
- Relationship*
- SecRoles*
- Stage*
- System*
- Taskflow*
- Time*
- Workflow*

Table View Sizing

The output interface to the Table View Business Rule is the OneStream Windows Application Spreadsheet and Excel Add-In.

Table Views should not be considered as a replacement for other Dashboard tools used with database tables, such as the **SQLTable Editor**or the **Grid View** components which support very large tables.

The Spreadsheet tool and Excel Add-In does not have a paging function to manage very large data sets. Therefore, careful testing is recommended to verify the size and performance of the records being managed with Table Views.

A significant impact on the performance of Table Views is the **cell content**. Along with the physical number of rows, the content contained in the cells can dramatically affect performance. The cell content is the key factor on the impact of the ultimate size on disk.

Table Views Spreadsheet/Excel Ribbon Button

Table Views is a OneStream Windows Application Spreadsheet and Excel Add-In feature used to assign a Spreadsheet Business Rule to a worksheet. All Table Views are derived through the definition of a Business Rule, and only Administrators have the rights to create Business Rules.

Ø Spreadshee	Ø Spreadsheet - (New)											
File Home	e Insert	Page L	ayout Form	nulas Data	Review View	OneStream						
Refresh Workbook She	esh Submit	Submit k Sheet	Consolidat	Quick Views	Data Attachment Cell Detail Torill Down	S Copy POV From Data	Cell 😡 Object Lookuj Il 😵 Select Membe	p Spread er • [H Flag Copy Clear	ading (Even) Selected Cells r Flags	Preferences	Autom) hatic
AutoSuus Ott	Data Calculation Analysis General Spreading Administration Spreadsheet Calculation											
File Home	File Home Insert Page Lavout Formulas Data Review View Developer Help OneStream											
Admin GolfStreamD)emo_2022 F	efresh Ref orkbook Sh	resh Submit Sub eet Workbook Sh	$\begin{array}{c c} & \swarrow & & \swarrow \\ & & & & \\$	Quick Views ~ 0 Quick Views ~ 1 Cube Views ~ 1 Table Views	Data Attachments Copy P Cell Detail Copy P Drill Down C Conver	DV From Data Cell 🕞 Obj DV As XFGetCell 🔓 Sele To XFGetCells 🕞 Save	ect Lookup ect Member 👻 e Offline Copy	☐ Spreading I Flag selected X Clear flags	cells E Prefer	y Context Pane ences plorer	Automatic
Logon			Data	Calculation	Analys	is	General		Spreading	Adm	inistration	Excel Calculatio

- 1. Open the OneStream Windows Application and select **Tools/Spreadsheet** or Open your **Excel Add-In**.
- 2. Select an available cell to begin the Table View range.
- 3. From the OneStream tool bar, choose the Table Views button.

ble View Name	Refers To	Table View Business Rule	Add
			Remove
			Edit
			Refresh
			Clear

 Choose the Add button. Selecting ellipsis button from the Table View Business Rule field allows browsing the available Business Rules. The selection will automatically assign the Name and Refers To cell intersection. Only Spreadsheet type Business Rules will render as a Table View.

${\it I}$ Table View Definition	1		ÔΧ	
Name	Employees			
Refers To =Sheet1!\$D\$5				
Table View Business Rule	Employees			
Insert Or Delete Rows \	When Resizing Table View Content			
Insert Or Delete Colum	ns When Resizing Table View Content			
		ОК	Cancel	

5. The Table View will render in the worksheet and is associated with a named range.

F	ile	Home	Insert	Page La	yout F	ormula	s Data	Review	View	One	Stream XF	
R We	Refresh orkboo	Refresh k Sheet	Submit Workbook	Submit Sheet	$\stackrel{\text{\tiny label{eq:linearconstraints}}}{\overset{\text{\tiny dag}}{\longrightarrow}} \operatorname{Transl}$	olidate ate late	Cube Vie Cube Vie Table Vie	ews - 0 ews - 1	Paste	POV Fro POV As vert To XF	m Data Cell XFGetCell GetCells	₿ ₽ ₽ ₽ •
G1	G12 Calculation Analysis General											
	Α	В	С		D		E	F		G	Н	1
1	Id	First	Last	Depart	ment	Employ	/ee_Status	SSN				
2	1	John	Smith	Dev		Active		XXX-XX-1	234			
3	2	Jane	Smith	Dev		Active		XXX-XX-4	567			
4	3	Lisa	Kron	HR		Active		XXX-XX-2	323			
5	4	Henrik	Ibsen	Sales		Active		XXX-XX-3	345			
6	5	Joyce	Oates	Sales		Active		XXX-XX-4	563			
7												

6. Choosing the Refresh options will retrieve the most current results from the source table.



Table View Business Rules

Access to **Table Views** in Spreadsheet and Excel Add-In is limited to the **Spreadsheet Business Rule Type.**The purpose of the Business Rule is to establish the source data records to be displayed. The ability to save a record or field within a record is also completely defined within the Business Rule. The Table View Business Rules also support Parameters to enable the resulting Worksheet to be included in complex Dashboards.

Spreadsheet Function Types

- GetCustomSubstVarsInUse Used to define the interaction with OneStream Dashboard
 Parameters
- GetTableView Used to define the source(s) for the Table View.
- **SaveTableView** This function defines the table or cell intersection that should be written to a target database table

```
Select Case args.FunctionType
Case Is = SpreadsheetFunctionType.Unknown
Case Is = SpreadsheetFunctionType.GetCustomSubstVarsInUse
    Return Nothing
Case Is = SpreadsheetFunctionType.GetTableView
    Return GetEmployeeDetails(si, args.CustSubstVarsAlreadyResolved)
Case Is = SpreadsheetFunctionType.SaveTableView
    Return UpdateEmployeeDeparment(si, args.TableView)
End Select
```

Processing Order

The Spreadsheet Function Types are designed to manage the processes within a common Dashboard environment.

- 1. GetCustomSubstitutionVariables is executed first.
 - a. If the defined Parameter is contained within the Dashboard, the selection will act as a bound parameter and will be passed into the business rule.
 - b. If the defined Parameter is not contained within the Dashboard, it will run/prompt the user.

- c. Additional conditional Parameters will be executed. The Spreadsheet Business Rules can conditionally execute additional Parameters, based on the results of resolved Parameters.
- Once all the Parameters are resolved, the GetTableView function will be processed. This
 section will generate the results in the Table View. The Table View will also be evaluated to
 determine if there will be any writable conditions. If there a no writeable conditions, which is
 the default, any refresh of the Spreadsheet/Table View will restart at the
 GetCustomSubstitutionVariables function.
- 3. If the GetTableView is flagged as a writeable table, the **SaveTableView** process will be executed, writing back only the elements specifically defined in the Business Rule.

Using Parameters

The **GetCustomSubstitutionVariables** function is used incorporate Parameters into the Table View. Any parameters required are passed in as a list within the Function Type. If the Parameter is not included in the supporting Dashboard and resolved, for example as a Combo box, the Parameter will be executed in the Table View to be resolved.

Dim list As New List(Of String)
list.Add("Param_SelectEntity")

Additional Parameters can be included in the Table View to act as a nested, conditional Parameter using the **custSubtVarsAlreadyResolved** function. This enables a resolved Parameter to be evaluated to trigger additional Parameters to execute. The custSubstVarsAlreadyResolved can conditionally evaluate all resolved parameters to determine subsequent parameters to be executed.

If custSubstVarsAlreadyResolved.ContainsKey("Param_SelectEntity")
 list.Add("Param_SelectDepartment")
End If

Can Modify Data

All Table Views will default to "read only". The Table View condition for **CanModifyData** must be set to True to allow write-back capability. The **CanModifyData** object is set in the **GetTableView** Function Type. It is only required if any write-back is required based on the current Table View. The **True** condition will enable objects to be passed, and enabled, in to the **SaveTableView** Function Type. When refreshing a Table View, the **SaveTableView** Function Type will not be executed unless the CanModifyData property is set to True.



Table View Conditions

A single Spreadsheet Business Rule can contain multiple Table View definitions. The Table View Name can be called using the **Args.TableViewName**to allow conditionally calling rule functions.

🚺 Table View Definition	Table View Definitions							
Table View Name	Refers To	Table View Business Rule	Add					
StatusList	=Sheet1!\$A\$1:\$D\$6	Employees	Remove					

<pre>Case Is = SpreadsheetFunctionType.GetTableView</pre>	
<pre>If args.TableViewName.Equals("Employees")</pre>	
Return GetAllEmployeeDetails(si, args.CustSubstVarsAlreadyResolved, Fals	e)
End If	

Table View Sources

Table View Business Rules can collect a variety of data records as a source. Typically, a source is defined as a table from a database. It is not limited to a single table but can collect records from multiple tables. The Table View Business Rule designer can define the source essentially as any data accessible to the Spreadsheet Business Rules. Similarly, the **SaveTableView** rules can be defined to any target accessible by the Business Rules.

Table View Business Rule Example

This is an example only for the purpose of outlining the basic elements of a Table View Business Rule. By default, a Table View is "read only". A Spreadsheet Business Rule can be defined to return a complete table. Always consider the size and content of the table as it may impact performance. Elements that can impact performance, such as exceeding the ability to render the Table View, are the total number of rows as well as the content within the records.

GetTableView Function Type

Database Connection

Create connections to sources, such as a database table using business rules.



Determine if the Table View Requires Write-Back

If the Table View must write-back to a target database or table, the **CanModifyData** property must be set to **True**.



Define the Table View Columns

Table columns can be returned for the entire table, or as distinct items. When columns are defined, they can be returned to the Table View using an alias description as part of a Header section.



Returning Rows to the Table View

Each row cell is evaluated from the data table columns. The designer has full control over the display of the content of the table using Business Rule functions. In the example below, the presentation of the results will vary by column, by user using the BRAPI Security Authorization function.

Technical Features and Setup

```
'Create Data Row Records
For Each dataRow As DataRow In dt.Rows
   Dim tableViewRow As New TableViewRow()
        For Each tableViewColumn As TableViewColumn In tableView.Columns
            Dim column As New TableViewColumn()
            Dim columnValue As String = ""
            column.Name = tableViewColumn.Name
            columnValue = dataRow.Item(tableViewColumn.Name)
            'Condition to limit view of results to only Administrators
            If column.Name.Equals("SSN") Then
                If Not BrApi.Security.Authorization.IsUserInAdminGroup(si) Then
                    columnValue = "XXX-XX-" + columnValue.Substring(7, 4)
               End If
            End If
            column.Value = columnValue
            column.IsHeader = False
            tableViewRow.Items.Add(tableViewColumn.Name, column)
        Next TableViewColumn
        tableView.Rows.Add(tableViewRow)
Next dataRow
Return tableView
```

Security Filtering Results

	A	В	C	D	E	ŀ
1	Id	First	Last	Department	Status	SSN
2	1	John	Smith	Dev	Active	XXX-XX-1234
3	2	Jane	Smith	Dev	Active	XXX-XX-4567

	Α	В	С	D	E	F
1	Id	First	Last	Department	Status	SSN
2	1	John	Smith	Dev	Active	000-00-1234
3	2	Jane	Smith	Dev	Active	000-00-4567

Add New Records

Add new records to a table by assigning a specific range of editable rows at the bottom of the Table View, which can be used by rules to commit the records into a table. Format the background area with a fill color to visually indicate the area is enabled for adding new records.

Use the Insert Rows feature to insert empty rows into a table and change the background color.

- CanModifyData: Set to True to False to determine if the table can contain empty rows.
- NumberofEmptyRowsToAdd: Set the number of empty rows to add.
- EmptyRowsBackgroundColor: Set the color of the background.

```
Dim tableView As New TableView()
tableView.CanModifyData = True
tableView.NumberOfEmptyRowsToAdd = 10
tableView.EmptyRowsBackgroundColor = XFColors.Blue
```

	А	В	С	D	E	F	
1	Id	First Name	Last Name	Departme	nt		
2	1	John	Smith	Dev			
3	2	Jane	Smith	Dev			
4	3	Lisa	Kron	HR			
5	4	Henrik	Ibsen	Sales			
6	5	Joyce	Oates	Sales			
7	6	Sara	Flynn	Sales			
8	7	John	Smith	Dev			
9	8	Jane	Smith	Dev			
10							
11							
12							
13							
14							
15							
16							
17							

The following example shows the business rule applied to the table.

DataType Object for Column Fields

The DataType object allows the designer to define the Column Field as Text or Numeric. This object references the current XFDataType object. However, not all XFDataType properties are valid for Table Views. Only Int16, Int32, Int64, Float, Double, Decimal, and Textare valid.

If you do not specify a data type, it will default to Text.

```
'Add Columns to the Table View
tableView.Columns.Add(CreateTableViewColumn("Id","Id", True))
tableView.Columns.Add(CreateTableViewColumn("First", "First Name", True))
tableView.Columns.Add(CreateTableViewColumn("Last", "Last Name", True))
tableView.Columns.Add(CreateTableViewColumn("Department", "Department", True))
Dim salaryColumn = CreateTableViewColumn("Salary", "Salary", True)
salaryColumn.DataType = XFDataType.Decimal
tableView.Columns.Add(salaryColumn)
```

In the example below, the Salary column is rendering the Table View Column fields as numeric values to accurately reflect their nature and will support Spreadsheet based calculations.

	A	8	C	D	E
1	Id	First Nar	ne Last Nar	ne Departme Salar	y
2	1	John	Smith	HR	80000.11
3	2	Jane	Smith	DEV	70000.12
4	3	Lisa	Kron	DEV	50000.11
5	4	Henrik	Ibsen	HR	50000
6	5	Joyce	Oates	HR	50000.11
7	6	Test	One	DEV	50000
8	7	Test	Two	DEV	50000
9	8	Test	Three	DEV	50000
10	9	Test	Four	HR	45123.23
11	10	Test	Five	DEV	41345.2345
12	11	Test	Six	HR	903.123
13					
14					
15					
16					
17					

Enable Status Column

The Table View Business Rule can create a dedicated status column. In the example below, it is My Status column. Use this to classify records for use in conditional business rule logic to drive behaviors.

In this example, the business rule can define members for a drop-down list defined as Delete, Archive, and Inactive. The designer creates business rules to perform actions based on the status of the records, such as delete, or archiving to another table.

Use the Enable Status Column option to manage records for your table.

- statusColumnEnabled: creates a status column in the table view when set to True.
- **statusColumnName**: string defines the name of the column. If left blank, the default name "XFTV_Status" will be assigned.
- **statusColumnIndex**: zero-based integer identifies the column where the status is created. A value above the actual number of columns will assign the Status as the last Column. A negative number wil assign the Status column as the first column.
- **statusColumnValues**: creates a list of members to select as a validation in the Status column. It is a hidden range at the top of the Table View. If left blank, no list or validation will automatically be created in the Status column, it will need to be created manually by the designer.

'If multiple SetCustomStatusColumn statements are set on the same table view, it will take the last statement. tableView.EnableStatusColumn(True, statusColumnName, 4, "DELETE,ARCHIVE,INACTIVE")

In the screenshot below, notice the Delete, Archive, Inactive, which is entered in the business rule.

				1.1.1		· · · · · · · · · · · · · · · · · · ·				.9
E5		•	× ✓ fx							
	А	В	С	D	E	F	G	Н	I.	J
4	Id	First Nam	eLast Name	Departme	MyStatus	_				
5	1	John	Smith	Dev						
6	2	Jane	Smith	Dev	DELETE	5				
7	3	Lisa	Kron	HR	ARCHIVE					
8	4	Henrik	Ibsen	Sales	INACTIVE					
9	5	Joyce	Oates	Sales						
10	6	Sara	Flynn	Sales						
11	7	John	Smith	Dev						
12	8	Jane	Smith	Dev						
13										
14										
15										
16										
17										
18										
19										
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22										
23										
24										

Write Back

If the **GetTableView**Function Type is modified to set the Table View property **CanModifyData**as True, the**SaveTableView** Function will execute. This section is used by the designer to define which records should write back to the target. The target table does not have to be the same as the source table.

Control conditions should be designed into the write-back rules for efficiency and performance. For example, Member Functions, such as **IsDirty()** can be incorporated to write only the modified members within the writeable records.

Member Functions

- IsDirty- Condition Check if the item has been modified
- IsHeader– Member record status as a Header record.
- Name Member label of the data table. Will not reference an alias label.
- OriginalValue Condition reflects last stored value prior to the Table View refresh

• Value– Reflects the current value present on the Spreadsheet Table View. This can be a changed, unsaved value.

```
Dim sql As String
Dim Id As String
Id = ""
Dim department As String
department = "
Using dbConnApp As DbConnInfo = BRApi.Database.CreateApplicationDbConnInfo(si)
    For Each tableViewRow As TableViewRow In tableView.Rows
       If tableViewRow.IsHeader = False
            For Each tableViewColumn As TableViewColumn In tableView.Columns
                If tableViewColumn.Name = "Id"
                    Id = tableViewRow.Item(tableViewColumn.Name).Value
                End If
                If tableViewColumn.Name = "Department"
                    Dim tableViewCellDepartment As TableViewColumn
                    tableViewCellDepartment = tableViewRow.Item(tableViewColumn.Name)
                    If tableViewCellDepartment.IsDirty() Then
                        department = tableViewCellDepartment.Value
                        Else
                        department = ""
                    End If
                End If
            Next tableViewColumn
                If Not String.IsNullOrEmpty(department) Then
                    sql = "Update Employees Set Department = '" & department & "' Where Id = " & Id & " "
                    BRApi.Database.ExecuteSql(dbConnApp, sql, False)
                End If
       End If
    Next tableViewRow
End Using
```

Create Table View From Data Table

You can create a Table View from Data Table using the Table View **PopulateFromDataTable**function. The new function has two additional Boolean properties to include a Header Row and to utilize the Data Table's Data Type. The function is able to utilize any Data Table, including those from Dashboard Data Adapters using the GetAdoDataSetForAdapter function.

Properties:

• tableView.PopulateFromDataTable(data Table , Include Header Row, Include Data Types)

Column Format Object

The ColumnFormat Object allows the Table View Designer to format the content area of a column, while excluding the Column Header for use as a separately formattable column header using the HeaderFormat object.

tableView.Columns(1).ColumnFormat.ColumnWidth = 15

- BackgroundColor
- ColumnWidth
- FontFamily
- FontSize
- IsBold
- IsItalic
- IsUnderlined
- TextColor
- NumDecimals
- AsPercentage

Header Format Object

The use of the HeaderFormat Object requires the PopulateFromDataTable to include a header or a scripted data table to define a TableViewRow as IsHeader=True. This function allows a column headers to be formatted as a row using all the formatting options except NumDecimals and AsPercentage.

tableView.HeaderFormat.BackgroundColor = XFColors.Navy Incorporating Parameters

CAUTION: The OneStream Parameters to be bound, or used, in the Spreadsheet Table View are defined in the **GetCustomSubstVarsInUse** Function Type. The Parameters can be resolved as a component within a Dashboard, or they can be an element of the Table View. Once resolved, the Parameter is passed to the **GetTableView** Function Type.

```
Private Function GetCustomSubstVarsInUse(ByVal si As SessionInfo, ByVal custSubstVarsAlreadyResolved As Dictionary(Of String, String))
    Try
       Dim list As New List(Of String)
       list.Add("LastName")
       If custSubstVarsAlreadyResolved.ContainsKey("LastName")
       list.Add("Department")
End If
        Return list
   Catch ex As Exception
        Throw ErrorHandler.LogWrite(si, New XFException(si, ex))
    End Try
End Function
Private Function GetEmployeeDetails(ByVal si As SessionInfo, ByVal custSubstVarsAlreadyResolved As Dictionary(Of String, String)) As Tab
   Try
       Dim sql As New Text.StringBuilder
sql.AppendLine("Select Id, First, Last, Department ")
        sql.AppendLine("From Employees ")
        If custSubstVarsAlreadyResolved.ContainsKey("LastName")
            sql.AppendLine("Where Last = '" & custSubstVarsAlreadyResolved("LastName") & "' ")
        End If
        If custSubstVarsAlreadyResolved.ContainsKey("Department")
        sql.AppendLine(" and Department = '" & custSubstVarsAlreadyResolved("Department") & "' ")
End If
```

Using XFTV Named Ranges

The purpose of creating a Spreadsheet using the "XFTV" named range is to manage data cells with read and write functionality to a Table View. This eliminates much of the work related to creating dashboards which may require multiple text boxes, labels, combo boxes, business rules and other controls to manage data across a table.

The XFTV Named Range can be used to link a field to a Table View. For example, a list of members may be used in a drop-down list. The selected item would then be used to write back to a required field in a Table View, which would ultimately write to a target data source.

A cell used as a Table View reference must be prefixed with **XFTV_** to pass into a Table View. The structure of the named range is "Prefix_Table View Name_Column Name_Row Number". The row number position is a zero-based index.

Example

Sheet1 is designed as an interface or form based on records sourced from a table.

The data cell items are organized on the primary sheet with each being set as a XFTV named range referencing Sheet2, which is the core Table View.

F	File Home Insert Page La			ayout	Formulas	Data	Review	View	OneStream XF			
Γ	ן 💼 📄			۵								
Ne	ew Open Save	Save Q As▼ P	uick Print rint	Print Preview	Encrypt with Password							
		Commor	n		Info							
XF	TV_SingleRowEc	ditPLPReg	gister_LastN	lame_1	▼	× ~ 1	Housm	an				
		А		В								
1			Peo	ople Pl	anning Re	egister						
2	Register Id			E000206								
3	First Name			Alfred								
4	Last Name			Housman								
5	Job Title			Dynamic Accountability Assistant								
6	Wage			87080.00000000								
7	Status			Active								
8												
-												

Sheet 2 is a Spreadsheet as defined by a Table Rule Business Rule

The Table View is added to the sheet and corresponds to the XFTV range definition on Sheet 1. The XFTV named ranges associate their value to the Table View for read or write processing dependent upon the Table View rule construction.



Modifying the Sheet1 "form" for an additional field simply requires adding a named range.

As an example, the "form" may require an additional field which may be found as a referenced validation or from the source table view. For example, the "TermDate" field may be required. Selecting the cell and adding the syntax for the XFTV named range, for the appropriate field, will incorporate the results into the sheet.

	A	В	С	D	E	F	G	н	1	J	K	L	М	N	0	Р	
1	RegisterID	Regis	WFProfi	WFScenari	WFTimeNa	JobTitle	LastName	FirstName	Wage	Bonu:	FTE	Grad	Statu	HireDate	Hire	TermDate	Terr
2	E000215	0	Houston	BudgetV1	2018	Jr Analyst	Rogers	Lucia	21639	0.034	1.0000	5	Activ	1/1/1900	1	1/1/1900 12:00:00 AM	0
3																	

		Common	INTO
	X	FTV_SingleRowEditPLPRegister_Tern	nDate_1 × ✓ fx
ar		A	В
of	1	Pe	ople Planning Register
F	2	Register Id	E000206
	3	First Name	Alfred
4	4	Last Name	Housman
	5	Job Title	Dynamic Accountability Assistant
	6	Wage	87080.00000000
	7	Status	Active
"	8		
t€	9		
lć	10		

The data will automatically refresh from the defined source. If defined as a write-back field, changes to the cell can be written back to a target table using the "submit" function.

File	Home	Insert	Page Layout	Formulas	Data	Review	View	OneStream XF
B14		• × ~						
		А				В		
1			People	Planning F	Registe	r		
2 Regi	ster Id		E0002	15				
3 First	Name		Lucia					
4 Last	Name		Roger	S				
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Security

Security is controlled by the Business Rule Developer in three ways. It is very important that the business rule designer/author consider data security when creating table views. The session info object within the rule can be used to restrict/grant data access for the current user. Second, the writeback functionality will also be controlled within the business rule to the user population allowed to perform the writeback, as well as the granular level elements which may be modified. Lastly, the Table View Business Rule itself should be secured for viewing or access outside of the defined dashboard.

Data level, or Table level, security is incorporated within the Business Rule script. Various BRAPI functions can be conditionally included in the script to control the read and write functionality each user will encounter when presented with the Table View. Using Table View Name arguments in the Business Rule, rather than relying on the default Business Rule Name, will also add an additional level of security for related to the tables.



Business Rule level security should also be utilized to restrict access to those who can edit and modify the underlying Table View Business Rule. This can be done by using **Business Rule Encryption**, which requires specific a user security role. Business Rule Encryption applies password protection to any Business Rule it is applied to.

Ø Encrypt Business Rule		Û	□×
 Password must be between 8 a Must contain at least one upper Must contain at least one lower Must contain at least one num Must contain at least one spectivalid special characters are limit No spaces allowed 	and 16 chara ercase letter rcase letter ber ial character ted to "@&	r. !\$#%	^*0"
Password			
Reenter New Password			
	OK	Са	incel

Additionally, the Business Rules for **Table Views** are stored in the **Spreadsheet** category. To control access to user's access to retrieving the Table Views in their Application Spreadsheet, the **Access Group** on each rule should exclude any user who is not a designer.

Ξ	General	
	Name	Employees
	Туре	Spreadsheet
	Referenced Assemblies	
	Is Encrypted	False
⊡	Security	
	Access Group	Administrators
	Maintenance Group	Administrators

The Table View function should be called using a condition for the Spreadsheet Table View Name. The will control all Table View functionality by a defined name, rather than through the business rule alone.

```
Case Is = SpreadsheetFunctionType.GetTableView
    If args.TableViewName = "GetTRXRegister22"
        Return GetPLPRegisterUsingRegisterID(si, args.Cust
    End If
```

${\it I} \hspace{15cm} {\it I}$ Table View Definitio	n	Ô	×
Name	GetTRXRegister22		
Refers To	=Sheet1!\$A\$1		
Table View Business Rule	TableView_PlanningSources		
Insert Or Delete Rows	When Resizing Table View Content		
Insert Or Delete Colum	ns When Resizing Table View Content		
		OK Can	cel

Summary

The **Table Views** feature is intended to provide a flexible solution for Dashboard "form" development when an update to a table is required. This business rule-based solution can manage records from a variety of sources, as well as control the target and granularity of the write-back records. This feature fully supports Dashboard based Parameters as well as additional levels of Table View based parameters to build rich Spreadsheet based Dashboard interfaces.

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✓ OnePlace App≯	Ø Dashboard - dashboard_Pl	PRegi	isterSinglel	Edit								
→ Workflow ▲	7 8 / 1											
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Dynamic Currency	Alfred Housman	1		A	De		Newsine F		B			
Dynamic Entity Ag	Victor1 Laszlo1	1 2 Pe	People Planning Register									
Financial Review	Angel Harrington	3 Fir	st Name			Angel	.1					
Financial Review H	Kristin Wilson	4 La	st Name			Harrington						
Legal (LGL)	Lucia Rogers	5 Job Title Progr 6 Wage 1193					Programming Manager 119376.000000000					
Security Audit Rep	Marcus Daniel											
Cube View Audit	Alexander Schwartz	8 Te	rm Date			1/1/19	00 12:00:00 A	M				
Explore Application	Rodolfo Young	9										
Explore Comment:	Susie Murphy	10										
 Explore Commenta Evolore Data Units 	Marcos Guzman	12										
· Copiore Data Offits	Renee Frazier	13										

Sample Table View Rules File

```
Namespace OneStream.BusinessRule.Spreadsheet.TableViewSample
Public Class MainClass
Public Function Main(ByVal si As SessionInfo, ByVal globals As BRGlobals, ByVal api As Object,
        ByVal args As SpreadsheetArgs) As Object
                Try
                Select Case args.FunctionType
                    Case Is = SpreadsheetFunctionType.Unknown
                    Case Is = SpreadsheetFunctionType.GetCustomSubstVarsInUse
                        Return GetCustomSubstVarsInUse(si, args.CustSubstVarsAlreadyResolved)
                    Case Is = SpreadsheetFunctionType.GetTableView
                        'The same business rule can support multiple Table Views.
                        If args.TableViewName.Equals("MyTableViewName")
                            Return GetMyTableView(si, args.CustSubstVarsAlreadyResolved)
                        End If
                    Case Is = SpreadsheetFunctionType.SaveTableView
                        SaveMyTableView(si, args.TableView)
                End Select
                Return Nothing
            Catch ex As Exception
                Throw ErrorHandler.LogWrite(si, New XFException(si, ex))
            End Try
        End Function
Private Function GetCustomSubstVarsInUse(ByVal si As SessionInfo, ByVal custSubstVarsAlreadyResolved
        As Dictionary(Of String, String)) As List(Of String)
```

Try

'You will be prompted for the value of these variables if they have not been resolved.

```
Dim list As New List(Of String)
                list.Add("MyTableViewParameterName")
                Return list
            Catch ex As Exception
                Throw ErrorHandler.LogWrite(si, New XFException(si, ex))
            End Try
        End Function
Private Function GetMyTableView(ByVal si As SessionInfo, ByVal custSubstVarsAlreadyResolved
       As Dictionary(Of String, String)) As TableView
            Try
                Dim sql As New Text.StringBuilder
                sql.AppendLine("Select * from MyTable")
                'You can use substitution variables that have been resolved within the query.
                If custSubstVarsAlreadyResolved.ContainsKey("MyTableViewParameterName")
sql.AppendLine("Where MyFilterColumn = '" & custSubstVarsAlreadyResolved("MyTableViewParameterName") & "'
")
                End If
                'Create and fill the data table
                Dim dt As DataTable = Nothing
                Using dbConnApp As DbConnInfo = BRApi.Database.CreateApplicationDbConnInfo(si)
                    dt = BRApi.Database.ExecuteSql(dbConnApp, sql.ToString, False)
                    If Not dt Is Nothing Then dt.TableName = "NoData"
                End Using
                'Create the Table View object
                Dim tableView As New TableView()
                'This allows the Table View data to be updated. This is set to False by default.
                tableView.CanModifyData = True
                'Create Columns on Table View using the Data Table columns.
                'Adding a header row to the Table View is optional
                Dim tableViewRowHeader As New TableViewRow()
                For Each dataColumn As DataColumn In dt.Columns
```

```
'You can conditionally hide a column
            'If Not Convert.ToString(dataColumn.ColumnName).Equals("MyColumnToHide")
               Dim column As New TableViewColumn()
                column.Name = dataColumn.ColumnName
                column.Value = dataColumn.ColumnName
                column.IsHeader = True
                tableView.Columns.Add(column)
                tableViewRowHeader.Items.Add(column.Name, column)
            'End If
       Next dataColumn
       tableView.Rows.Add(tableViewRowHeader)
       'Create Column Data Rows
        For Each dataRow As DataRow In dt.Rows
           Dim tableViewRow As New TableViewRow()
                For Each tableViewColumn As TableViewColumn In tableView.Columns
                    Dim column As New TableViewColumn()
                    Dim columnValue As String = ""
                    column.Name = tableViewColumn.Name
                    columnValue = dataRow.Item(tableViewColumn.Name)
                'You can show/hide/mask column conditionally (e.g. based on the user group)
                    If column.Name.Equals("MySensitiveData") Then
                       If Not BrApi.Security.Authorization.IsUserInAdminGroup(si) Then
                            columnValue = "Not Available"
                       End If
                    End If
                    column.Value = columnValue
                    column.IsHeader = False
                    tableViewRow.Items.Add(tableViewColumn.Name, column)
                Next TableViewColumn
                tableView.Rows.Add(tableViewRow)
       Next dataRow
       Return tableView
   Catch ex As Exception
       Throw ErrorHandler.LogWrite(si, New XFException(si, ex))
   End Try
End Function
```

```
Private Function SaveMyTableView(ByVal si As SessionInfo, ByVal tableView As TableView) As Boolean
                'Add code to check if the user has permission to write data.
                If Not tableView Is Nothing
                    Dim sql As String = String.Empty
                    Dim tableViewMyPrimaryKey As New TableViewColumn()
                    Dim tableViewMyColumnToUpdate As New TableViewColumn()
                    Using dbConnApp As DbConnInfo = BRApi.Database.CreateApplicationDbConnInfo(si)
                        For Each tableViewRow As TableViewRow In tableView.Rows
                            If tableViewRow.IsHeader = False
                            For Each tableViewColumn As TableViewColumn In tableView.Columns
                                    If tableViewColumn.Name = "MyPrimaryKey"
                    tableViewMyPrimaryKey = tableViewRow.Item(tableViewColumn.Name)
                                    End If
                            If tableViewColumn.Name = "MyColumnToUpdate"
                        tableViewMyColumnToUpdate = tableViewRow.Item(tableViewColumn.Name)
                                End If
                                Next tableViewColumn
                                'Update the column value only if the value was changed.
                                If tableViewMyColumnToUpdate.IsDirty()
                            'Create audit records as needed before and after updating data.
sql = "Update MyTable Set MyColumnToUpdate = '" & tableViewMyColumnToUpdate.Value & "' Where
        MyPrimaryKey = " & tableViewMyPrimaryKey.Value & " "
                                        BRApi.Database.ExecuteSql(dbConnApp, sql, False)
                                    End If
                            End If
                        Next tableViewRow
                    End Using
                End If
            Return True
        End Function
```

End Class

End Namespace