How To... Efficiently Use the New SAP NetWeaver BW Integration in SAP BusinessObjects Xcelsius

Applicable Releases:

SAP NetWeaver BW 7.01 SP5 and higher, SAP NetWeaver BW 7.20

SAP BusinessObjects Xcelsius 2008, SP2

IT Practice:

Business Information Management

IT Scenario:

Enterprise Data Warehousing

Version 1.1

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Document History

Document Version	Description
1.0	First official release of this guide
1.1	Changed version – with Xcelsius 3, SP 1 the option 'Use Default Data' is available also without the option 'Refresh Before Components Are Loaded' (chapter 4.4)
	Link to How to paper on Xcelsius performance added

Typographic Conventions

Type Style	Description
Example Text	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options.
	Cross-references to other documentation
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
`Example text`	File and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
`Example text`	User entry texts. These are words or characters that you enter in the system exactly as they appear in the documentation.
`<Example text>`	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
`EXAMPLE TEXT`	Keys on the keyboard, for example, `F2` or `ENTER`.

Icons

Icon	Description
⚠	Caution
💡	Note or Important
✦	Example
⬆	Recommendation or Tip

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SAP

Table of Contents

1. Scenario

SAP BusinessObjects Xcelsius is a widely used dashboarding tool. It has the capability to show data from various sources and data bases, including data residing in the SAP NetWeaver BW. So far data from BW was available via a web service connection. With the latest version of Xcelsius and SAP NetWeaver BW 7.01, SP5 we offer a new connection type for BW data that offers a tighter integration of BW data into Xcelsius dashboards. In addition the Xcelsius dashboard can be stored on the BW server and is integrated into the BW infrastructure, providing features such as transport, translation support, where-used lists, and collection of dependent objects.

2. Background Information

With the new SAP NetWeaver integration in Xcelsius users have the possibility to use a great number of features of SAP NetWeaver BW directly. Technically the communication between Xcelsius and the back end system is done via the same interface that is used for BEx Web layouts. Thus BEx queries are used directly and a great part of the features of BEx queries can also be used in Xcelsius. This is particularly true for all types of data that can be visualized with queries. Thus in Xcelsius you can directly use:

- (sub) totals defined in the query

- Calculated key figures

- Restricted key figures

- Exception aggregations

- Conditions

- Filters

- Variables

- Default values

Features of BW queries that cannot be used in Xcelsius are hierarchies or exceptions. Also please note that all queries displayed in Xcelsius are not input enabled. Planning features as in BW Integrated Planning are not supported in Xcelsius.

As the SAP NetWeaver connection just delivers data to the Xcelsius dashboard and all interaction with the data is done by the dashboard interactive features know from the BEx frontends such as drill down, swap axes etc. are not available in Xcelsius.

3. Prerequisites

In order to use the new integration you need a recent Xcelsius installation (Xcelsius 2008, SP2 or higher). On the BW side you need a SAP NetWeaver 7.0, EHP1 (also called 7.01), SP 5. The integration is also available with SAP NetWeaver 7.20.

For creating the dashboards you need a SAP GUI 7.10 patch 9.01 installation including the BEx Add-on. For executing the dashboards no SAP GUI installation is necessary.

4. Step-by-Step Procedures

4.1 Creating a New BW Connection

In the Data Manager you can create new connections to a SAP NetWeaver BW system. You use these connections to retrieve query data, information about the current characteristic selection, or information about the available values of the characteristics in the used query. Note that one dashboard can only be connected to one SAP NetWeaver BW system at a time. Thus the query data is retrieved from the system the dashboard has been published on and started from. However, one dashboard may have several connections to the same BW system, and combine data from different queries.
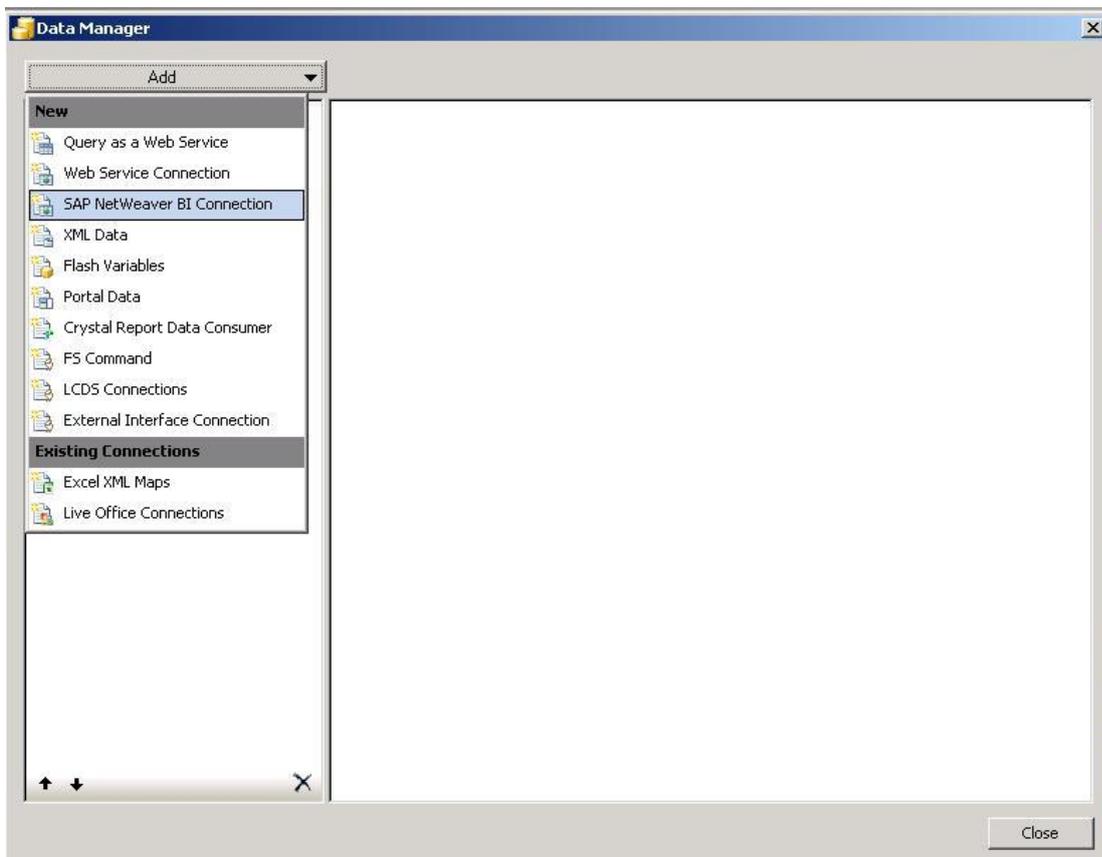
4.2 Definition Tab

The new SAP NetWeaver connection offers you three different tabs. On the 'Definition'- tab you enter the name of the new connection and choose a query used in the connection. If you are not yet logged on to a BW system Xcelsius will prompt you for the system by calling the usual SAPGUI logon once you press the input help for the query. If you are already logged on to a BW system Xcelsius will show the name of the system in the corresponding field.
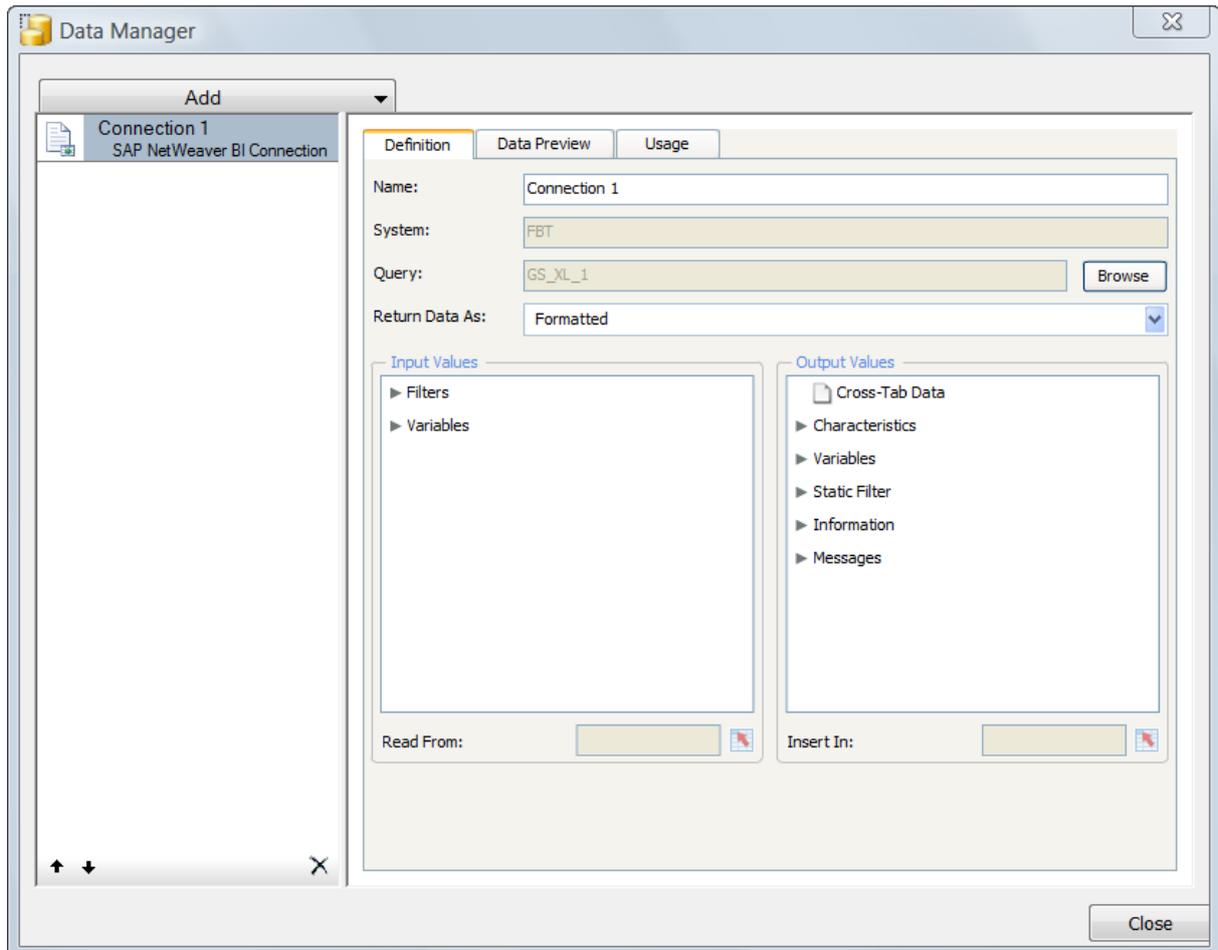
Please note that you can only have one query per data connection. If you need the data of more than one query in the dashboard then you have to create a connection for each query.

Note

If you replace the query in the connection by another query then all connections to Excel ranges where data is inserted or read from (see below) are cleared. Thus when replacing a query for example with a copy of itself make sure you have noted down which data is written into which Excel range!

You have two different options of how key figures are retrieved from the BW system. Data can be retrieved as 'raw' or as 'formatted'. In the first case the BW system returns a pure number without any formatting information (such as thousands separators) and the formatting is done in Xcelsius. In the latter case the BW returns a formatted string, including thousands separators, decimals, units (if necessary) etc. The system will use the default settings for the decimal notation from the ABAP user.

CAUTION

Any variable used in the query must return a proper default value. When inserting a query into a connection the system needs to replace all variables (as variables might determine the structure of the query). If a variable cannot be replaced properly the system will raise an error and the query cannot be inserted into the dashboard. This can happen when you are using mandatory variables without a proper default value. Also when you are using exit variables in your query make sure that the exit returns a valid value (in internal format) in ANY case.

Below the general settings you will find areas for the input values as well as for the output values. As input values you can set filter values or variable values (provided variables are available for this query).

The system will show the characteristics for which filter values can be set. You simply specify an Excel cell that holds the value for the filter selection.

Also you will see a list of all available variables. Again you can fill variables by linking each variable to an appropriate Excel cell.

⬆ Tip

If your query uses mandatory variables the variable window will pop up when running the query for the user to enter variable values. You can prevent the pop-up window by using url parameters in the start url of the dashboard. (see documentation for BEx Web API for further details and as a part of this series, the white paper Integration of an Xcelsius dashboard in portals).

The output area contains all information that can be retrieved from the query. This information can again be used by linking the output to the relevant Excel cells.

The Cross-Tab Data contains the result of the query. Depending on your query definition (BEx Query Designer), the result will include: the key columns, the data columns, calculated key figures, restricted key figures, sub-) total.

Under the node 'Characteristics' you will find the relevant information about the characteristics (and key figures), such as the description, key and text of the current filter value. In addition you get a list of all possible characteristics values. You can use that list as a source for selector components like a drop down list and bring more interactivity to your dashboard. This is a key feature of that connection because it allows you to retrieve both the query result and the list of values in a single execution. This greatly reduces the number of connections in your Xcelsius dashboard. Along with the list of values, you get all necessary information such as the (internal, external, compound and non-compound) key, text, and attribute values.

⬆ Tip

For setting selections you should use the entries in 'key (filter values)'. These values contain all necessary information for uniquely setting the selection. They contain also compounding information. When you want to clear a selection (and select everything in the fixed filter) you just set an empty selection. If you want to use a drop down box for also clearing a selection just add an empty entry to the value list of the drop down box.

⬆ Tip

If you have not set a filter selection for a characteristic the system will return an empty value for the current filter. If you connect that output value to an Excel cell the Excel formula '=isblank(<output cell>)' will nevertheless return the value 'FALSE'.

If you want to create a check for an empty output the following if-statement will show a 1 if the output is empty and a 0 if a filter value is set: '=if(<output cell>="";1;0)'.

⬆ Tip

The list of returned values can be influenced by the settings for 'Filter Value Selection at Query Execution' in the BEx Query Designer. You can (among others) make the system return all posted characteristic values in the result set of all possible values from the master data. In any case the result will only show those values that are within the fixed filter selection of the query.

⬆ Tip

If the characteristic carries a hierarchy in the query you also get information for building up a hierarchical selector. Each characteristic value carries its node-id as well as a parent-id for specifying the next node up in the hierarchy. Note that Xcelsius does not deliver a hierarchical selector but hierarchical selectors can be imported as Add-ons.

You will find similar entries for the variables and the underlying characteristics, information about the static filter of the query (defined in the BEx Query Designer), additional information such as the name of the user, the name of the query and the underlying InfoProvider. In addition you can use and display the messages from the backend system.

When building up a dashboard, Xcelsius will read the necessary query information (such as the characteristics involved) once the data connection is defined. If the query is changed from BEx Query Designer after that, Xcelsius Designer will not notice these changes. However, the BW web runtime will use the latest active version of the query (and the characteristics) when executing the dashboard. Thus the definitions in the dashboard might not match the query definition or structure anymore and problems may occur. It is highly recommended to check the dashboard anytime the query structure is changed and, if necessary, re-import the query information into the dashboard. This can be done be replacing the query in the connection by its latest version. Please be aware that, by doing so, you unfortunately lose the previous connection settings and cell range mappings. If you do not change the query structure but only adjust settings that do not directly affect the dashboard logic or structure, you can leave the dashboard as is and the query changes will automatically take effect at runtime.

Here are examples of query changes and their impact on the dashboard structure.

Query changes that do *not* affect the dashboard structure	Query changes that *might* affect the dashboard structure	Query changes that do affect the dashboard structure (and require to re-import the query into the dashboard)
Add/modify a static filter	Add/remove characteristics subtotals	Modify characteristics display options (as key, as text, as key and text…)
Add/modify default values	Add/remove free characteristics	Add / remove rows, columns
Modify characteristic sorting settings	Change variable values	
Change definition of restricted key figure		

4.3   Data Preview Tab

On the 'Data Preview' tab you see a preview of the query structure. You can see which characteristics are used as rows, columns, or free characteristics, and which key figures are used as columns. You can also overwrite the settings from the query from this tab and move characteristics (e.g. from rows to free characteristics) or change the sort order. By doing so, you define a query view that is later used for retrieving the data.

Note that the data shown in the Preview tab is not real. This is because you can only retrieve data from BW at runtime, when executing the dashboard within BEx Web. The data shown in the Preview tab is fake and only there to view and modify the row / column structure.
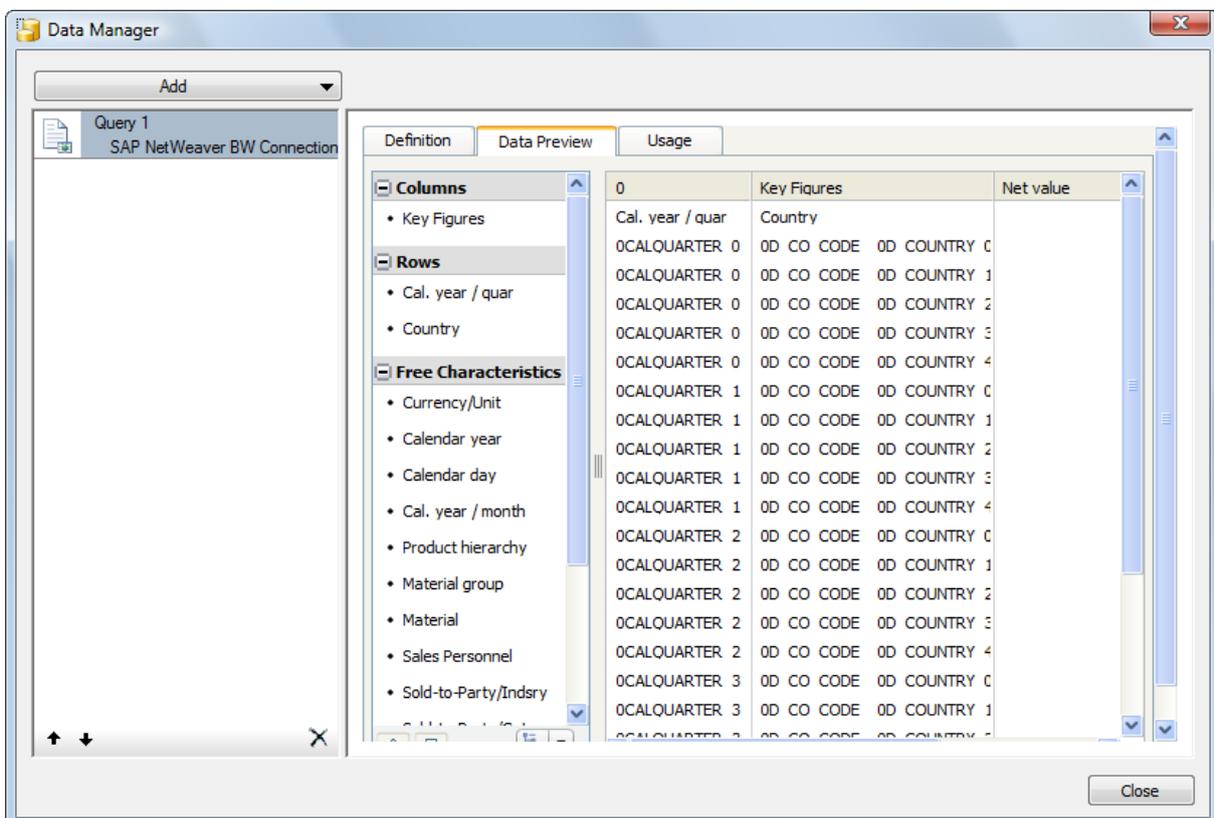
4.4   Usage Tab

On the third tab you can define the refresh behavior of the data connection. No data is retrieved or shown when the connection has not yet been refreshed.

If you need to see the data once the dashboard is started, you should check the checkmark 'Refresh on Load'. If the data is not needed at the initial view of the dashboard (e.g. the data is displayed in another tab, or on subsequent user actions), this option should be unchecked. This is for performance reasons at the initial load of the dashboard. Other options (see below) allow you to refresh the connection on specific user actions or events.

⬆ Tip

Please note that the system will read query information on each connection defined in the dashboard at the initial load, whether the connection is to be refreshed or not. This has an impact on performance and it is recommended to have as few connections as possible defined in the dashboard. Please refer to the paper How to... Build Fast and Efficient Dashboards Using the New NetWeaver BW Integration in SAP BusinessObjects Xcelsius for more details. The system will also check for variables and prompt the user for mandatory variables even if the query is not yet refreshed.

The check box 'Use Default Query Data' determines what data is shown when you refresh the query for the first time. If the checkbox is ticked, then the system uses the default values from the query and variable values entered in the variable popup for the data selection. Any input that is set via the connection (see above) will be ignored. If the checkbox is not marked then the system will use the input values set in the data connection. As a default you should set the above flag as otherwise some 'surprising' situations may occur.
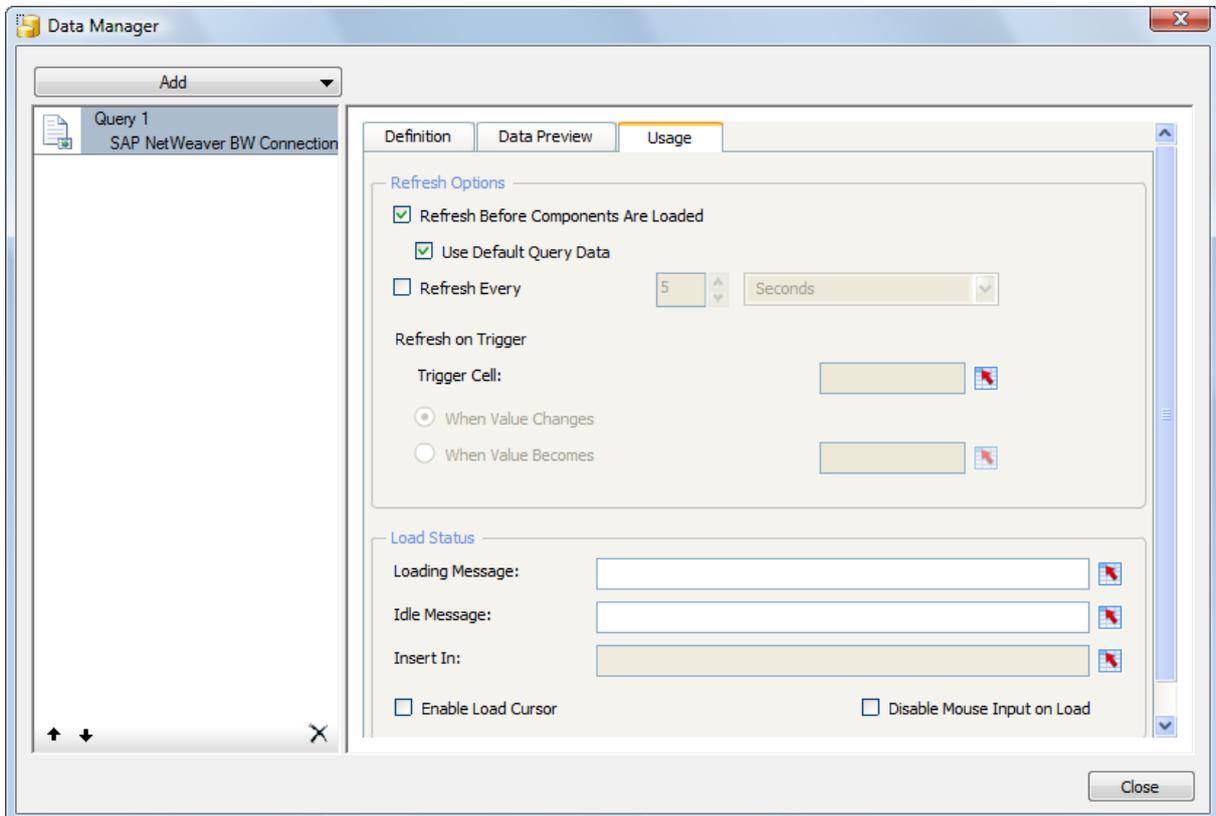
Example 1

Let us assume that you have set the checkmark for 'Refresh on Load' but you have not set the checkmark for the default data. In your query you have a mandatory variable for country. You have connected the input value for the variable in the definition tab to an Excel cell. The Excel cell contains a value, say 'FR' for France. When you start the dashboard the system will send the variable popup for the variable for the country. Assume you enter 'DE' for Germany. The query will be initialized with country 'Germany' but then the input values are evaluated. Thus the country will be set to 'France' and the dashboard will show data for France instead of Germany. When you set the checkmark for the default data the input 'France' will be ignored and the dashboard will show data for Germany as expected.

Example 2

Again you have the same settings as above – you refresh the data on load but do not use the setting for the default data. Assume that in your query you have not restricted the year in the fixed filter (defining all possible values for the characteristic) and thus allow data for all years. In the default filter you have set the year to 2009. You also have linked the input for year in the definition tab to a data cell in Excel and the cell in Excel is empty. When you now execute the dashboard and read the query data the system will use the input value (which is empty) instead of the default value in the query. Thus the system

will select data FOR ALL YEARS. This will usually lead to a severe performance problem. Again, if you set the checkmark the system will only retrieve the data for the year 2009.

4.5   Further Refresh Options (on User Action or Events)

In addition or instead of loading the query data upon starting the dashboard you can also refresh the connection on a regular basis (only recommended if you need a real time scenario) or by using a trigger cell. Once the specified trigger cell either changes or reaches a certain value the connection is refreshed. You could use the same cell you use for setting an input value for a filter or a variable as trigger cell. Once the input changes (e.g. by selecting a value in a drop down box or from a list) the cell triggers an automatic refresh.
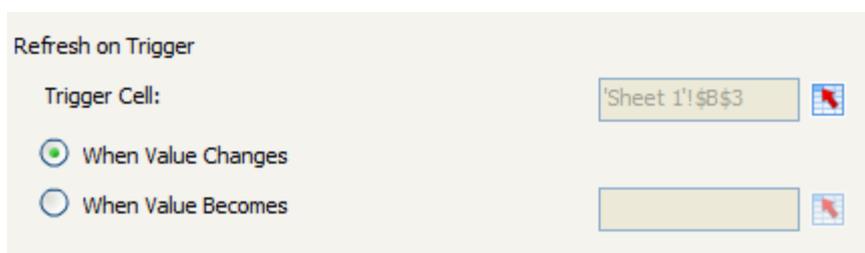
An additional option to refresh a connection is by using a refresh button.

Please note that you can only have one trigger cell per connection. If you have several characteristics in the filter that you want to set from the dashboard by user interaction you have two options:

1. Do not refresh the connection automatically once an input value has changed but let the user make all his selections and the use a refresh button to set all selections in one go. This approach is recommended if characteristic values only make sense in pairs (triples…) and you want to avoid unnecessary refreshes in between setting those values.

2. Use one 'global' trigger cell that changes when any of the input values has changed. Thus the connection is refreshed when the user changes the selection of any of the characteristics in the filter. A very easy way to realize this is to simple use a trigger cell that concatenates all of the input values. The value of this cell changes as soon as any of the values changes.

Trigger cells and use of default values can sometimes conflict or create undesired issues. Here is a common scenario. You define a new connection with a query that has some default value for the characteristic year. The user should be able to select the year he wants to see from a list of values. This could be done for example by a drop down box. Once the user has selected a year the value will be written to an Excel cell that acts as an input for the filter selection in the connection. You also have defined a trigger cell that triggers a refresh once the input value for the year has changed (either use the input cell itself or a global trigger cell). As you do not know what the default value for the year is you leave the input cell empty and use the connection options 'refresh on load' and 'use default query data' (see above). As you do not only want to see the default value in the query but want to see the default filter also as a preselected value in your drop down box you link the current filter in the connection to an Excel cell and use this cell to set the default in the drop down box.

What happens when you execute the dashboard is that the system will use the default filter in the query (say 2009) and read data for 2009. The cross-tab data is transmitted as well as the output value for the filter for year. As the output filter also acts as a source for the selected value in the drop down

box the value 2009 will be set in the drop down box. Now in Excel we have defined the cell carrying the input value for the filter as the target of the drop down box and so the input value will be automatically set to 2009. Thus the input value changes from 'empty' to 2009 and as it acts as a trigger the connection is refreshed once more with the filter selection year 2009. Thus upon opening the dashboard the connection gets refreshed twice which obviously is bad for the starting performance.

You can avoid this problem by either not using an automatic trigger but a refresh button once the selection of the year was changed by the user or by carefully designing the trigger using the Excel functionality (if-clauses).

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