

BW Query on CDS View, OData from BW and value of BW Query in S/4HANA

13-17 minutes

Purpose and target audience:

This blog explains the scenario to create BW Query on top of CDS View (Transient Provider). includes how it can be created and the values for doing it. By using this scenario, sophisticated calculations are possible, which are impossible or difficult to implement in Analytic Query of CDS view.

Main target audience is BW experts who have BW Query knowledge. Yes, this is for you, who have already have enough experiences of realizing sophisticated or complex business requirements of customers' KPIs with BW Query so have already known BW Query has powerful functions to make it possible.

Another target is the ones who want to realize sophisticated calculations in S/4HANA Analytics including BPC for S/4HANA. With BW Query function and the help of BW experts, it might be able to be realized much easier. One of the key or challenge for S/4HANA App development is to realize the sophisticated calculations on CDS View.

Highlights:

- BW Query can be the source of many analytical apps in S/4HANA including Fiori KPI tile and Fiori Elements app (by exposing it as OData Service), as well as Fiori Multidimensional Reporting app, BusinessObjects, SAP Analytics Cloud (SAC).
- BW Query can be created from CDS View in which Analy

Data Category is set to #DIMENSION or #CUBE (called Transient Provider), although Analytic Query should be used as much as possible.

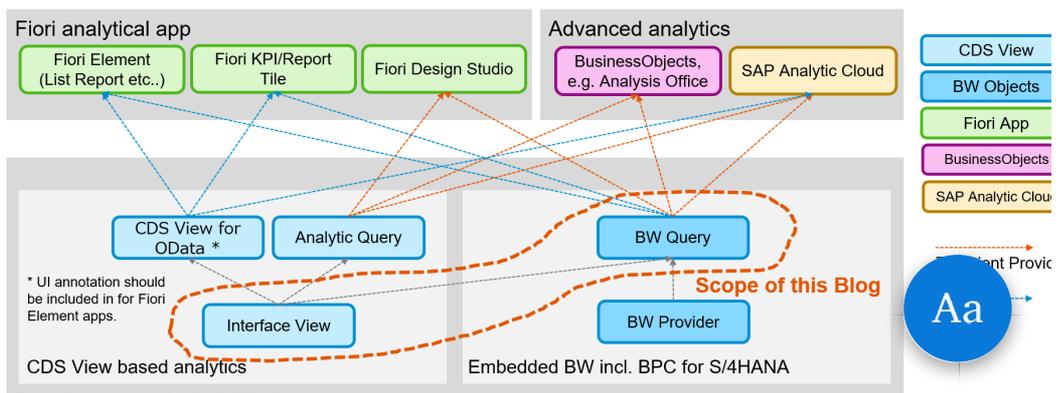
- Customers can enjoy the values of BW Query as below.
 - Many BW OLAP functions are available which are impossible or difficult in Analytical Queries of CDS View.
 - The Second Structure, Sort by an attribute desc, Condition, Constant Selection etc..
 - Some of those BW functions can be used when exposed to OData Service, and can be used for Fiori Elements apps and KPI/Report Tiles like Restricted/Calculated Measures.
 - For BPC for S/4HANA data, it is possible to leverage those functions to create reports and also possible to create KPI Tile or Fiori Elements apps from BPC for S/4HANA Data even when using Realtime Infocube.

Scenarios to use BW Query in S/4HANA:

BW Query can be created from CDS View (called Transient Provider), as well as BW Providers, e.g. Composite Provider. (In addition, it can be created from HANA Calculation View.)

BW Query can be the source of

- Fiori Multidimensional Reporting (Transient Provider)
- Fiori KPI Tile / Report Tile (OData)
- Fiori Element apps (OData with UI Annotation)
- SAP Analytics Cloud (Transient Provider/OData)
- BusinessObjects (Transient Provider)



BW Query has already been used in BPC for S/4HANA and embedded BW in S/4HANA. There are some Predefined Fiori apps using BW Query, e.g. [Cost Centers – Actuals](#).

For creating Multidimensional Reporting app using BW Query, see [How to create custom Fiori Multidimensional Reporting Application in S/4HANA on-premise](#). But BW Query is not listed in Fiori Query Browser.

Fiori Multidimensional Reporting app:



The screenshot shows the SAP Fiori Multidimensional Reporting app interface. The top bar displays the SAP logo and the query ID '0D_FC_NW_M01_Q0001'. The main content area shows a table with the following data:

SALES ORGANIZATION	NET VALUE STAT. CURR.	NET VALUE STAT. CURR.
Berlin		47.500.000,00 EUR
London		38.100.000,00 EUR
Paris		32.300.000,00 EUR
New York		50.500.000,00 EUR
San Francisco		50.000.000,00 EUR
Overall Result		218.400.000,00 EUR

BW Query can be exposed as OData Service and it can be used as the source for Fiori Elements app (List Report, Analytical List Page, Overview Page, Object Page, etc..) and Fiori KPI Tile and Report Tile. See [Steps to Create an ODATA service for a BW Query](#) and [BW OData Queries](#) to expose BW Query as OData Service. This means you can create them for creating Fiori analytical app using BPC for S/4HANA data. This also means Restricted and Calculated Key Figure in BW Query can be used for KPI tile or Fiori Elements apps. You may be able to go without using “[Semantic Tag](#)”.

BW Query can be set as OData Service in “General” tab of BW Query Definition in BW-MT.

Remote Access

By Easy Query

Aa

By OLE DB for OLAP

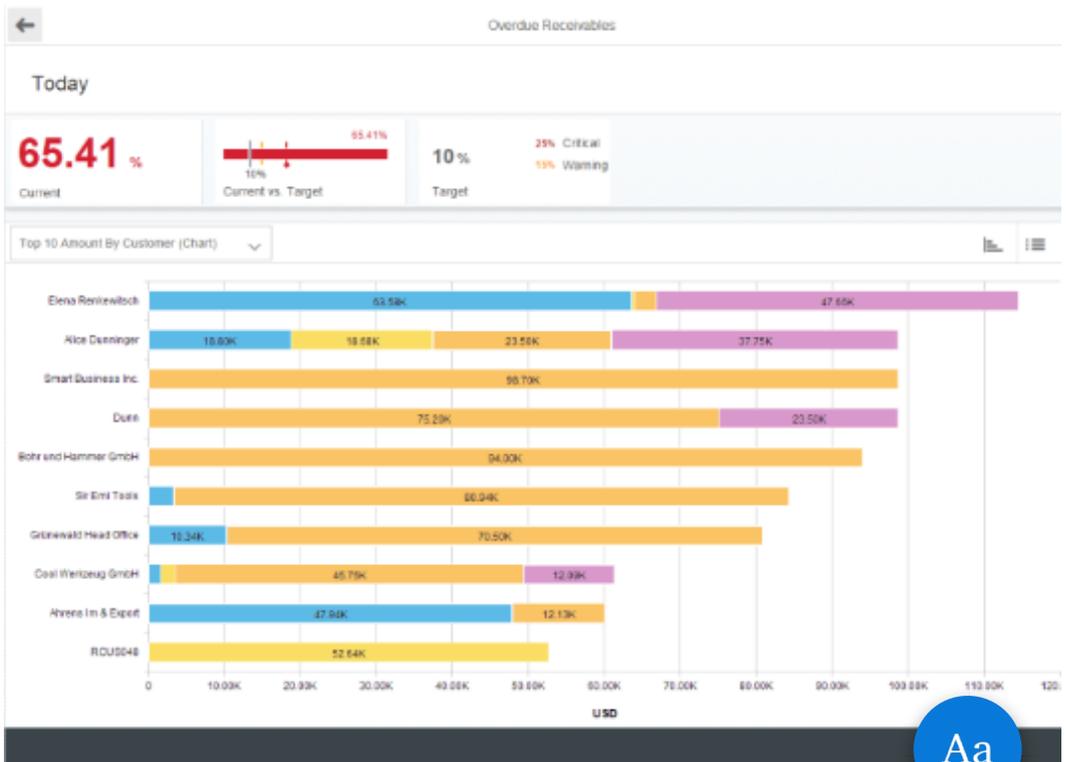
By OData

External SAP HANA View

For creating KPI Tile, see [Create Your First Smart Business KPI and Tiles in 10 Minutes](#). But Please note that it can be created only if the BW Query is in S/4HANA, as Evaluation of KPI Tile cannot be saved in Standalone BW system in which S4CORE or S4FND is not installed. See [SAP Note 2547185](#) in detail.

To understand Fiori Elements, there are many sites like [Introduction to SAP Fiori Elements](#). There are also many blogs about Fiori Elements apps like [SAP FIORI ELEMENT: List Report For Beginners](#). For creating Fiori Elements app from the OData Service based on BW Query, UI annotations have to be added with e.g. Annotation Modeler. See [Fiori Elements – How to Develop a List Report – Using Local Annotations](#).

KPI Tile:





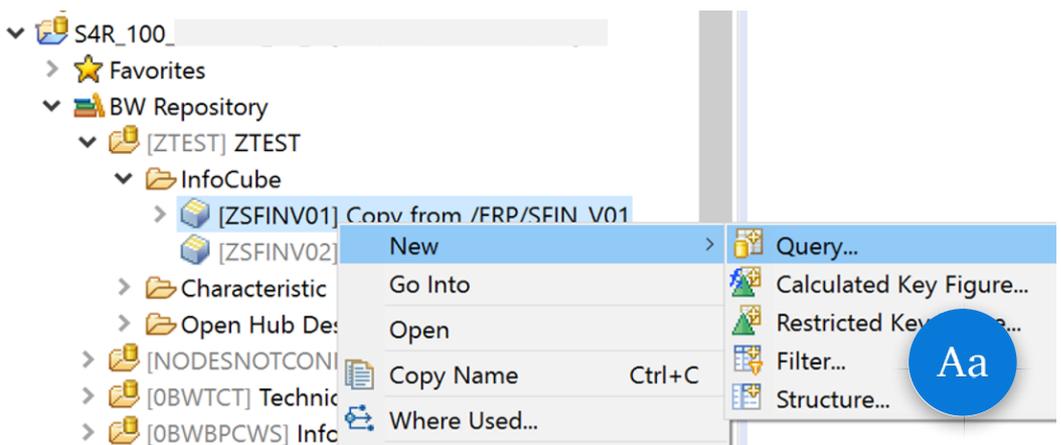
Note: whether Analytic Query or BW Query?

If functionality is available, a CDS query (means CDS view with @Analytics.query:true) should be preferred. Lifecycle (transport, activaten, where used) of BW query is different from CDS View. Also changes of CDS view might cause changes of BW-InfoObject names, such that the BW query has to be adjusted. In short BW-queries on top of CDS transient Providers are possible, but might cause issues regarding the lifecycle.

Create BW Query with BW-MT:

BW-Modeling Tools (BW-MT) has to be prepared beforehand to create BW Query. It is the add-in tool in HANA Studio. (See the blog ["BW Modeling Tools – Installation and configuration hints"](#))

Login the BW system with BW-MT and start creating a BW Query from a InfoProvider (anyAny InfoProviders are okay to select).



Check "Search for TransientProvider", and push "Browse" of InfoProvider.

New Query

Query

Specify object name

BW Project:* S4R_100_..._en_1 Browse...

InfoProvider:* ZSFINV01 Browse...

Search for TransientProvider

Add to Favorites

Name:*

Description:

Copy From: Browse...

? Finish Cancel

Search the CDS View as the InfoProvider of the BW Query.

The name of the InfoProvider should be "2C<SQL View name of the CDS View>", e.g. "2CIFIGLBALCUBE" for the CDS View "I_GLACCTBALANCECUBE".

InfoProviders

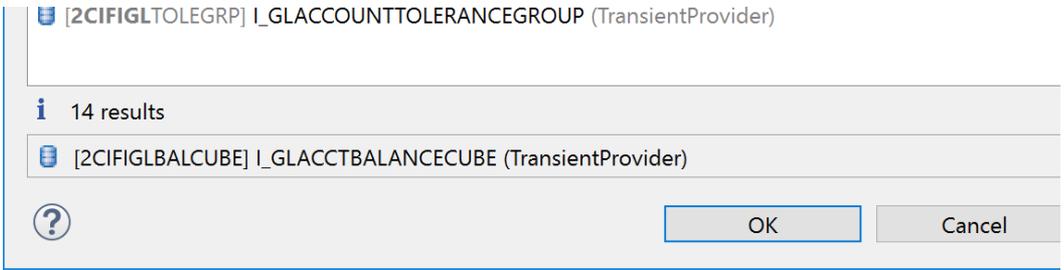
Select an item to open (? = any character, * = any string):

2CIFIGL

Matching items:

- [2CIFIGLACCHER] I_FINANCIALSTATEMENTHIER (TransientProvider)
- [2CIFIGLACCINCCODE] I_GLACCOUNTINCOMPANYCODE (TransientProvider)
- [2CIFIGLACCINCOA] I_GLACCOUNTINCHARTOFACCOUNTS (TransientProvider)
- [2CIFIGLACCOUNTH] I_GLACCOUNTHIERARCHY (TransientProvider)
- [2CIFIGLACCOUNT] I_GLACCOUNT (TransientProvider)
- [2CIFIGLACCTLITST] I_GLACCOUNTLINEITEMSEMTAG (TransientProvider)
- [2CIFIGLACCTLIT] I_GLACCOUNTLINEITEM (TransientProvider)
- [2CIFIGLBALANCE] I_GLACCTBALANCE (TransientProvider)
- [2CIFIGLBALCMPCUBE] I_GLACCTBALANCECOMPRNCUBE (TransientProvider)
- [2CIFIGLBALCUBE] I_GLACCTBALANCECUBE (TransientProvider)**
- [2CIFIGLGRPCOA] I_GLACCTWITHGRPCHARTOFACCOUNTS (TransientProvider)
- [2CIFIGLLITMCUBE] I_GLACCOUNTLINEITEMCUBE (TransientProvider)
- [2CIFIGLRECORDTYPE] I_GLRECORDTYPE (TransientProvider)

Aa



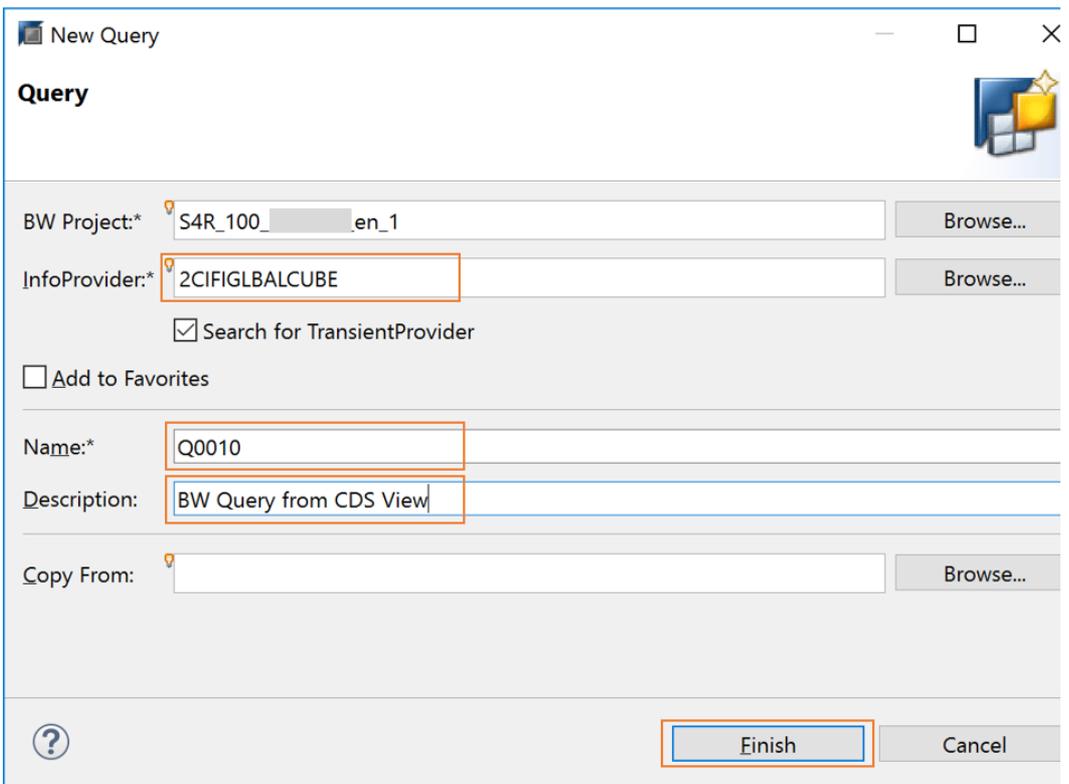
- CDS Views in which Analytics Data Category is set as “CUBE” or “DIMENSION” can be selected (@Analytics.dataCategory: #CUBE or #DIMENSION) as only those CDS Views works as InfoProviders (called Transient Provider).

Then the InfoProvider name is set in the original screen.

Set Query technical name and description of the Query, and push “Finish” in button-right.

Query Name: Q0010

Description: BW Query from CDS View



(Set query definition)

Query definition is opened. The query is set as below. I will s



the detail of how to create BW Query as is the same as normal BW Query creation. Please read the blog [“New Query Designer in Eclipse with SAP BW 7.4 powered by SAP HANA”](#) and watch the movie in it in detail about BW Query creation with BW-MT.

“General” tab:

The screenshot shows the 'General' configuration tab for a BW Query. The 'General' section includes fields for Technical Name (Q0010), Description (BW Query from CDS View), InfoProvider (2CIFIGBALCUBE), and Key Date (<default>). Below this are sections for Output Settings (with checkboxes for formatting and suppression), Remote Access (with checkboxes for query types), Result Location (with radio buttons for rows and columns), Zero Suppression (with checkboxes for rows and columns), and Universal Display Hierarchy (with checkboxes and expand levels). At the bottom, there are tabs for Filter, Sheet Definition, Conditions, Exceptions, Dependencies, and Runtime Properties.

“Filter” tab:

In “Fixed Values” in the “Filter: Fixed Values”, P_TOPOSTINGDATE and P_FROMPOSTING DATE are added and variable are set for them. P_TOPOSTINGDATE and P_FROMPOSTING DATE are Parameters in the source CDS View, and the parameters have to be filtered in “Filter: Fixed Values”.

The screenshot shows the 'Filter' configuration tab. It is divided into two main sections: 'Filter: Fixed Values' and 'Filter: Default Values'. The 'Fixed Values' section contains two entries: '[VA1010] End Date' and '[VA1000] Start Date'. The 'Default Values' section lists several key figures like 'Company Code', 'G/L Account', 'Controlling Area', and 'Cost Center'. On the right, the 'General' section for the filter shows Technical Name (VA1010), Description (End Date), and Global Settings (Type: Characteristic Value, Processed By: Manual Input/Default Value). A details section shows 'Variable Represents: Single Value' and 'Input Type: Mandatory with Initial'. At the bottom, there is a 'Default Values' section with a date field set to '06/30/2018' and a text input field with 'Aa'.



General Filter Sheet Definition Conditions Exceptions Dependencies Runtime Properties

“Sheet Definition” tab:

In “Column” Area, 3 measures are added: “Credit Amount in Company Code Currency”, “Debit Amount in Company Code Currency”, “Ending Balance in Company Code Currency”.

In “Rows” Area, “Company Code” and “G/A Account” are added and hierarchy “YCOA” is set in “G/L Account”.

In “Free” Area, “Controlling Area”, “Controlling Area” and “Cost Center” are added.

Now the Query setting is completed. Push “Save” button to save the query.

Run “Data Preview”.

Enter the values in the Selection and push “Start Selection”.

Saved Selections:

Selection

Start Date is 01/01/2018

End Date is 06/30/2018

Start Selection Clear Entries Reset to Default Save Selection As:

Result is displayed.

Navigation Panel

Dimensions
Search Dimensions

Rows

- Company Code
- GL Account

Columns

- Key Figures

Available Fields

- Controlling Area
- Cost Center

Selection

Start Date is 01/01/2018

End Date is 06/30/2018

Start Selection Clear Entries Reset to Default Save Selection As:

DataGrid Query Information

Filter Sort Hierarchy Drilldown Display Measures Totals

Company Code	GL Account	Cr Amt in CC Crcty	Dr Amt in CC Crcty	End. Bal. in CC Crcty
	Sample Grouping of P	0.00 EUR	0.00 EUR	0.00 EUR
	Petty Cash	0.00 EUR	0.00 EUR	-36,200.00 EUR
	Bank1 Cash Payment	0.00 EUR	0.00 EUR	-36,200.00 EUR
	Bank1 Bank Transfer	0.00 EUR	0.00 EUR	-43,078.00 EUR
	Other Down Payments	0.00 EUR	0.00 EUR	36,200.00 EUR
	Input Tax clrg DownP	0.00 EUR	0.00 EUR	-5,781.14 EUR
	Input Tax (VST)	0.00 EUR	0.00 EUR	6,878.00 EUR
	Import Sale Tax paid	0.00 EUR	0.00 EUR	5,781.14 EUR
	Paybls Domestic	0.00 EUR	0.00 EUR	-362,000.00 EUR
	Retained Earnings	0.00 EUR	0.00 EUR	434,400.00 EUR
	Sample Grouping of P	\$ -50,737,629.72	\$ 50,737,629.72	\$ 0.00

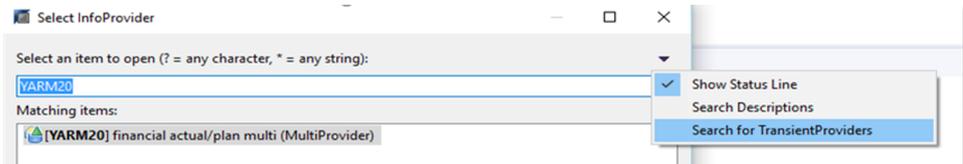
BW Query can be executed with the Transaction RSRT in Backend System as well.

This scenario is explained in the Best Practice Explorer [“Integration between SAP S/4HANA and SAP BW \(BGB\)”](#).

Referential Info:

- BW-MT has to be used as BEX Query Designer is not supported as of NetWeaver 7.51, although BEX Query Designer works technically. (it is Not in “Technical Release Information” in PAM SAP NETWEAVER >= 7.51). It is possible to open the BW Query created with BW-MT in BEX Query Designer, and vice versa. (I have to confess I sometimes still use BEx Query Designer...)
- When the version of BW-MT is >=1.18, select the menu “Search for TransientProviders” as below.

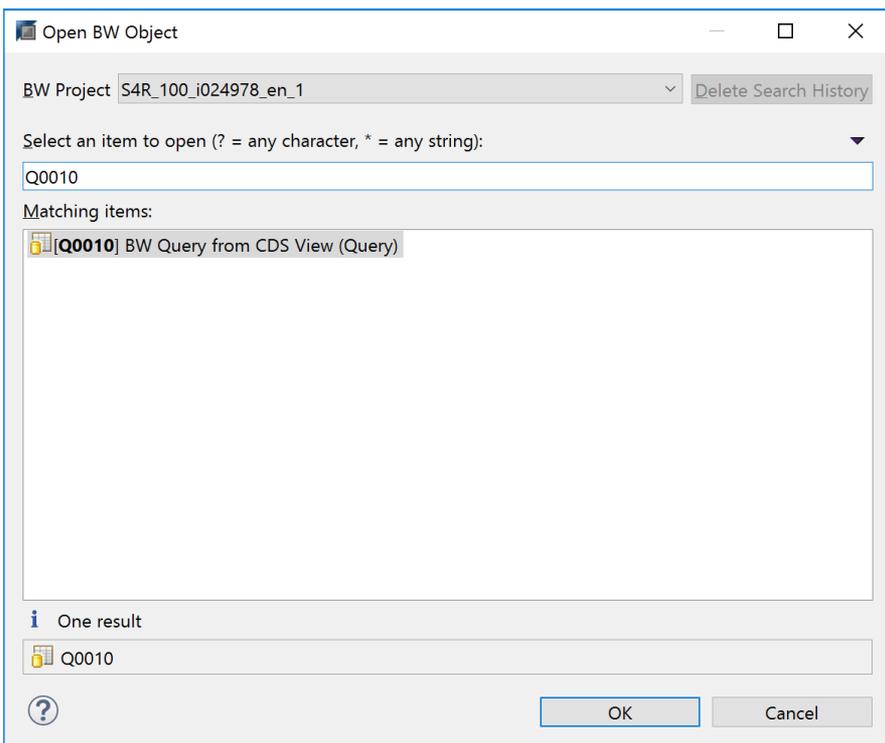




- To open the BW Query created on top of CDS View in BW-MT, the only way is to use “Open BW Object” and search with the Query name. It is not displayed under the InfoProvider in BW Repository tree at the moment as CDS View (Transient Provider) is not displayed in the BW Repository Tree in BW-MT.



- Search with tech name.



Value: What are possible with BW Query?

Below is the comparison of the functional availability among 1) Analytic Query of CDS View, 2) BW Query on CDS View and 3) BW Query on BW Provider including BW Provider for BPC for S/4HANA and Open ODS View using CDS View/HANA View a

source.

Example:

Query Definition:

Sheet Definition: ZQ1001 - From Custom CDSView Active Version

Columns

- Key Figures
 - [2C-LOCALVALUE-LOCALCURRE] Actual
 - [2C-LOCALVALUE-LOCALCURRE] Prev,Year
 - [] %

General

Technical Name:

Description:

Display

Visibility of Structure Members:

Variable:

Zero Suppression

Rows

- [2CZQI_D000001-COMPANY] Company Code
- Account
 - [2CF5FV0NCHZFEJL4A2JTUFSZCG8] Revenue
 - [2CZQI_D000001-ACCOUNT] Cost
 - [] GP

Free

General | Filter | Sheet Definition | Conditions | Exceptions | Dependencies | Cells | Priorities | Runtime Properties

In this sample BW Query,

- **Exit Variable** is used in Restricted Key Figure “Actual” in which the Current Fiscal Year is derived for filtering automatically.
 - • Range value can be derived in one Variable, which is not possible in Parameter in CDS View.

Result:

Company Code	Struct.	Actual	Prev,Year	%
1010	Revenue			
	Cost		100.00 EUR	
	GP		100.00 EUR	
1710	Revenue	\$ -3,998,928.74	\$ -4,681,703.41	-85.4 %
	Cost	\$ 3,401.95	\$ -7,960.00	42.7 %
	GP	\$ -3,995,526.79	\$ -4,689,663.41	-85.2 %
SUMME	Revenue	\$ -3,998,928.74	\$ -4,681,703.41	-85.4 %
	Cost	\$ 3,401.95		*
	GP	\$ -3,995,526.79		*



Other Scenarios:

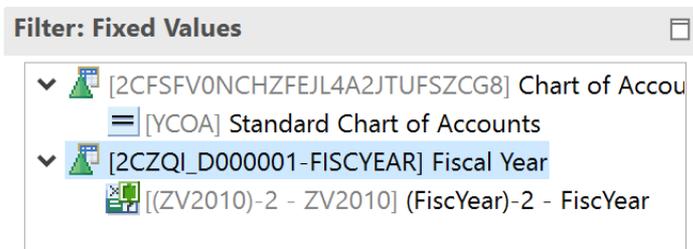
- Constant Selection:** By using Constant Selection, the value of the result is displayed in each records. "Amount(C)" and "Quantity(C)" are set to be Constant Selection. By using them, "Amount by Storage Location" can be calculated ("Amount(C)" * "Quantity" / "Quantity (C)").

Plant	Storage location	Amount by Storage Loc	Amount	Amount(C)	Quantity	Quantity(C)
1100	#	0 EUR	1,200 EUR	1,200 EUR	0	10
	X100	800 EUR	0 EUR	1,200 EUR	5	10
	X200	380 EUR	0 EUR	1,200 EUR	3	10
	X300	240 EUR	0 EUR	1,200 EUR	2	10
		1,200 EUR	1,200 EUR	1,200 EUR	10	10
1200	#	0 EUR	3,000 EUR	3,000 EUR	0	20
	Y100	1,200 EUR	0 EUR	3,000 EUR	8	20
	Y200	1,200 EUR	0 EUR	3,000 EUR	8	20
	Y300	800 EUR	0 EUR	3,000 EUR	4	20
		3,000 EUR	3,000 EUR	3,000 EUR	20	20
	4,200 EUR	4,200 EUR	4,200 EUR	30	30	

- Use Exception Aggregation and Plant/Material is used as Exception Aggregation Element. Note that the runtime would be longer because it is calculating by each Plant/Material.
- FIX Operator:** Net Sales > To count the number of sales representatives having net sales greater than the threshold value, Formula: "Net Sales > 0,15 * (Net Sales CS Sales Representative)" is used for each Sales Personal using Exception Aggregation. "Net Sales CS Sales Representative" is Constant Selection Value. The formula has to be "Net Sales > **FIX**(0,15 * (Net Sales CS Sales Representative))" as without FIX, Exception Aggregation overwrite Constant Selection so that it would not be calculated as expected.

Sales Personnel	Net Sales	Net Sales for CS S.Rep	15 % of Net Sales CS S.Rep	Net Sales > 15 % of the Net Sales CS S. Rep
Birgitta Kivi	27,00 EUR	125,00 EUR	18,75 EUR	1
Dolores Seda	14,00 EUR	125,00 EUR	18,75 EUR	0
Overall Result	41,00 EUR	125,00 EUR	18,75 EUR	1

- See also [Fix Operator](#).
- Range filtering using Offset:** Variable ZV2010 for Fiscal Year is created (Single value). Range filtering is possible from "(the input value in ZV2010) - 2" to "(the input value in ZV2010)". Offset is used to set "-2".



- **Current Member:** "Previous Year" is a Restricted Measure in which the key figure is filtered on Calmonth with Replacement Path Variable "CURRENT_MEMBER" - 12 (offset)".

Calendar Year / Month	Current Year	Previous Year
01/2015	1000	800
02/2015	1010	820
03/2015	1020	880
...
01/2016	1120	1000
02/2016	1130	1010

- Current Member is available for BW Query on BW provider, but in BW Query created on CDS View, it is available only for Date characteristics but not available for other time characteristics like Calendar Year/Month.
- Other examples:
 - Rolling window (e.g. average of last 3 months)
 - Simplified modeling e.g. Year To Date calculations
- See also [Current Member Variables](#).

- **Elimination of Internal Business Volume:** In the query, you use the country hierarchy. The (internal business volume) amount for Europe and the country is eliminated, because the amount of \$50 was counted from Germany to the UK.

Country	Sales	Sales Country
Country	\$50.00	
Europe	\$50.00	
UK	\$50.00	\$50.00

← eliminated
← eliminated

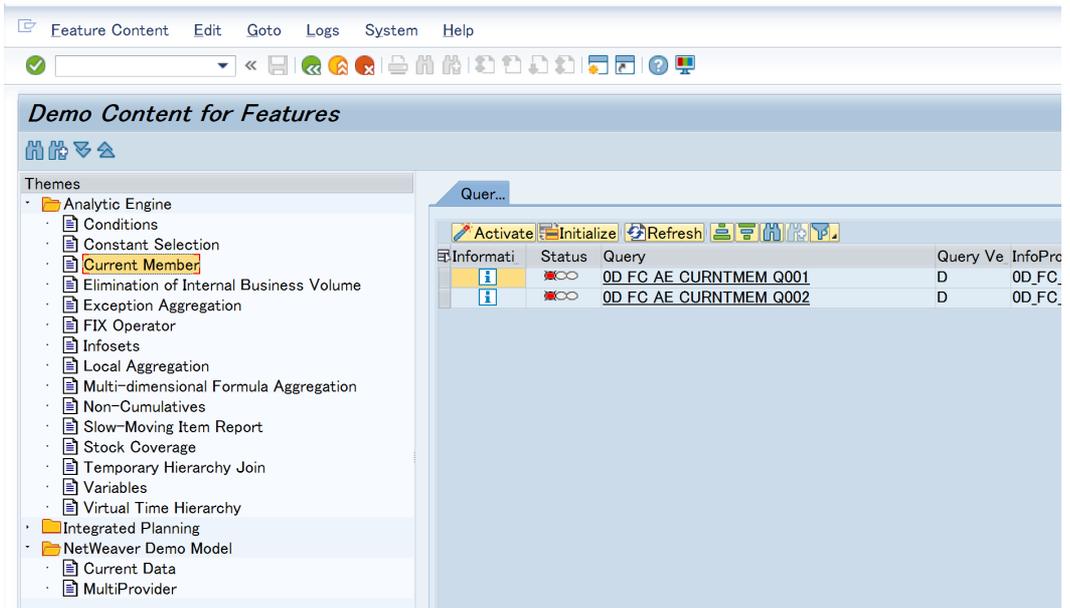
- This function is available only in BW Query based on BW Provider. If you want to use it for CDS View, Open OD View or Composite Provider has to be created and



InfoObjects have to be associated. It should not be so difficult for BPC for S/4HANA as InfoObjects for master data have been prepared.

Referential Info:

You can check the behaviors of some sophisticated calculations in S/4HANA by activating sample contents with Transaction RSFC.



See also [RSFC SAP BW Demo content for BI 7.x.](#)

Message to BW and the ones who want to create values from S/4HANA

I know you.

I know you have already known the most tangible and promising value of S/4HANA is in short Analytics, whatever conceptual words SAP says like "Intelligent Enterprise" or "Digital Transformation". After many discussions about new and conceptual words, in practice, many customers turn out to start with Analytical applications. This is because one of the most important value of SAP ERP is just the integrated data in it a called "Enterprise Resource" Planning. In addition, the two most important innovations in S/4HANA are HANA and Simplified Data

model, or Universal Journal. To enjoy those innovations, the simplest way is Analytics.

I know you have already known although so many people talk about frontend technologies, in reality, business users are far more interested in sophisticated KPI, so more importance and greater challenges should rather be in the backend or data source, so you are concerned there are not so many people in SAP who talk about the data source.

I know you who have contributed to customers and business users by realizing KPIs using BW or some other analytical solutions, so have been concerned missing critical OLAP functions in Analytic Query or CDS View and the complexity of the technologies in S/4HANA to realize that. I hope if this blog could help as BW Query has long history (since 1999) and have included ideas coming from all over the world as functions to realize their requirements, and I know you have already known it.

I write this blog for you, who have contributed to customers with your great experiences of BW and who should now be expected to do the same or more for S/4HANA customers.

I want you.

I want you to make Analytics happening.

I believe business users and customers want you and wait for you to enjoy the great potential values of S/4HANA.

Thanks.

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