SAP HANA SQL scripting optimization: the CE Functions

By Matthieu Munch | June 12, 2015 | Development & Performance | 3 Comments

In SAP HANA, you have two possibilities to create the Calculated Views:

- Using the graphical method
- Using the scripting method with CE functions

In this blog, I will demonstrate that CE Functions can improve performances from a Calculated View.

First, I will give you some general information regarding the CE Functions. After that, I will show you the

CE Functions

The CE Functions encapsulate data-transformation functionalities. They constitute an alternative to using SQL statements as their logic is directly implemented in the Sap HANA CALC engine. Direct use of the CALC engine allows implementers to influence the execution of a procedure or a query which, in some cases, is more efficient.

In the table below, you can find the list of the CE Functions and their use cases:

WHERE HAVING	SELECT A, B, C SUM(D) From "ANALYTICAL_VIEW" WHERE B = 'Value' AND C = 'Value'	var_tab = **CE_COLUMN_TABLE**("COLUMN_TABLE"); **CE_PROJECTION**(:var_tab,[A,B,C],'"B" = "value" AND "C" = "value"');
GROUP BY	SELECT A, B, C SUM(D) From "COLUMN_TABLE" GROUP BY A, B, C	var_tab = **CE_COLUMN_TABLE**("COLUMN_TABLE"); **CE_AGGREGATION**(:var_tab,SUM(D), [A,B,C]);
INNER JOIN	SELECT A, B, Y, SUM(D) FROM "COLTAB1" INNER JOIN "COLTAB2" WHERE "COLTAB1"."KEY1" AND "COLTAB1"."KEY2" AND "COLTAB1"."KEY2" = "COLTAB2"."KEY2"	**CE_JOIN**("COLTAB1","COLTAB2",[KEY1,KEY2],[A,B,C,D])
LEFT OUTER JOIN	SELECT A, B, Y, SUM(D) FROM "COLTAB1" LEFT OUTER JOIN "COLTAB2" WHERE "COLTAB1"."KEY1" AND "COLTAB1"."KEY2" AND "COLTAB1"."KEY2" = "COLTAB2"."KEY2"	**CE_LEFT_OUTER_JOIN**("COLTAB1","COLTAN2",[KEY1,KEY2], [A,B,Y,D])
SQL Expressions	SELECT A, B, C, SUBSTRING(D,2,5) FROM "COLUMN_TABLE"	var_tab = **CE_COLUMN_TABLE**("COLUMN_TABLE"); **CE_PROJECTION**(:var_tab,["A","B","C", CE_CALC('midstr("D",2,5)]);
UNION ALL	VAR_TAB1 = SELECT A, B, C, D FROM "COLUMN_TABLE1"; VAR_TAB2 = SELECT A, B, C, D FROM "COLUMN_TABLE2"; SELECT * FROM: VAR_TAB1 UNION ALL SELECT * FROM :VAR_TAB2	VAR_TAB1 = **CE_COLUMN_TABLE**("COLUMN_TABLE1",[A,B,C,D]); VAR_TAB2 = **CE_COLUMN_TABLE**("COLUMN_TABLE2",[A,B,C,D]); **CE_UNION_ALL**(:var_tab1;:var_tab2);

How to create a Calculation View

As I say at the beginning, you have two methods to create a Calculation View in Sap HANA:

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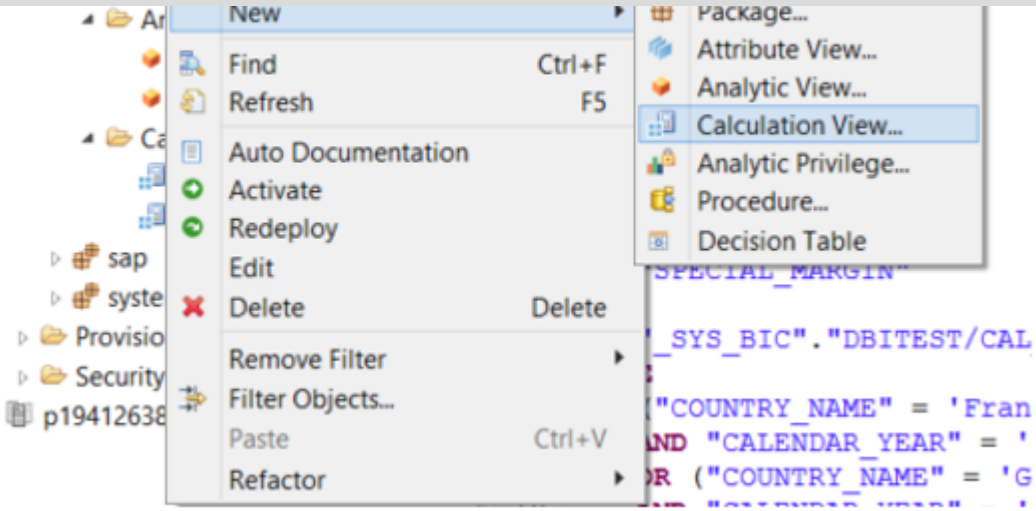

Select the "Graphical" type

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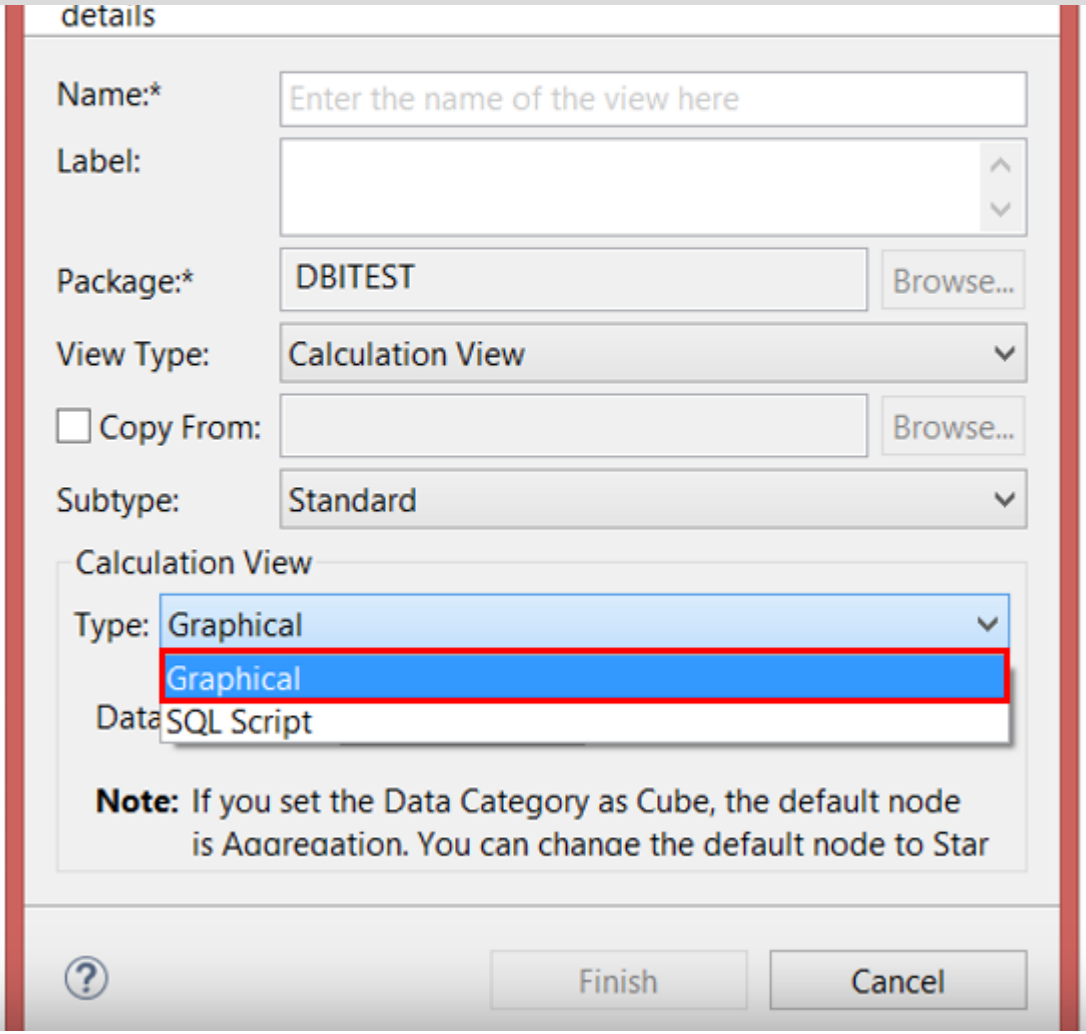
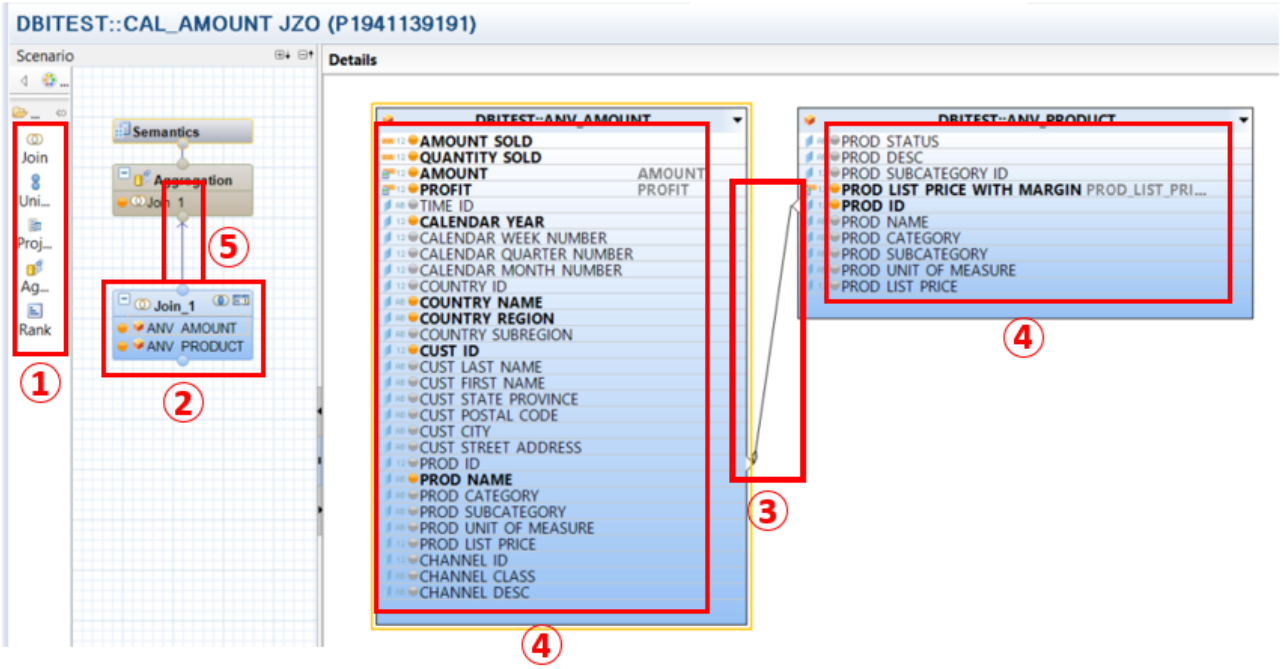


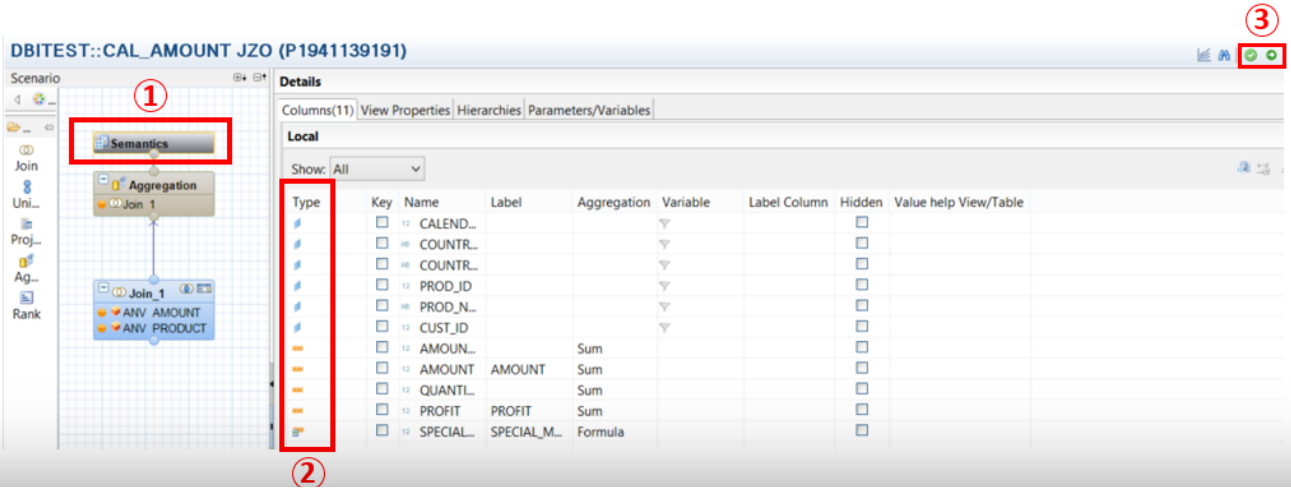
5. Join your "Aggregation operation" to the "Aggregation" box

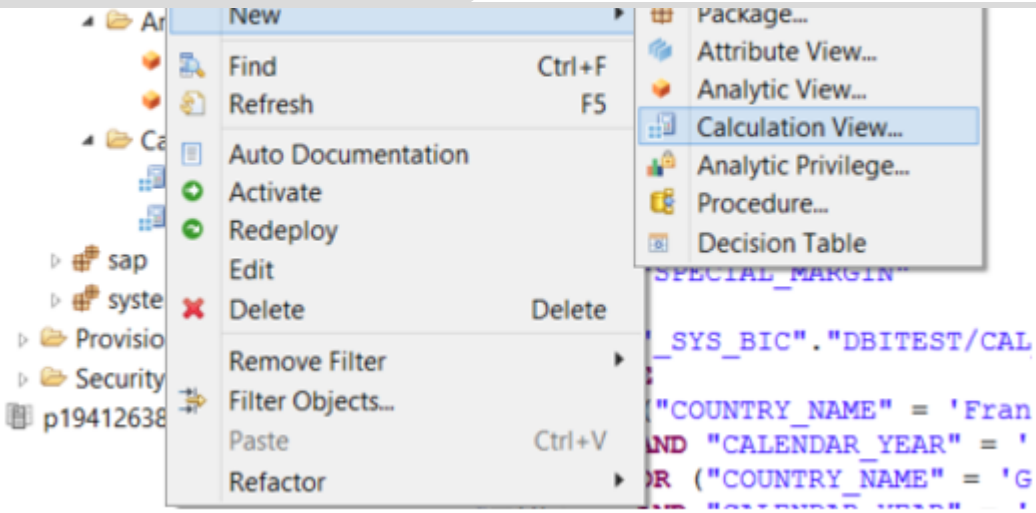


Create your Calculation View Layout

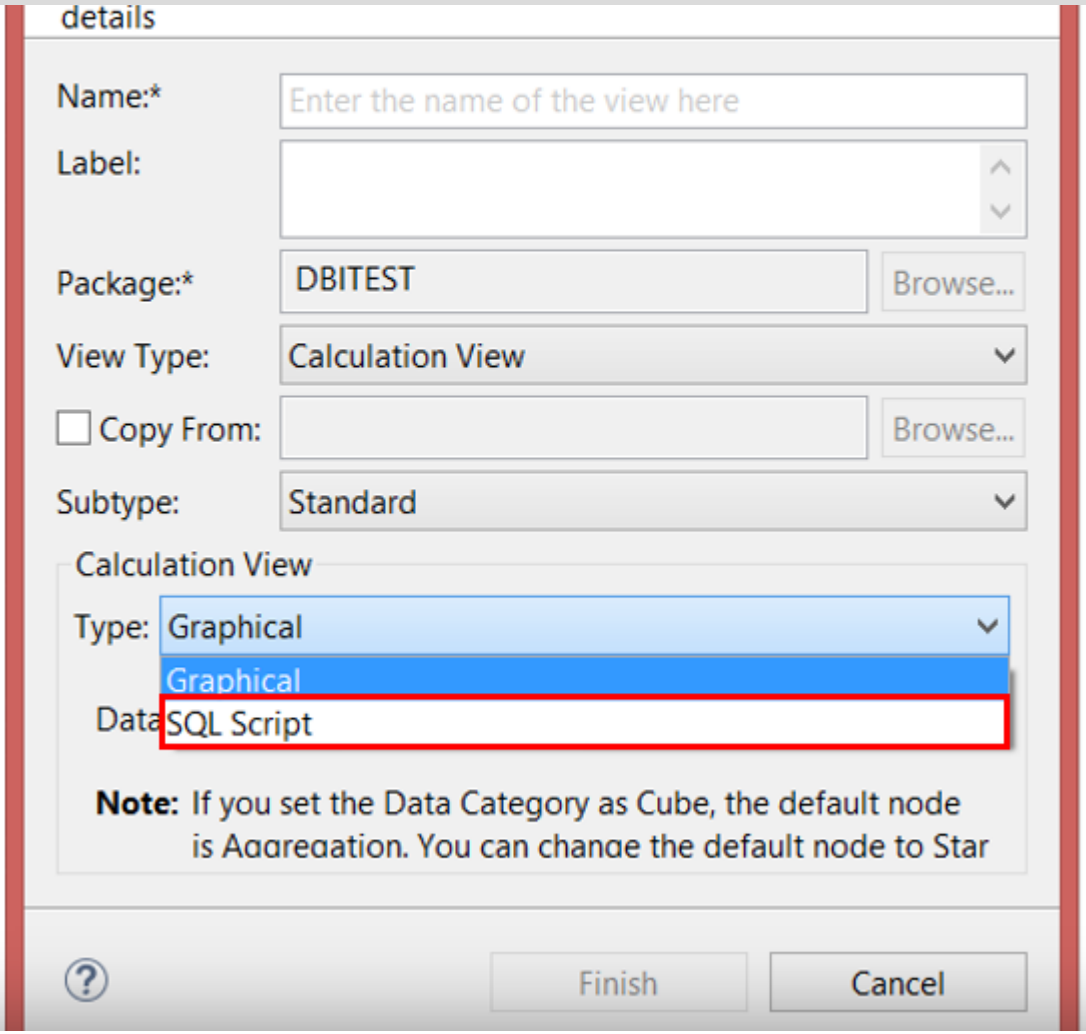
Check the objects

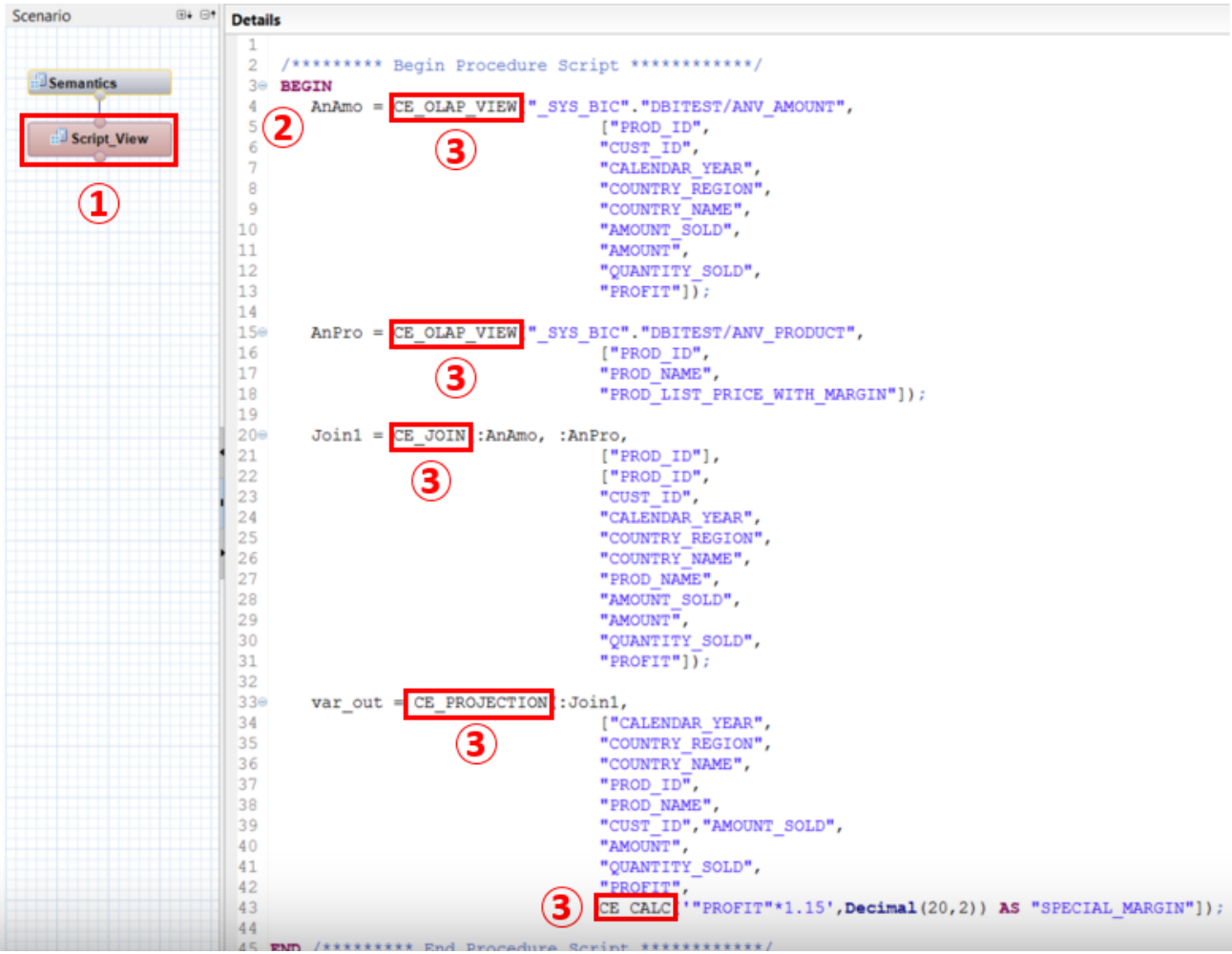
1. Click on "Semantics" box
2. Select the type of the objects
3. Validate and activate the view

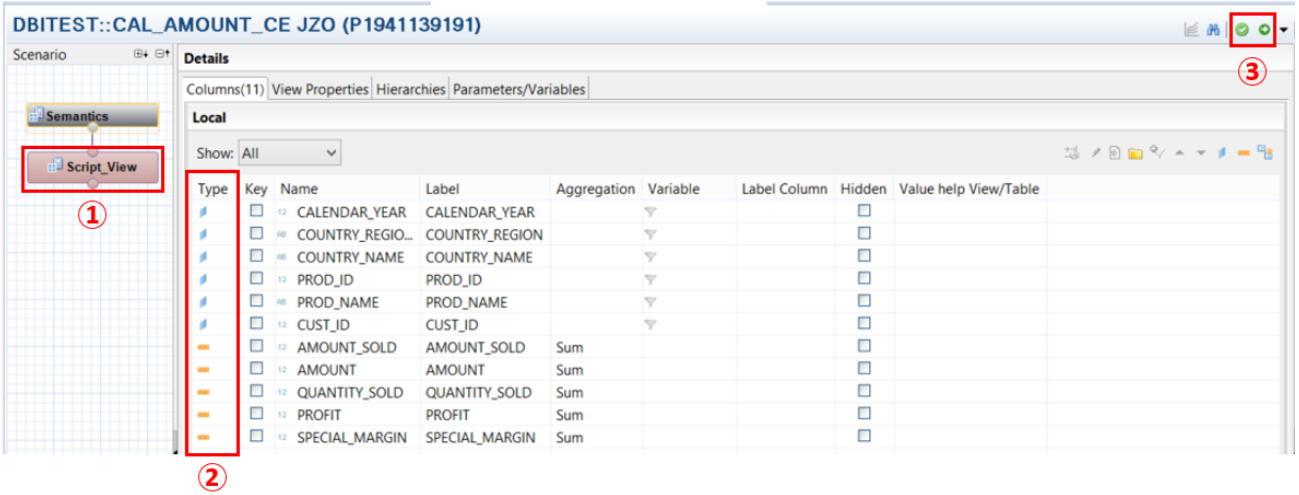




Select the “SQL Script” type







SQL Performance comparison

Goal of the test

In this part, I will compare the SQL performance from two calculated views that have been built with the two different methods:

- "Graphical" method
- "SQL scripting" method

Test with the “Graphical” calculated view

SQL Query

```
  "COUNTRY_NAME",
  "PROD_ID",
  "PROD_NAME",
  "CUST_ID",
  "AMOUNT_SOLD",
  "AMOUNT",
  "QUANTITY_SOLD",
  "PROFIT",
  "SPECIAL_MARGIN"
FROM
  "_SYS_BIC"."DBITEST/CAL_AMOUNT"
WHERE
  ("COUNTRY_NAME" = 'France'
  AND "CALENDAR_YEAR" = '2011')
  OR ("COUNTRY_NAME" = 'Germany'
  AND "CALENDAR_YEAR" = '2010');
```

Test with the “SQL Scripting” calculated view

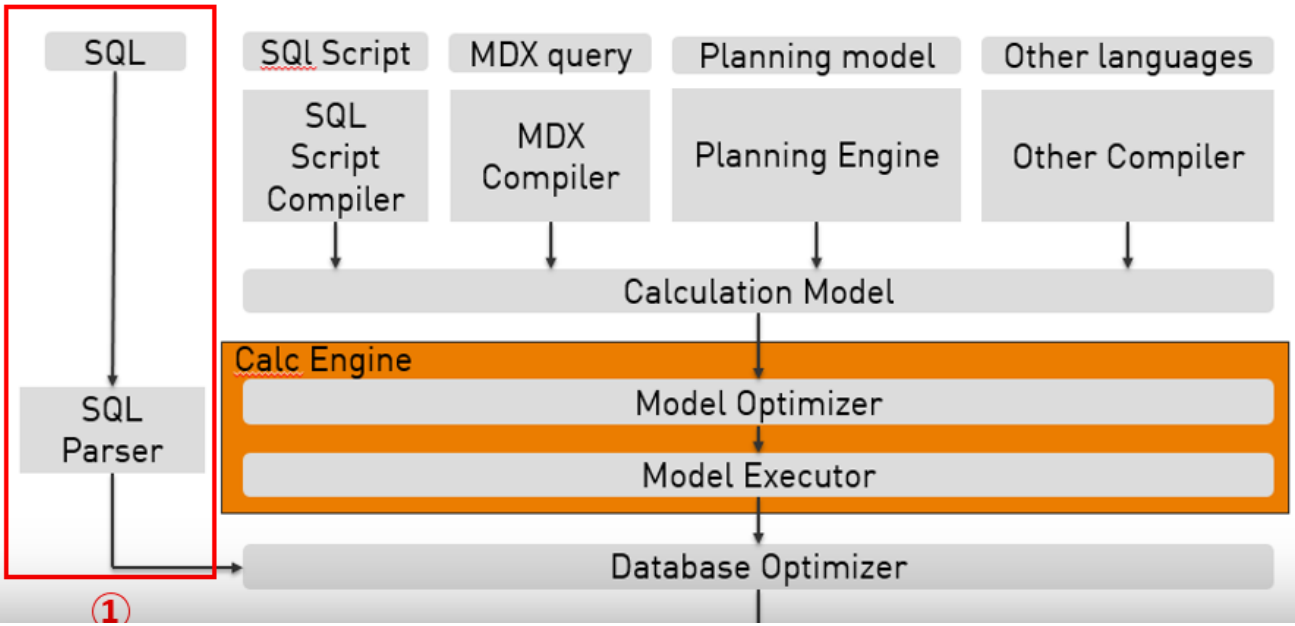
SQL Query

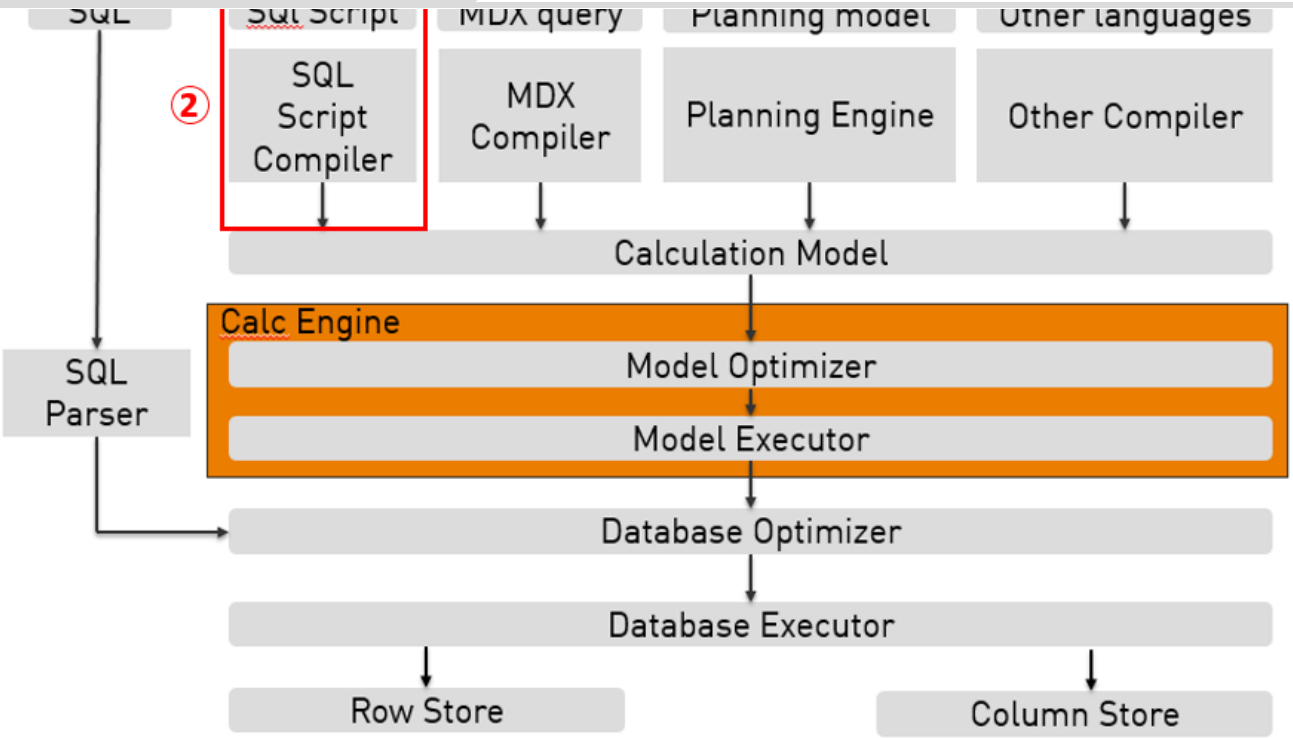
```
 "COUNTRY_NAME",
 "PROD_ID",
 "PROD_NAME",
 "CUST_ID",
 "AMOUNT_SOLD",
 "AMOUNT",
 "QUANTITY_SOLD",
 "PROFIT",
 "SPECIAL_MARGIN"
FROM
 "_SYS_BIC"."DBITEST/CAL_AMOUNT_CE"
WHERE
 ("COUNTRY_NAME" = 'France'
 AND "CALENDAR_YEAR" = '2011')
 OR ("COUNTRY_NAME" = 'Germany'
 AND "CALENDAR_YEAR" = '2010');
```

Performance decoding

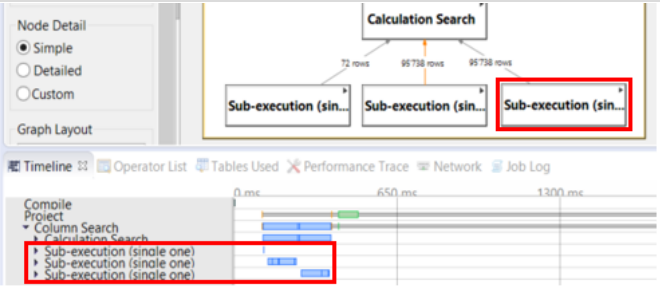
Why the use of these CE functions boost the performances of your queries? The explanation is located in the query execution plan and especially in the use of the CALC engine from the SAP HANA database.

When you send a "normal" SQL query in the SAP HANA database, the CALC engine is not used. The SQL parser send the query directly to the "Database optimizer" to optimize the execution of the query (1).

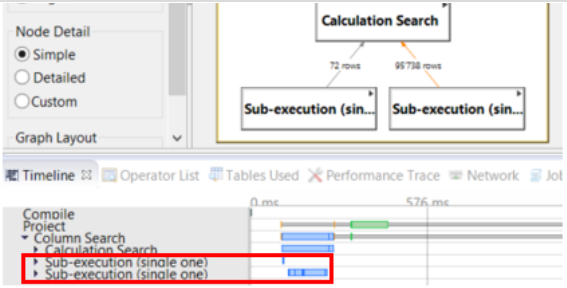




In our case, when we analyze the "normal" SQL query, the "calculation search" task has been split in 3 different sub-queries that can't start at the same time.



SQL without view using CE functions



SQL With view using CE functions

Conclusion

The use of CE functions in the creation of calculated views can significantly accelerate the execution of your SQL queries. The CALC engine from SAP HANA is optimize to use these functions.

There's only one restriction using this kind of functions. The performance will dramatically reduce if you try to create a SQL query mixing "normal" and "optimized" calculated views.

Michael Stannard says:
June 20, 2016 at 18 h 20 min

Reply to Michael

Hi

Interesting article.

Do you have information on SQL scripted CV (traditional SQL coding) verses Graphical CVs or indeed your CE functions based CVs?

Regards

Michael

Palani Ramu says:
April 13, 2018 at 17 h 26 min

Reply to Palani

Thanks for the document posted.

I have small query , I have to collect columns more that 10 table, such situation how to use CE function ?

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