Use Virtual Key Figures for Complex Weighted Average KPIs

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1. Reporting Scenario where VKF is the only option

Within the scope of Accounts Receivable reporting we have to calculate Days Overdue KPI, a number of days each invoice has not been paid (due date – key date) and average it over customers using outstanding invoice amounts as a weighted average parameter.

For example, customer X has two outstanding invoices:
  Invoice 1: overdue 5 days, amount 5000 EUR
  Invoice 2: overdue 50 days, amount 100 EUR.
  In this case the result will be (5*5000+50*100)/(5000+100) = 5.9 days

This KPI can be calculated over a group of customers and allows making operating decisions and customer classifications more efficiently.

Number of days difference can be calculated in BEx using query variables, however aggregation of these values over transaction lines won’t be possible. Therefore you will always have to have dates displayed in the report results in order to see the values. This prevents us from having this KPI at the aggregated level (customer level for example).

Implementation of Virtual Key Figures (VKF) for this task will allow us calculating Days Overdue KPI at various aggregation levels (by customer, customer group, etc.)

2. Introduce VKF in the cube and multiprovider

Create a new Key Figure for Number of days and add it to the relevant cube and multiprovider:
3. Introduce infoobject for passing parameter from query variable to VKF

Key date will be entered by users as a query parameter and should be passed to the method in the BADI with the VKF value calculation. In order to pass the value I suggest creating a new infoobject with a Date type (ZKDATPAR) compounded with a counter (KNCOUNTER) and saving key date’s value in the P table of this infoobject.

In the Transaction Code CMOD BEx variable exit (EXIT_SAPLRRS0_001) we have to place the following code for the relevant BEx variable in order to store entered key date:

```plaintext
DATA: wa_t_var_range TYPE RRRANGEXIT.
DATA: keydate TYPE D.
DATA: wa TYPE /BIC/PZKDATPAR.
IF I_STEP = 3.
  LOOP AT i_t_var_range into wa_t_var_range
    WHERE vnam = '0P_KEYDT'.
    keydate = wa_t_var_range-low.
    DELETE FROM /BIC/PZKDATPAR WHERE KNCOUNTER = '1'.
    wa-OBJVERS = 'A'. wa-KNCOUNTER = '1'. wa-
    /BIC/ZKDATPAR = keydate.
    MODIFY /BIC/PZKDATPAR FROM wa.
    COMMIT WORK.
  ENDLOOP.
ENDIF.
```
4. Define CKFs in the query to support calculation before/after aggregation

We have to define a Calculated Key Figure (CKF) in the query that would multiply Number of days by the Amount prior to aggregation:

![CKF Definition](image1)

Then we have to define a CKF that would calculate the weighted average value by dividing the total “Due Days by Amount” by the aggregated Amount value:

![CKF Definition](image2)

5. Configure VKF BADi for reading query parameter and calculating values

Detailed steps for the VKF BADi set up you may find in the previous post: Implement Performing Virtual Key Figures in BW 7.3 and BO4.

Here I will give a code example that you may use in the INITIALIZE method to read the key date’s value from the infoobject:

```plaintext
DATA: dd TYPE C LENGTH 8.
SELECT SINGLE /BIC/ZKDATPAR
FROM /BIC/PZKDATPAR INTO dd
WHERE OBJVERS = 'A' AND KNCOUNTER = '1'.

IF sy-subrc = 0. keydate = dd.
ELSE. keydate = sy-datum.
ENDIF.
```

And a code example for the Number of days VKF calculation from the COMPUTE method:
IF i_s_rkblid-COMPID = "ZQUERY1". " Check for the query name
<fs_ZNUMDAYS> = <fs_ONETDUEDATE> - keydate.
ENDIF.

6. Test results

Here is the BEx query output with a drill down by due date (Key Date = 26/09/2012):

<table>
<thead>
<tr>
<th>Net due date</th>
<th>Amount</th>
<th>Due Days Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/02/2012</td>
<td>€ 25.52</td>
<td>-215.0</td>
</tr>
<tr>
<td>18/03/2012</td>
<td>€ 4.25</td>
<td>-192.0</td>
</tr>
</tbody>
</table>

Aggregated results by Customer:

<table>
<thead>
<tr>
<th>Payer</th>
<th>Amount</th>
<th>Due Days Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>0010113017 LBB Test customer</td>
<td>€ 29.77</td>
<td>-211.7</td>
</tr>
</tbody>
</table>