

**How-to Guide  
SAP NetWeaver '04**



# **How To... Reconcile Data Between SAP Source Systems and SAP NetWeaver BI**

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**Applicable Releases:  
SAP BW 3.5**

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# 1 Business Scenario

SAP has grown to be the most important information system for many companies. These companies use SAP BI as the central tool for operational and analytical reporting. Companies make decisions of local and global importance based on the results of reporting in SAP BI. As the information stored within SAP BI is used as the basis of company-wide decisions and strategies, data quality plays a crucial role.

One of the most important aspects of data quality is data consistency. Because SAP BI as a data warehouse integrates, stores and transforms (prepares) data, the consistency of data between the different processing steps is a key factor. This how-to-paper describes the possible data reconciliation scenarios and the relevant implementation steps that you can apply in your system to check whether data is consistent in the SAP source system and SAP BI. In addition, these scenarios also support you in determining the causes of data inconsistency.

As well as this how-to paper, you can find the most up-to-date information about this BI-related issue in SAP Service Marketplace: <http://service.sap.com/bi> → Data Consistency. A list of check-tools for how to resolve data consistency problems within BI is also provided.

## 2 Concept

### 2.1 Data Reconciliation Scenarios

In general there are four possible data reconciliation scenarios that can be applied in a system in order to reconcile the data between SAP source systems and SAP BI. In addition, depending on the application area (CO, FI, SD, MM etc), some special reconciliation scenarios are available.

#### 2.1.1 Reconciliation DataSource

The reconciliation DataSource is a DataSource which SAP delivers as standard business content for data reconciliation purposes. In the documentation on DataSources, a reconciliation DataSource is mentioned that can be used for reconciliation with the original DataSource. Alternatively the documentation describes how to design a data reconciliation scenario for the relevant DataSource.

#### 2.1.2 Generic DataSource with Database View or InfoSet

If no reconciliation DataSource is available in the standard business content it is sometimes possible to create a customer-specific reconciliation DataSource from a database view, table or InfoSet in transaction RSO2.

Since the extraction of the data reconciliation DataSource is performed remotely, it is necessary to keep the volume of data transferred as low as possible. This process is thus not suitable

- If the volume of data to be extracted and transferred cannot be reduced effectively
- If the data that the original DataSource provides is not saved in a database table (e.g. calculated key figures).

### **2.1.3 Generic DataSource with Function Module**

With this scenario it is possible to reproduce complex extraction logic so that the data attained is suitable for the data reconciliation. You can also restrict the volume of data to be transferred using data aggregation.

If the extraction logic of the original DataSource is highly complex, there is a danger that errors can creep into the extraction logic, leading to incorrect results in the reconciliation DataSource. Thus this scenario is only recommended for experienced developers. It is not appropriate if no suitable data can be prepared for the data reconciliation due to complex extraction logic in the original DataSource.

### **2.1.4 Direct Access to the DataSource**

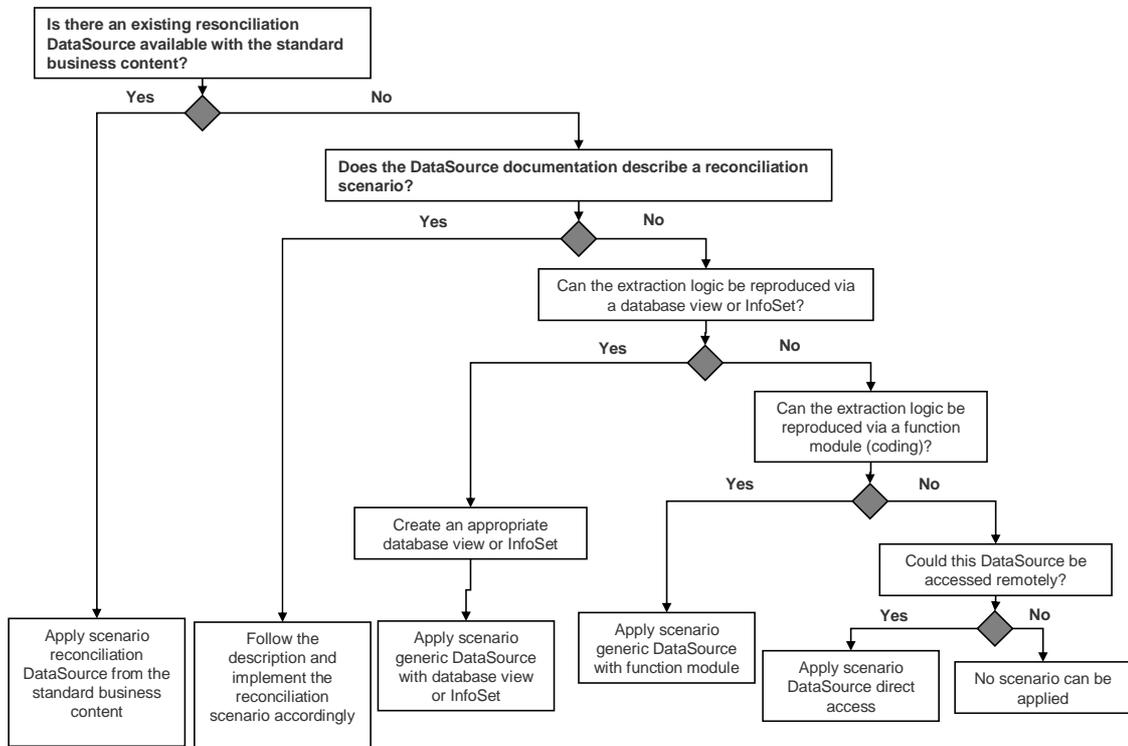
If none of the scenarios mentioned above are applicable, data reconciliation can be performed using direct access to the DataSource. Dependent on the design, not all DataSources allow direct access. This property is stored in the 'virtcube' field in table roosource. If 'D' is entered in this field direct access cannot be performed. Otherwise direct access is possible, but the runtime depends on the volume of data that must be read and transferred from the database.

In order for direct access to function properly, the technical design of the system (processor, memory) must enable the user to make a meaningful selection.

Since the original DataSource is applied as the reconciliation DataSource in this scenario, any inconsistencies in the administration of the delta queue can be identified. On the other hand, there is also the danger that some system errors may not be identified, so this scenario should only be applied for data reconciliation purposes on a limited basis.

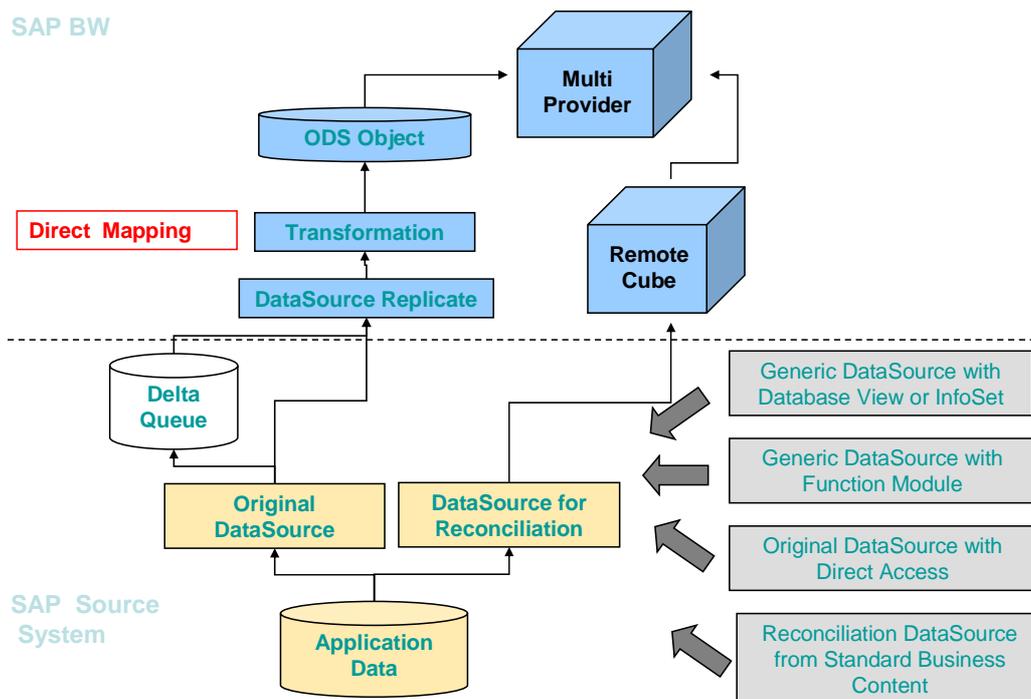
## 2.2 Decision Tree for Data Reconciliation Scenarios

The following decision tree supports you in deciding which reconciliation scenario should be applied in the system:



## 2.3 Applying the Data Reconciliation Scenario

After you have determined the scenario that should be applied in the system, see the following slide for the appropriate data models for the afore-mentioned reconciliation scenarios.



Whichever scenario you are going to apply in your system, they all consist of the following objects:

- **MultiProvider for results**  
The MultiProvider is used to combine data in ODS objects and data in RemoteCubes. This allows results to be compared easily.
- **Query**  
A query is used to report on data from different data providers.
- **ODS object based on the original DataSource**  
Data from OLTP is loaded directly into the ODS object without any data transformation or manipulation. In some areas of the standard business content this type of ODS object has already been delivered, for example, in the CO, SRM and Logistics areas.

A RemoteCube has to be created and should be connected to the reconciliation DataSource, generic DataSource with database view, generic DataSource with function module, or original DataSource upon which you are going to apply the reconciliation scenario.

Depending on the scenario, one of the following DataSources is required:

‘Reconciliation DataSource’ Delivered with SAP BI Business Content

- (as of NetWeaver 2004s, PI\_BASIS 2005.1)  
Reconciliation DataSources are planned to be delivered with PI\_BASIS 2005.1. If a DataSource is assigned to the node ‘Reconciliation’ in transaction RSA6 in SAP source systems, this DataSource can be applied for data reconciliation purposes.

‘Generic DataSource with Database View’:

- A generic DataSource based on an R/3 database table or R/3 database view. This DataSource should be implemented in a customer system.

‘Generic DataSource with Function Module’

- A generic DataSource based on a function module. This DataSource should be implemented in a customer system.

‘Direct Access to the DataSource’

- No additional DataSource needs to be implemented in the customer system. The original DataSource can be used to perform the data reconciliation scenario. This DataSource is either delivered by SAP with the standard business content or is implemented by customers themselves. As the prerequisite, this DataSource should be accessible remotely.

## 2.4 Application-Specific Scenarios

Besides the generic reconciliation scenarios, some application-specific extraction logic necessitate the use of application-specific reconciliation.

### 2.4.1 Application: Controlling and Financial Accounting

Controlling Area

- Extract totals: 0CO\_OM\_CCA\_1: This DataSource extracts information regarding costs (primary and secondary) and quantities posted to cost centers for each fiscal year period.
- Extract single records: 0CO\_OM\_CCA\_9: This DataSource extracts information regarding actual costs which are posted to the cost center. It extracts on a daily basis (on the posting date) and is able to select delta datasets.

These two DataSources extract the same information. The first extracts the CO cost at the end of each period while the other DataSource extracts the CO cost on a daily basis. These two DataSources can be applied for the reconciliation scenario.

Financial Accounting – General Ledger Area:

- Extracts transaction figures: 0FIGL\_1: This DataSource is used to load General Ledger transaction figures (table GLTO) from the R/3 source system to the Business Information Warehouse.
- Extracts transaction figures with delta method: 0FIGL\_6: This DataSource is used to load General Ledger transaction figures (table GLTO) from the R/3 source system to the Business Information Warehouse using the delta extraction method.

These two DataSources extract exactly the same information but with different delta methods. We recommend that you apply 0FIGL\_6 to extract the information from table GLTO and apply 0FIGL\_1 as the reconciliation DataSource in your system.

#### **2.4.2 Application: Logistic (SD, MM, PLM etc)**

In general, the 'Generic View DataSource' scenario is suitable for reconciling key figures that are stored directly in database tables in a source system. As key figures are always stored in database tables in the controlling and financial applications, this scenario is suitable for the FI and CO areas.

In contrast, logistics applications like SD, MM, PLM, etc. may also contain key figures that are determined dynamically within an online transaction (e.g. key figure 'open order quantity' in application SD). Key figures of this type are not stored in a database table. In this case, you need to program your own generic DataSource with a function module (scenario 'Generic DataSource with function module'). This requires a certain amount of effort and extensive understanding of the extraction and application logic.

As an alternative, the following workaround can be applied to reconcile data of this type:

- Select a set of data for reconciliation (e.g. particular order number or sales area)
- Run transaction OLI7BW for a statistical setup of this data selection in the source system
- Compare the data from BI (PSA table) and the data in RSA3.

As a statistical data setup is time-consuming for a huge amount of data, this alternative is not applicable for reconciling mass data. It is more suitable for testing a small set of data.

## 3 The Step-By-Step Solution

This chapter gives you a step-by-step solution for reconciliation scenarios based on an example from the controlling area. All of the possible reconciliation scenarios are listed below. It is not necessary to apply all of these scenarios in your system. Based on your own reconciliation requirements (content area, key figure, etc), you should apply the most appropriate scenario.

### 3.1 Implementing DataSources Dependent on Reconciliation Scenarios

This section demonstrates how to implement these DataSources depending on different reconciliation scenarios.

#### 3.1.1 Scenario Reconciliation DataSource

The reconciliation DataSource technology is available as of PI-BASIS 2005.1 / SAP NetWeaver 2004s. As of PI-BASIS 2005.1 / SAP NetWeaver 2004s SAP plans to deliver reconciliation DataSources gradually within SAP applications.

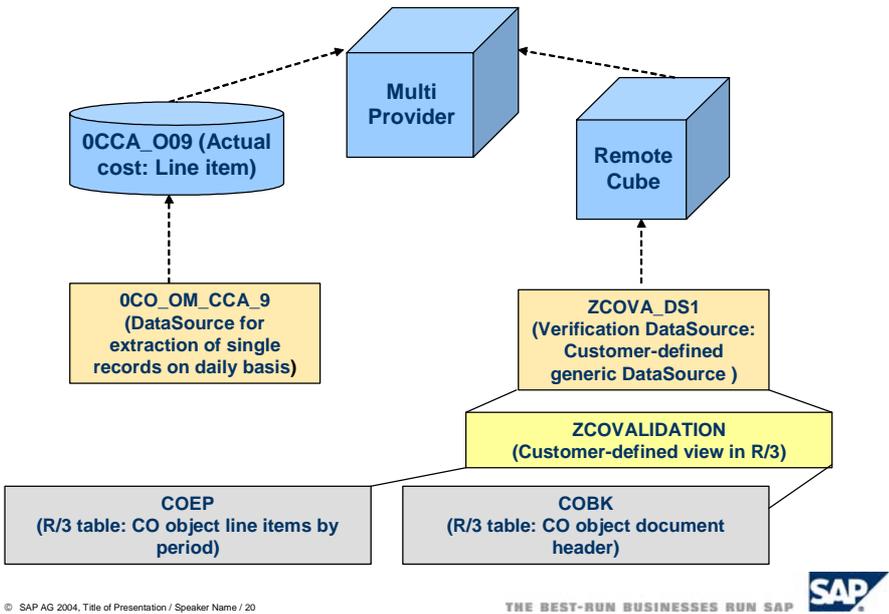
#### 3.1.2 Scenario Generic DataSource with Database View

This scenario uses the generic DataSource with a database view as the reconciliation DataSource to be compared with the original DataSource. You can also apply this scenario in your system if the extraction logic can be 'replaced' by an R/3 database table or view and the volume of data to be extracted is not huge.

This scenario is generally valid for all applications (SD, MM, QM, CO, FI, etc) for those fields that are persisting in the database table in R/3. For fields that are determined dynamically (e.g. 'open order quantity' is determined during the online transaction and stored directly in the delta queue but not in the database table), a table view cannot be applied to 'replace' the complex extraction logic. Therefore this reconciliation scenario is not applicable for dynamically determined fields.

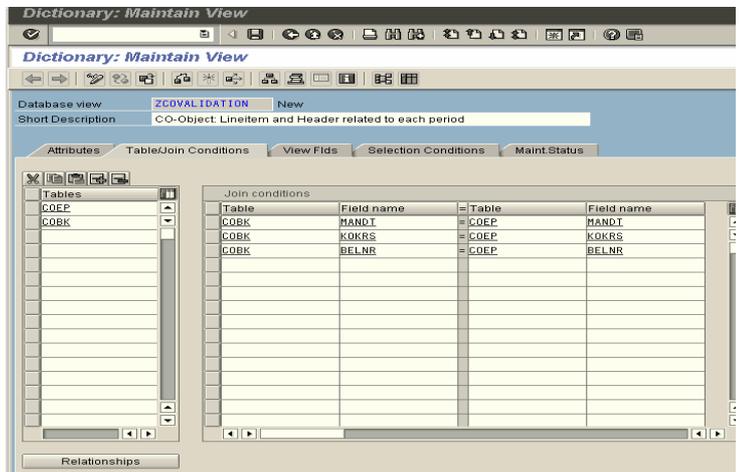
In the CO area, every field that is relevant for the DataSource is stored in the database table in R/3. Therefore, a generic DataSource can be implemented in order to replace the original extraction logic. The results of this generic DataSource can be compared with the results of the original DataSource (original function module). For details, see the following slide.

Data Model for Reconciliation Scenario 'Generic DataSource with Database View'

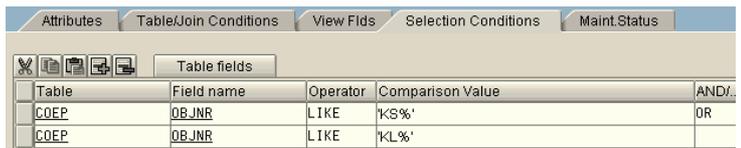


The following step-by-step solutions are only an example. Check whether this is applicable to your concrete business case.

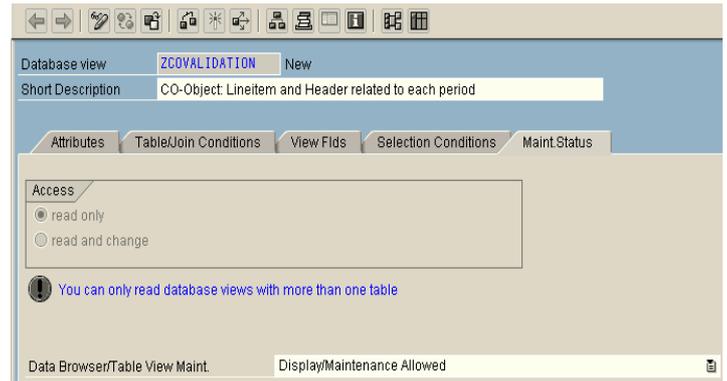
1. Run transaction SE11 in the R/3 system to create a view which is based on the table of COEP and COBK. These two tables are the source information for extractor 0CO\_OM\_CCA\_9 (CO cost on the line item level).



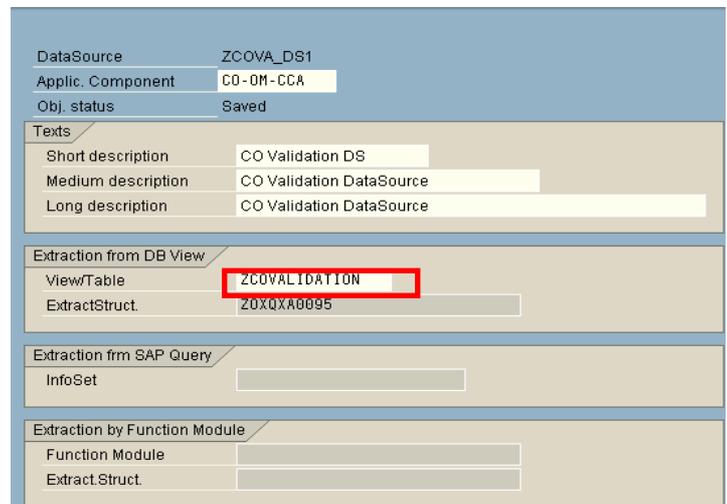
2. Define selection conditions. Only CO objects with prefix 'KS' or 'KL' should be selected because only these objects are relevant for the extraction and relevant for the reconciliation.  
'KS' means controlling area;  
'KL' means cost element.



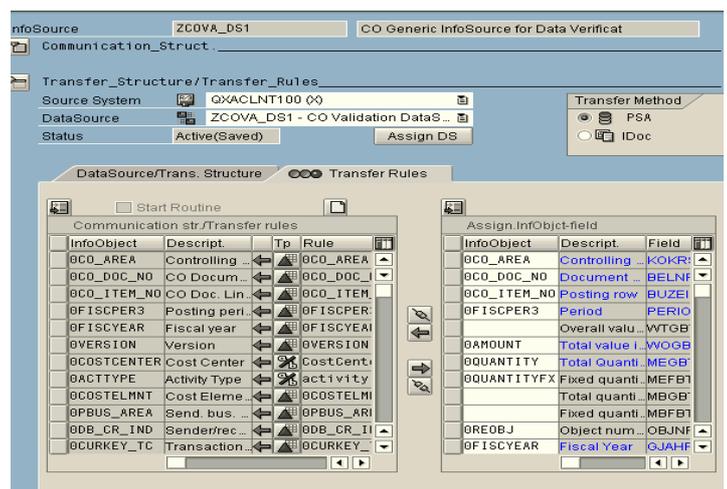
- Setting the 'Maintenance Status'. Status 'Display/Maintenance Allowed' allows you to display and edit this view.



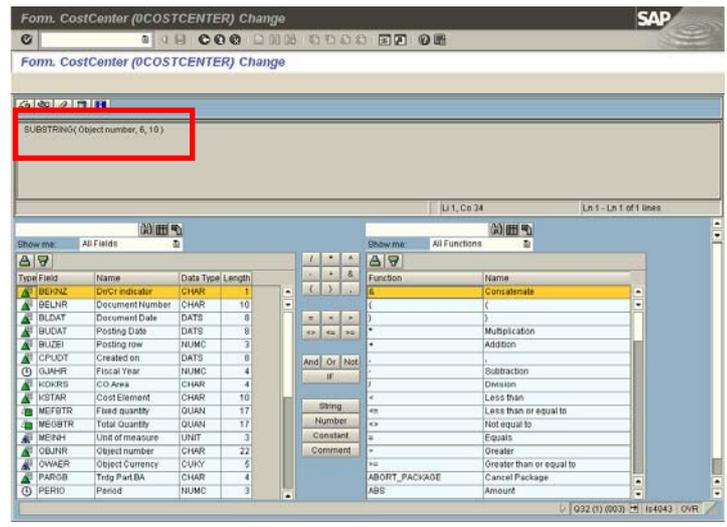
- Create a DataSource in transaction RSO2. Assign the DataSource to the appropriate application component. The view, which is created by following the steps above, should be used in this field. Click the 'Save' button to save this DataSource. You will get a pop-up for the development class. For testing purposes you can save this DataSource as a local object. If you want to transport this DataSource into any other systems it should be saved with the appropriate development class.



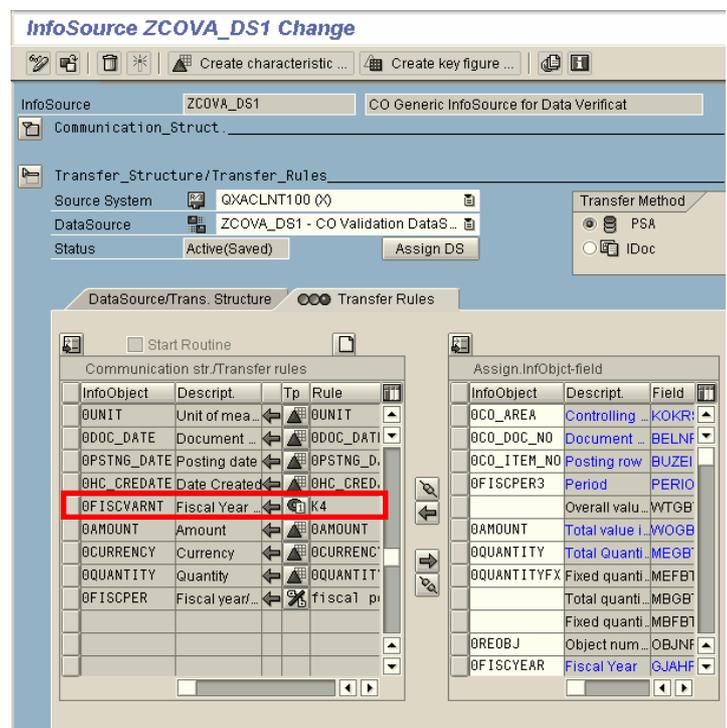
- Replicate this new Datasource 'ZCOVA\_DS1' to BI and create InfoSource / Transfer Rule in BI the system.



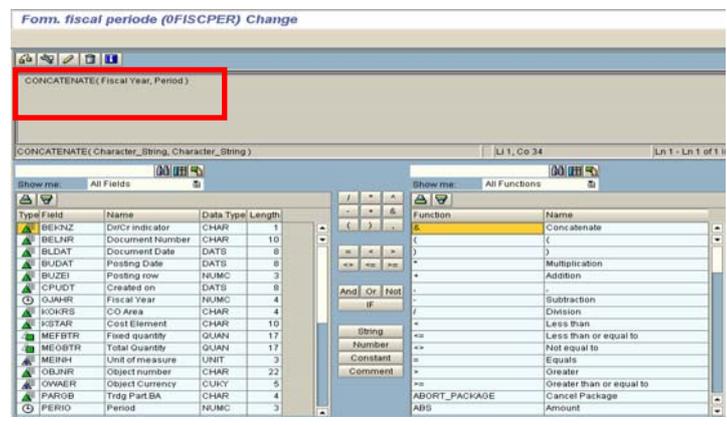
6. Because the value of InfoObject 'Ocostcenter' is determined in extractor OCO\_OM\_CCA\_9 and this logic cannot be replaced by the view 'ZCORECONCILIATION', this InfoObject has to be determined in the transfer rule using formula: Ocostcenter = substring (object number, 6, 10).



7. InfoObject 'Ofiscvarnt' can be assigned to a constant for testing purposes. In this example we assume that K4 is the fiscal year variant for the company. You can also determine the value of InfoObject 'Ofiscvarnt' by reading the attribute value of InfoObject 'OCOMP\_CODE' which is available in the transfer structure.



8. In 'ZCOVA\_DS1' InfoObject 'Ofiscper' (fiscal period) can be added to the InfoSource to make the comparison fairly easy. This InfoObject can be determined in the transfer rule using formula: Ofiscper = CONCATENATE (fiscal year, period).



### 3.1.3 Scenario Generic DataSource with Function Module

If the extraction logic is not sufficiently transparent that it can be reproduced using a table or view, you can create a generic DataSource based on a function module.

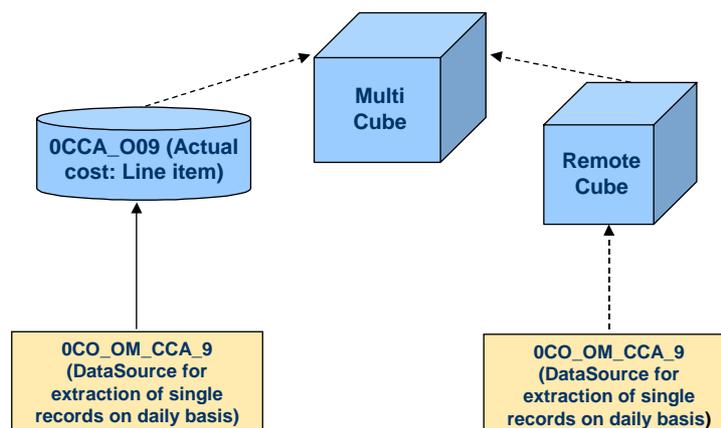
For more information about how to create a generic DataSource based on a function module, see

[http://help.sap.com/saphelp\\_nw04/helpdata/de/3f/548c9ec754ee4d90188a4f108e0121/frameset.htm](http://help.sap.com/saphelp_nw04/helpdata/de/3f/548c9ec754ee4d90188a4f108e0121/frameset.htm)

### 3.1.4 Scenario Direct Access to DataSource

With this scenario the original DataSource is accessed remotely via a RemoteCube. The results of the direct access and the results of ODS object (data in OLTP is loaded into an ODS object) are compared. As the same DataSource is applied as the reconciliation DataSource in this scenario, any errors existing in the DataSource (extractor) cannot be identified. On the other hand, this scenario can be applied for identifying inconsistencies in delta handling.

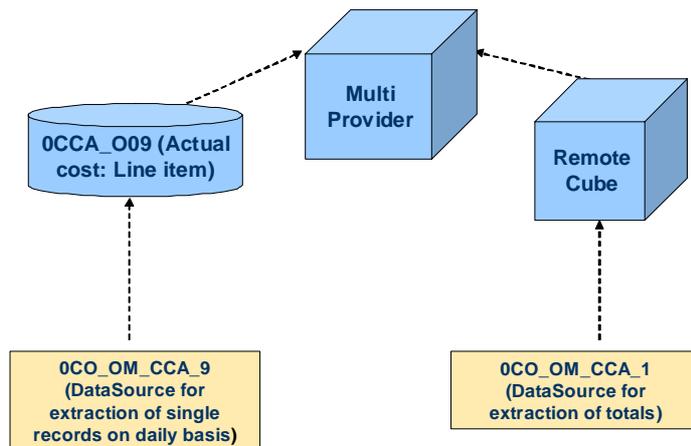
#### Data Model for Reconciliation Scenario 'Direct Access to DataSource'



### 3.1.5 Application-Specific Scenario: Reconciliation between Two Standard DataSources

The following two DataSources extract the same information and differ only in their time periods. Therefore they can be applied for the reconciliation scenario:

- 0CO\_OM\_CCA\_9: DataSource for extraction of single records on a daily basis
- 0CO\_OM\_CCA\_1: DataSource for extraction of totals.



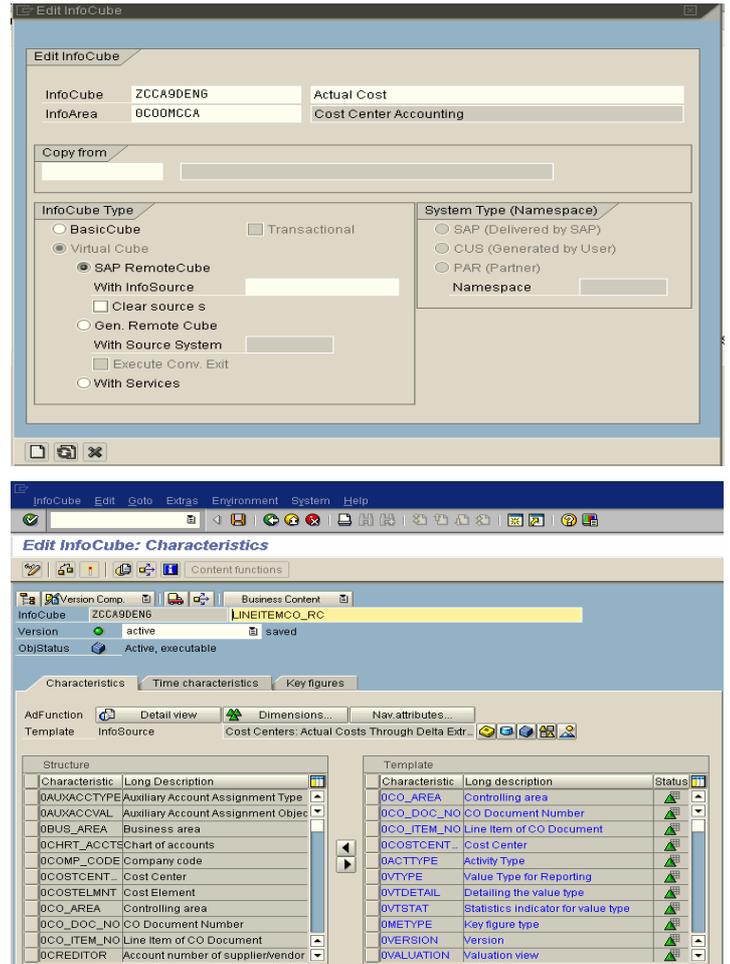
### 3.2 Implementing Common Content Objects for Different Reconciliation Scenarios

After you have implemented the appropriate DataSource for the different reconciliation scenarios, the step-by-step solutions introduced in this chapter are mainly the same for the different scenarios. This is an example for creating objects based on the 'Direct Access to DataSources' reconciliation scenario:

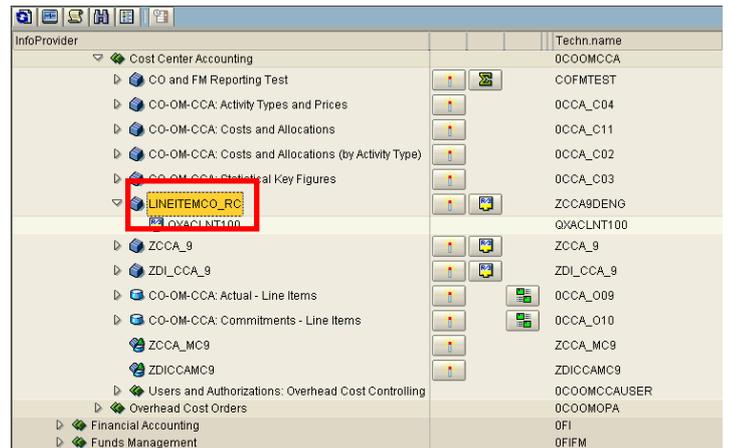
- RemoteCube
- ODS objects
- MultiProvider
- Query

The following step-by-step solutions are only an example. Check whether this is applicable to your concrete business case.

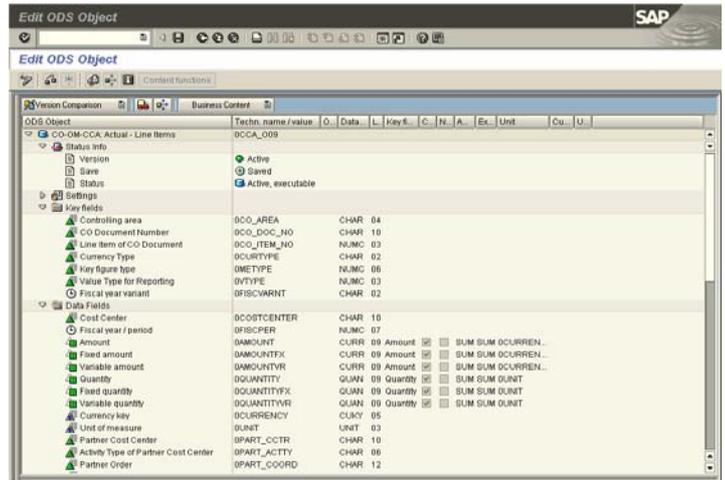
1. Create an SAP RemoteCube for InfoSource 0CO\_OM\_CCA\_9 in the customer system by using the proposed characteristics and key figures from InfoSource 0CO\_OM\_CCA\_9. Click 'Save' and 'Generate' to generate the InfoCube.



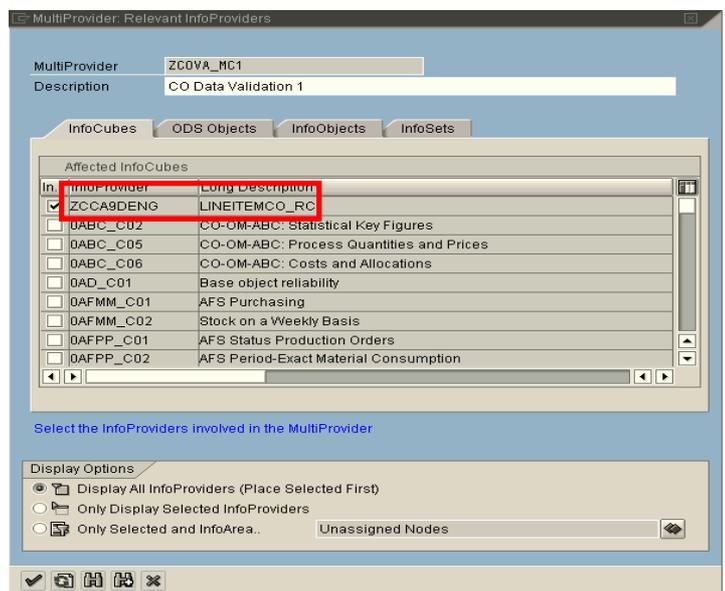
2. Assign a relevant source system to this RemoteCube by right-clicking on the 'Assign Source Systems' context menu.



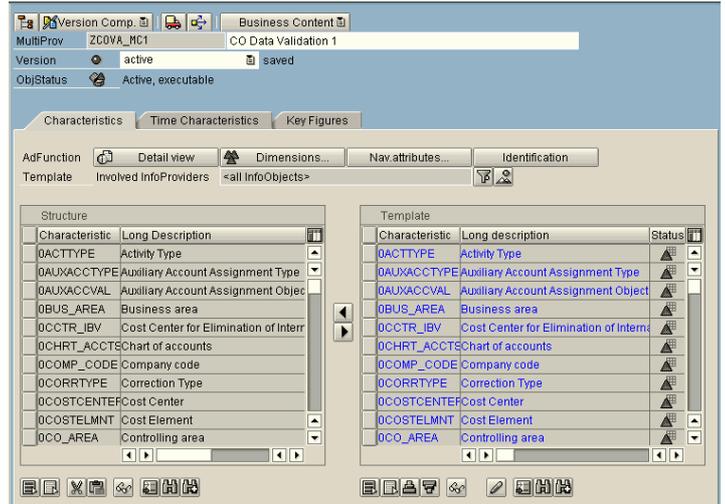
3. Create an ODS object without data transformation or manipulation. Assign the ODS object to InfoSource OCO\_OM\_CCA\_9. In this scenario we use ODS object OCCA\_O09 (ODS object which stores the actual cost for each cost center on the order item level) which is delivered to the customer with the standard business content.



4. Create a MultiProvider which is based on ODS object OCO\_O09 and the RemoteCube you created in step 1.



5. Assign characteristics to dimensions, identify characteristics and key figures. If all these steps are completed, you can save and activate this MultiProvider for data reconciliation.



- Here is an example for creating a query for data comparison based on this MultiProvider:

Start the BEX Query Analyzer or run transaction RSRT to define a new query.

Details for query definition:

*Filter:*

Currency type, controlling area, fiscal period

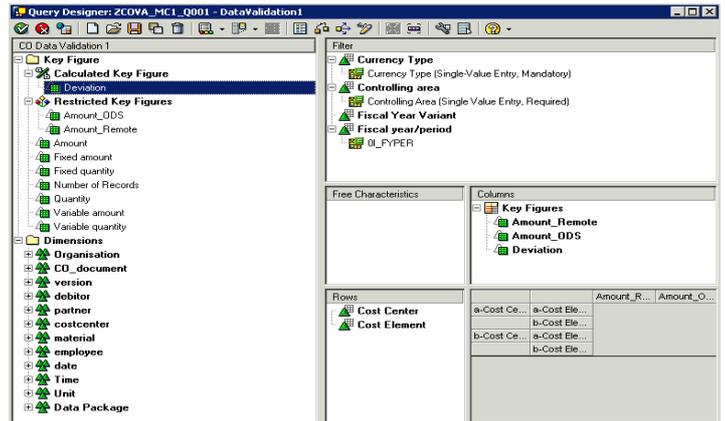
*Rows:*

Cost center, cost element

*Key figures:*

Amount\_ODS (result from ODS object), Amount\_Remote (result from the RemoteCube)

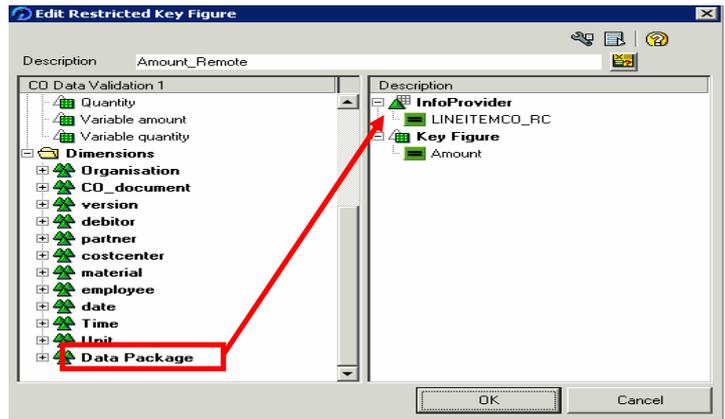
Deviation (the difference between the results from the ODS object and RemoteCube)



Query definition can be adjusted in accordance with your individual reporting requirements.

- Define restricted key figures.  
Example: Amount\_Remote (result from RemoteCube) is restricted by:  
InfoProvider = name of RemoteCube  
Key figure = Amount

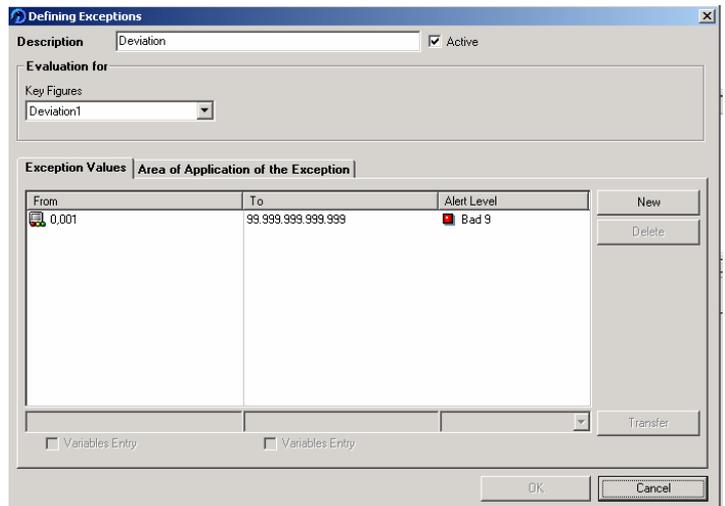
You can define other restricted key figures in the same way.



- Define an exception for calculated key figure 'deviation1'.

Deviation 1 = ABS ( 'Amount\_ODS' - 'Amount\_Remote' )

Information broadcasting can also be implemented to broadcast the exception automatically via email or a KM document. For details, see the 'Information Broadcasting' how-to-paper in the SAP Service Marketplace.



- After defining the query and the key figures you can run the query to see the result.

In this example you can see that the results for cost center 2-4200 and 2-4100 do not match in the ODS object and the RemoteCube. One reason may be that the data in the SAP source system is not completely loaded into the ODS object. In this case, restart the data load into the ODS object.

	A	B	C	D	E
1	DataValidation1				
2					
3	<b>Cost Element</b>				
4	<b>Fiscal year/period</b>				
5	<b>Key Figures</b>				
6	<b>Cost Center</b>				
7					
8	Controlling area	CO Europe			
9	Currency Type	Company code currency			
10	Fiscal year/period	006.2004 .012.2004			
11					
12	<b>Cost Center</b>		Amount_Remote	Amount_ODS	Deviation
13	1000	tst	61.639,83 EUR	61.639,83 EUR	0,00 EUR
14	1200	Cafeteria	241,18 EUR	241,18 EUR	0,00 EUR
15	4100	Technical Service I	18.437,93 EUR	18.437,93 EUR	0,00 EUR
16	4300	Plant Maintenance	-3.069,32 EUR	-3.069,32 EUR	0,00 EUR
17	2-1000	Corporate Services	-£ 1.063,83	-£ 1.063,83	£0,00
18	2-1200	Cafeteria	£ 5.000,00	£ 5.000,00	£0,00
19	2-4200	Production PC Parts	£ 102.029,84	£ 97.718,72	£ 4.311,12
20	2-4210	Assembly PC Parts	-£ 102.029,84	-£ 97.718,72	£ 4.311,12
21	<b>Overall Result</b>		*	*	*

- After the data load, the results from the ODS object are identical to those from the RemoteCube. Make sure that you have loaded all the data from the SAP source system into SAP BI before you start data reconciliation.

	A	B	C	D	E
1	DataValidation1				
2					
3	<b>Cost Element</b>				
4	<b>Fiscal year/period</b>				
5	<b>Key Figures</b>				
6	<b>Cost Center</b>				
7					
8	Controlling area	CO Europe			
9	Currency Type	Company code currency			
10	Fiscal year/period	006.2004 .012.2004			
11					
12	<b>Cost Center</b>		Amount_Remote	Amount_ODS	Deviation
13	1000	tst	61.639,83 EUR	61.639,83 EUR	0,00 EUR
14	1200	Cafeteria	241,18 EUR	241,18 EUR	0,00 EUR
15	4100	Technical Service I	18.437,93 EUR	18.437,93 EUR	0,00 EUR
16	4300	Plant Maintenance	-3.069,32 EUR	-3.069,32 EUR	0,00 EUR
17	2-1000	Corporate Services	-£ 1.063,83	-£ 1.063,83	£0,00
18	2-1200	Cafeteria	£ 5.000,00	£ 5.000,00	£0,00
19	2-4200	Production PC Parts	£ 102.029,84	£ 102.029,84	£0,00
20	2-4210	Assembly PC Parts	-£ 102.029,84	-£ 102.029,84	£0,00
21	<b>Overall Result</b>		*	*	*

## 4 Appendix

This chapter provides additional channels of information about data reconciliation and data consistency:

### 4.1 Business Content Documentation:

Business content documentation (e.g. description of DataSources) explains the extraction logic, related application logic. and technical information etc. This description helps you to understand the standard DataSource and offers more transparency.

The business content documentation can be accessed via link: <http://help.sap.com/>

### 4.2 Relevant How-To-Papers

<http://service.sao.com/bi> → SAP BW InfoIndex → Data Quality

### 4.3 Notes

General notes on data reconciliation:

- Repair Request Functionality (How to Use the Repair Request): 739863
- How to Reload Delta Data Without New Init (Workaround): 691721
- Down Time Reducing in LO-LIS: 753654
- Multiple BI Systems Are Getting Data from One OLTP- Problems with Delta: 775568
- Backup in BI and OLTP: Risks & Tips: 731682
- Extraction from Archives: DataSources / Applications / Workaround if the Functionality Is Not Available: 643541
- Wrong Results with STAR\_TRANSFORMATION\_ENABLED=TRUE : 717496
- Wrong Results with ODS or Non-Star Transformation Queries: 727310

Notes for the data reconciliation in specific content area:

- FI: Reconciliation Items : 616331, 616918
- FI: Reload Wrong or Missing Documents: 616331
- FI: How to Involve Documents Which Did Not Have Been Updated in the System into Delta Load: 651227
- FI: Recommendations to the Delta Modeling in FI Content Area: 656687
- FS-TB : Comparison Report Payment Item Content OTB\*: 757008
- MM-PUR: Number of Deliveries for Goods Receipt: 381267
- CO-OM: Elimination of Internal Business Volume: 590812
- CO: Customer Uses ODS Object with Totals Record: 448693
- CO: Safety Time Interval for CO DataSource is Too Small: 553561 and 416265.
- LO Cockpit: Changes to Extract Structures in Customizing Cockpit: 328181

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