

How-to Guide
SAP NetWeaver 2004s



How To... Implement a VirtualProvider with Services

Version 2.00 – April 2007

Applicable Releases:
SAP NetWeaver 2004s BI

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1 Overview

This how-to guide covers two scenarios. The first scenario describes how to implement a VirtualProvider in general using the SBOOK table for flight bookings as an example. The second scenario explains how to create a generic VirtualProvider that can be used to read any database table.

For more information about VirtualProviders please refer to the online documentation:
http://help.sap.com/saphelp_nw2004s/helpdata/en/62/d2e26b696b11d5b2f50050da4c74dc/frameset.htm

2 Scenario: Flight Bookings

A travel agency is using a custom transactional application to enter flight bookings. This transactional application updates a custom table "SBOOK". A manager wants to see the total booking price per airline and year real time. The total booking prices for all posted flights are specified in a Query. The fields BOOKID (Booking Number), CARRID (Airline Code), CLASS (Class), CONNID (Flight Connection Number), and FLDATE (Flight Date) of the table SBOOK are used to provide drilldown capabilities for the manager.

	A	B	C	D
1	Flight Booking			
2				
3	Calendar Day			
4	Calendar month			
5	Booking Number			
6	Airline Code			
7	Flight Connection No			
8	Flight Class			
9	Key Figures			
10	Calendar Year			
11				
12	Calendar Year	Airline Code	Flight Price	
13	1995	LH	3.897,00 DM	
14		SQ	835,00 DM	
15		Result	4.732,00 DM	
16	1996	LH	289.058,97 DM	
17		Result	289.058,97 DM	
18	Overall Result		293.790,97 DM	
19				

2.1 Introduction

The realization has been implemented with a VirtualProvider with Services. For the implementation of a VirtualProvider a customer function module (service) has to be created. The function module selects the necessary data from the transparent table SBOOK and transfers it to the VirtualProvider interface. A query on the VirtualProvider displays the data in the Business Explorer in real time.

2.2 The Step By Step Solution

2.2.1 Service Variants

The Service Variants determine which interface should be used for the customer-defined function module. The variants indicate which information has to be provided or can be transferred / processed by the function module.

There are three types of service variants that can be defined by flags in the service definition.

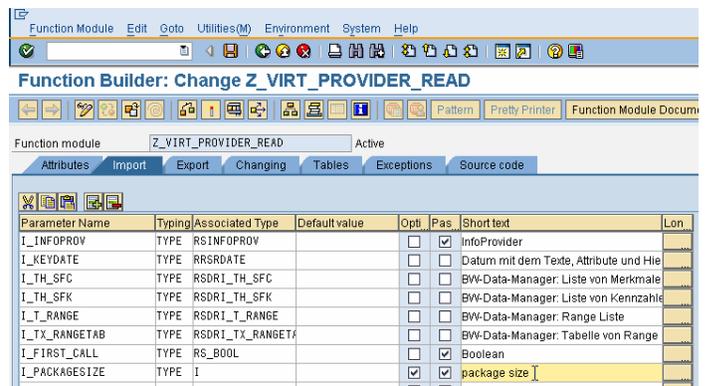
The types are:

- (1) Pack RFC is switched on
- (2) SID support (by the Function Module) is switched off (is used in this example)
- (3) SID support (by the Function Module) is switched on

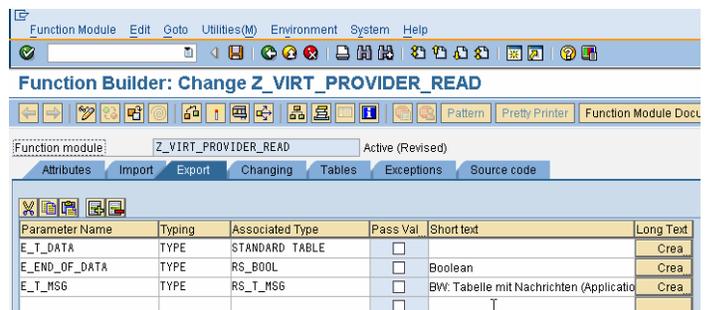
For detailed information about the different service variants, please refer to the chapter "Virtual InfoCubes with Services" in the SAP NetWeaver 2004s usage type BI documentation.

2.2.2 Create Function Module

1. Create 'Importing Parameters' of the function module



2. Create 'Exporting Parameters' of the function module

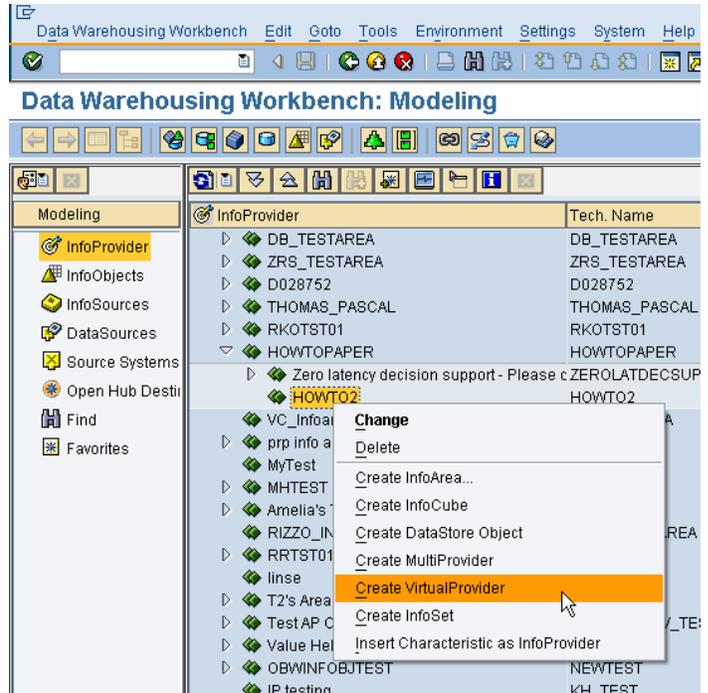


- The coding of function module "Z_VIRT_PROVIDER_READ" is included in the ZIP file.

Paste the coding into the editor and activate the function module.

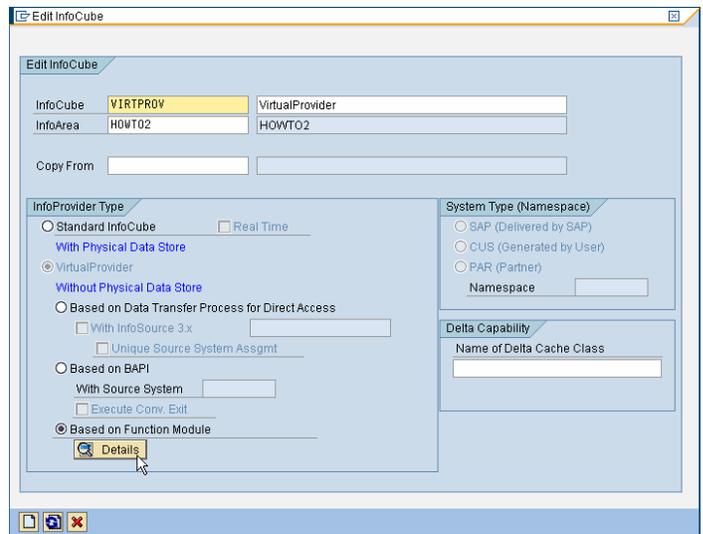
2.2.3 Creating the VirtualProvider

- Right mouse click on a InfoArea and select 'Create VirtualProvider' from the context menu



- Specify a technical InfoCube name and a description.

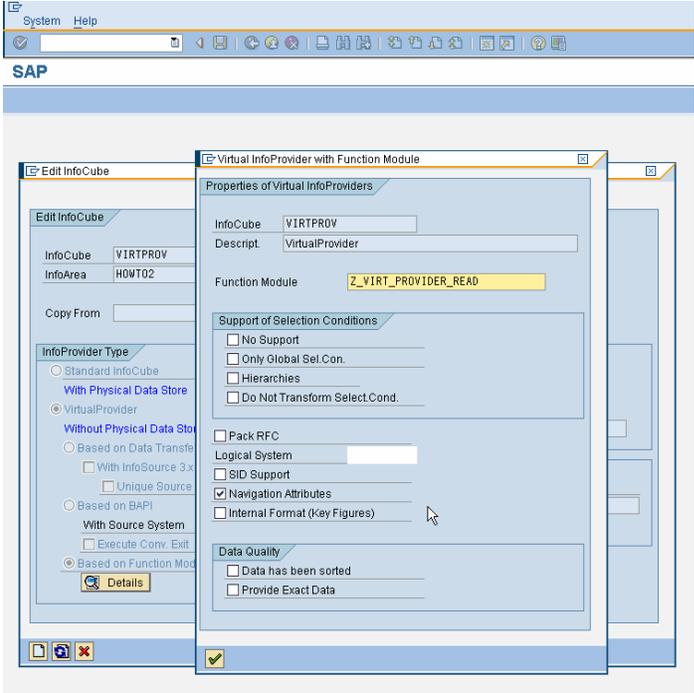
Select the radio button for 'Based on function module', and click on 'Details'.



- Enter the function module name and enable the parameter “Navigational Attributes”.

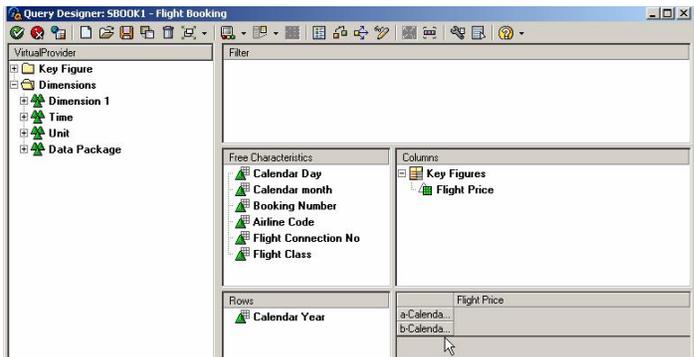
Note: On this pop-up you can also specify which service variant you want to use by setting the check boxes for ‘Pack RFC’ and ‘SID Support’ correspondingly. Switch ‘Pack RFC’ and ‘SID Support’ off for this example.

Please check the documentation carefully before entering the parameters.



2.2.4 Create a Query

- Create a Query



8. Execute the Query.

You can see the data of table SBOOK in the results. Navigation like filtering and drill-downs is fully supported.

	A	B	C
1	Flight Booking		
2			
3	Calendar Day		
4	Calendar month		
5	Booking Number		
6	Airline Code		
7	Flight Connection No		
8	Flight Class		
9	Key Figures		
10	Calendar Year		
11			
12	Calendar Year	Airline Code	Flight Price
13	1995	LH	3.897,00 DM
14		SQ	835,00 DM
15		Result	4.732,00 DM
16	1996	LH	289.058,97 DM
17		Result	289.058,97 DM
18	Overall Result		293.790,97 DM
19			

3 Scenario: Any Table

You are looking for a generic solution that allows you to use the BI query and reporting tools against any table. Further more you don't want to load the data from the table into an InfoProvider.

This section describes how to create a VirtualProvider that can be used to read any database table^{*}. With the proposed solution you can for example run queries against PSA tables, un-activated data within a DataStore Object, or a custom table.

Note:

The solution does NOT replace best practices for BI data modeling and provides limited means for performance tuning (DB indexes). If you want to report on high data volumes, data should be loaded into standard InfoCubes.

3.1 Introduction

This guide explains how-to implement a VirtualProvider that allows you to read any table and make it available for reporting in SAP NetWeaver BI. For each table you want to read, you create one VirtualProvider. These VirtualProviders are based on the same generic ABAP function module. The solution provides default mapping rules between BI metadata (InfoCube and InfoObjects) to database metadata (DB table and fields). However it's possible to overwrite the defaults with custom mapping rules.

InfoCube	↔	Database Table
InfoObjects	↔	Table Fields
Query Selection	↔	Where Clause

The default mapping is used if the InfoCube and database table have the same name and the table fields correspond 1:1 to an InfoObject. In other cases, custom mapping rules can be maintained in simple configuration tables (see appendix).

The example in this how-to guide is setting up a VirtualProvider for DataStore Object "SAP Demo Sales and Distribution: Details" (0D_SD_001). Standard BI queries can retrieve only activated data from the DSO. However, with this solution you can also query the newly loaded but not yet activated records (table /BI0/AD_SD_00140).

^{*} The solution will work with transparent database tables and views. Cluster tables with RAW data fields are not supported.

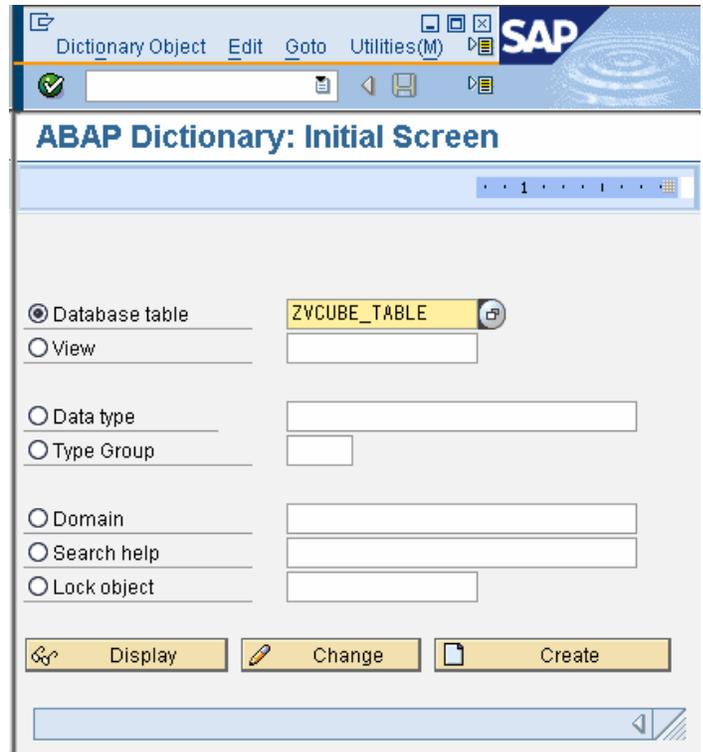
3.2 The Step By Step Solution

3.2.1 Create Configuration Tables

- Go to transaction SE11 and create two database tables ZVCUBE_TABLE and ZVCUBE_FIELDS.

Assign a package and add the objects to a transport (or use package \$TMP).

See appendix for field list.



- Settings for both tables:

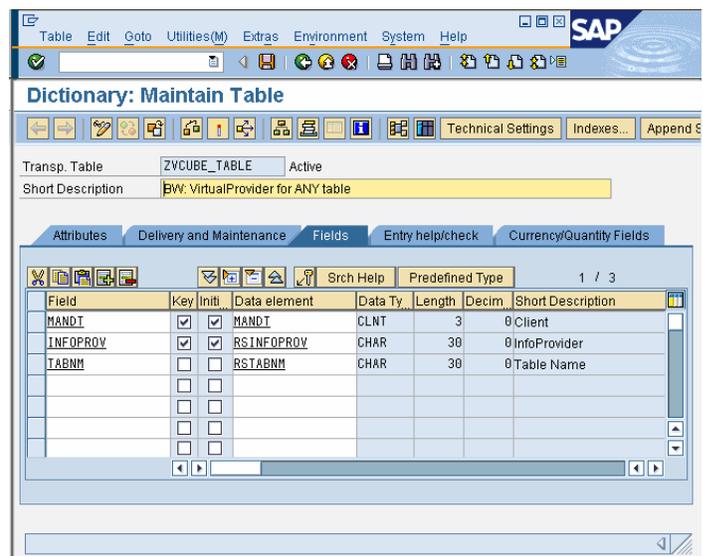
Delivery Class = A
Data Browser =
Display/Maintenance Allowed

Data class = USER
Size category = 0
Buffering switched on
Fully buffered

Extras → Enhancement Category =
Can be enhanced (deep)

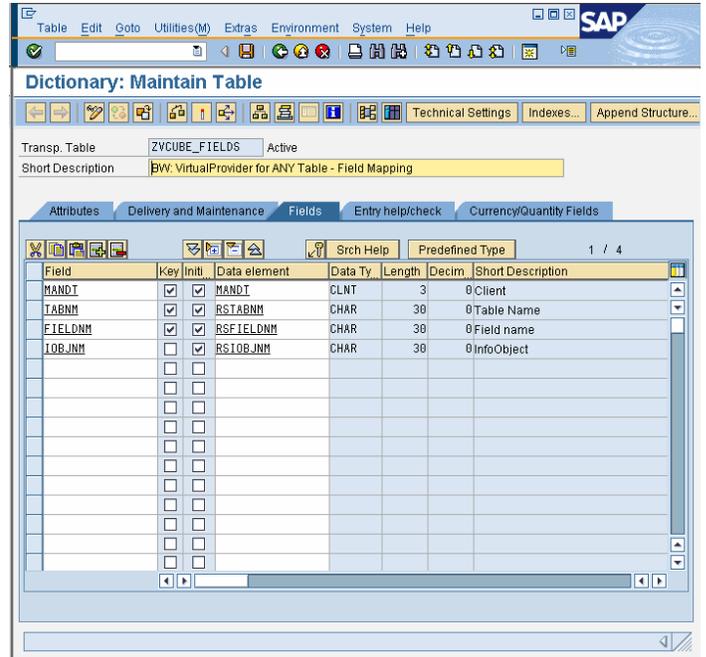
Table ZVCUBE_TABLE:

Field	Key	Data element
MANDT	X	MANDT
INFOPROV	X	RSINFOPROV
TABNM		RSTABNM



11. Table ZVCUBE_FIELDS:

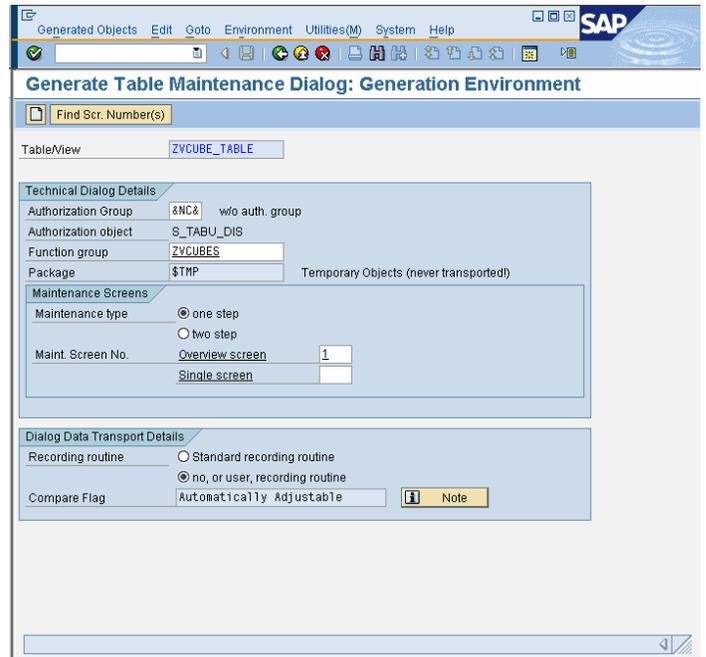
Field	Key	Data element
MANDT	X	MANDT
TABNM	X	RSTABNM
FIELDNM	X	RSFIELDNM
IOBJNM		RSIOBJNM



12. Create a table maintenance dialog.
Choose Utilities → Table Maintenance Generator.

Authorization Group = &NC&
Function Group = ZVCUBES
Maintenance Type = one step
Overview Screen = 1 (2 for other table)

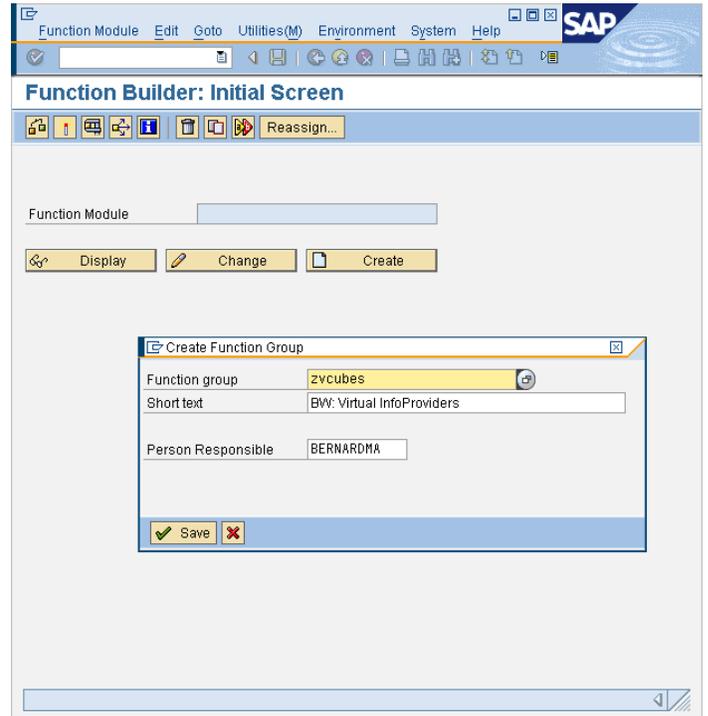
If you want to transport the settings, select "Standard recording routine".
Click New and confirm the dialogs.



3.2.2 Implement Function Module for VirtualProvider

13. Go to transaction SE37 and create a new function group ZVCUBES.

Assign a package and add the object to a transport (or use package \$TMP).

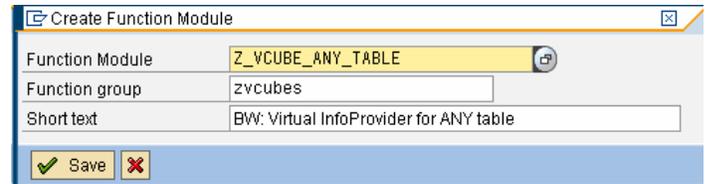


14. Implement function module Z_VCUBE_ANY_TABLE. The ABAP coding can be found in a separate attachment.

Add the type-pool RS to the global data of the function group.

Save and activate everything.

Now the function module can be used to define VirtualProviders.



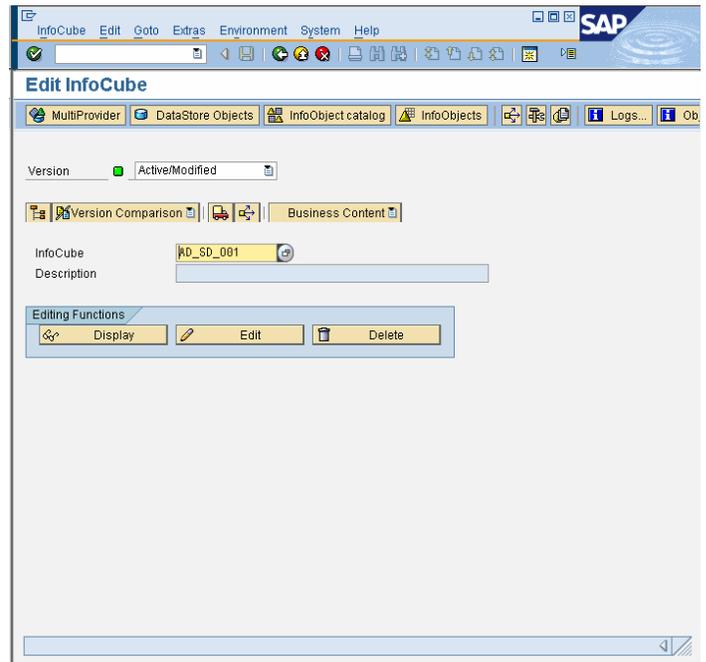
3.2.3 Create VirtualProviders

15. Go to the Modeling Workbench (RSA1) or transaction RSDCUBE to create a VirtualProvider.

If you use the name of the database table that you want to read as the name for the InfoCube, then no further mapping is required.

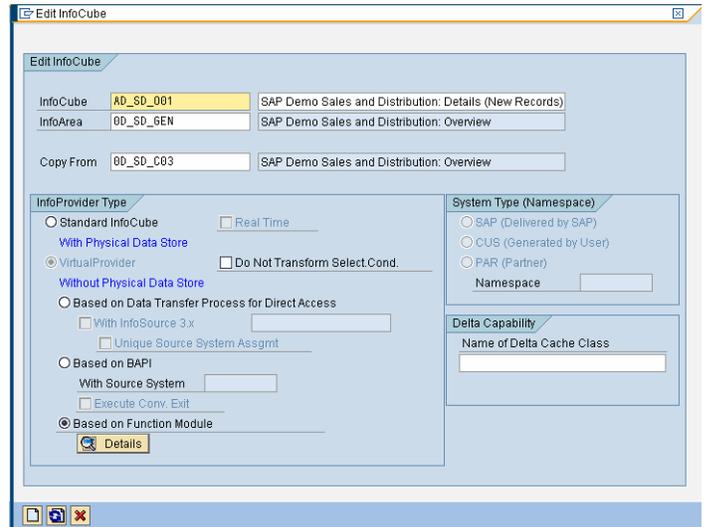
See appendix for other additional mapping options.

Example: InfoCube AD_SD_O01.



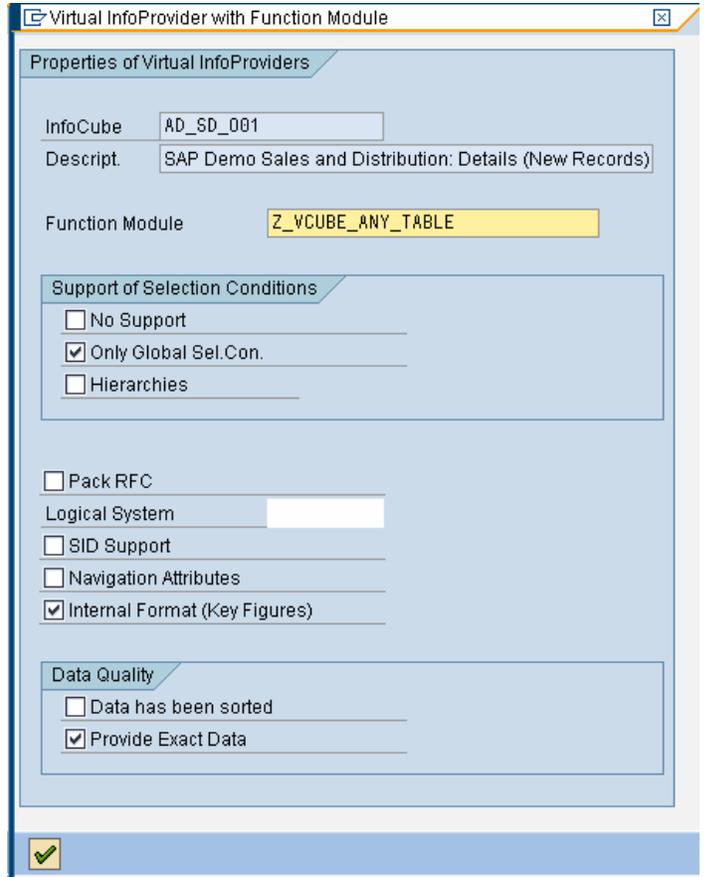
16. Set the InfoProvider Type to "Based on Function Module" select "Details".

Example: Copy from 0D_SD_C03



- Enter function module
Z_VCUBE_ANY_TABLE.

Only Global Sel. Con. = X
 Internal Format (Key Figures) = X
 Provide Exact Data = X



- Maintain the characteristics and key figures of the InfoCube.

For each field of your database table add either a characteristic or a key figure. If you don't need the field for reporting you don't have to include it the InfoCube.

Optionally you can turn on navigation attributes.

For the example add the following characteristics to a new dimension called "Admin":

0TCTSYSID
 0TCTREQSID
 0TCTDPAKID
 ZRECORD (NUMC 10)
 ZRECMODE (CHAR 1)
 These characteristics will be used in a custom mapping.

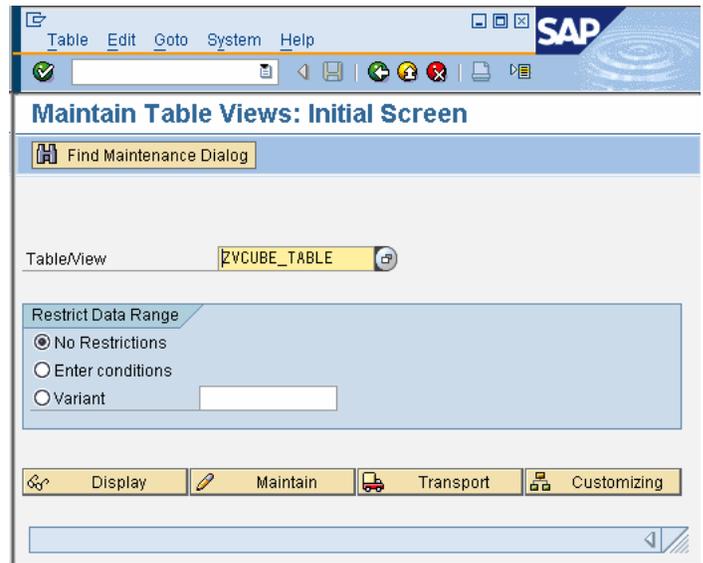
InfoCube	Techn. name / value	Fu...	O...	Data...	L
SAP Demo Sales and Distribution: Details (New Records)					
Object Information					
Version		◇ New			
Save		□ Not saved			
Object Status		○ Inactive, not exec...			
Settings					
Dimensions					
Data Package	AD_SD_001P				
Time	AD_SD_001T				
Unit	AD_SD_001U				
Organisation	AD_SD_0011				
Customer	AD_SD_0012				
Payer (SAP DEMO)	0D_PAYER			CHAR	10
Ship-to Party (SAP DEMO)	0D_SHIPTO			CHAR	10
Sold-to Party (SAP DEMO)	0D_SOLD_TO			CHAR	10
Product	AD_SD_0013				
Value Type	AD_SD_0014				
Version	AD_SD_0015				
Sales Area	AD_SD_0016				
Document Classification	AD_SD_0017				
Country Code	AD_SD_0018				
Admin	AD_SD_0019				
BW System	0TCTSYSID			CHAR	10
Data Request (SID)	0TCTREQSID			NUMC	09
Data Package ID	0TCTDPAKID			NUMC	06
Record	ZRECORD			NUMC	10
Record Mode	ZRECMODE			CHAR	01
Navigation Attributes					
Key Figures					
Cost in statistics currency (SAP DEMO)	0D_COSTVALS			CURR	09
Number of Document Items (SAP DEMO)	0D_DOCITEMS			DEC	09
Number of documents (SAP DEMO)	0D_DOCUMENT			DEC	09
Gross weight in kg (SAP DEMO)	0D_GR_WT_KG			QUAN	09
Net Value in Statistics Currency (SAP DEMO)	0D_NETVAL_S			CURR	09
Net weight in kg (SAP DEMO)	0D_NT_WT_KG			QUAN	09
Open order quantity in base unit (SAP DEMO)	0D_OORQTYBM			QUAN	09
Open order net value in statistic currency (SAP DEMO)	0D_OORVALSC			CURR	09
Quantity in base units (SAP DEMO)	0D_QUANT_B			QUAN	09
Volume in Cubic Decimeters (SAP DEMO)	0D_VOLUMCDM			QUAN	09

19. Save and activate the InfoCube.

InfoCube	Techn. name / value
<ul style="list-style-type: none"> SAP Demo Sales and Distribution: Details (New Records) Object Information <ul style="list-style-type: none"> Version Save Revised Version Object Status Settings <ul style="list-style-type: none"> Type Subtype 	AD_SD_001 In Process Saved Active Version Active, executable Virtual InfoProvider Based on Function Module

3.2.4 Maintain Mapping Rules

20. Go to transaction SM30 and maintain table ZVCUBE_TABLE.



21. Enter the InfoCube and table name.

Note: If InfoCube and table name are identical you can skip this entry.

Example:
 InfoCube = AD_SD_001
 Table = /BI0/AD_SD_00140

The second line show an example for a PSA table.

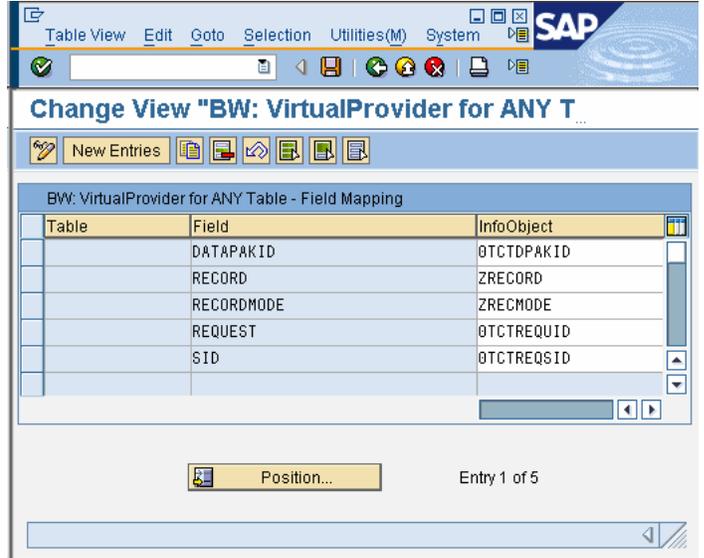
The screenshot shows the SAP SM30 'Change View BW: VirtualProvider for ANY ta...' screen. It features a table with two columns: 'InfoProvider' and 'Table'. The first row is highlighted in yellow and contains 'AD_SD_001' and '/BI0/AD_SD_00140'. The second row contains 'B0001880' and '/BIC/B0001880'. Below the table, there is a 'Position...' button and the text 'Entry 1 of 2'.

InfoProvider	Table
AD_SD_001	/BI0/AD_SD_00140
B0001880	/BIC/B0001880

22. Maintain table ZVCUBE_FIELDS and enter the mapping of table fields to InfoObjects.

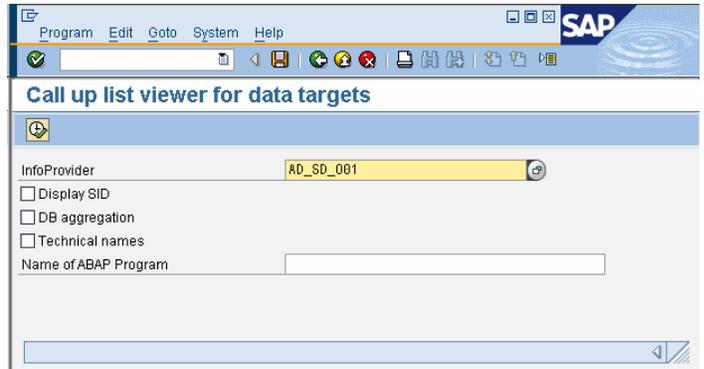
Note: The system provides a default mapping rule for all InfoObjects.

You can define mapping rules by table or system wide if you leave the table field empty.



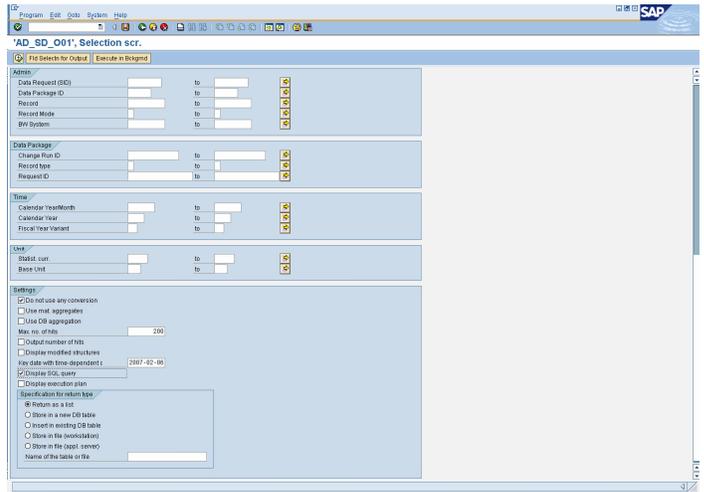
3.3 Test VirtualProvider

23. Go to transaction LISTCUBE and select your VirtualProvider.



24. Choose the fields for output and enter selection criteria as required. Then execute to display the data from your database table.

For troubleshooting you can select "Display SQL Query". This will show the actual SQL statement being executed to select the data.



4 Appendix

4.1 Mapping Rules for InfoCube <> Table

Rule	Description
Default	Direct mapping of InfoCube to table name
Custom	Look-up of table name in ZVCUBE_TABLE
Custom PSA	Look-up of PSA name in ZVCUBE_TABLE and look-up of table name based on query key date in RSTSODS

4.2 Mapping Rules for InfoObjects <> Fields

Rule	Description
Default	<p>Mapping of InfoObject to field name</p> <p><u>SAP InfoObjects</u> Field name is name of InfoObject without 0-prefix</p> <p><u>Custom InfoObjects</u> Field name is name of InfoObject with /BIC/ prefix</p> <p><u>Namespace InfoObjects</u> See function modules</p> <p>Please execute function modules <code>RSD_IOBJNM_GET_FROM_FIELDNM</code> and <code>RSD_FIELDNM_GET_FROM_IOBJNM</code> to determine exact mapping (there are a few exceptions).</p>
Custom	Look-up of field name by table in ZVCUBE_FIELDS
Custom Global	Look-up of field name in ZVCUBE_FIELDS (table name = initial)

4.3 Special Rules for InfoObjects

InfoObjects in the data package dimension of the VirtualProvider can not be mapped to table fields because the selection criteria for InfoObjects 0REQUID, 0RECORDTP, and 0CHNGID are not passed to the function module of the VirtualProvider.

However, there are tables that contain for example request IDs which you want to read using the VirtualProvider. The way to get around this limitation is to add technical InfoObjects to the VirtualProvider and maintain a corresponding mapping rule.

The following table contains recommended global mapping rules (leave table name empty in ZVCUBE_FIELDS).

Field	InfoObject	Description (Example)
REQUEST	0TCTREQUID	Request (PSA tables)
DATAPAKID	0TCTDPAKID	Data Package (PSA and DSO tables)
RECORD	ZRECORD (NUMC 10)	Record Number (PSA tables)
SID	0TCTREQSID	Request ID (DSO tables)
RECORDMODE	ZRECMODE (CHAR 1)	Record Mode (DSO tables)

www.sdn.sap.com/irj/sdn/howtoguides