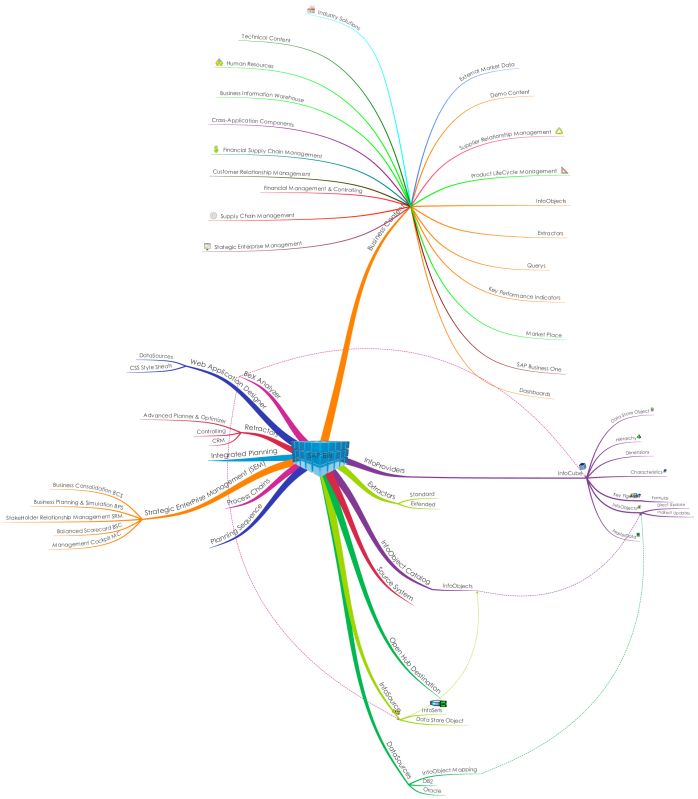
MULTIPROVIDERS AND BI INFOSETS



A DEEP DIVE INTO DESIGNING AND DEPLOYMENT

Authors: Lonnie Ayers, Doug Ayers, Victor Ayers

Table of Contents

MultiProviders and BI InfoSets 1

Overview 1

Example Business Scenario 1

Aircraft Industry-Common BW User 1

Knowledge 1

BW Consulting Skillsets 1

About SAP BW Consulting, Inc. 1

Introduction to MultiProviders 2

What is a MultiProvider Use For? 2

MultiProvider 3

Advantages of the MultiProvider 3

Integration 3

MultiProviders as Unions of Providers 4

Our MultiProvider Example 4

Example: Plan and Actual Cost Center Transaction 5

MultiProvider Queries 6

Designing a MultiProvider in BI 6

Step One-Define and Name Your MultiProvider 7

Step 2-Select Your InfoProviders 8

Step 3-Choose Specific InfoProviders 9

Step 4-You See The MultiProvider Screen 10

Step 5-Select Identify Characteristics 10

Step 6-Choose Characteristics On This Screen 11

Step 7-Choosing Key Figures 12

Step 7A-Finalize Key Figure Selection 13

Now You're Ready 13

InfoSets and Their Business Purpose 14

BI InfoSets: Definition and Features 14

Step One-Create It. 15

Step Two-Add InfoProvider From the Available List 16

Step 3-Add Another Relevant InfoProvider As Required 16

Step 4-Add and Define Your Joins 17

Step 5-Decide What Should be Displayed By Selecting/De-Selecting the Checkboxes 17

InfoSet Maintenance GUI 18

Business Scenarios for BI InfoSets 19

Join Concepts for BI InfoSets 20

Unsupported Functions of InfoSet Query 20

Supported Functions of the InfoSet Query 20

Summary 20

Glossary 22

MultiProviders and BI InfoSets

Overview

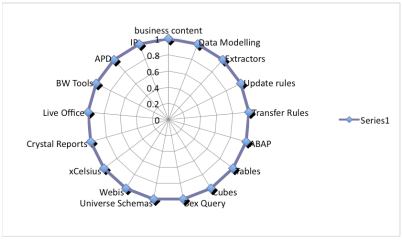
As part of our series on SAP BW Data Modeling, we next cover MultiProviders and InfoSets. MultiProviders and InfoSets enable you to combine other InfoProviders into a logical group. In turn, this group provides a semantic layer on which to base reporting. As both MultiProviders and BI (Business Intelligence) InfoSets do not store the data persistently, the data is only collected when the queries are executed. We explore and explain the differences and similarities between MultiProviders and InfoSets in this eBook.

Example Business Scenario

You have already developed InfoProviders for cost center transactions that provide both plan and actual data. BI Integrated Planning (IP) can be supported by this separate plan-vs-actual design with the addition of one more infocube. It can also be used to support the loading of actual cost data from the SAP source system. Your business users need reports that provide comparison reports of planned vs actual cost.

Aircraft Industry-Common BW User

Knowledge



BW Consulting Skillsets

About SAP BW Consulting, Inc.

SAP BW Consulting, Inc. is one of the fastest growing Business Intelligence consultancies. Our focus is on delivering value to our customers and providing a challenging set of projects for consultants. Our approach is based upon continuous education, of our consultants, ourselves, and our customers.

Industry Focus

We bring more than 70 years of combined Industry Experience spanning the Military Logistics arena, Automotive Real Time embedded system, High-Tech Manufacturing, NASA and other government organizations, Rail, Airlines, Manufacturing, Consumer Packaged Goods (CPG), Airports and pharmaceuticals.

SAP BW Consulting, Inc.

Share on Facebook Post on LinkedIN Tweet this eBook

Introduction to MultiProviders

MultiProviders are a special type of InfoProvider that combine data from several InfoProviders. They are then available for reporting. MultiProviders themselves (like InfoSets and VirtualProviders) do not contain any data. Their data comes exclusively on the InfoProviders upon which they are based. MultiProviders can be based upon any combination of the following InfoProviders:

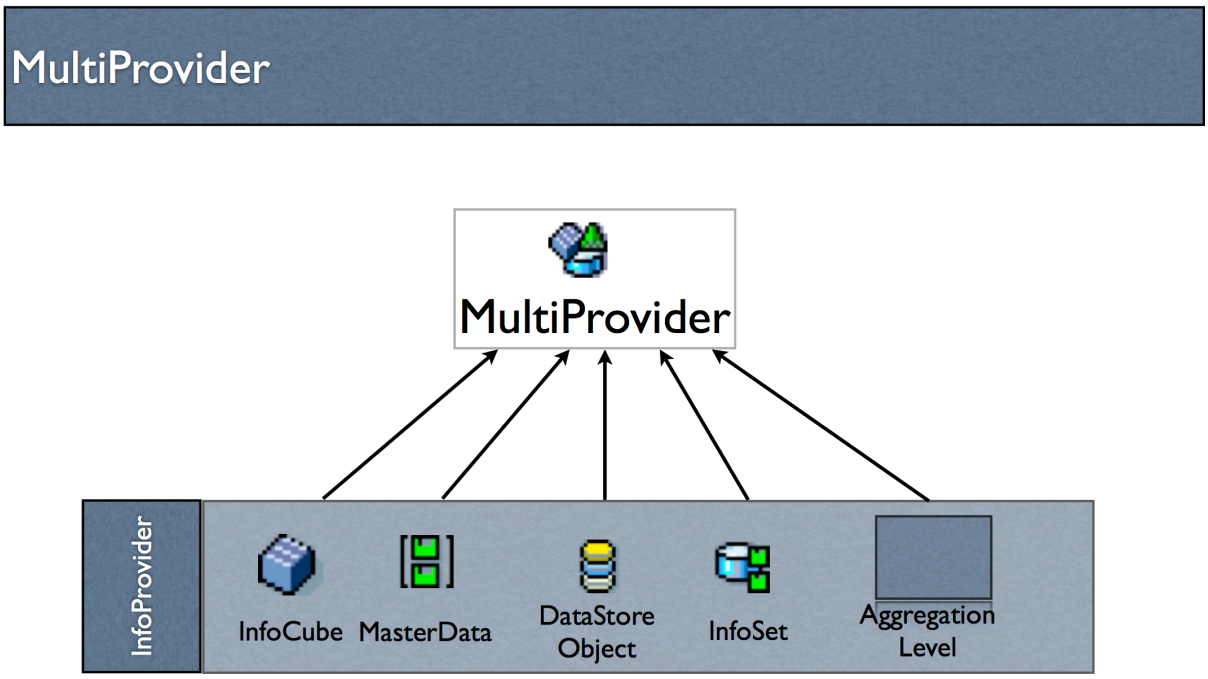
- InfoCubes
- DataStore Objects
- InfoObjects
- InfoSets
- Aggregation levels (slices of InfoCubes to support BI Integrated Planning)

What is a MultiProvider Used For?

You can only create a BEx query against a single InfoProvider. A MultiProvider provides a way to to access multiple InfoProviders, as it can combine a number of InfoProviders

Our Business Scenario includes two InfoCubes (plan and actual cost data). We have one InfoProvider with actual data for a logically self-contained business area and a corresponding InfoProvider with plan data. By using a MultiProvider, you can combine the InfoProviders into a MultiProvider to compare Plan vs. Actual data in a query.

Many other examples exist. You could have an InfoCube and an InfoObject. You have an InfoCube with your products and revenues. You could combine it with the InfoObject PROD (product). This would allow you to display slow-moving items, since products that generate no revenue are also displayed.



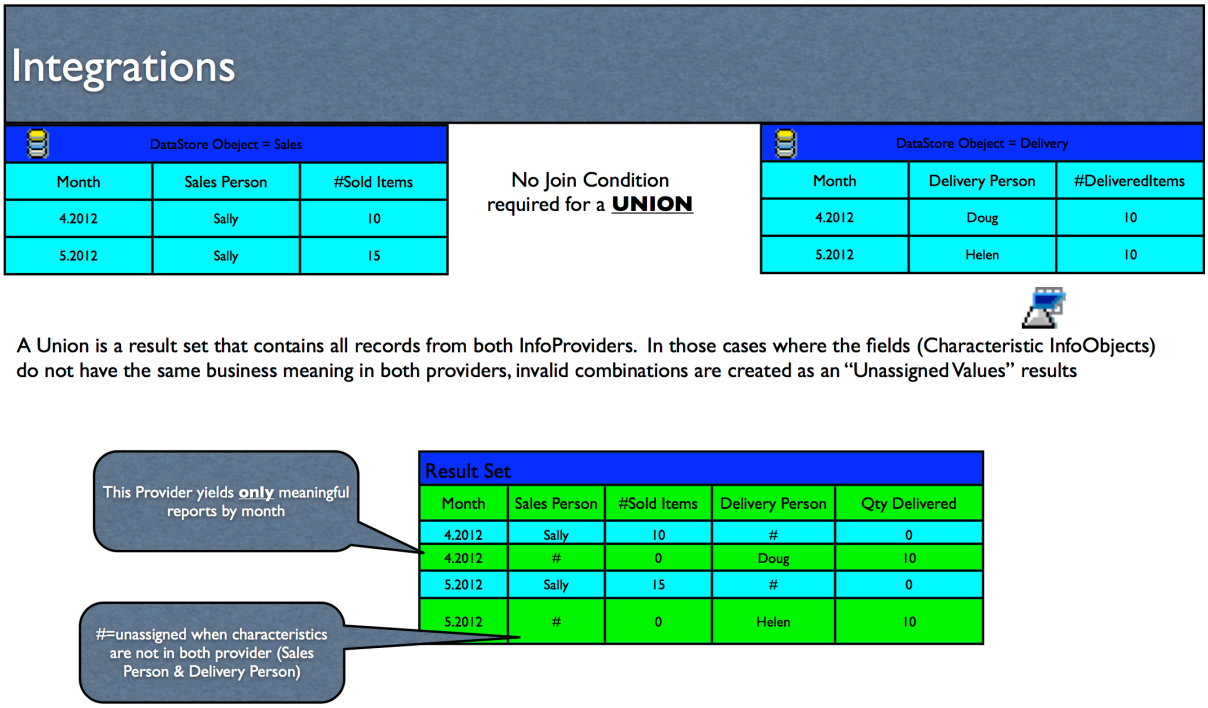
MultiProvider

Advantages of the MultiProvider

- **Simplified Design:** The MultiProvider concept provides you with advanced analysis options, without you having to fill new and extremely large InfoCubes with data. You can construct simpler BasicCubes with smaller tables and with less redundancy.
- **Individual InfoCubes and DataStore Objects can be partitioned separately***
- **Performance gains** through parallel execution of subqueries
    - Note: *"partitioned separately" can either relate to the concept of splitting cubes and DataStroe Objects into smaller ones, perhaps by limiting the number of years in a each or via physical database partitioning of the fact table.

Integration

MultiProviders exist only as a logical definition. The data is still stored in the InfoProviders on which they are based. This aspect of MultiProviders makes them very similar to InfoSets; however, the big difference between InfoSets and MultiProviders is in the technical way the tables are linked. InfoSets link the underlying providers with database joins, and MultiProviders use a technically different method called unions. These differences result in different result sets and, therefore, different end uses for MultiProviders versus InfoSets.



MultiProviders as Unions of Providers

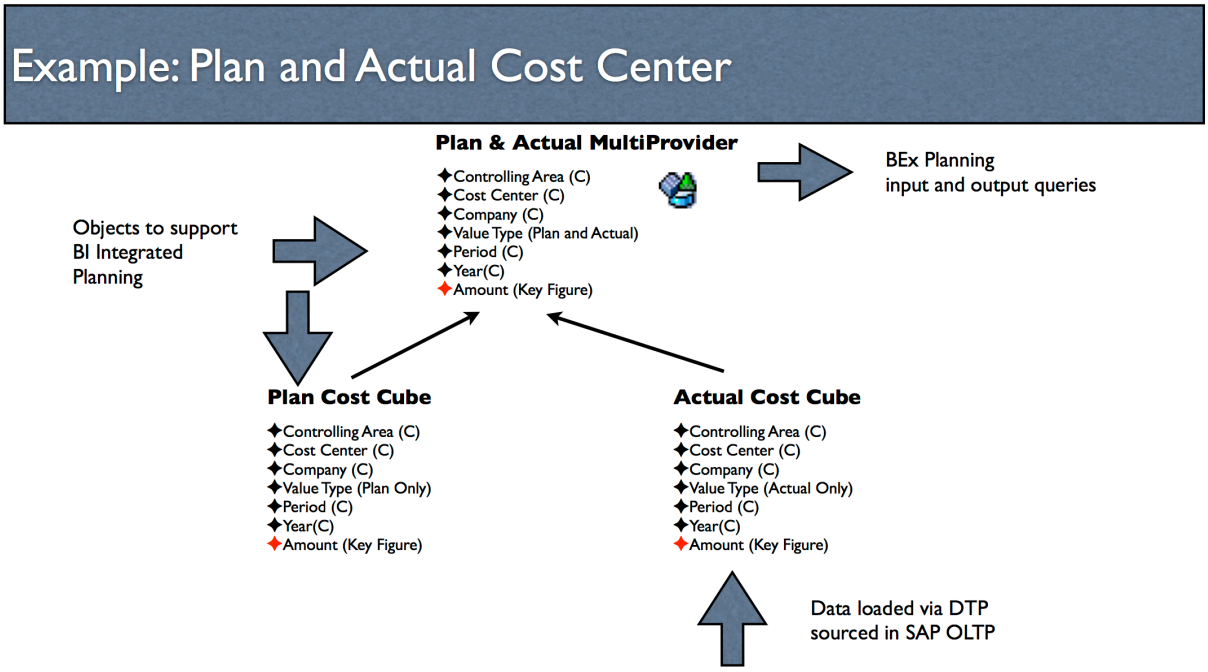
Each characteristic of a MultiProvider must match precisely one characteristic or navigation attribute in each Info-Provider involved. As shown above, when this does not happen, a normally # (which means unassigned) appears.

Our MultiProvider Example

A cost center plan and a cost center actual InfoCube, when combined into a plan/actual MultiProvider, is a common design approach to support cost center planning and performance to plan reporting. Our InfoCubes are identical, but one is populated with **Value Type = Plan data** and the other with **Value type = Actual Data**. The architecture is shown below.

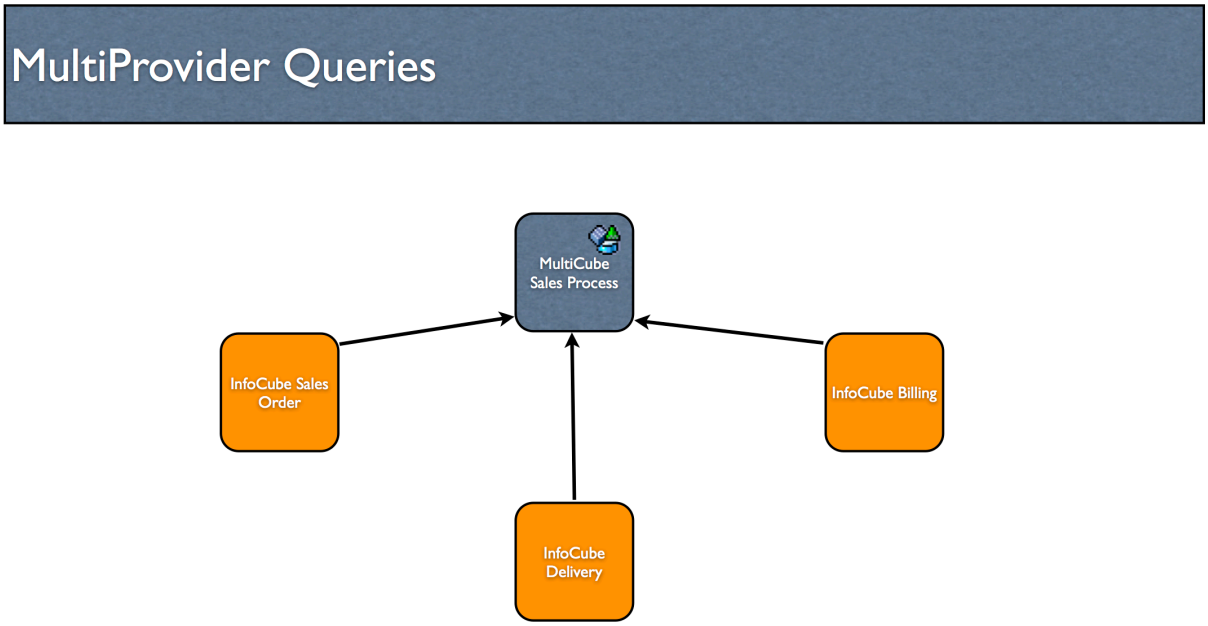
You can define MultiProvider that includes these common characteristics as well as the key figures of the InfoCubes involved. The MultiProvider can then be used BEx Queries.

> **Note:** There are many other BI architectures involving MultiProviders, some of which have dramatic effects on performance. Skilled **SAP BW Data Modeling** expertise is required to get it right.



Example: Plan and Actual Cost Center Transaction

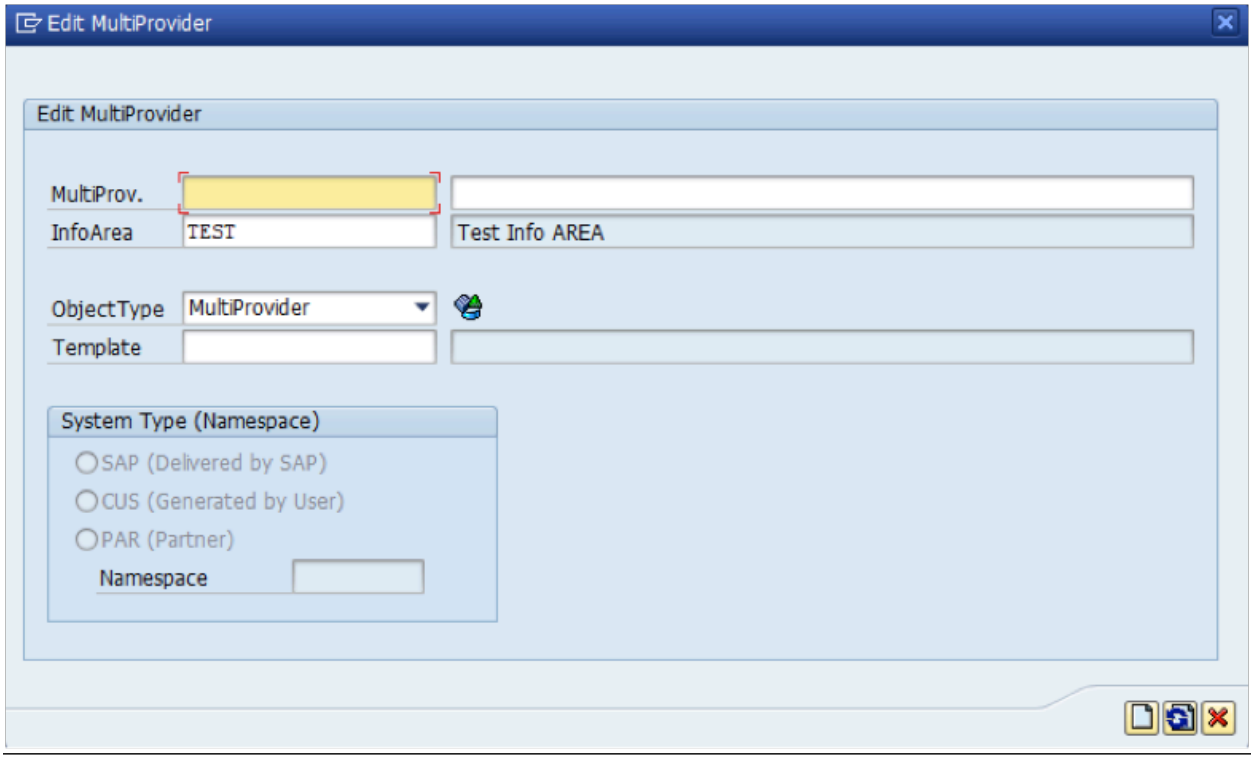
A query executed using a MultiProvider is divided across the involved InfoProviders with several select statements, which can be processed in parallel. This improves system performance. The OLAP processor presents the combination of the results from all individual select statements as the query result.



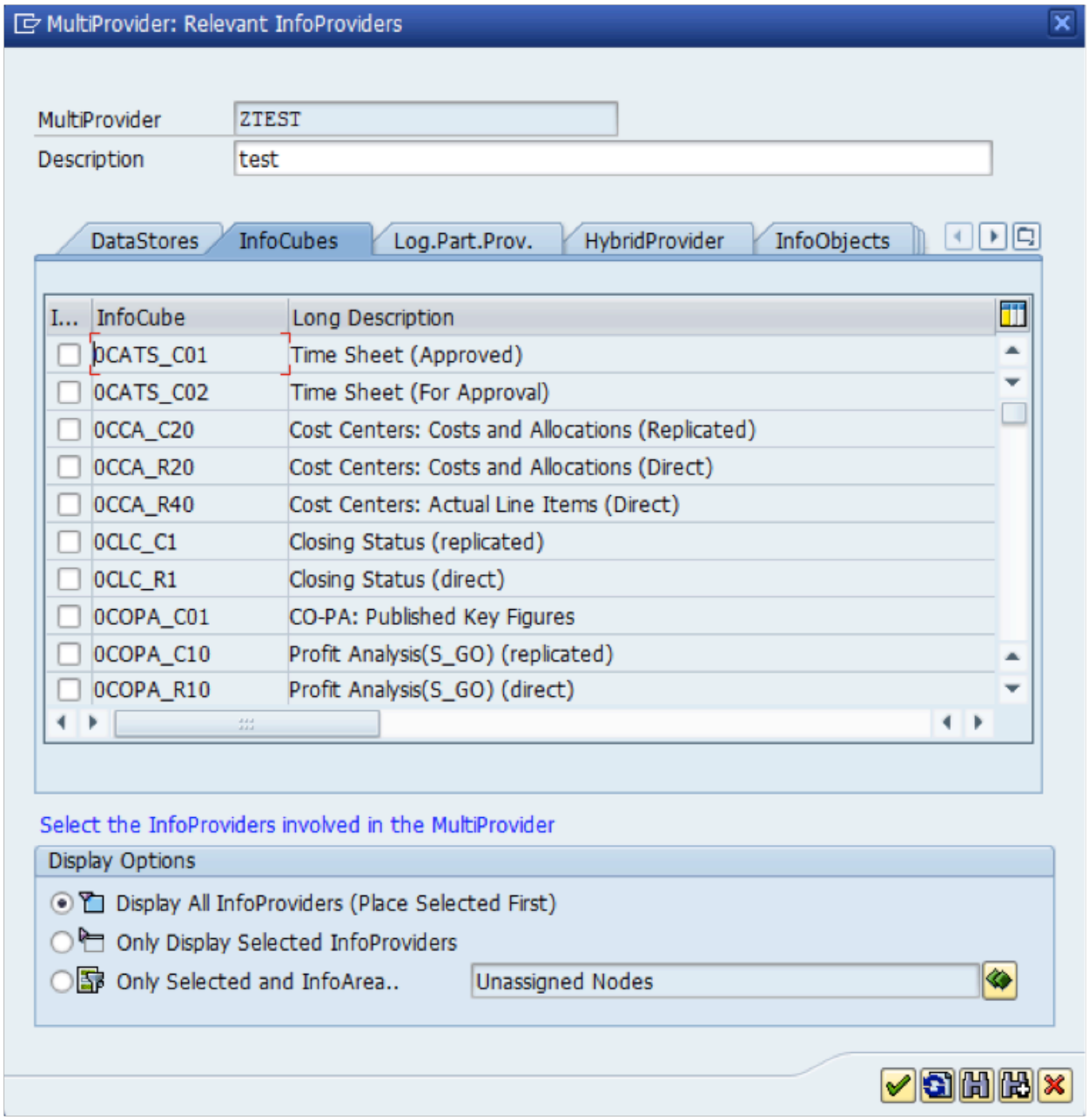
MultiProvider Queries

Designing a MultiProvider in BI

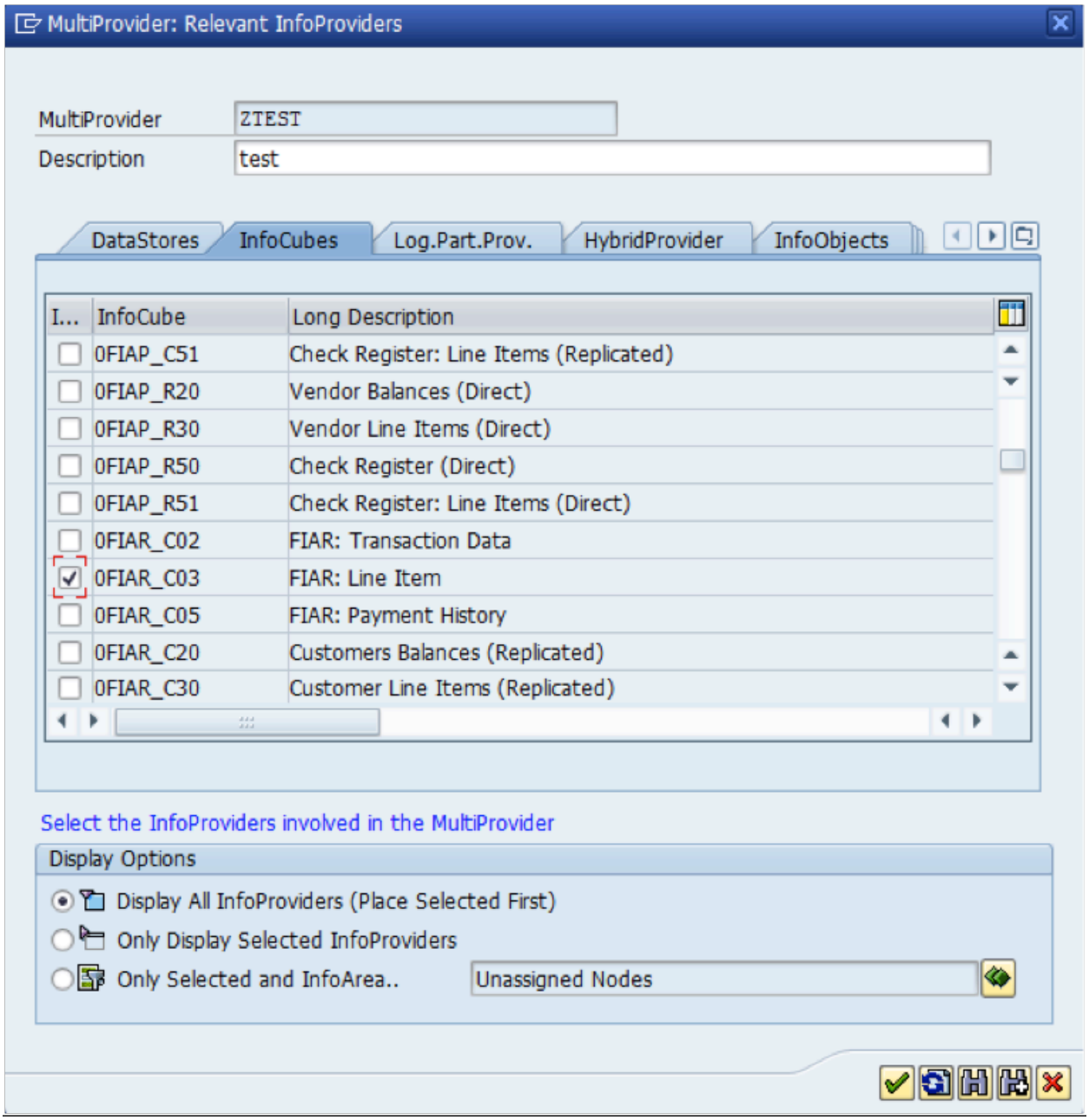
In the initial screen in the process of designing a MultiProvider, the individual providers that feed the MultiProvider are selected. These can include any InfoProvider, as well as a new aggregation-level provider in support of BI Integrated Planning. We will walk you through the complete MultiProvider Set-Up Process in the following screen shots.



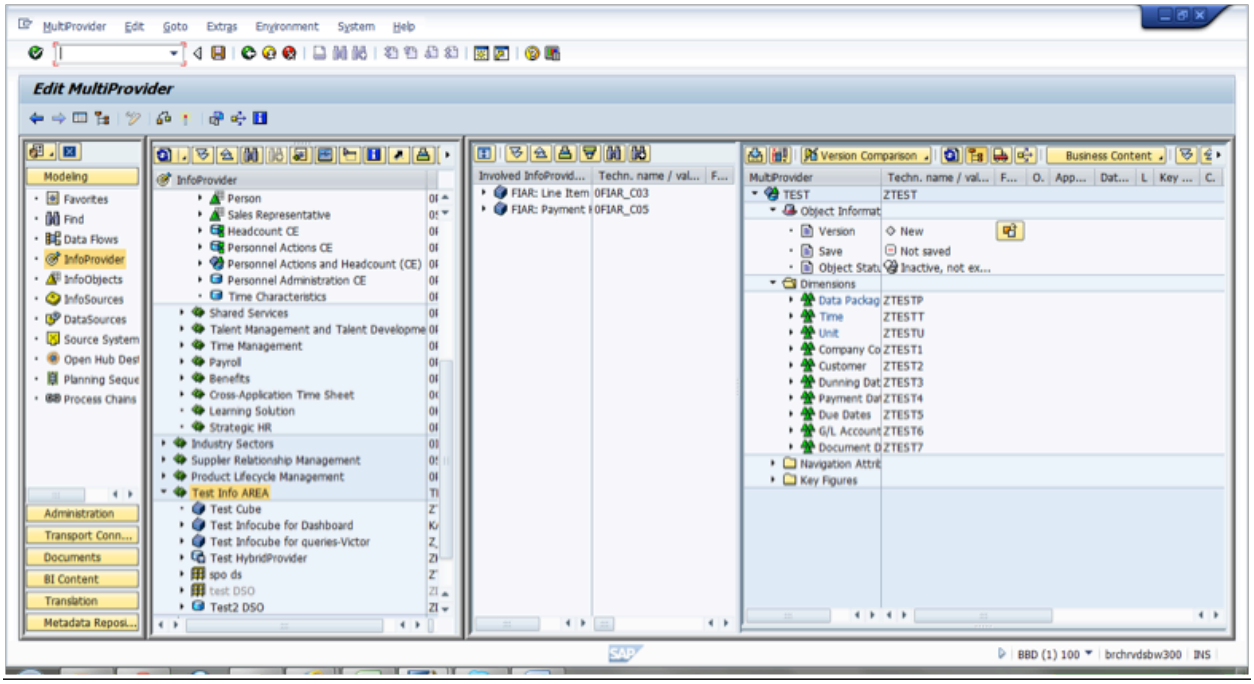
Step One-Define and Name Your MultiProvider



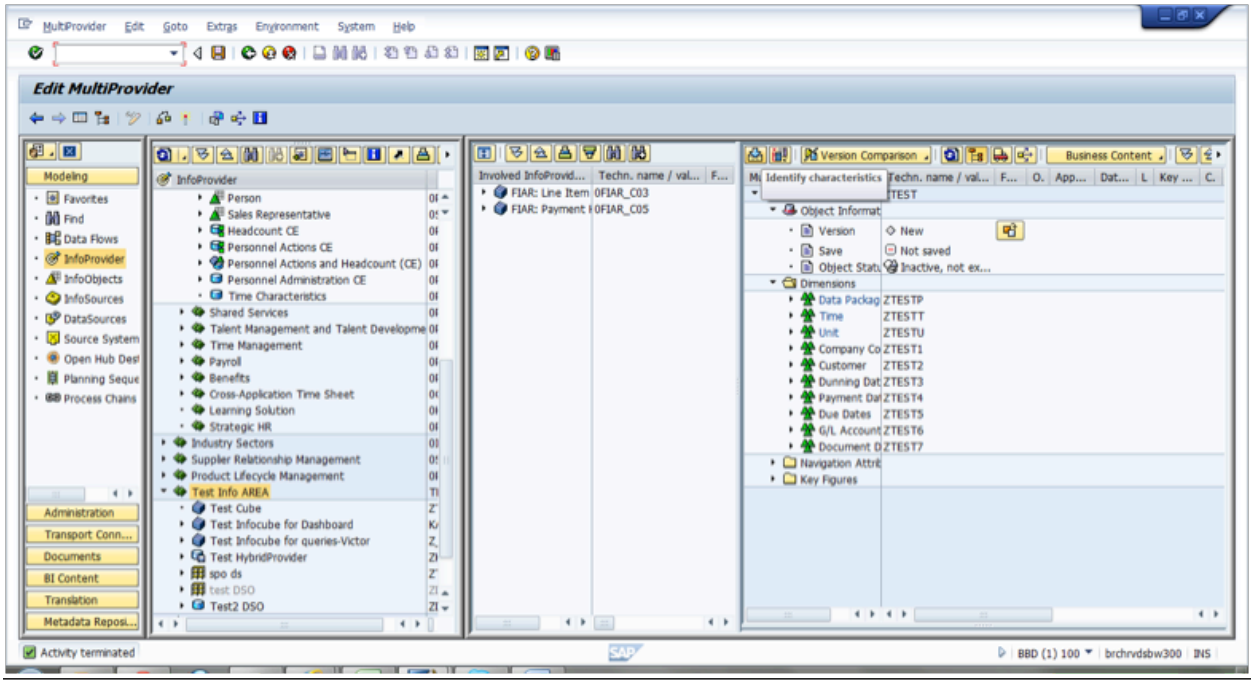
Step 2-Select Your InfoProviders



Step 3-Choose Specific InfoProviders



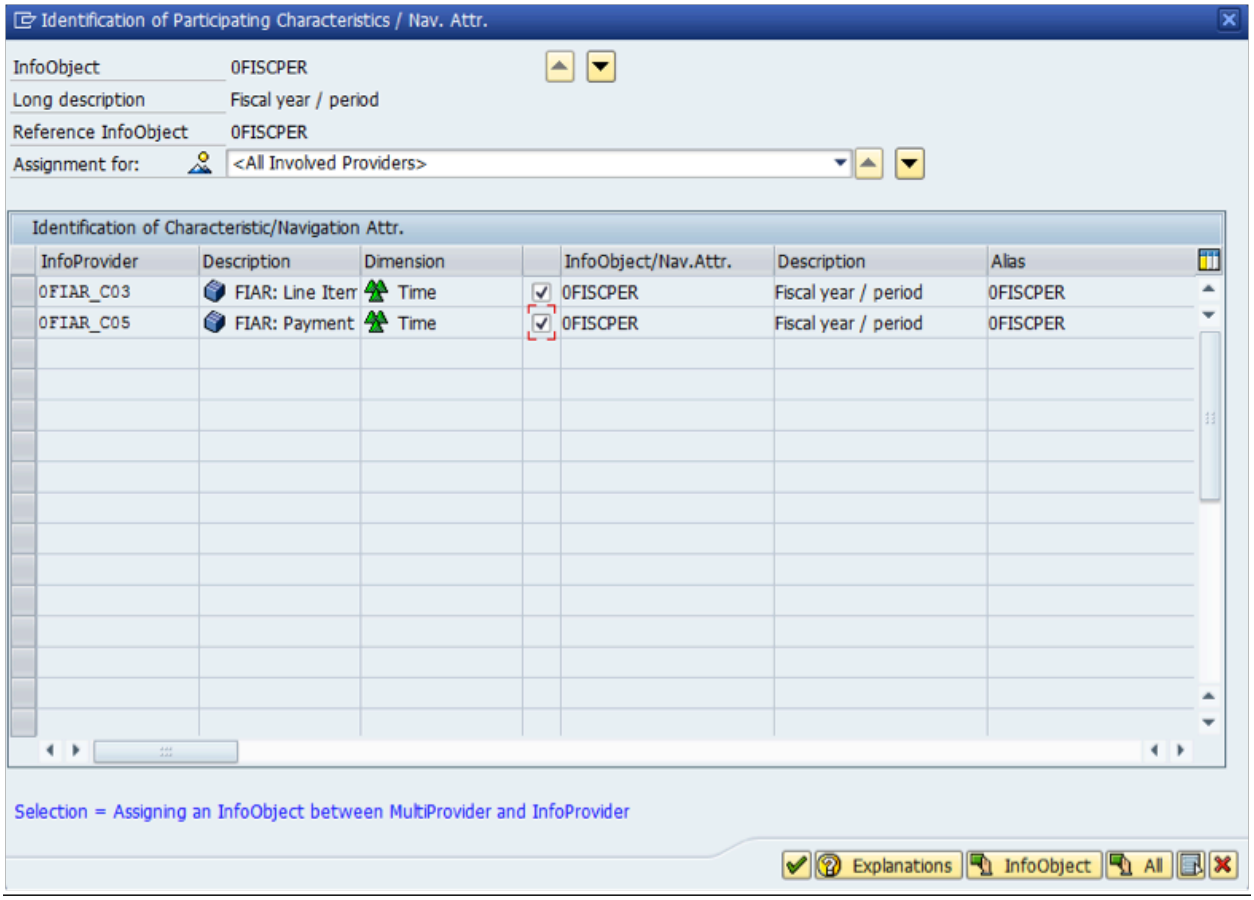
Step 4-You See The MultiProvider Screen



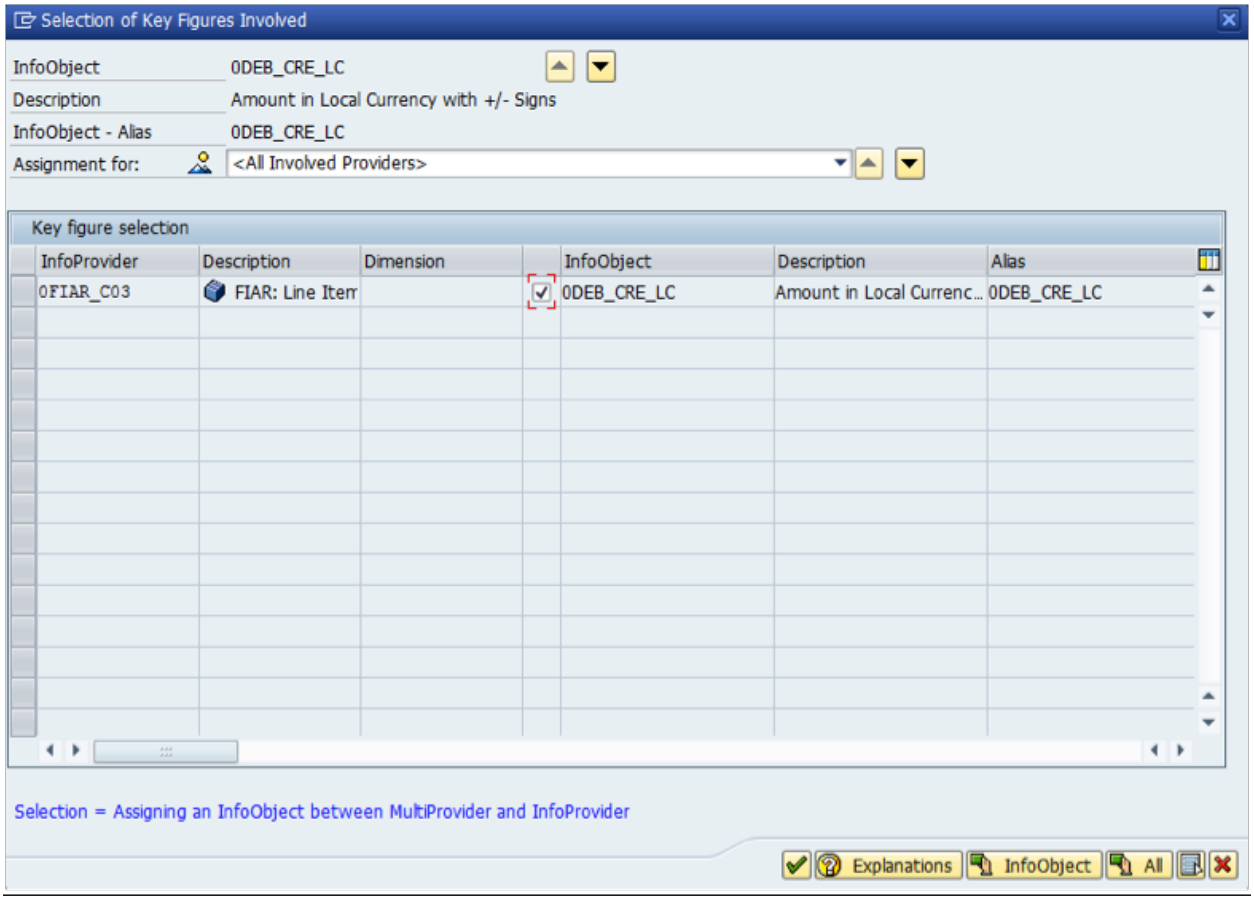
Step 5-Select Identify Characteristics

SAP BW Consulting, Inc.

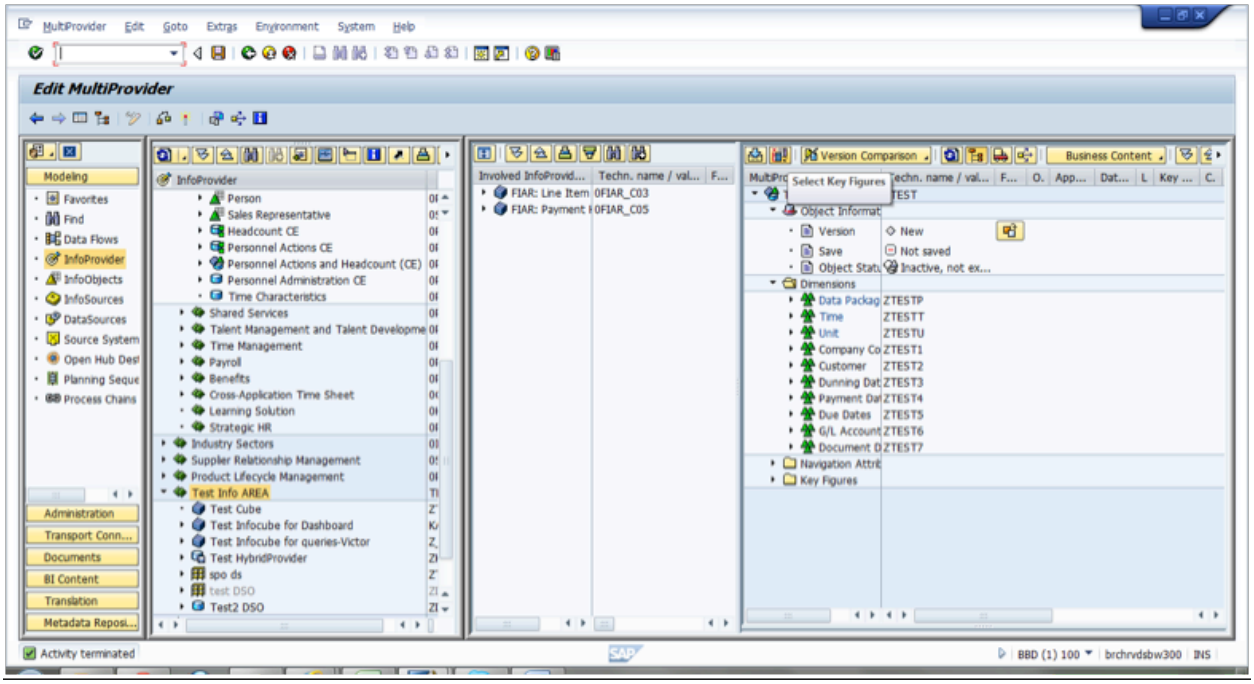
Share on Facebook Post on LinkedIN Tweet this eBook



Step 6-Choose Characteristics On This Screen



Step 7-Choosing Key Figures



Step 7A-Finalize Key Figure Selection

Now You're Ready

As of SAP Netweaver 2004s, the design GUIs for all the providers look and feel very similar. There are, however, a few critical differences in the MultiProvider GUI that you should be aware of. First, the superset of InfoObjects eligible for inclusion into the DIMs of your MultiProvider are limited to those that are in the included underlying InfoProviders. Second, settings must be made for how each InfoObject from the individual InfoProvider reacts with the MultiProvider.

Due to the way unions work, it makes sense to only include characteristics in the MultiProvider that appear in the source InfoProviders. In some cases, exact matches do not exist between the characteristics in the dimension tables or the active table of the DataSource Object. In this case, you might source the underlying characteristic from a navigational attribute. You must, however, be aware that you may not be merging apples with apples. For example, a Country from one InfoCube is not the exact same thing as a Sold_To_Country from another InfoCube. The GUI to identify characteristics in the MultiProvider is accessed with a special icon, show below.

> **Note:** The system can propose characteristic identification (above) and key figure selection (below) using the buttons at the bottom of the appropriate screens.

A **key figure** contained in a **MultiProvider** must be selected from at least one of the **InfoProviders** involved. Generally, the **key figure** is supplied from precisely one **InfoProvider**. If it is supplied from more than one source, it is additive, and usually gives inflated and inaccurate results (and the end user can easily miss that this is happening if modeled incorrectly).

Share on Facebook Post on LinkedIN Tweet this eBook

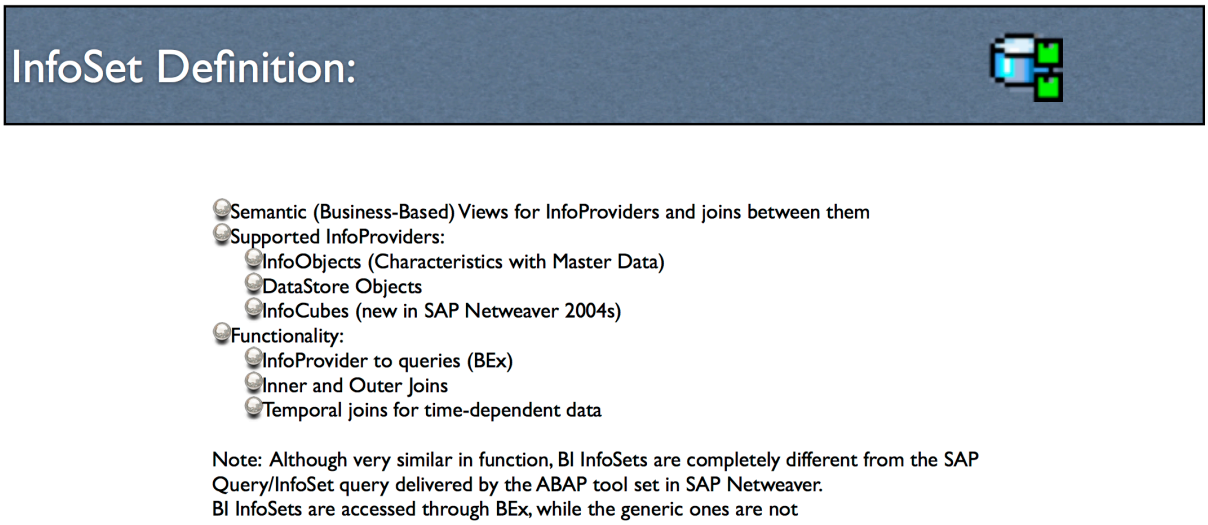
Note: There are some situations in which it makes sense to select from more than one InfoProvider. It is desirable to source the key figure from more than one underlying InfoProvider in cases where key figure, for example 0Amount (Amount), is stored redundantly in several InfoProviders but the business meaning of the data is different. Technically, this means it comes from disjointed record sets that do not overlap. For example, one InfoCube has US amounts only and the other has EU (Euros) amounts.

In our example, one InfoCube has plan amount and one has actual (no overlap). In our special case, we also need to make sure the query is designed to never add plan and actual data. Nonetheless, we need both to be fed to the MultiProvider.

Key Figure Selection Slide Goes here

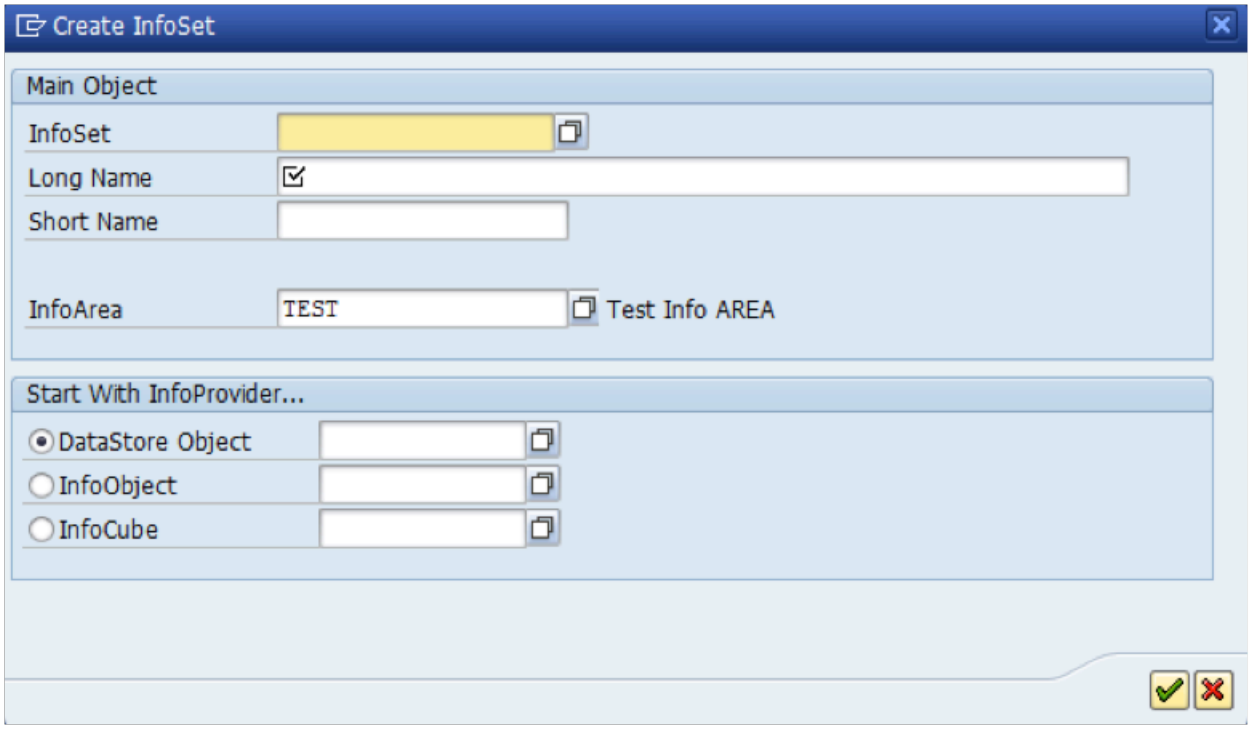
InfoSets and Their Business Purpose

SAP BI InfoSets are objects that serve to collect and join any of the targets into a logical view that can be collected and used as the provider to queries. They are, in many ways, analogous to database views, which collect various tables for subsequent access by a programmer.



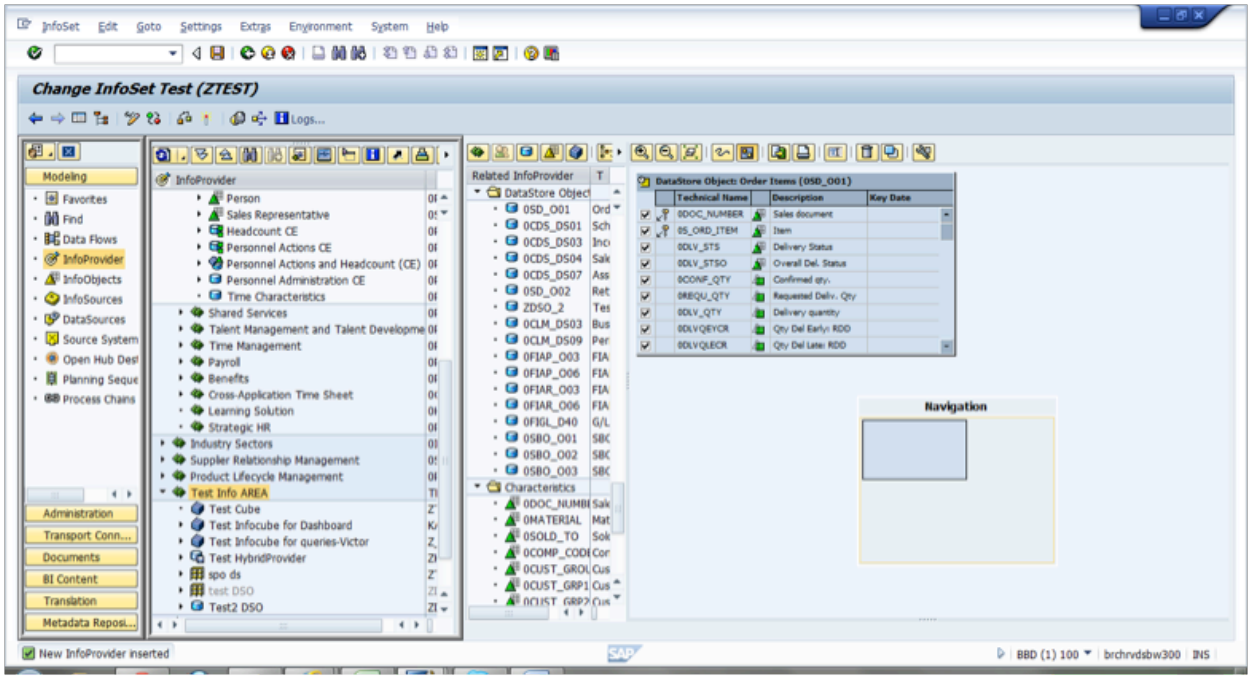
BI InfoSets: Definition and Features

Now lets walk through the set up of an InfoSet Step-by-Step.

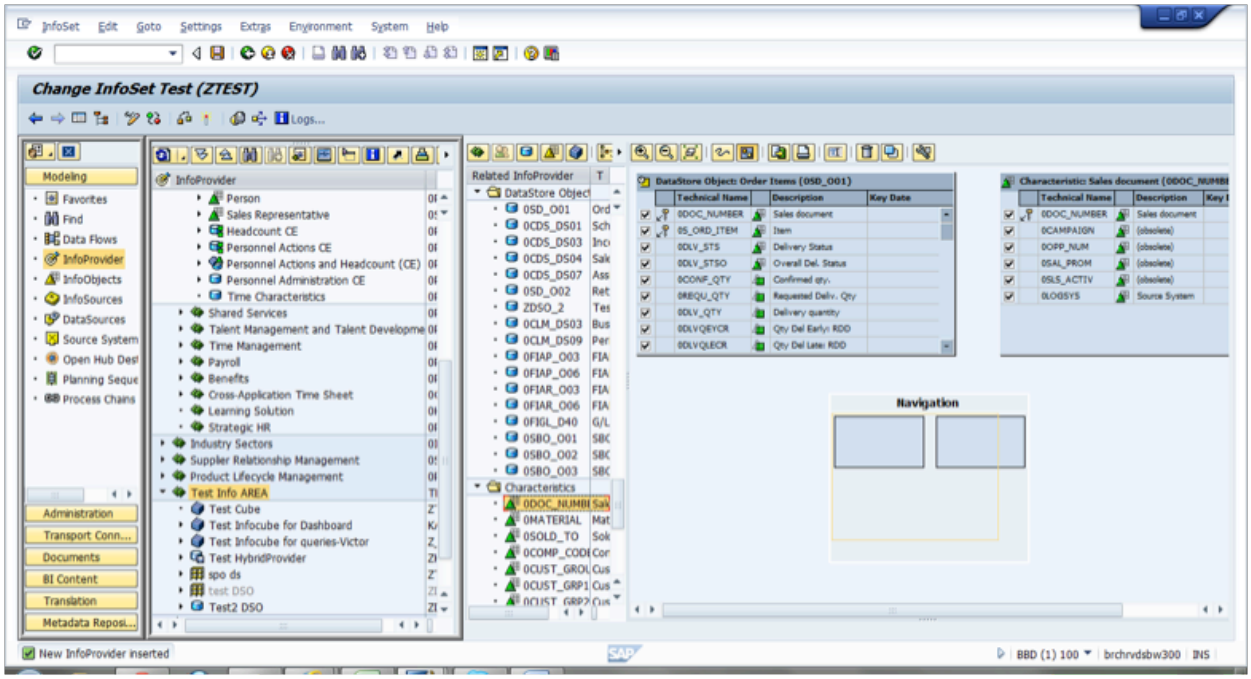


Step One-Create It.

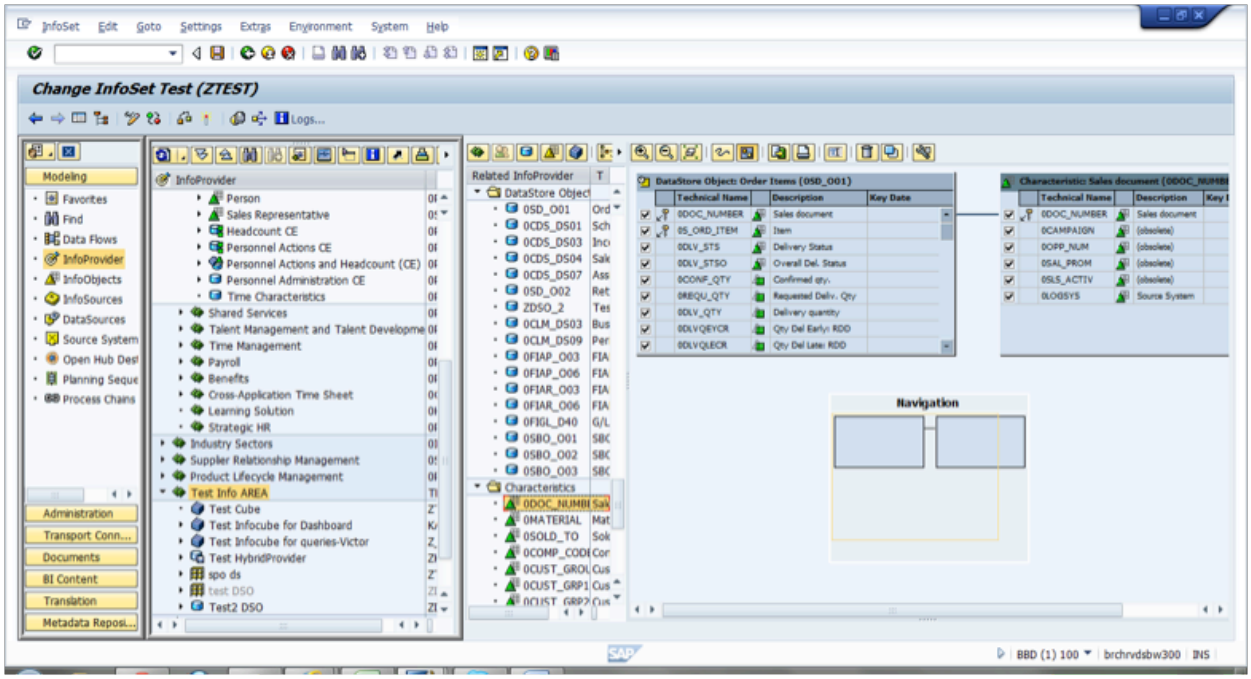
Our chief developer will tell you that it is critical here to get the naming conventing right.



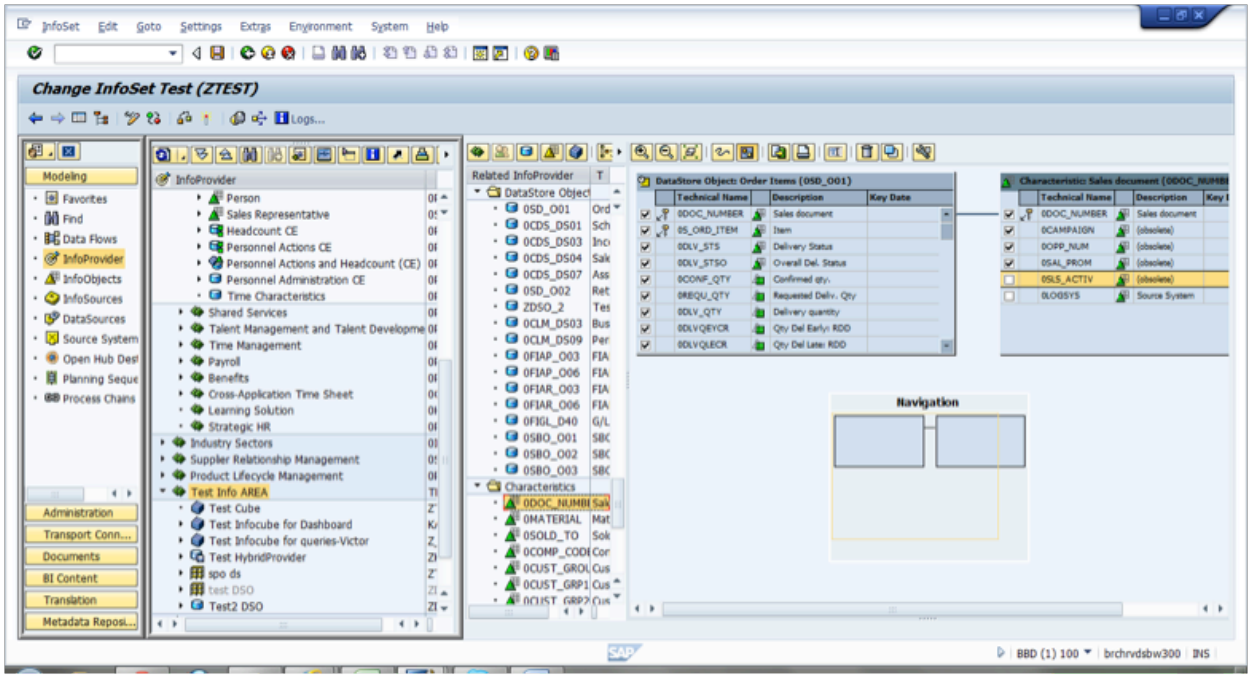
Step Two-Add InfoProvider From the Available List



Step 3-Add Another Relevant InfoProvider As Required

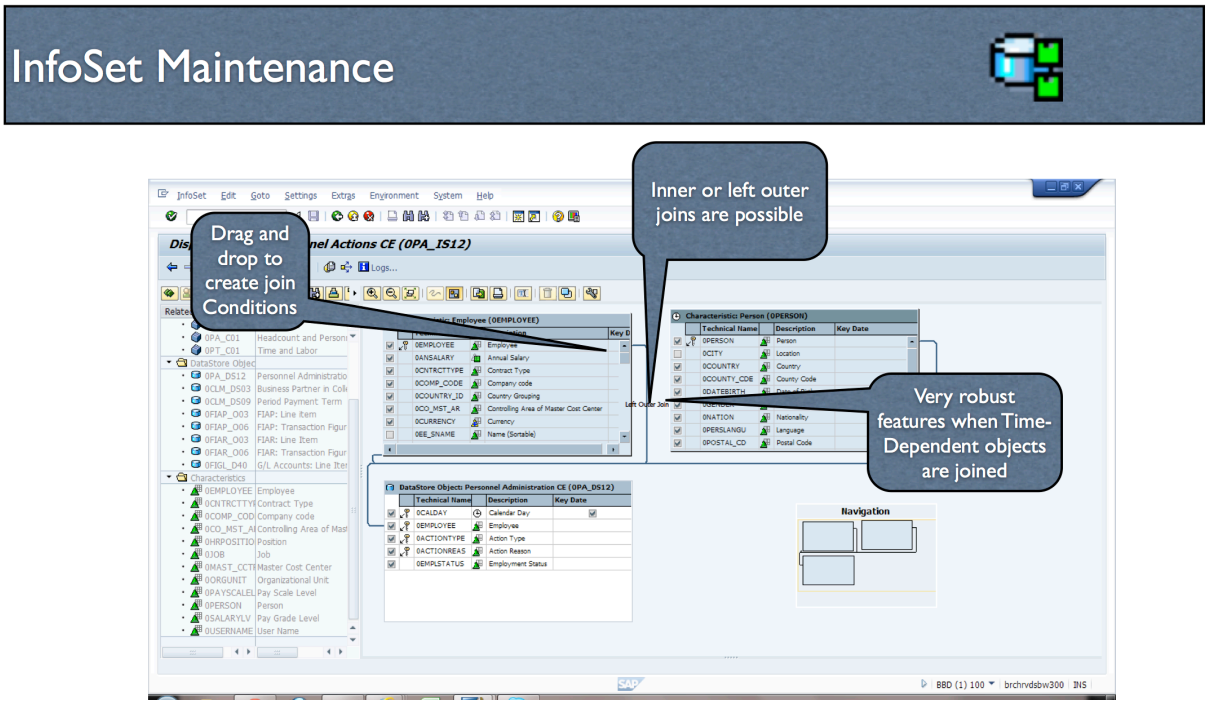


Step 4-Add and Define Your Joins



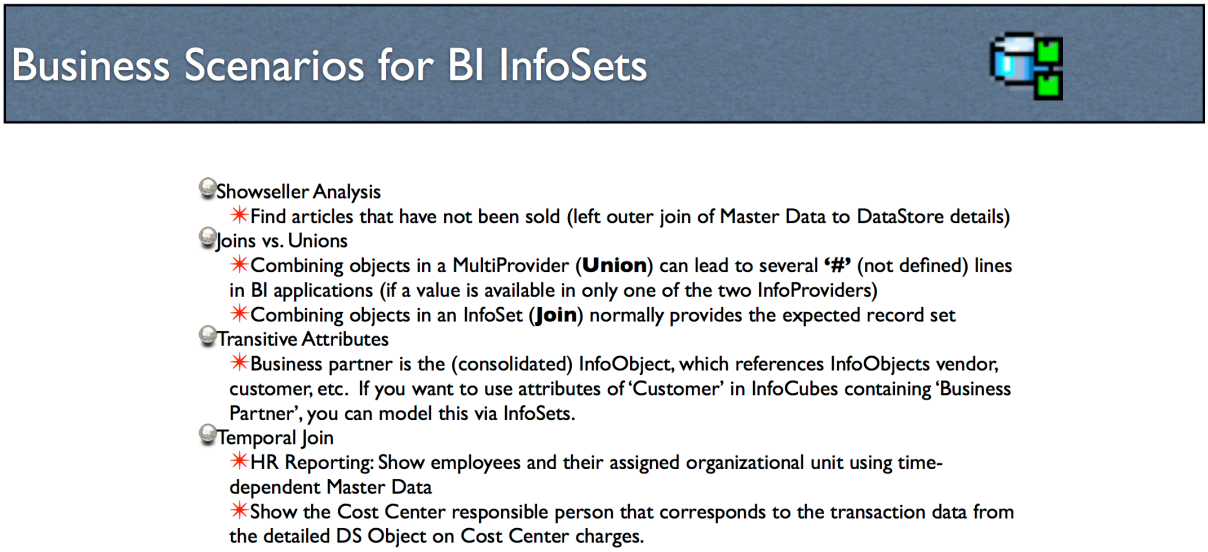
Step 5-Decide What Should be Displayed By Selecting/De-Selecting the Checkboxes

The GUI (shown below) to build InfoSets is much like Microsoft Access (a database which comes as part of the Microsoft Office suite of products). BI InfoProviders can be added to the set by using drag and drop, then you would link the objects with a connector at the fields used in the join. You can decide which InfoObjects can be used in subsequent queries on the InfoSet, by using the appropriate checkbox in the GUI. In addition, both inner and outer join types can be configured.



InfoSet Maintenance GUI

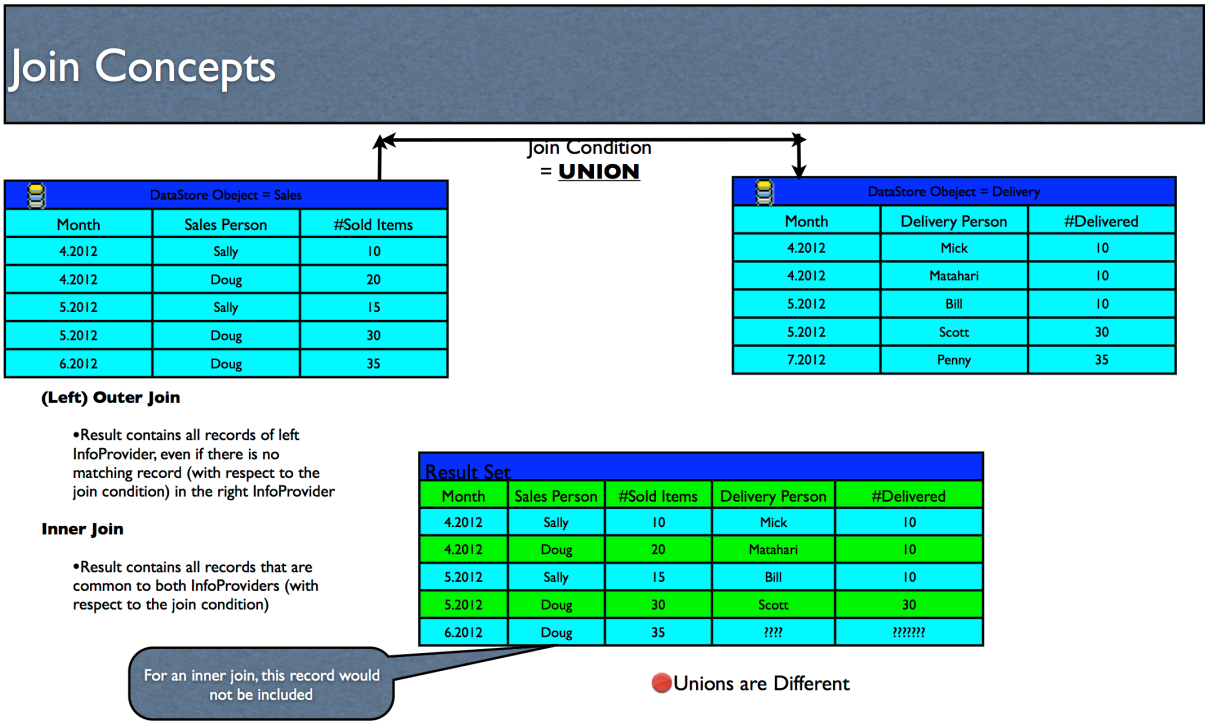
Note: The concept of InfoSet joins involving time-dependent objects known as temporal joins (time, roughly speaking) is discussed in later modeling guides from SAP BW Consulting, inc. The most important aspect about them for you, the BW modeler, is know when to use these. Please refer the guide below for help.



Business Scenarios for BI InfoSets

As mentioned in the preceding figure, there are differences between **joins** and **unions**. InfoSets do **joins**, and Multi-Providers do **Unions**. When it comes to joins, there are two types supported by InfoSets: **inner** (equal'=')joins and **outer** joins

Both types are similar, as shown below, and both types normally provide the outcome that your end user expects. On the other hand, misuse of MultiProviders (unions) can yield very unexpected results.



Join Concepts for BI InfoSets

Unsupported Functions of InfoSet Query

The InfoSet Query does *not* support: Navigation, Hierarchies, delivery of BI Content,currency translation, variables, exception reporting, and interactive graphics on the Web. You also cannot perform transformations as an InfoSet Query is designed to report on flat structures, such as InfoObjects, DataStore Objects, and DataStore Object Joins.

Supported Functions of the InfoSet Query

The following functions are supported for the InfoSet Query:

- Joins from multiple Master Data Tables
- Joins from multiple Data Store Objects
- Support for the Report-to-Report Interface (RRI)
- Authorization Checks

Summary

If you have followed our guide, you should now know:

- How to construct a MultiProvider
- Know the appropriate uses and limitations for MultiProvider
- Understand Queries for a MultiProvider
- Understand the uses of BI InfoSets
- Understand the difference between classic InfoSets and BI InfoSets

Glossary

A) InfoCube

An InfoCube is the central data storage object in SAP Business Warehouse. Its structure is set up to allow optimized query performance. It uses the SAP Extended Star Schema. There are several types of InfoCubes, some contain data, and some do not.

B) InfoSets

Different from the SAP query / InfoSet tool in that they are accessed via the SAP BW BEx.

C) InfoProvider

An element that is visible via BEx Query designer and can thus be reported on.

D) Key Figures

The answer you are trying to find when performing analysis. Examples include: Sales Totals, Sales by Customer, Profit and Loss, and many others.

E) Inner Join

Result contains all records that are common to both InfoProviders (with respect to the join condition).

F) Left Outer Join

A join condition that will return all the records contained in the first table, and any matching records in the second table that forms part of the join.

G) Master Data

Master Data is data that does not change very often (with some exceptions depending on the Industry), and includes, for example, Customer Names, Product Codes, or Material Safety Data Sheets.

H) MultiProvider

A MultiProvider is a special InfoProvider that combines data from several InfoProviders. It does not contain any data.

I) Transitive Attributes

Transitive attributes are attributes at the secondary level. Suppose, for example, you have an InfoObject called Customer that has an attribute of Region, and that attribute, Region, has an attribute of Country. You can set up a process that you can report on Country via Customer.

J) Temporal Join

Used to show time dependent records.

K) Unions

Whereas a Join is used to find the intersection two groups of items have in common, a Union is used when creating a MultiProvider, and allows you join information from various InfoProvider