espresso tutorials

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First Steps in SAP® Business Warehouse (BW)

- Tips for Loading Data to SAP BW with SAP ETL
- Using Business Content to Accelerate your BW objects
- How to Automate ETL Tasks Using Process Chains
- Leverage BEx Query Designer and BEx Analyzer

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2 Basic objects in the SAP BW layer

This chapter focuses on all types of InfoProviders available in SAP BW. We will then look at InfoObjects and InfoCubes (the star schema) in detail because they are the foundation of multidimensional modeling in SAP BW. You will learn how to create, administer, maintain, and monitor the data structure and data objects using the Data Warehousing Workbench (DWW).

2.1 InfoProviders

InfoProviders are objects that provide data for a query. They can be *persistent* (data is stored physically and persistently) or *non-persistent* (they provide only data stored in other objects such as data targets).

Queries and InfoProviders

A query can only be based on a single InfoProvider. The non-persistent InfoProviders are often used to combine data from various persistent InfoProviders and present the results as if they were one source.

2.1.1 The InfoProviders list

The persistent InfoProviders (also called *data targets*) are mainly the **InfoObject**, **DataStore Object (DSO)**, and the **InfoCube**. The non-persistent InfoProviders are the **MultiProvider**, **InfoSet**, and the **VirtualProvider** (see Figure 2.1). From SAP BW 7.3 on, new advanced InfoProviders are available to respond to new technologies (e.g., in-memory database), including: **BWA only InfoCube**, **semantically partitioned objects (SPO), Hybrid Provider, analytical index, Composite Provider,** and **TransientProvider.**

2.2 InfoObjects in brief

InfoObjects ( ) are the basic building blocks of SAP BW. They are the basis for defining or configuring all of the other InfoProviders. They can also act as InfoProviders themselves.

InfoObjects information

A description and unique technical name are information elements that have to be provided for each InfoObject.

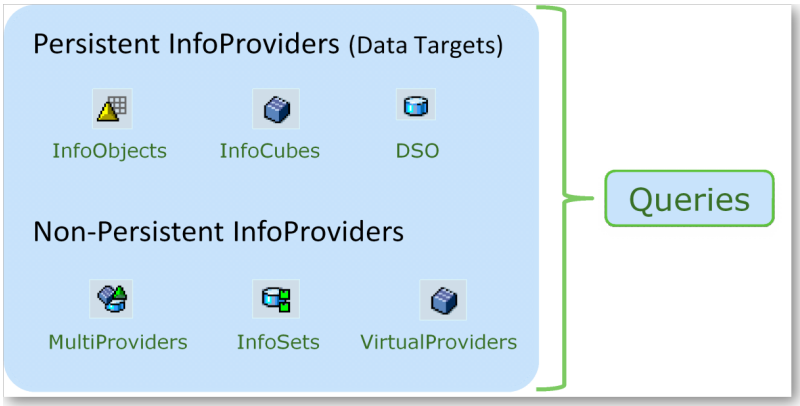

Figure 2.1: Basic SAP BW InfoProviders

2.2.1 Five types of InfoObjects

There are five types of InfoObjects: Deutschland

- *Characteristic*: Identifies a business entity such as a customer, an employee, a product, or a supplier. An example of an SAP predefined characteristic is a company's cost centers (technical name: 0COSTCENTER).
- *Key figure*: A numeric value for measuring a business activity (e.g., revenue for a certain month). An example of an SAP predefined key figure is the amount (0AMOUNT).

Key figures and queries

In SAP BW, a query always has to contain a key figure.

Unit: Represents the unit (weight, volume, measure, currency, etc.) of a key figure. Examples of an SAP predefined units are the amount units (0UNIT) or currencies (technical name: 0CURRENCY).

Time characteristic: Can be a calendar period (day, month, year), or a certain time. An example of an SAP predefined time characteristic is the fiscal year (technical name: 0FISCYEAR).

Time characteristics

Only SAP BW-supplied time characteristics can be used.

► *Technical characteristic*: Used by the SAP BW system. Cannot be defined or changed by the user.

2.3 InfoCubes in brief

InfoCubes ( ) are mainly used for multidimensional reporting (OLAP) and are the primary object used to support queries. They physically store data and are optimized for the performance of queries. The InfoCube data model should be designed after carefully analyzing the business requirements.

2.3.1 InfoCube components

The following components are important for InfoCubes:

- *Characteristics* and *key figures* are as explained for the InfoObjects.
- *Facts* are occurrences of a business activity (e.g., a sale).
- *Dimensions* regroup characteristics that are related.
- *Attributes* provide additional information about characteristics. The address may be an attribute of a client, for example.
- *Granularity* defines the level of detail of the recorded data. For example, data stored at the week level has a lower level of granularity than data stored at the day level.

2.3.2 InfoCube design

An InfoCube is designed as a star schema (see Figure 1.2). The fact table contains the key figures and the dimension IDs. SAP BW uses an *extended star schema* for InfoCubes. The schema is *extended* because the master data used to build the dimension tables to form the unique entries is replaced by keys again. I will go into more detail about this design later.

InfoCubes and dimensions

An InfoCube must contain at least four dimensions. SAP BW automatically assigns three of them: the *data package*, the *time,* and the *unit*. The fourth one must be defined by the user.

InfoCube numbers

The InfoCube schema has the following limitations that must be borne in mind: maximum 16 dimensions; the fact table can contain up to 233 key figures; and 248 maximum characteristics for each dimension.

2.3.3 Four types of InfoCubes

- *Standard InfoCubes* are mainly used and optimized for read access (reporting); InfoCubes can be loaded using the standard loading process.
- *Real-time* InfoCubes are InfoCubes that can be loaded via an interface (APIs). Data is written and read concurrently.
- *VirtualProvider InfoCubes* do not store data; they link to the data in a source system.
- *Semantically partitioned InfoCubes* consist of smaller InfoCubes automatically partitioned by the system. The process is performed for a certain key value, e.g., one InfoCube for each country or for each time period (year).

Star schema performance

A star schema is optimized for fast reading data access. This is possible due to the aggregation of data performed when data is written to the InfoCube and not during the query execution. This is the main aspect of an OLAP system such as SAP BW.

2.4 DataStore Object (DSO) in brief

A *DSO* ( ) stores data in transparent tables. Data is extracted and unified at a very detailed level, and for that reason, DSOs are not optimized for reporting purposes.

2.4.1 DSO components

Key fields and *data fields* are the two types of DSO components. Key fields are InfoObjects that uniquely identify each line. Data fields contain characteristics and key figures loaded from the operational system.

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