**SAP BusinessObjects - Sample Universe on Microsoft SQL Server**

**Applies to:**
SAP BusinessObjects XI4, the information design tool and Microsoft SQL Server 2005 & 2008. For more information, visit the Business Objects homepage.

**Summary**
This article describes the content of the sample universe for Microsoft SQL Server. It explains how to set up the universe in the information design tool and how to make it available to the SAP Business Objects client tools. Download the attached file here to retrieve the information design tool sample resources as well as the sample database. Download attached files [here](#).

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**Author Bio**
Marc Daniau joined Business Objects in 1992 as project consultant in France. He moved to the product group in San Jose in 1998 to work on EPM products. He moved back to Paris in 2003 to work within the semantic layer team.
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The Business Layer

The Warehouse universe is built against the Microsoft SQL Server database named SPL_Warehouse. It covers several domains like Sales, Purchasing, Customer care and Inventory.

Sales View

The Sales business layer view is the largest view of the “Warehouse” universe. It enables you to analyze various aspects of sales such as the quality of the sales order process with the indicator “% Late Orders”, the financial performance with the indicator “Margin as % of Sales” or the achievement of the plan by comparing “Net Sales” and “Sales Target”.

Purchase view

The Purchase business layer view helps evaluate the quality of the suppliers with the indicator “% Unfulfilled Orders”.

[Diagram of Sales and Purchase views]
Customer care view

The Customer care business layer view gathers a few indicators around customer calls and satisfaction.

![Customer Care diagram](image)

Inventory view

The Inventory business layer view provides the stock levels.

![Inventory diagram](image)

Finance view

The Finance business layer view includes indicators for time series analysis. The “Time” folder that we saw in the previous views does not appear in the Finance view, simply because the time element is built into the indicators. At refresh time, the user will be asked to choose a reference quarter.

![Finance diagram](image)
Sample queries

The business layer contains sample queries that illustrate different functionalities available on SQL data sources.

Those queries are local to the business layer for test purposes within the information design tool. They will not be available within the SAP Business Objects tools like Web Intelligence, Crystal Reports, Dashboards or Explorer.

The following table summarizes the main features employed in the sample queries.

<table>
<thead>
<tr>
<th>Query name</th>
<th>Showcased features</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Time Delivery</td>
<td>This query contains a restricted measure “Late Orders”.</td>
</tr>
<tr>
<td>Sales Performance</td>
<td>This query involves two fact tables. Under the cover two SQL queries are run; the resulting data sets are joined together in order to restitute a single data set.</td>
</tr>
<tr>
<td>Supplier Quality</td>
<td>The “Supplier Quality” query filters quarters by selecting a Year node (CY2011) from a hierarchical list of values. One can pick and choose Year nodes as well as Quarter nodes.</td>
</tr>
<tr>
<td>Profitable Products</td>
<td>This query takes advantage of the aggregate awareness feature. It also includes a Ranking filter.</td>
</tr>
<tr>
<td>Inventory</td>
<td>The Inventory query involves a business filter. The category name displays multilingual data depending on the user locale. If you want to see the category names changing based on the user locale, go to the menu “Window&gt;Preferences”, change the language and refresh the query.</td>
</tr>
<tr>
<td>Quarterly KPI</td>
<td>We use here Year-to-date and time comparison calculations. At refresh one must answer prompts on measure name, period type, reference year and quarter.</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>This query involves a calculated column (Target).</td>
</tr>
<tr>
<td>Customer Calls</td>
<td>Here we combine two queries.</td>
</tr>
</tbody>
</table>

For any given query you can preview the data and see the underlying SQL script.
Lists of Values

Lists of values have been defined in the business layer for the main dimensions: Time, Customer, Product and Sales organization. On the Time dimension alone, three hierarchical lists of values are available:

- Fiscal-Year > Quarter > Month > Week
- Calendar-Year > Quarter > Month
- Calendar-Year > Week

The Fiscal Year is a 52/53-week year. Each fiscal quarter has 13 weeks organized by fiscal months following a 4-5-4 pattern. For a 53-week year, the 4th quarter has 14 weeks following a 4-5-5 pattern. Here is a preview of the Fiscal Weeks list of values.

Here is the list of values for navigating Customers by geography.
The list of values for Products is a 3-node tree: Line > Category > Product

![Product Tree]

The list of values for the Sales Organization is also a 3-node tree: VP > Sales-Manager > Sales-Rep

![Sales Rep Tree]
The Database

The SPL_Warehouse database is a Microsoft SQL Server 2005 relational database. References from foreign keys to primary keys have been enforced. Those references can be leveraged if you create your own data foundation from scratch. Make sure you have set up the preferences in the information design tool in order to automatically detect joins based upon the database keys.

The diagram below represents all the references defined in the SPL_Warehouse database.
The Data Foundation

The Warehouse data foundation content is summarized below.

In information designer tool you have the ability to create a data foundation view that represents a subset schema from the default Master view. We built four additional views in the Warehouse data foundation. If you find the Master view too crowded, use a domain specific data foundation view instead.

Aliases and contexts

The sales organization hierarchy has been flattened using aliases. The ambiguity around city being used by both the suppliers and the customers has been solved through an alias. We have defined a context for each fact table.
Derived table

The derived table PERIOD_TO_DATE in the data foundation computes a time window based on user inputs. The figure below shows the prompts to answer when running the 'View table values' command on the derived table.

![Derived table PERIOD_TO_DATE in the data foundation computes a time window based on user inputs.](image)

Parameters and Lists of values

Here are the prompts and list of values that the PERIOD_TO_DATE derived table uses. The “Period Type” prompt is also used by measures in the business layer.

![Parameters and Lists of values](image)
Handling multilingual data

The table PRODUCT_INTL contains multilingual labels. We set up a filter against the PRODUCT_INTL table. The filter expression invokes the system variable Preferred Viewing Locale.

```
PRODUCT_INTL

Details

- Filter
  PRODUCT_INTL.USER_LOCALE = @Variable('PREFERRED_VIEWING_LOCALE')
```

Sales domain

A large part of the Warehouse data foundation is related to the Sales domain. An aggregate table has been derived from the Sales Order Line table in order to accelerate queries. Check the sample query “Profitable Products” in order to see the aggregate awareness feature in use. Quarterly targets are available by sales representatives. Here is the granularity of the data found in the different fact tables regarding Sales.

<table>
<thead>
<tr>
<th>Sales Order</th>
<th>Aggregate</th>
<th>Sales Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header</td>
<td>Line</td>
<td>Sales Rep</td>
</tr>
<tr>
<td>Sales Order</td>
<td>Line</td>
<td>Sales Rep</td>
</tr>
<tr>
<td>Sales Organization</td>
<td>Sales Rep</td>
<td>Sales Rep</td>
</tr>
<tr>
<td>Customers</td>
<td>Company</td>
<td>Company</td>
</tr>
<tr>
<td>Products</td>
<td>Product</td>
<td>Product</td>
</tr>
<tr>
<td>Time</td>
<td>Day</td>
<td>Day</td>
</tr>
<tr>
<td>Time</td>
<td>Day</td>
<td>Day</td>
</tr>
<tr>
<td>Time</td>
<td>Day</td>
<td>Quarter</td>
</tr>
</tbody>
</table>

All the tables and joins that are related to Sales are gathered in the “Sales Orders” data foundation view.
Customer care, Purchasing and Inventory domains

The rest of the data foundation covers three other domains: Customer care, Purchasing and Inventory. The following table describes the granularity of the data for these domains. We can see that some dimensions are shared with the Sales domain such as Customers, Products and Time.

<table>
<thead>
<tr>
<th></th>
<th>Customer care</th>
<th>Purchase Order</th>
<th>Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call Reasons</td>
<td>Reason</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
<td>Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers</td>
<td>Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td>Product</td>
<td></td>
<td>Product</td>
</tr>
<tr>
<td>Time</td>
<td>Month</td>
<td>Month</td>
<td>Day</td>
</tr>
</tbody>
</table>

The Customer facts other than orders are gathered in the “Customer care” data foundation view.

The table CUSTOMER_SATISFACTION contains a calculated column TARGET that assigns a constant value of 85.
The tables related to Purchasing have their dedicated data foundation view.

![Diagram of Purchasing data foundation view]

Inventory is a simple view around stock levels.

![Diagram of Inventory view]

**Advanced parameters**

A couple of advanced parameters have been entered in the Warehouse data foundation. The END_SQL parameter leaves a comment with the user and universe names at the end of each query sent to the database for audit purposes. The JOIN_BY_SQL parameter allows pushing queries on multiple facts tables directly to the database provided that the dimensions involved in the main query are shared across facts. Check the sample query “Sales Performance” to see the generated SQL script on multiple facts.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOUNDARY_WEIGHT_TABLE</td>
<td>-1</td>
</tr>
<tr>
<td>COLUMNS_SORT</td>
<td>No</td>
</tr>
<tr>
<td>COMPARE_CONTEXTS_WITH_JOINS</td>
<td>Yes</td>
</tr>
<tr>
<td>END_SQL</td>
<td>/* User: @Variable('BOUSER') Universe: @Variable('UNVNAME') */</td>
</tr>
<tr>
<td>FORCE_SORTED_LOV</td>
<td>No</td>
</tr>
<tr>
<td>JOIN_BY_SQL</td>
<td>Yes</td>
</tr>
<tr>
<td>MAX_INLIST_VALUES</td>
<td>-1</td>
</tr>
</tbody>
</table>

To view the advanced parameters, go to the navigation pane ‘Data Foundation’, select the root node named ‘Warehouse.dfX’, open the properties screen below the graphical view by using the black up arrow. You should now see on the right the SQL parameters button that takes you to the advanced parameters.
Setting up the Universe in Information Design Tool

The sample universe for Microsoft SQL Server consists of four files:

- **WRH_SPL.cnx** for the relational connection
- **Warehouse.dfx** for the data foundation
- **Warehouse.blx** for the business layer
- **SPL_Warehouse.bak** for the database.

To install the sample universe, first copy the cnx, dfx and blx files on your local file system. Open the information design tool and create a local project.

Copy the three files on your file system and then paste them into the local project.

You can now open the business layer and navigate through it. You can see the list of queries but you cannot yet execute them.
Connecting to the Database

In order to run the universe sample queries, you must have the SPL_Warehouse database installed and accessible through JDBC, ODBC or OLE DB. Among the files attached to this article is the SPL_Warehouse.bak file which is a SQL Server backup that you must restore in your own SQL Server database instance whether it is a 2005 or a 2008 version.

For more information on how to restore a .bak file from a device, visit the Microsoft page http://msdn.microsoft.com/en-US/library/ms188312(v=SQL.90).aspx

When the SPL_Warehouse SQL Server database is ready, open the cnx file in information design tool. The sample connection uses JDBC and is preset for SQL Server 2005. If you happen to be in this same configuration, you just need to edit the connection and enter your database server name.

Test the connection to check that you can reach the SPL_Warehouse database. Save the connection. You are now ready to run the sample queries in information design tool.

If you are running Microsoft Analysis Services 2008, or if you prefer using ODBC or OLE DB rather than using JDBC, you can create a new connection based on the driver that fits your configuration. After creating the connection, you need to modify the data foundation to make it point to the new cnx file. To do so, open the dfx file and select the “Connection” navigation pane on the left. Click the upper left button “Change connection…”, select your newly created connection and click OK. Save the data foundation and close it.
Making the Universe Available to Client Tools

In order to use the universe in a SAP Business Objects client tool, you must publish the business layer as a UNX universe to the repository for consumption in Crystal Reports, Web Intelligence, Dashboards or Explorer. You can also publish directly to the file system and use the business layer in WebI Rich Client without having to go through the enterprise repository.

Secured UNX universe

There are two steps to make the sample universe available in the Central Management Server (CMS). First you must publish the connection. To do so, right click on the cnx file in your local project, and select Publish connection to CMS.

After being authenticated and connected to the CMS, choose the folder where to store the connection and answer ‘Yes’ when asked to create a secured connection shortcut. A new cns file appears in your local project.

We will now modify the data foundation to make it point to the cns connection. Open the dfx file, and select the “Connection” navigation pane on the left. Click the upper left button “Change connection…”, select the cns connection file and click OK. Save the data foundation and close it.

The second step consists of publishing the business layer to the CMS. Right click on the blx file in your local project, and select Publish to a Central Management Server.

After being authenticated and connected to the CMS, choose the folder where to store the universe and click Finish. The SQL Server sample universe is now ready to be used by enterprise client tools.

Local UNX universe

You can publish the sample universe as a local UNX file for consumption by WebI Rich Client. To do so, right click on the blx file in your local project, and select Publish to a local folder.

The UNX file can be placed in the folder ‘Universes’ under ‘Application Data’ or its equivalent depending on the operating system you are using.

…\Application Data\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\Universes
Related Content

Sample Universe on Microsoft OLAP cube

Create a relational connection to SQL Server

information design tool - eLearning

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