Integration of Oracle BI EE and Oracle Analytic Workspaces

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SUMMARY

Oracle's integration of Business Intelligence Enterprise Edition (formerly Siebel Analytics) into the Oracle product family provides exciting opportunities to extend the use of Oracle's multidimensional OLAP cubes to include Oracle's customers who have adopted the BIEE environment. BIEE users can harness the power of Oracle's multidimensional data engine and features, while still retaining the user-friendly BIEE interface.

This presentation will demonstrate how Genco used OLAP cubes and the OLAP_TABLE object in Oracle 10g for preparing multidimensional data cubes for use by Oracle BI EE analytics. We will briefly discuss the development of the multidimensional environment using Oracle Analytic Workspace Manager (AWM), then focus on the development of the corresponding OLAP_TABLE objects to be referenced by Oracle BI EE, and finally review the end-user environment.

The presentation will provide a broad overview of the ability to integrate these two portions of the Oracle Business Intelligence product suite.

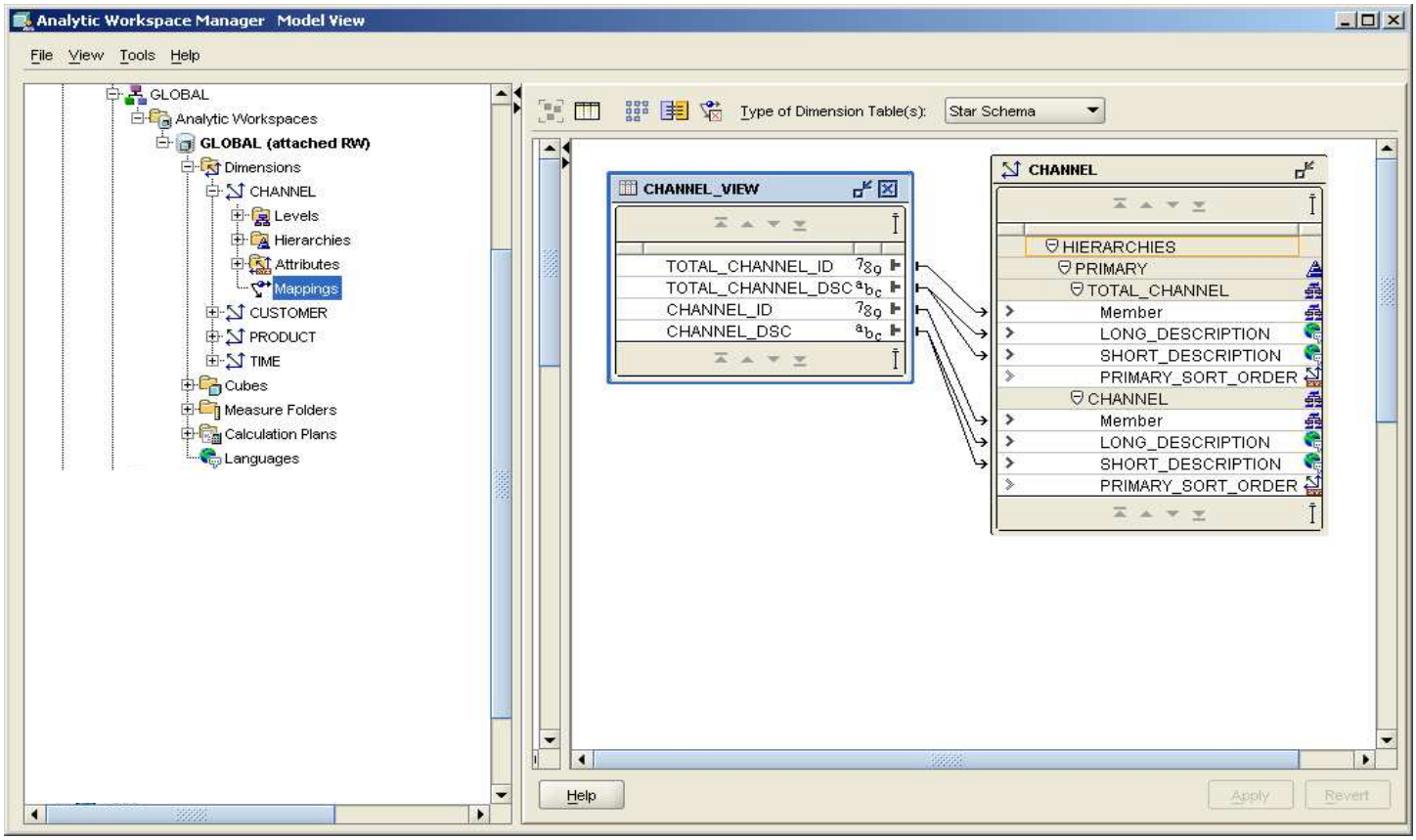
OVERVIEW OF AWM AND THE ORACLE MULTI-DIMENSIONAL ENVIRONMENT

The OLAP option to Oracle 10g and 11g provides companies with the ability to perform multi-dimensional analysis completely within the context of the Oracle Database. Oracle presents OLAP as a central component of the data warehouse, rather than as an add-on to the database. Oracle's implementation of multi-dimensional OLAP data is highly scalable, partitionable, and, as an integral part of the Oracle database, is included in all of the normal backup and maintenance procedures in the database.

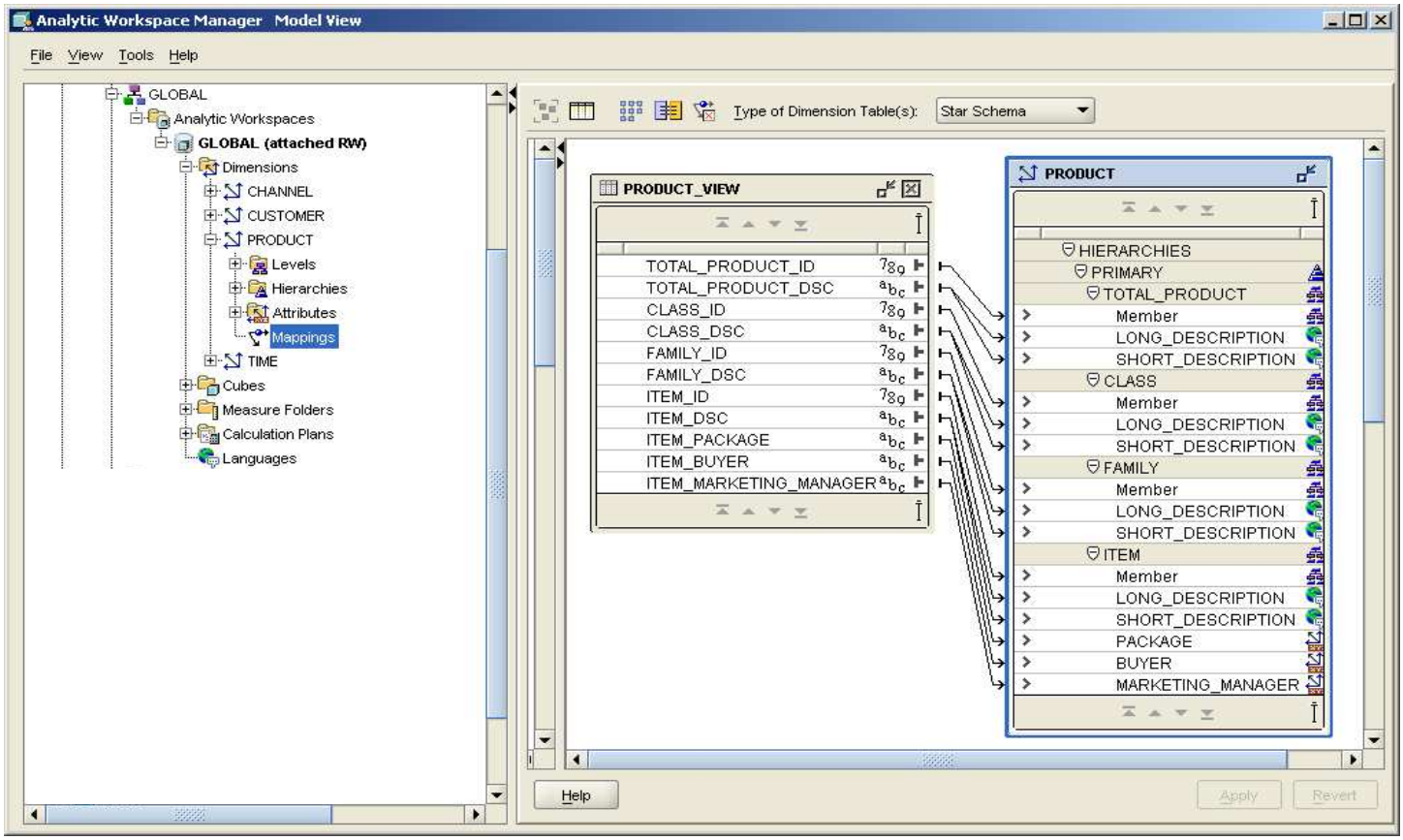
Oracle's OLAP option is implemented through the use of Oracle Analytic Workspaces (AWs), which are created using Oracle's Analytic Workspace Manager (AWM) or Oracle Warehouse Builder (OWB).

Using AWM, we can define the dimensions of our data, and also define multi-dimensional "cubes" of data for analysis. Those cubes can contain stored data objects, as well as computed measures that are calculated "on the fly". Data stored in the cubes is typically read in from relational tables or views, often in a non-aggregated state, and is frequently aggregated using the OLAP calculation engine.

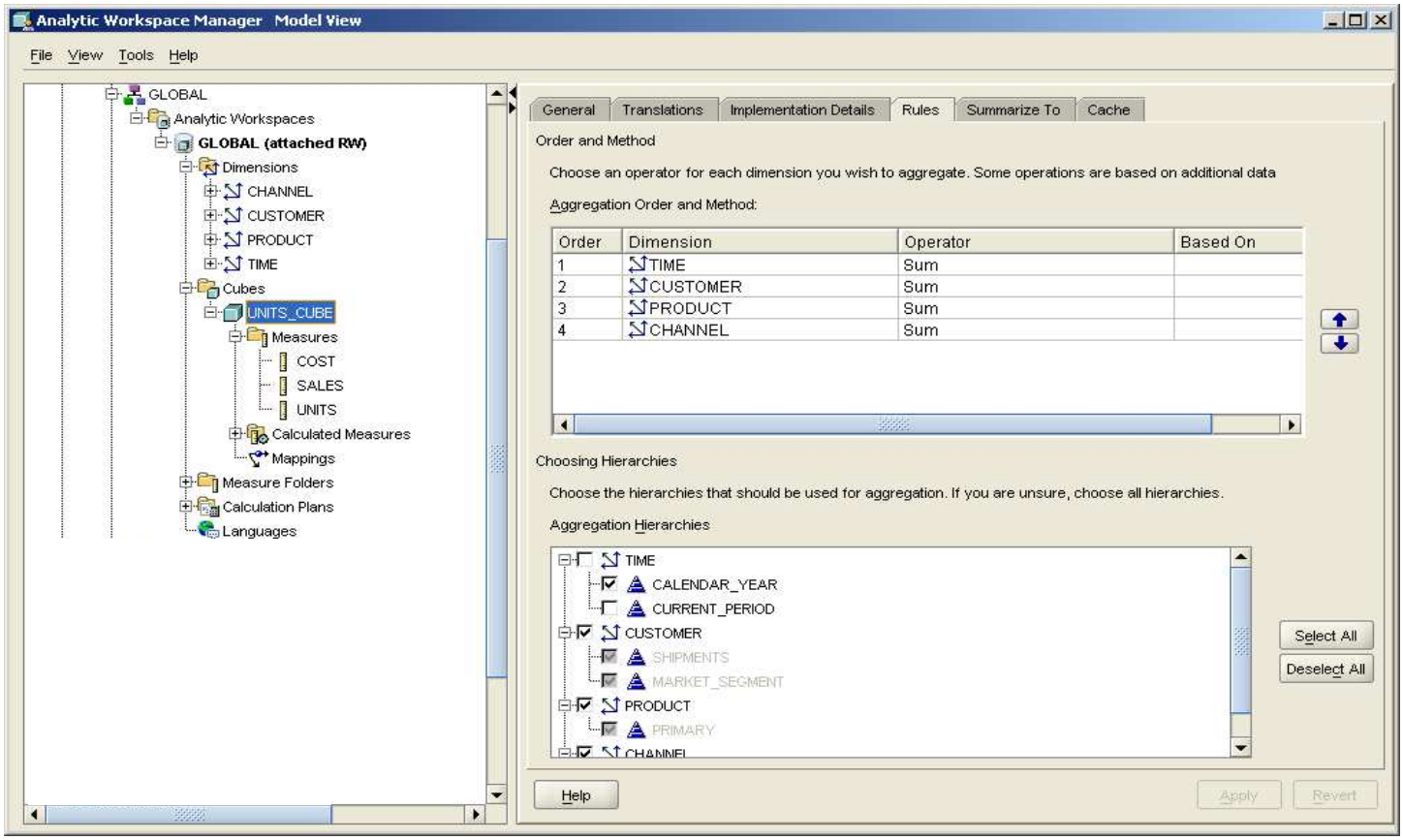
EXAMPLE: DEFINING A DIMENSION (CHANNEL) IN AWM



EXAMPLE: DEFINING A DIMENSION (PRODUCT) IN AWM



EXAMPLE: DEFINING A DATA CUBE IN AWM



The traditional interface to view data in an Oracle Analytic Workspace was Oracle's Discoverer for OLAP. The Analytic Workspace Manager contains the same BI Beans that Discoverer for OLAP uses, so that the system developer can see and manipulate data and dimensions much as they would in Discoverer. Without leaving AWM, the developer can take advantage of those BI Beans.

OVERVIEW OF THE SIEBEL ANALYTICS ENVIRONMENT

The business market has also validated another interface for data analysis. Oracle Business Intelligence Enterprise Edition (OBIEE), formerly Siebel Analytics, presents relational data to the user in a pseudo-multidimensional manner, with many of the same features and functionalities present in AWM. OBIEE requires a relational data store, instead of the multi-dimensional data store used by Discoverer for OLAP. This allows OBIEE to use any of several relational database technologies, such as Microsoft SQL Server, as its data storage engine. OBIEE is a feature-rich analysis environment, incorporating dashboards and other controls that provide fine-grain control over the user environment.

Title

Mouse Pad Sales

Table

Channel	Item	Year	Quarter	Sales	Sales Prior Year	Sales YTD	Sales % Change Prior Year
Catalog	Mouse Pad	2003	Q1-03	3,784	4,039	3,784	-6.311%
			Q2-03	3,934	4,122	7,718	-4.555%
			Q3-03	4,019	4,089	11,737	-1.717%
			Q4-03	4,493	3,945	16,230	13.900%
		2004	Q1-04	3,842	3,784	3,842	1.550%
			Q2-04	3,754	3,934	7,596	-4.582%
			Q3-04	1,250	4,019	8,846	-68.900%
Direct Sales	Mouse Pad	2003	Q1-03	662	657	662	0.821%
			Q2-03	714	711	1,376	0.488%
			Q3-03	709	647	2,086	9.682%
			Q4-03	731	624	2,817	17.237%
		2004	Q1-04	804	662	804	21.485%
			Q2-04	773	714	1,578	8.304%
			Q3-04	298	709	1,875	-58.059%

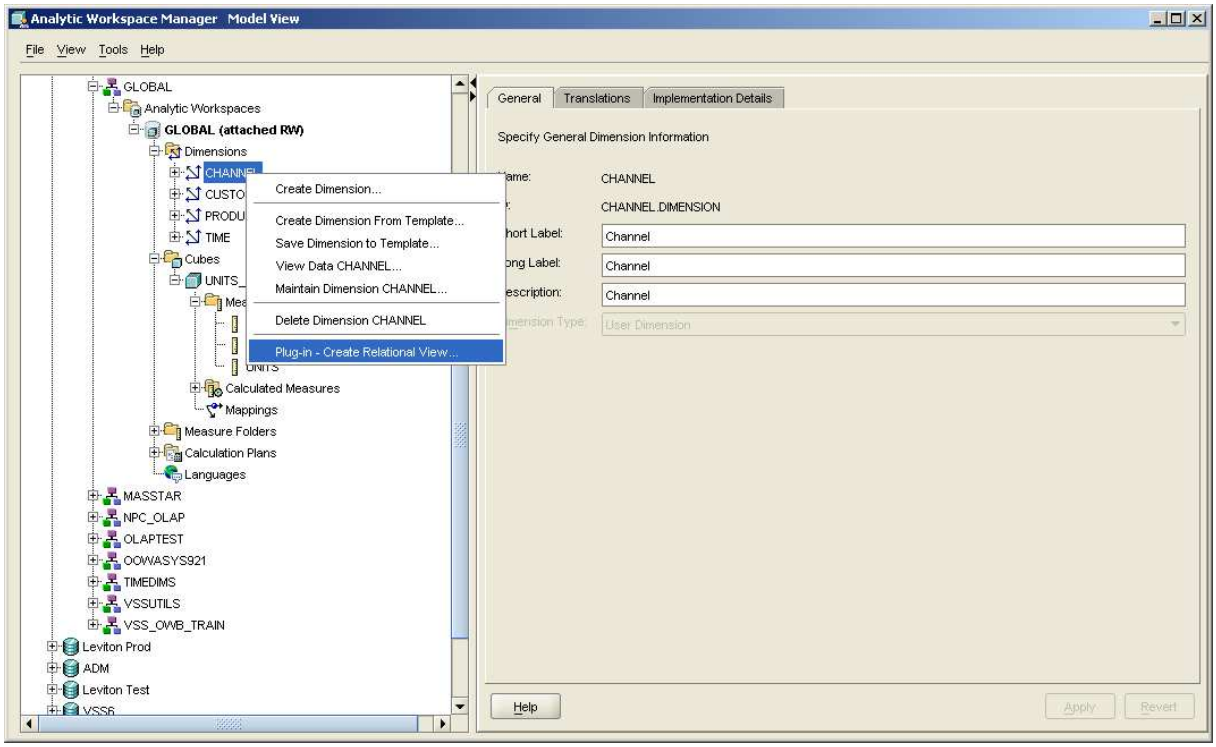
INTEGRATION OF OBIEE AND AWM

In the OBIEE environment, we see the same numbers as we see in the AWM/Discoverer environment. And in fact, the two environments are looking at the same data objects. Not replications, not copies, but the same physically stored data objects. So, how do we integrate the two environments? How can we use the strengths of the multi-dimensional OLAP engine for processing large amounts of data, but view the data using OBIEE? Since OBIEE requires a relational view of the data, and since our data is stored in the multi-dimensional Analytic Workspace, we need a method to present the data in the AW in a relational view.

OLAP_TABLE AND LIMITMAP

Within the Oracle 10g Database engine, Oracle developed a function called an OLAP_TABLE. Relational views can be defined that refer to the OLAP_TABLE function, which in turn refers to AW (multi-dimensional) data. Dimensions are presented as columns in those views, as are data measures which share those dimensions. The OLAP_TABLE function handles all of the transitions required to present multi-dimensional data in a relational format. In Oracle 11g, this functionality is completely embedded in the relational environment, and developers no longer need to manually create the OLAP_TABLE function in the database.

Oracle simplified the creation of the OLAP_TABLE in 10g with a wizard that is called directly from AWM.



The wizard created this new OLAP_TABLE:

```
CREATE OR REPLACE FORCE VIEW "GLOBAL"."CHANNEL_DIMVIEW" ("CHANNEL", "CHANNEL_LEVEL",
"PRIMARY_SORT_ORDER", "CHANNEL_SDSC", "CHANNEL_LDSC", "CHANNEL_CHANNEL_LVLDSC",
"CHANNEL_TOTAL_CHAN_LVLDSC", "CHANNEL_PRIMARY_PRNT") AS
  SELECT
"CHANNEL","CHANNEL_LEVEL","PRIMARY_SORT_ORDER","CHANNEL_SDSC","CHANNEL_LDSC","CHANNEL_CHA
NNEL_LVLDSC","CHANNEL_TOTAL_CHAN_LVLDSC","CHANNEL_PRIMARY_PRNT"
FROM table(OLAP_TABLE ('GLOBAL.GLOBAL duration session',
'', '', '&(CHANNEL_LIMITMAP)'))
MODEL
  DIMENSION BY (CHANNEL)
   MEASURES (
      CHANNEL_LEVEL,
      CHANNEL_SDSC,
      CHANNEL_LDSC,
      CHANNEL_CHANNEL_LVLDSC,
      CHANNEL_TOTAL_CHAN_LVLDSC,
      CHANNEL_PRIMARY_PRNT
    )  RULES UPDATE SEQUENTIAL ORDER();
```

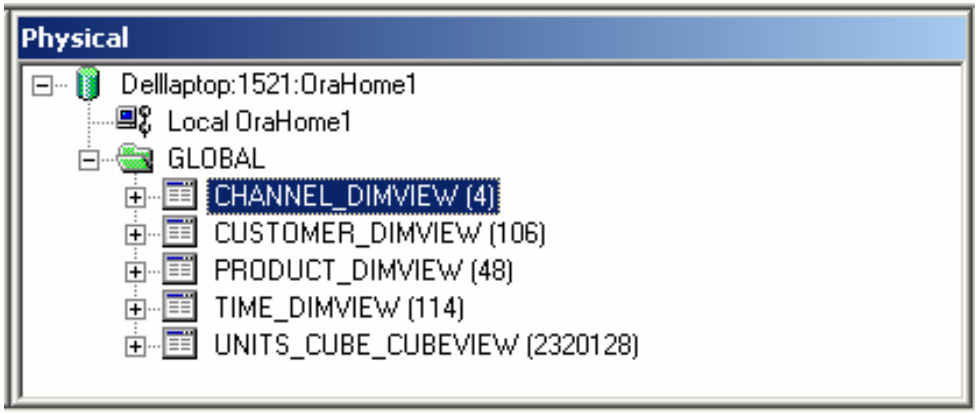
The wizard also created an object called a LIMITMAP in the Analytic Workspace. The LIMITMAP provides the information that the OLAP_TABLE requires in order to convert the multi-dimensional data into a relational view.

```
DIMENSION CHANNEL FROM CHANNEL WITH HIERARCHY
CHANNEL_PRIMARY_PRNT FROM
CHANNEL_PARENTREL(CHANNEL_HIERLIST 'PRIMARY')
INHIERARCHY CHANNEL_INHIER
FAMILYREL CHANNEL_TOTAL_CHAN_LVLDSC,
CHANNEL_CHANNEL_LVLDSC
FROM CHANNEL_FAMILYREL(CHANNEL_LEVELLIST 'TOTAL_CHANNEL'),
CHANNEL_FAMILYREL(CHANNEL_LEVELLIST 'CHANNEL')
LABEL CHANNEL_LONG_DESCRIPTION
ATTRIBUTE CHANNEL_LDSC FROM CHANNEL_LONG_DESCRIPTION
ATTRIBUTE CHANNEL_SDSC FROM CHANNEL_SHORT_DESCRIPTION
ATTRIBUTE CHANNEL_LEVEL FROM CHANNEL_LEVELREL
```

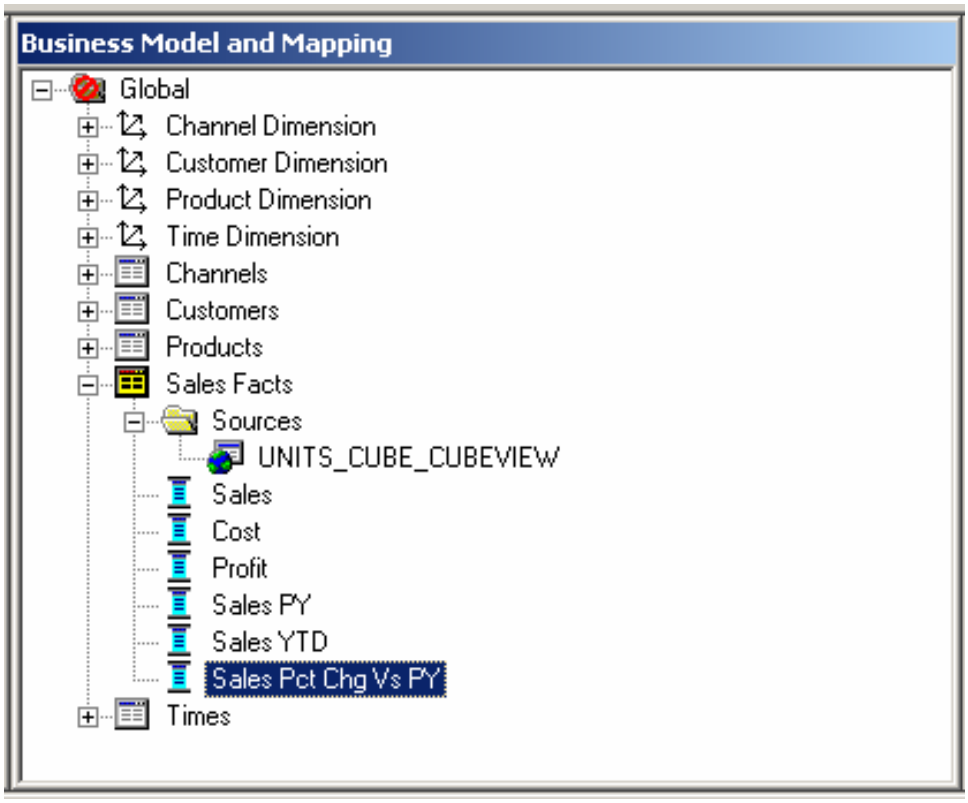
OBIEE ADMINISTRATOR

Now that we have a relational view of the multi-dimensional data, we can use the OBIEE Administrator tool (formerly known at the Siebel Administrator) to configure that view for our use with the OBIEE analysis environment. The tool has three sections.

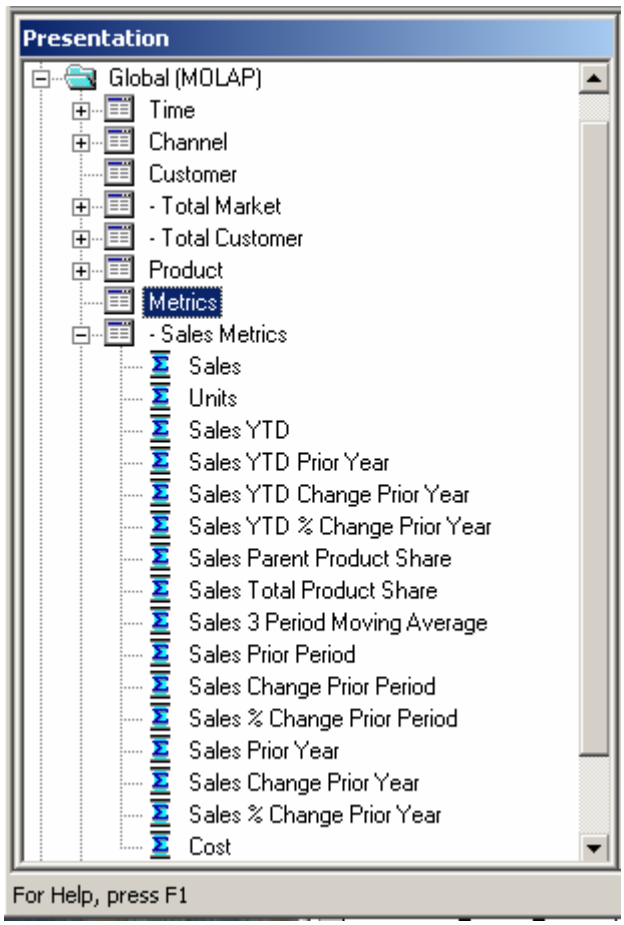
The *Physical Layer* is where we point to the relational tables and views that we want to use as our data sources. In this example, the Physical Layer contains references to the OLAP_TABLEs that were created by the wizard in AWM.



The *Business Model Layer* is where we convert the objects in the physical layer into objects that are meaningful for our business. For example, a relational column might be entitled 'REV', while we want to present it to our users as 'Sales Revenue'. The Business Model Layer is where that happens.



The *Presentation Layer* is where we decide and control what pieces of the Business Model our users can see. There may be objects such as calculations that are important for preparing the Business Model, but which the users need not see. Whatever objects the users are eligible to see will be placed into the Presentation Layer.



OBIEE ANALYTICS

After the Physical Layer, Business Layer, and Presentation layer are created, the results can be viewed in the OBIEE analysis environment, OBIEE Analytics.

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WHAT'S IN 11G?

Oracle 11g takes the 10g enhancements to the next level, featuring

- Materialized view rewrite (transparent to the application)
- Automatic Materialized View Loading
- Views for SQL access automatically generated
- Cost-based aggregation optimization
- Metadata integrated into Oracle dictionary
- Tolerant of non-dimensional SQL
- New GUI to define cell-level security

SUMMARY

Oracle's direction clearly supports the use of multi-dimensional data in BIEE analysis. Oracle continues to enhance and update the BIEE toolset, and will be including more robust functionality with some "Discoverer-like" capabilities in the near future.

AUTHOR

Mark Thompson is a Senior Consultant with Vlamis Software Solutions (mthompson@vlamis.com). He has been designing and developing MOLAP systems using Oracle's toolset for 24 years. He has authored numerous white papers for Oracle OLAP tools, and has presented at IOUGA and Oracle Open World.