

REVIEW ARTICLE

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IMPLEMENTATION OF ESSBASE APPLICATION USING ORACLE HYPERION

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Abstract: Essbase is multidimensional database software that is optimized for planning, analysis, and management-reporting applications. Essbase uniquely blends an innovative technical design with an open, client-server architecture. The product enables you to extend decision support systems beyond ad hoc queries and reports on historical performance to dynamic, operational systems that combine historical analysis and future planning.

Oracle Hyperion Essbase is the industry-leading multi-dimensional online analytical processing server, providing a rich environment for effectively developing custom analytic and enterprise performance management applications. By leveraging its self-managed, rapid application development capabilities, business users can quickly model complex business scenarios. In this paper we see how Oracle Hyperion Essbase supports extremely fast query response times for vast numbers of users, large data sets, and complex business models.

Keywords: Oracle Hyperion Essbase; Multidimensional database

INTRODUCTION

Multidimensional Database : Multidimensional database Supports multiple view of data sets. In multidimensional data base data is stored in cubes not in the form of tables. In multi - dimensional database data can be analyzed from different pre - spective. A multidimensional database (MDB) is a type of database that is optimized for data warehouse and online analytical processing (OLAP) applications.

A multidimensional database - or a multidimensional database management system (MDDDBMS)-imply the ability to rapidly process the data in the database so that answers can be generated quickly. A number of vendors provide products that use multidimensional databases. Approaches to how data is stored and the user interface vary.

Oracle's Hyperion Essbase allows users to model, analyze, and interpret the most complex business scenarios. Essbase is an object oriented database that provides users with multidimensional analysis capabilities. Essbase Databases are often called "Cubes" and are defined by dimensions, which themselves are hierarchical groups of members Data is organized into cross sectional groups that can be accessed by users depending on what sections of the hierarchal dimensions they wish to see. The Dimensions are hierarchical representations of descriptors that business users are familiar with, such as a Product Hierarchy. By simply choosing any point in the various dimension hierarchies users are instantly presented with the data values. Users can drill up or down, or users can pivot different dimensions to form new cross sections and better analyze the information. Essbase is optimized to support On-Line Analytical Processing (OLAP) as opposed to the more traditional transaction processing (OLTP) found in relational databases. This enables rapid response times for large volumes of users and large volumes of information.

Essbase gets its name from Extended Spreadsheet Database and is commonly accessed via a spreadsheet add-in that provides users the capability to analyze information within

a familiar environment such as Microsoft Excel. Essbase can accept data input from end users which makes it a very capable budgeting tool in addition to its analytic capabilities. Essbase also contains a very powerful calculation engine and is often used to create Profitability Costing models or other types of analytic models that require allocations or more advanced calculations

DATA WAREHOUSE

This definition of the data warehouse focuses on data storage. The main source of the data is cleaned, transformed catalogued, and made available for use by managers and other business professionals for data mining, online analytical processing, market research and decision support (Marakas & O'Brien 2009). However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, an expanded definition for data warehousing includes business intelligence tools, tools to extract, transform and load data into the repository, and tools to manage and retrieve metadata.

WHAT IS HYPERION?

Hyperion is a Business Intelligence (BI) and Business Performance Management (BPM) Tool. It's the market leader in Financial, Operational and Strategic Planning. It has applications for Planning, Financial consolidation, and score carding, reporting, dashboards, Analysis, Workspace, Master Data Management and Foundation. Hyperion can deliver this sort of breakthrough performance management because we offer the most comprehensive set of features, functionality and flexibility in one system.

1. Modules of Hyperion

- Hyperion Essbase.
Essbase is mdbms that provide multidimensional database platform.
- Shared services

All the other components that are installed need to be registered with shared services .Shared Services integrates the products to provide these functionalities:

- User provisioning.
- External authentication definition.
- Task flow management
- Essbase Administrative Service
- Essbase Server
- Essbase Client

INTRODUCING ESSBASE

Essbase products provide companies with the ability to deliver critical business information to the right people when they need it. With Essbase, companies quickly leverage and integrate data from multiple existing data sources and distribute filtered information to end-user communities in the format that best meets the users’ needs. Users interact and intuitively explore data in realtime and along familiar business dimensions, enabling them to perform speed-of-thought analytics.

Key Features:

- Essbase products provide the analytic solution that integrates data from multiple sources and meets the needs of users across an enterprise. Essbase products enable the quick and easy implementation of solutions, add value to previously inaccessible data, and transform data into actionable information.
- Essbase is a powerful multidimensional database and calculation engine designed to support modeling, planning, simulations, forecasting and allocations.
- It provides an integrated environment for rapidly developing custom analytical and Enterprise Performance Management applications.

Essbase product Components: Essbase products incorporate powerful architectural features to handle a wide range of analytic applications across large multi-user environments. Figure 1 provides a high-level view of the information flow between the source data and the product components.

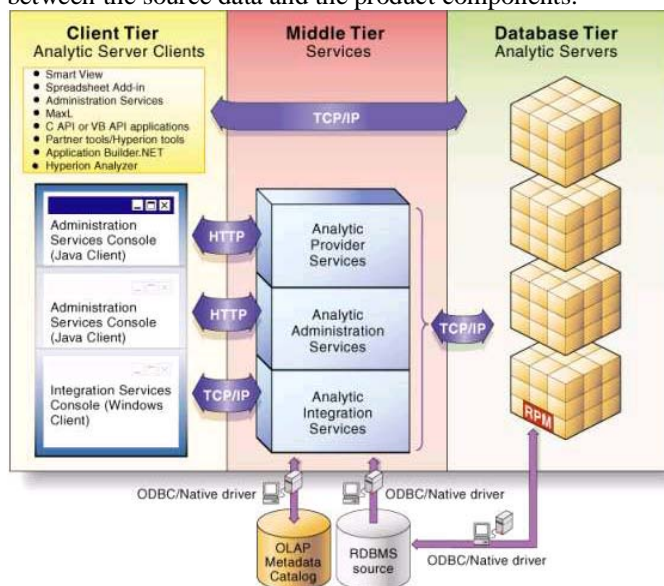


Figure: 1 High-level Information Flow Between Product Components

ADMINISTRATION SERVICES ARCHITECTURE

Administration Services works with Essbase Servers in a three-tiered system that consists of a client user interface (UI), a middle-tier server, and one or more Essbase Servers. The middle tier coordinates interactions and resources between the UI and Essbase Servers. The three tiers may or may not be on the same computer or platform. The three tiers include the following components, as illustrated below:

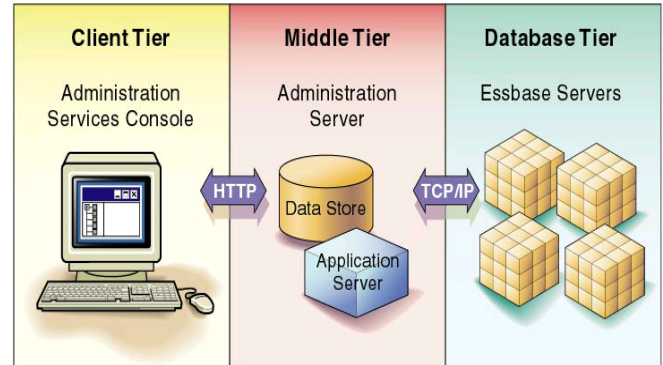


Figure: 2 Administration Services Architecture

- Client tier (Administration Services Console): A Java-based client console provides a UI to manage the Essbase environment.
- Middle tier (Essbase Administration Server): A Java-based server maintains communication, session, and security information for connections to Essbase Servers.
- Database tier (Essbase Server): One or more Essbase Servers store and process multidimensional database information. Essbase Servers are installed separately from Administration Services.

PROCESS OF DESIGNING A DATABASE

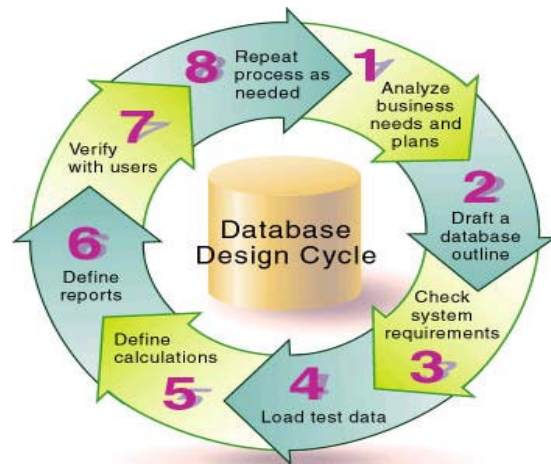


Figure 3 :The Database Design Cycle

As illustrated in Figure3, designing an application is a cyclic process that moves from a planning stage to a verification stage.

Analyze business needs and plan:

Where does each department currently store data?
Is data in a form that Essbase can use?

Who updates the database and how frequently?
 Does the data support the desired analysis and reporting goals?
 Do those who need to update data have access to it?

Creating Database outline

Most businesses analyse the following areas:

- Time periods
- Accounting measures
- Distribution channels
- Geographical regions
- Business units

If you need to analyze a business area by classification or attribute, such as by the size or color of products, you can use attribute dimensions to represent the classification views.

Checking System Requirements

Now you are ready to determine the system requirements for the database.

- Ensure that you have enough disk space.
- Ensure that you have enough memory.
- Ensure that your caches are set correctly.

Loading Test Data

Before you can test Essbase - Calculations, consolidations, and reports, you need data in the database. During the design process, loading mocked-up data or a subset of real data provides flexibility and shortens the time required to test and analyze results.

Defining Calculations

Use the following checklist when you define a Essbase - Calculations:

- Does the default calculation logic achieve accurate results?
- Which members require Essbase - Formulas?
- Which members require Essbase - Two-Pass Calculations ?
- Which members can be tagged as Dynamic cal ?

Defining Reports

To ensure that the design meets user information requirements, you must view data as users view it. Users typically view data through spreadsheets, printed reports, or reports published on the Web.

Verifying the Design

- Ensure that the database satisfies all of their goals
- Do the calculations provide the information they need?
- Are they able to generate reports quickly?
- Are they satisfied with consolidation times?

DEFINITION OF MULTIDIMENSIONAL

A *dimension* is a perspective or view of a specific dataset. A different view of the same data is an *alternate dimension*. A system that supports simultaneous, alternate views of datasets is *multidimensional*. Dimensions are typically categories such as time, accounts, product lines, markets, budgets, and so on (see figure 3). Each dimension contains additional categories that have various relationships one to another. In contrast to the multidimensional view, worksheets stores data in two dimensions, usually time and accounts, as shown in figure 4:

	A	B	C	D	E	F	G
1		Jan	Feb	Mar	Apr	May	Jun
2	Sales	1212	1421	1354	1178	1254	1465
3	COGS	345	392	387	321	320	401
4	Margin	867	1029	967	857	934	1064
5							
6	Marketing	46	24	95	11	56	5
7	Freight	21	71	93	23	88	21
8	Discounts	2	24	52	14	53	59
9	Total Expenses	69	119	240	48	197	85
10							
11	Gross Profit	798	910	727	809	737	979
12							
13							

Figure 4. Multiple Views from a Five-Dimensional Database

A Hyperion Essbase application contains an unlimited number of dimensions, so you can analyze large amounts of data from multiple viewpoints.

DATABASE OUTLINES

Understanding the *database outline* is the key to understanding Hyperion Essbase. To define a multidimensional database, you design its database outline. The database outline contains the database organization (structure), the database members, and the database rules, as shown in 5:

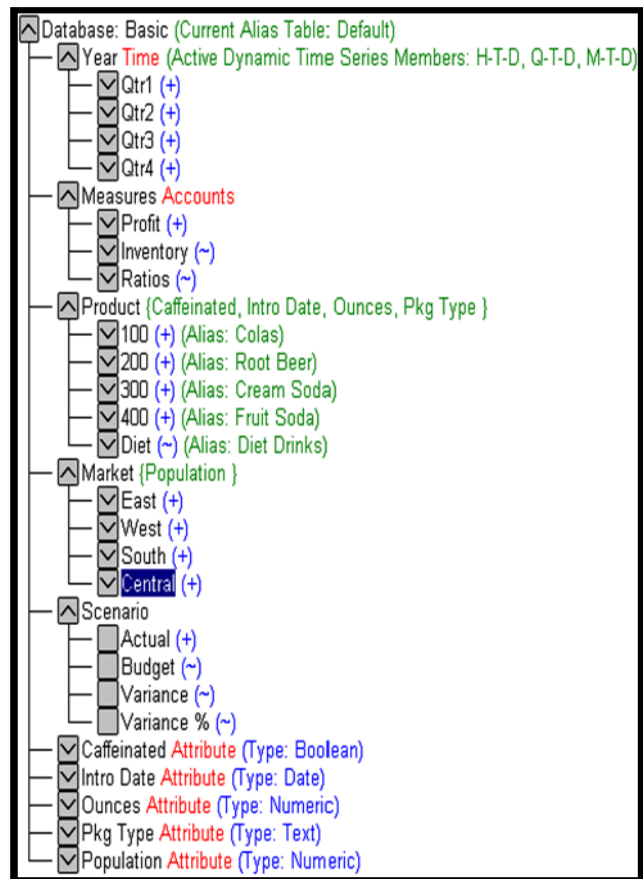


Figure5 : ESSBASE DATABASE OUTLINE

The components of the database outline are the following:

- Dimensions
- Members

- Attributes
- Formulas
- Aliases
- Consolidations

Refer to the following sections for descriptions of the outline components.

Dimensions

Dimensions are the most basic categorical definitions of data within the database outline. You need at least two dimensions to make any meaningful reference to data; for example, a time dimension and an accounts dimension. Other dimensions may categorize products, markets, and scenarios. Using dimensional organization, you can define any consolidation structure or any slice of data that is relevant to the application. Hyperion Essbase supports an unlimited number of dimensions.

Members

Members are the names of the elements within a dimension. A dimension can contain an unlimited number of members. The calculation, reporting, and dimension-building facilities in Hyperion Essbase use the following terms to describe members.

- **Parents.** A parent is a member with a consolidation branch below it. For example, in the illustration below, Qtr1 is a parent member because there is a branch containing monthly members below it.
- **Children.** A child is a member with a parent above it. For example, Jan, Feb, and Mar are children of the parent Qtr1.
- **Siblings.** A sibling is a child member of the same parent and on the same branch (same level). For example, Jan, Feb, and Mar are siblings. Apr is not a sibling of Jan, Feb, or Mar, however, because it has a different parent, Qtr2.
- **Descendants.** A descendant is a member at any level below a parent. For example, each member that falls in the Year branch is a descendant of Year. The following members are all descendants of Year: Qtr1, Jan, Feb, Mar; Qtr2, Apr, May, Jun; Qtr3, Jul, Aug, Sep; Qtr4, Oct, Nov, Dec.
- **Ancestors.** An ancestor is a member of a branch above a member. For example, Qtr2 and Year are ancestors of Apr.
- **Generations.** The term *generation* describes the branch number of a member. Generations count from the root of the tree (generation 1, which is the dimension name) toward the leaf node.
- **Levels.** The term *level* describes the branch number of a member. Levels count from the leaf node (level 0) toward the root (the dimension name).

Attributes

Attributes describe characteristics of data, such as the size and color of products. Through attributes, you can group and analyze members of dimensions based on their characteristics. Attribute dimensions must be associated with base dimensions.

Formulas

Each database member can be associated with one or more formulas in the database outline.

Aliases

Essbase supports alternative names, or aliases, for database members. Aliases are useful when various labels are used for the same member in various worksheets. Aliases also can be used for reporting in alternative languages or for more formal output name sets, such as account numbers.

Consolidations

Consolidations in Essbase applications are defined by member branches. The database outline determines consolidation paths. The determination is based on the location of members within a dimension. Indentation of one member below another indicates a consolidation relationship.

RULES FILES

Rules define operations that Essbase performs on data values or on dimensions and members when it processes a data source. Use rules to map data values to an Essbase database or to map dimensions and members to an Essbase outline Rules are stored in rules files. A rules file defines which build method to use, whether data values or members are sorted or in random order, and how to transform data values or members before loading them. It is best to create a separate rules file for each dimension.

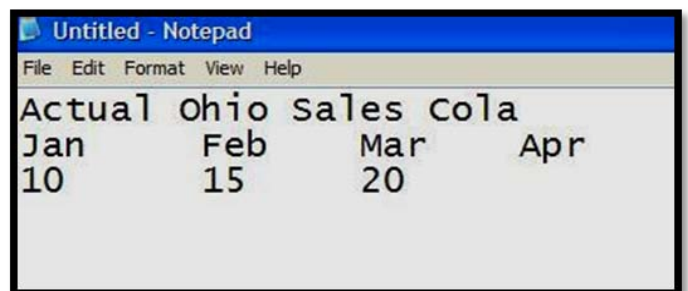
DATA LOADING

Loading data is the process of adding data values to an database from a data_source. If the data source is not perfectly formatted, you need a data load rules files to load the data values.

To load data values into an Essbase database, follow these steps:

- Set up the data source.
- If you are not using a rules file, you must set up the data source outside Essbase.
- Each record in the data source must have the same number of data value fields to perform a data load. If data values are missing, the data load processes incorrectly.

For example, in figure5 the file is invalid, because there is no value under Apr:



To fix the file, insert #MISSING or #MI into the missing field:

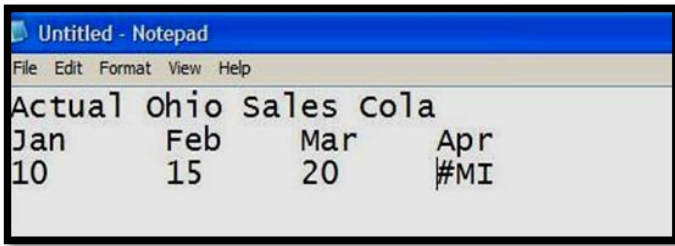


Figure 6

Set up the data load rule file
 We can use data load rule file to load the data and also we can use free form loading.

1. Data Load Rules file:

Data Load Rules file is the rules files which is involved in the data load process. A data source for data load must contain :not only the values that you want to load but also identification of the location to which Essbase should load the values: a data address that includes one member from every standard dimension in your outline.

2. Free form loading:

If a Essbase - Data Source contains all of the information required to load the data values in it into the database, you can load the data source directly in a free-form data load (without rule file) .To load a data value successfully, Essbase must encounter one member from each dimension before encountering the data value. For example, in the figure6, Essbase loads the data value 42 into the database with the members Texas, 100-10, Jan, Sales, and Actual.

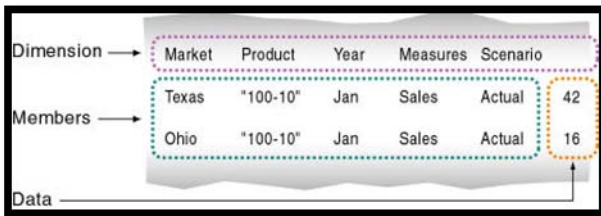


Figure 7

CALCULATIONS

1. Database Calculation

A database contains two types of values:

- Values that you enter, which are called *input data*
- Values that are calculated from input data
- For example: You enter regional sales figures for a variety of products. You calculate the total sales for each product.
- You enter the budget and actual values for the cost of goods sold for several products in several regions. You calculate the variance between budget and actual values for each product in each region.
- The database contains regional sales figures and prices for all products. You calculate what happens to total profit if you increase the price of one product in one region by 5%.

2. Outline Calculation

Outline calculation is the simplest method of calculation. Essbase bases the calculation of the database on the relationships between members in the database outline and on any formulas that are associated with members in the outline.

➤ **Member Formulas**

Formulas calculate relationships between member in the database outline.

You can :

- apply formulas to members in the outline,
- or place formulas in a calculation script.

Figure7 shows the Scenario dimension from the Sample Basic database. The Variance and Variance % members are calculated by using the formulas attached to them.

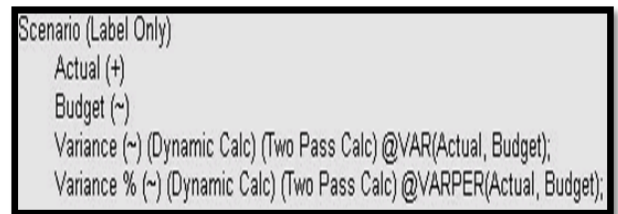


Figure 7: Calculation of Variance and Variance %

It may be more efficient to calculate some member combinations when you retrieve the data, instead of calculating the member combinations during the regular database calculation. You can use dynamic calculations to calculate data at retrieval time.

3. Calculation Script

Calculation script calculation is the second method of calculation. Using a calculation script, you can choose exactly how to calculate a database. For example, you can calculate part of a database or copy data values between members.

A calculation script contains a series of calculation commands, equations, and formulas. For example, the following calculation script increases the actual marketing expenses in the New York region by 5%.

```
FIX (Actual, "New York")
Marketing = Marketing *1.05;
ENDFIX;
```

CONCLUSION

Essbase is multidimensional database application tool that lets you continually analyze and compare aspects of your business. An Essbase database works with multidimensional data and rollup hierarchies within dimensions. Essbase deals with some level of summarized data, not transaction. Essbase can be adapted to many different reporting and analysis environment. With the help of essbase we can analyze the same business information from different perspectives .Essbase allow data storageand analysis to occur at different level of detail.

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