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Understanding Oracle OLAP Solutions – Oracle OLAP Database Option and Oracle Essbase Session - 747

Michael Schrader Director, BI & PM Strategic Architecture

BI & PM Strategic Architecture Organization Chart



Michael Schrader Director, BI & PM Strategic Architecture



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Dan Vlamis





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Provider of BIC2G VM images

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Agenda

- A Brief History of OLAP
- Why OLAP?
- Oracle OLAP and Oracle Essbase Comparisons
- Oracle OLAP Database Option Features
- Oracle Essbase Features



Oracle Essbase & Oracle OLAP: A Guide to Oracle's Multidimensional Solution

- Published by Oracle Press Sept 2009
 - Michael Nader
 - David Collins
 - Floyd Conrad
 - Mitchell Campbell
 - Michael Schrader
 - Dan Vlamis
 - Chris Claterbos



- Cover both Oracle Essbase and Oracle OLAP Database Option
- 500 Pages
- See http://mhprofessional.com/product.php?isbn=0071621822 for details
- Special Thanks to Kathy Horton

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Oracle Essbase & Oracle OLAP: A Guide to Oracle's Multidimensional Solution - Outline

- Table of contents
- Preliminary Contents Subject to Change Prior to Publication

Ch 1. The Need for OLAP Ch 2. The Evolution of OLAP Ch 3. Design and Methodology Ch 4. Building Your Database Ch 5. Application of OLAP Ch 6. Keeping it Running Ch 7. Advanced Topics Ch 8. Real-World Examples Ch 9. Future Direction Bibliography Glossary



Creating a Market The Birth of OLAP

- E.F. "Ted" Codd (1923-2003)
- 1970: A Relational Model of Data for Large Shared Data Banks
- 1994: Coined the term OLAP "OnLine Analytical Processing"
- Published the "12 rules of OLAP"







E.F. Codd Providing OLAP to Analysts: An IT Mandate

"organizations require robust OLAP data analysis tools which complement the enterprise's existing data management system and which are rigorous enough to anticipate and facilitate the types of sophisticated business data analysis inherent in OLAP."





Why OLAP?



Flexibility with "Speed of Thought"

I need a way to analyze 10 million customers, and not have the query take 20 minutes and impact production systems.



Multi-Sheet = Nightmare

- How about by Product and Market?
 - 5 Markets BY 5 Products = 25 Sheets!
- You are entering "Spreadsheet Hell"
- What about Pivot tables?

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Let's Do the Math!

Dimension	Input Members	Consolidations	Total
Year	12	5	17
Measures	9	9	18
Scenario	2	2	4
Products	14	5	(19)
Markets	20	5	25

That's **581,400** data cells spread over **1,900** spreadsheets!

Speed of Deployment (Development)

- OLAP development can be faster than traditional data warehouse development.
- Easy to utilize toolsets.



Essbase & Oracle Database OLAP Option Product Positioning

- Both Essbase and Oracle OLAP have significant advantages over non-Oracle rivals and share similar capabilities such as:
 - Fast query performance.
 - Fast incremental update of data sets.
 - Rich calculation capabilities.
 - Dimensional calculation and query models.
- Essbase and the OLAP Option target different markets and buyers.
 - Although there are shared capabilities, to whom and how these capabilities are delivered are quite different.

Essbase & Oracle Database OLAP Option Product Positioning

	Oracle's Hyperion Essbase	Oracle Database OLAP Option
Purpose	Custom analytic & BI applications with a focus on EPM; built and maintained by analysts.	Improves the performance and analytic content of SQL- based BI applications.
Buyer	Line of Business (LoB).	IT.
Typical End Users	Line of Business users who query and create data within Essbase tools and OLAP applications.	Users of SQL-based business intelligence tools who query data in the database.
Data Management Strategy	Easily combine data from a wide variety of data sources.	Optimized for data in the Oracle database.
Architecture	OLAP in a server, part of Fusion Middleware	OLAP in the Oracle Database

Ford Motor Company

Oracle OLAP



Business Problem:	Analyze energy consumption patterns within an automotive assembly plant with goal of rescheduling peak usage to coincide with times of day with lower per unit costs.
Solution	Consolidate energy meter readings in Oracle Data Warehouse, including OLAP cubes used for time series analysis.
Buyer:	IT
User Community	Line of business users at product unit and cost center levels query Oracle Data Warehouse with OLAP cube using Business Objects Web Intelligence and Spreadsheet Add-in.

Southwest Airlines



<u>Essbase</u>

Business Problem:	Needed to project cash flow in the face of unprecedented uncertainty about customer travel plans, fuel prices, new security regulations, and other variables after 911
Solution:	Alternative cash flow scenario models, capital spending plans, 15 month rolling forecasts, and "Business Cockpits" (multidimensional dashboards)
Buyer:	VP of Finance

User Community Business users in finance, reservations, ground operations



9/11 Crisis in the Airline Industry Southwest Airlines adapts



Needs

- Determine how long cash balances of \$1 billion would last – immediately
- Develop capital spending plans and 15 month rolling forecasts in 1 day



83 million passengers a year

63 destinations

3300 flights a day

After

- Ability to forecast within 2% of outcome, providing top-bottom and bottom-top analysis
- Analysis provided comfort level (no employees laid off; no need for government funding)
- Finance moved to spending 10% accumulating data and 90% analyzing (75% / 25% before)

9/11 Crisis in the Airline Industry Southwest Airlines adapts

"Without the level of detail Hyperion provides – regional patterns, long vs. short haul, business vs. leisure, etc. – we could not have planned with the accuracy and speed so critical to the time. We were able to model many scenarios that provided the moral support, comfort level, and confidence for many departments working hard to make it through that fateful day."

> Mike Van de Ven Vice President Financial Planning & Analysis

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Purpose Buyers, Users, Data Management Profile

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Essbase & Oracle OLAP Option Positioning Details

Purpose



Oracle's Hyperion Essbase

- Provide line of business with the capability to build custom analytic applications with complex calculations.
- A platform for enterprise performance management (EPM) applications.
- Consolidate a variety of different data sources in LoB view of data.

- Oracle Database OLAP Option
 - Provide IT with the ability to enhance the performance and analytic content of the Oracle Database
 - Improve SQL based business intelligence tools with enhanced query performance and analytic content.
 - Centralize data, meta data and business rules within the Oracle Database.



Buyer



- Primarily Line of Business (Occasionally IT)
- Special Interest in:
 - Performance Management
 Applications
 - Advanced write-back capabilities & allocations
 - All available via Excel or prebuilt applications
 - Designed and built by Line-of-Business with limited IT Support
 - Using data from disparate Systems

Oracle Database OLAP Option

- Primarily IT (Occasionally LoB)
- Special Interest in:
 - Summary management solution for database.
 - Extending the database with analytic content.
 - Centralized management of data.
 - Querying analytic content using Excel and SQL based business intelligence tools.
 - Leveraging existing infrastructure.
 - Incremental, cost effective solutions.

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Typical End Users



Oracle's Hyperion Essbase

- Line-of-Business Analyst
- Financial Analyst
- Quantitative End-User
- Line-of-Business Management
- Executive Management

Oracle Database OLAP Option

- End users of SQL-based query and reporting tools and applications
- SQL application developer
- Oracle Database Administrator
- Some LoB users for cube design

Typical Front Ends for End Users



• Oracle's Hyperion Essbase

- MS Office: Excel, Word, PowerPoint
- Hyperion Planning
- Hyperion Financial Reporting
- Hyperion Web Analyzer
- Hyperion Interactive Reporting
- Hyperion Visual Explorer
- Hyperion Smart Space
- Custom Development via API
- Google OneBox, Oracle Secure
 Enterprise Search

- Oracle Database OLAP Option
 - Oracle BI EE
 - Hyperion (BI EE +)
 - Business Objects
 - Cognos
 - MicroStrategy
 - Other SQL-based BI tools
 - Custom SQL-based applications
 - Oracle OLAP Excel Add-in
 - Oracle Discoverer Plus OLAP



Data Management



	Oracle's Hyperion Essbase	Oracle Database OLAP Option
Data Store	Essbase cubes in the middle tier.	Oracle cubes in the Oracle Database.
Data Acquisition	Allow LoB to consolidate data from multiple data sources including RDBMS, flat file, Excel, financial ERP applications, etc.	Allow IT to populate cubes from any relational source in the Oracle Database (tables, external tables, gateways, etc.).
Data Creation	LoB users often create new data via calculation scripts and user write back.	IT users often create new data via calculation scripts to extend the data warehouse.
Meta Data	Managed in Essbase.	Managed in Oracle Data Dictionary.

Summary OLAP Product Positioning

- Both Essbase and the Oracle OLAP Option share common characteristics such as excellent query performance, fast update, rich analytic content and a dimensional model.
- Essbase is designed for Line of Business managed Enterprise Performance Management applications.
- Oracle OLAP Option is designed for IT managed database summary management and extending the database with analytic content.





Oracle OLAP Database Option Features



Analytic Workspace Manager

- AWM 11g is a tool for creating, developing, and managing multidimensional data in an Oracle 11g data warehouse.
- With this easy-to-use GUI tool, you create the container for OLAP data, an analytic workspace (AW), and then add OLAP dimensions and cubes.



Analytic Workspace Manager

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Star versus Cubes - Facts and Dimensions

- A cube view plays the role of a fact table.
- Dimension views and hierarchy views play the role of dimension tables.
- The star design exposed by OLAP cubes is very similar to traditional table-based star models. The dimension views form a constellation around one or more cube views.







Star versus Cubes - Facts and Dimensions

- However, there are two key differences:
- Fact tables in a star schema store detail data (called leaves), while the cube views reveal many summary levels.
- Calculations in a cube are simply exposed as column in the cube view, and the computation for the equations occurs in the OLAP engine.



Star versus Cube - Facts and Dimensions

 These differences impact the way you query data. With star queries, you aggregate the data by combining aggregation functions (such as sum) and the GROUP BY clause. With OLAP queries, you simply select the data you want (either stored or calculated) as a column. Typically, no aggregation function is necessary since the data has already been summarized by the cube.



Fast Answers to Tough Questions Simple SQL for Complex Queries

Query With OLAP Cubes:

SELECT [breakout columns], sales, sales_prior_year sales_ytd, sales_ytd_prior_year FROM sales_cube_view WHERE [star join]

Query w/o OLAP Cubes:

WITH sales dense AS (SELECT [breakout columns] sales, SUM(sales) over(PARTITION BY [breakout columns] ORDER BY [time column] ASC range BETWEEN unbounded preceding AND CURRENT ROW) AS sales ytd FROM (SELECT [breakout columns] a.sales FROM (SELECT [breakout columns] SUM(f.sales) sales FROM [table list] WHERE [star join and other filters] GROUP BY [breakout columns] a PARTITION BY(breakout columns) RIGHT OUTER JOIN (-- need list of all time periods SELECT DISTINCT [time columns] FROM time dim b ON([join on relevant time level]))) ... Continued...



Expense Cubeview

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• Dimensions map to the primary key columns	•

Attributes and measures map to data columns

Partitioning and Parallel

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Cube-based Materialized Views Breakthrough Manageability & Performance

- The 11g SQL Query Optimizer treats OLAP cubes as MV's and rewrites queries to access cubes transparently
- Cube refreshed using standard MV procedures







Explain Plan Breakthrough Manageability & Performance

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Oracle Essbase Features



Hyperion Essbase A Brief History

- Developed by Arbor Software 1991
- Essbase:
 - <u>Extended Spreadsheet Server Database</u>
- Heritage:
 - Spreadsheets
 - Financial modeling tools
- Client/Server architecture
- Dynamic Sparse matrix handling
- US patent 5359724 granted 1994



"Speed of Thought" response



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Hyperion Smart View[™] for Office

- Use MS Office to enter, analyze and report budget data
- MS Excel add-in allowing access on or off-line
- Users download forms to Excel
- Manipulate data just like the full web client
- Synchronize to server when ready





Hyperion Planning



• Strategic Planning

- Modeling & Simulation
- What-if Analysis
- Excel Integration
- Enterprise Collaboration
- Native Reporting & Analysis
- Top Down & Bottoms Up

Planning & Budgeting Applications

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Thank You

- Please, complete the evaluation form.
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