Using Business Intelligence with Oracle’s E-Business Suite

Paper # 89

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Vlamis Software Solutions, Inc.

- Founded in 1992 in Kansas City, Missouri
- A Member of Oracle Partner Program since 1995 along with various Oracle Beta Programs
- Designs and implements databases/data marts/data warehouses using RDBMS and Multidimensional tools
- Specializes in Data Transformation, Data Warehousing, Business Intelligence, Oracle Financials and Applications Development
- Founder Dan Vlamis is former developer at Oracle-Waltham office for Sales Analyzer Application
- Oracle Certified Solutions Provider
Agenda

• What BI Is
• What BI Is Not
• Terminology and Marketplace
• Assessing Data Warehouse Readiness
• Oracle’s Business Intelligence Tools
• Oracle Sales Analyzer
• Oracle Financial Analyzer
• Questions
“Knowledge workers in an organization need to be able to access relevant, comprehensive information and use analysis tools to make better business decisions that will help the organization gain a competitive advantage. This is Business Intelligence.”
“Business Intelligence is not one single application or one company’s set of applications. Instead, BI is the culmination of all of the systems an organization uses to supply its users with business information for making decisions. A data mart or data warehouse might be a part of the BI solution, but is usually not the whole of the solution.”
BI Terminology

- Business Intelligence (BI)
- On-Line Analytical Process (OLAP)
- Decision Support System (DSS)
- Data Mart
- Data Warehouse
What is OLAP?

• **On Line Analytical Processing Tool**
• Aggregate data
• Iterative discovery process
• Analysis of data warehouses
• Visual multi-dimensional tables or graphs
• Market historically broken into ROLAP, MOLAP, DOLAP
“Based on the many criteria discussed in The OLAP Report, a potential buyer should create a shortlist of OLAP vendors for detailed consideration that fall largely into a single one of the four categories. There is something wrong with a shortlist that includes products from opposite sides of the square.”

Nigel Pendse
Relational Reporting

- **Advantages**
  - Lowest Cost Per Seat
  - Rich Formatting
  - Web deployable

- **Disadvantages**
  - No real analysis
  - Not interactive
  - Hard to manipulate for end users
  - Not really OLAP

- **Major Players**
  - Crystal Reports
  - BI/Query
  - IQ/Objects
  - Cognos (Impromptu)
DOLAP (Desktop)

- **Advantages**
  - Low Cost Per Seat
  - Easiest to Deploy
  - End User Friendly
  - Transactional Data

- **Disadvantages**
  - Limited Functionality
  - Limited Data Capacity
  - Limited Customization

- **Major Players**
  - Cognos (PowerPlay)
  - Business Objects
  - Brio
  - Oracle (Discoverer)
ROLAP (Relational)

• Advantages
  – Deal with Large Data Volumes (Terabytes)
  – Access via SQL
  – Read-Only Reporting

• Disadvantages
  – Slow Performance
  – Limited Financial Calculations

• Major Players
  – MicroStrategy (DSS)
  – Informix (MetaCube)
  – MindShare
  – WhiteLight
MOLAP (Multidimensional)

- **Advantages**
  - High Performance Database
  - Sophisticated Functionality
  - Supports Multiple Third Party Tools
  - Supports Gigabytes

- **Disadvantages**
  - Proprietary Language

- **Major Players**
  - MS OLAP Services
  - Hyperion/Arbor (Essbase)
  - Applix (TM1)
  - Seagate (Holos)
  - Oracle (Express)
Application OLAP

- **Advantages**
  - Integrated Application with Database
  - Out-of-Box Complete Toolkit
  - High Functionality
  - Some can be configured as Hybrid OLAP (HOLAP)

- **Disadvantages**
  - Complexity
  - Cost Per User

- **Major Players**
  - Oracle (OFA & OSA)
  - Hyperion/Arbor (Essbase)
  - Information Builders (WorldMart)
  - SAS
“Instead of a small number of analysts spending 100 percent of their time analyzing data,

all managers and professionals will spend 10 percent of their time analyzing the data themselves.”

- Gartner Group
# OLTP versus OLAP/BI

**OLTP**

- Transactional data
- Detail data
- Heavy Read/write
- Focus on entering data
- Basic reporting

**OLAP/BI**

- Summary data
- Aggregate
- Access Read/only
- Focus on reading data
- Analysis

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OLTP versus OLAP/BI

- OLAP/BI is *iterative* in modeling, design, and implementation
- Frequent exposure of unknown data quality problems
- Multiple source systems (OLTP) converge into one or more target (DW/OLAP/BI) systems
- Multiple lines of business use different business rules, assumptions, terminology
- Quantity of data that will reside in DW/OLAP/BI is typically unknown
- Difficulties in loading and aggregating data
- Different challenges in performance tuning
Why a Separate OLAP Tool?

- Empowers end-users to do own analysis
- Frees up IS backlog of report requests
- Ease of use—easy selection of data
- Drill-down
- Limited or no knowledge of SQL or tables required
- Exception Analysis
- Variance Analysis
- Easy rotation
- Formula calculations
- Aggregate data
What Is A Data Mart or Data Warehouse?

Data Warehouse

- Capture Data That Will Help a Company Answer Questions About the Entire Business
- Uses Dimensional Modeling To Establish Structure – Star Schema
- Unlike OLTP, Answer Questions About the Process Not the Transaction

Data Mart

- Similar to Data Warehouse
- But, Focused on One Business Process
Assessing Data Warehouse/BI Readiness

- Strong Business Management Sponsor
- Business Vision
- IS/Business Partnership
- Current Analytic Culture
- Feasibility

--Ralph Kimball, The Data Warehouse Lifecycle Toolkit
The Process

• Everyone Needs To Be Part of Process – End-users, IS, & Management

• Identify the Business Process That Needs Questions Answered

• Establish Evaluation and Review Teams
  – Two Primary Teams - Decision Team and Management Review Committee

• Remove Politics

• Identify a Selection Methodology

• Design the Solution
# Oracle Business Intelligence

<table>
<thead>
<tr>
<th>Products</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Express Server</td>
<td>The Express Engine</td>
</tr>
<tr>
<td>Oracle Express Objects (OEO)</td>
<td>Object oriented development environment for building applications</td>
</tr>
<tr>
<td>Oracle Express Analyzer</td>
<td>Ad-hoc user tool for analysis and reporting of Express database data</td>
</tr>
<tr>
<td>Discoverer</td>
<td>Ad-hoc user tool for data analysis</td>
</tr>
<tr>
<td>Reports</td>
<td>Report writing tool</td>
</tr>
<tr>
<td>Oracle Sales Analyzer (OSA)</td>
<td>Pre-built sales/marketing analysis application</td>
</tr>
<tr>
<td>Oracle Financial Analyzer (OFA)</td>
<td>Pre-built financial analysis application</td>
</tr>
</tbody>
</table>
Express Product Architecture

- Express Applications
  - OSA
  - OFA
- Express Clients
- Express Objects
- Spreadsheets
- Web Browser
- Other Tools

Oracle Express Server 6.3 or older

Oracle8 Data Warehouse

- External Data
- Corporate RDBMS
- Legacy Systems

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Express Server

- Database Engine Maintains Data Used by Oracle’s BI tools
- Multidimensional Database
- Efficient For Maintaining and Analyzing Data
- Uses Dimensions and Hierarchies.
- Capability to Drill-down and Pivot Dimensions
- Has a Specialized Procedural Language
- Requires Custom Developed Applications or Pre-built Applications to Read the Data.
Why a Multidimensional DB?

Advantages of Express DB

- Better access to multidimensional problems
- Better than relational for OLAP problems
- MOLAP provides fast access to data
- Empowers users to do their own analysis
- Pre-aggregated data or aggregate on the fly
## RDBMS vs. MDBMS

<table>
<thead>
<tr>
<th>RDBMS</th>
<th>MDBMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data in tables</td>
<td>Data in variables</td>
</tr>
<tr>
<td>Row-oriented</td>
<td>Array-oriented (“cubes”)</td>
</tr>
<tr>
<td>Index access</td>
<td>Offset access</td>
</tr>
<tr>
<td>Access via SQL</td>
<td>Proprietary language</td>
</tr>
<tr>
<td>Transient selection</td>
<td>Persistent selection</td>
</tr>
<tr>
<td>Handles terabytes</td>
<td>Hundreds of Gigabytes</td>
</tr>
</tbody>
</table>
Express Advantages

- Designed for Multidimensional data
- Powerful formula capability
- Dimension-based selection
- Application programmability (OEO)
- Multiple hierarchies in dimension
- Selection separate from reporting
What regions increased Merlot sales over last month?

<table>
<thead>
<tr>
<th>TIME</th>
<th>PROD</th>
<th>REGION</th>
<th>SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOV97</td>
<td>Merlot</td>
<td>Chicago</td>
<td>19904</td>
</tr>
<tr>
<td>DEC97</td>
<td>Merlot</td>
<td>Chicago</td>
<td>6535</td>
</tr>
<tr>
<td>NOV97</td>
<td>Merlot</td>
<td>Dallas</td>
<td>11889</td>
</tr>
<tr>
<td>DEC97</td>
<td>Merlot</td>
<td>Dallas</td>
<td>23882</td>
</tr>
<tr>
<td>NOV97</td>
<td>Merlot</td>
<td>SF</td>
<td>14582</td>
</tr>
<tr>
<td>DEC97</td>
<td>Merlot</td>
<td>SF</td>
<td>11596</td>
</tr>
<tr>
<td>NOV97</td>
<td>Merlot</td>
<td>Seattle</td>
<td>12171</td>
</tr>
<tr>
<td>DEC97</td>
<td>Merlot</td>
<td>Seattle</td>
<td>12920</td>
</tr>
</tbody>
</table>

select time, prod, region, a.sales, b.sales from salesdata a, salesdata b where a.time = b.time + 1 and a.sales > b.sales and a.prod = ‘Merlot’
What regions increased sales over last month?

<table>
<thead>
<tr>
<th>Region</th>
<th>Nov97</th>
<th>Dec97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>19904</td>
<td>6535</td>
</tr>
<tr>
<td>Dallas</td>
<td>11889</td>
<td>23882</td>
</tr>
<tr>
<td>San Francisco</td>
<td>14582</td>
<td>11596</td>
</tr>
<tr>
<td>Seattle</td>
<td>12171</td>
<td>12920</td>
</tr>
</tbody>
</table>

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Express Objects in Database

Express Objects: Structures that define an Express DB

- Dimension – index to variable data (who = product, geography, time, channel)
- Variable – arrays of data (what = sales dollars or units)
- Relation – simply a variable with a constrained domain
- Formulas – variable data calculated on the fly
- Programs – custom code
- Miscellaneous other types
### Dimensions, Variables & Formulas

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Jan97</th>
<th>Feb97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Units</td>
<td>Avg Price</td>
</tr>
<tr>
<td>World</td>
<td>8,769,594.00</td>
<td>11554</td>
</tr>
<tr>
<td>Americas</td>
<td>2,620,114.00</td>
<td>3202</td>
</tr>
<tr>
<td>Canada</td>
<td>696,492.90</td>
<td>806</td>
</tr>
<tr>
<td>USA</td>
<td>1,553,282.00</td>
<td>1609</td>
</tr>
<tr>
<td>Mexico</td>
<td>160,006.30</td>
<td>215</td>
</tr>
<tr>
<td>Argentina</td>
<td>58,284.48</td>
<td>363</td>
</tr>
<tr>
<td>Brazil</td>
<td>111,276.60</td>
<td>165</td>
</tr>
<tr>
<td>Colombia</td>
<td>40,770.59</td>
<td>44</td>
</tr>
<tr>
<td>Australia</td>
<td>740,387.00</td>
<td>944</td>
</tr>
<tr>
<td>Europe</td>
<td>3,773,573.00</td>
<td>5278</td>
</tr>
<tr>
<td>Asia</td>
<td>1,635,521.00</td>
<td>2131</td>
</tr>
</tbody>
</table>
Express Objects & Analyzer

Express Objects
- Is an Object-oriented Tool
- Used to Create Custom Applications
- Sits on Top of the Express Server
- Has the Object-oriented Functionality: Inheritance, Encapsulation, and Polymorphism

Express Analyzer
- Used to Extend Applications Developed Using Express Objects
- Allows Users to Do Ad-hoc Analysis of the Data

Unfortunately, these tools seem to be at the end of their life-cycle as Oracle tools and will not be fully supported in the future.
Discoverer

- Ad-hoc Query Tool Used to Analyze Data on the fly From Oracle’s Relational Database
- Tightly integrated With Oracle’s databases Which Simplifies:
  - Security
  - Scalability
  - Data Access
  - Metadata Creation
- Tight Integration With Oracle Reports, Oracle Applications Products, and Oracle Designer
- Uses Drill-down and Pivoting
- Disadvantage - Need For Users to Know Underlying DB

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Express and Discoverer Both Have

- Tables and graphs
- Drag-and-drop rotation
- Drill-down/up
- Easy to use interface
- Cache data
- Conditional formatting (color-coding)
Discoverer Advantages

- Easier custom calculations
- More flexible reporting (subtotals, etc.)
- Operates directly against RDBMS
- Transactional view available
- Record-based selection
- More intuitive for users that know SQL
# Transaction Data in Discoverer

![Oracle Discoverer - [todetail2.DIS]](image)

<table>
<thead>
<tr>
<th>INV ID</th>
<th>TIME DET</th>
<th>PROD DET</th>
<th>GEOG ID</th>
<th>ORDERDATE</th>
<th>SALES</th>
<th>SHIPVIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>689</td>
<td>14Jan-98</td>
<td>Merlot 1997</td>
<td>SanFran</td>
<td>05DEC97</td>
<td>17936.96</td>
<td>COMMON</td>
</tr>
<tr>
<td>690</td>
<td>15Jan-98</td>
<td>Merlot 1997</td>
<td>SanFran</td>
<td>06DEC97</td>
<td>3165.35</td>
<td>FEDEX</td>
</tr>
<tr>
<td>770</td>
<td>18Jan-98</td>
<td>Merlot 1998</td>
<td>SanFran</td>
<td>09DEC97</td>
<td>351.71</td>
<td>COMMON</td>
</tr>
<tr>
<td>769</td>
<td>24Jan-98</td>
<td>Merlot 1998</td>
<td>SanFran</td>
<td>15DEC97</td>
<td>1993.00</td>
<td>UPS</td>
</tr>
</tbody>
</table>

Sum: 23447.02

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Reports

- Allows Users to Create Complex Reports from Oracle’s Relational or Multidimensional Databases
- Unlimited Data Formatting and High-quality Presentation
- End-users Usually Only View the Reports
- Disadvantage - Developers May Need to Create the Complex Reports
Oracle Sales Analyzer

- Server-centric Approach for the Express Databases
- Read-only Application
- Ability for End-users to Create Custom Measures and Aggregates
- Ability to Deploy in Any OLAP Mode:
  - ROLAP
  - MOLAP
  - HOLAP
- Not Tightly Integrated with Any of the Modules of the E-Business Suite
OSA Mini-Case Study – Company Background

- Pioneer Worldwide is a diversified manufacturing and marketing company with emphasis in balloons serving the advertising, entertainment, decorating, and social expressions industries.
- 10 subsidiary companies with 11 physical locations worldwide
- Doing business in 80+ countries with transactions in 8 different currencies
- Over 1,300 employees worldwide
The Ongoing Cycle

Accounting & Finance

Information Services

Sales & Marketing

Operations & Plant Management

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Initial OSA Requirements

• Replace and integrate Pioneer’s separate Product Sales Analysis and Customer Sales Analysis tools
• Allow drill-down through all levels of customer and product hierarchies
• Plan for drill down to transactional data at some point in the future
• Allow exception reporting (e.g., top 25 customers of 11” balloons)
• Allow users to easily share reports with others
Initial OSA Requirements (continued)

• Allow users to develop custom groups (aggregates) of customers, items, etc.
• Allow users to develop custom measures “on-the-fly”
• Easily graph the report data
• Allow users basic forecasting and “what-if” capabilities
• Allow users access via the web
• Allow Macintosh users access to the application
Initial Business Requirements

A user-friendly sales and product analysis tool to help users:

- Redirect marketing $ to promote the most profitable products.
- Analyze market profitability
- Analyze territory and salesperson profitability
- Identify slow moving products for liquidation
- Analyze customer sales performance
- Analyze effectiveness of sales/marketing promotions
“GO LIVE”

- General users were given two-hour training sessions in small groups with hands-on activities
- Pilot Users were utilized as training assistants and became a resource after the classroom training
- Detailed training manuals were provided that included screen shots
- Lotus Notes Feedback Database was opened up to all users for help, bug tracking, and enhancement requests.
Conclusion

The success of the implementation can be attributed to:

- Support from Executive level
- Consultants with in-depth knowledge of the tool as well as Pioneer’s business
- Creative solutions quickly applied as problems arose
- Pilot users that are readily available to assist others
- Motivated end users
Oracle Financial Analyzer

- Distributed Approach in Using Express
- Allows Users the Autonomy to Create and Manipulate Own Scenarios of Data
- Ability to Write Data Back
  - Budgets and Forecasts
- Ability to Create Asymmetric Reports
- Integrates OFA with the Oracle General Ledger from the E-Business Suite
- Custom Facts (FDIs), But Knowledge of Express Language Needed
Oracle GL to OFA Mapping

Oracle General Ledger → OFA

Relational → Multidimensional

Segments → Dimensions
Segment Values → Dimension Values
Calendar → Time Dimensions
Rollups → Hierarchies
Balances → Financial Data Items

Financial Data Set
OFA Integration With OGL

- Is the Analysis and Planning Tool of Choice
- Use the GL Link to Load Data from OGL to OFA
- Map Structures from OGL Directly to OFA Structures Using Forms in OGL
- Can Alter Number of Segments Brought Over From OGL – Can Combine Segments
- Can Customize OFA and Use Other Non-OGL Sources
OFA Extras

- Analyze How Many Dimensions Are Really Needed
- Maintain Hierarchies in OGL, If Possible
- Use GL Link to Load Structures, But May Need to Write Custom Load for Data – Size Issue
- Use GL Link to Load Actuals, Custom Code to Take That Information and Load Into Other FDI In Order to Customize Structures
- Any Customization Would Require a Knowledgeable Express Resource
- Use Models to Create Balance Sheet or Income Statement If COA Not Capable, or need “what if” scenarios in budgeting or forecasting
BI Implementation Suggestions

- Pick single first department
- Decide on set of terminology at beginning
- Show instances in addition to "levels" in diagrams
- Prototype and design iteratively
- Pick small initial project. Deliver value quickly
- Involve users early on. Listen to feedback
- Develop in phases with milestones
Required Skill Set for BI success

• **Extract, Transform, Load (ETL)**
  - Source data is heterogeneous
  - Referential integrity of data is questionable
  - Want to use outside market or purchased data in cube

• **Translating Business Needs into OLAP**
  - “Shifting Sands Vision”
  - End-users have unrealistic expectations
  - Internal goals include cultural change
  - Want decision making based on facts and figures
  - Build consensus
Required Skill Set for BI success

• Design and Modeling experience
  – Multidimensional model using variables, dimensions, hierarchies, attributes
  – Data mart and data warehousing load and query optimizations
  – Industry knowledge
  – Experience based Toolkit

• Client front-end
  – Multiple vendor front-end choices
  – Application building and gap filling
  – SPL complexities
Putting it All Together – Keys to Success

• Executive Sponsorship
• * Realistic Expectations
• * Methodology
• * Team
• * Proper technical architecture and tools
• * Quality data
• * Limited scope changes
• Fast payback projects

*Note: Key areas where ETL tools and OLAP/BI consultants can add value.
QUESTIONS?

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