Introduction to Oracle Data Warehousing / BI
NY OUG December 8, 2010
Sameer Singhal
Oracle Consulting
Agenda

• Evolution of Enterprise Reporting/BI
• Oracle EPM/BI Strategic Direction
• Overview of Oracle EPM/BI Tools - Technologies
  • BIEE
  • BI Applications
  • BI Publisher
  • Hyperion Essbase & Oracle OLAP
  • Real Time Decisions
Evolution of Reporting / Business Intelligence
I didn't have any accurate numbers so I just made up this one.

Studies have shown that accurate numbers aren't any more useful than the ones you make up.

How many studies showed that?

Eighty-seven.

Dogbert consults

You need a dash-board application to track your key metrics.

That way you'll have more data to ignore when you make your decisions based on company politics.

Will the data be accurate?

Okay, let's pretend that matters.
Levels of Reporting/BI Needs

- Operational Efficiency
  - Operational
  - BI/OLAP
  - Scorecarding

- Productivity
  - Planning
  - Forecasting

- BIEE, Dashboards, Essbase, Discoverer
- BI Publisher, Oracle Reports, FSGs
- Hyperion Planning
- RTD
- Prediction
- Optimization
Oracle Business Intelligence
Continued Investment and Innovation

BI Releases  1.2  1.6  2.0  8i  8.3  9i  10g  10g R3  10g R5  11g

1995  2000  2005  2010
Management Excellence: The Next Competitive Edge

![Graph showing Operational Excellence and Management Excellence over time.](image)

- Operational Excellence: Cost, Quality, Speed
- Management Excellence: Smart, Agile, Aligned
Oracle EPM/BI Strategic Direction
Where are we headed?
Oracle’s Enterprise Performance Management System
Complete. Open. Integrated.

- **Data Integration**
- **Scorecards**
- **Interactive Dashboards**
- **Reporting & Publishing**
- **Ad-hoc Analysis**
- **Office Integration**
- **Search**
- **Detect & Alert**
- **Collaborate**
- **Mobile**
- **Embedded**

### Key Components

**Strategy Management**
- Financial Close and Reporting
- Profitability Management

**Planning & Forecasting**
- ERP Analytics
- CRM Analytics
- Industry Analytics

**OLTP & ODS Systems**
- Data Warehouse
- Data Mart
- Exadata
- OLAP Sources
- Packaged Applications (Oracle, SAP, Others)
- Unstructured & Semi-Structured
- Excel XML/Office
- Business Process

**Common Enterprise Information Model**
- BI Server
- Essbase
- Dimension Management
- Predictive Analytics

**Office**
- Search
- Embedded
- Mobile
- Collaboration
- Data Integration
- Mobile
- Scorecards

**OLTP & ODS Systems**
- Data Warehouse
- Data Mart
- Exadata
- OLAP Sources
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- Unstructured & Semi-Structured
- Excel XML/Office
- Business Process

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Oracle BI Technologies - Tools

- All customer needs are different
- No size fits all
- Many different options within Oracle basket so analysis is key before deciding on specific products to use
Oracle Business Intelligence Enterprise Edition (OBIEE)
The New Standard for Enterprise Analytics

Oracle Business Intelligence 11g

Most Complete

- First common interface for analysis of relational, OLAP, & XML data sources
- First BI solution to offer full spectrum of collaboration capabilities
- First BI solution that lets users initiate actions from dashboards
- Most complete Scorecard and Strategy Management application
- Only single solution for Web-based interactive and pixel-perfect production reporting

Most Integrated

- Only with integrated ROLAP, MOLAP, Enterprise Reporting, Scorecard
- Only Common Enterprise Information Model with semantic representation of all data sources and business logic
- Only integrated system for Enterprise Performance Management
- Only system management environment that integrates with the entire IT stack
- Only BI solution integrated with Oracle database, middleware, and applications
Unified End User Experience
Complete. Consistent. Accurate. Many Channels

- Mobile
- Scorecards
- Reports
- Interactive Dashboards
- Geospatial Visualization
- Ad-hoc Queries
- Applications & Portals
- Office Integration
- Search
- Collaboration

Enterprise Analytic Foundation

Prebuilt • Custom • Embedded

Common Enterprise Information Model
Integrating Insights with Business Processes

Oracle Business Intelligence 11g

THE OLD WAY
Disconnected. Open Ended.

THE NEW WAY: Action Framework
Integrated. Closed Loop.
Intelligent Business Process

Sales Rep in Consumer Electronics Manufacturer

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Rep receives out of stock alert on iPhone. Unable to fulfill order for key account on hot new product.

Initiates change request in order management system. Updates discount terms to reflect greater discount – Embedded Analytics

Reviews all orders for customer with hot products and analyzes available to promise for replacement.
Value of Linking Insights to Action
Shortens Decisioning Cycle Time

INSIGHT

Late Payment Trend
Headcount Budget Analysis
Forecast Update
Product Safety
Supply Shortfall
Poor Campaign Results

Finance
HR
Sales
Service
Supply Chain
Marketing

Hold Credit
Approve Hire
Approve Discount
Escalate Issue
Change Request
Redirect Funds

Lower Bad Debt
Greater Team Productivity
Higher Win Rates
Better Customer Service
Higher On-Time Deliveries
Improved Marketing ROI
Relational v Multi Dimensional View

• “Relational” style
  – Data appears as flat attributes
  – Column based filtering
  – Column based calculations
  – Ideal for query and reporting

• “Multi Dimensional” style
  – Data appears as dimensions
  – Member based filtering
  – Member based calculations
  – Ideal for “train of thought” analysis
OBIEE – Best Fit

When to Use?
• Analytical Reporting
• Dashboards
• Interactive Reporting
• Adhoc Reporting

When Not to Use?
• High Volume Printing
• Scalable reports generation and delivery
• Reporting that requires multiple document formats and delivering via multiple delivery channels.
• Reports that require “pixel-perfect” formatting and layout and has graphical complexity
BI Applications (ERP/CRM)
Oracle BI Applications Suite
Complete, Prebuilt, Best Practice Analytics

### CRM Analytics
- **Sales**
  - Pipeline Analysis
  - Forecast Accuracy
  - Up-sell/Cross-sell
  - Cycle Times
  - Lead Conversion
  - Sales Team Effectiveness
- **Marketing**
  - Campaign Effectiveness
  - Customer Insight
  - Product Propensity
  - Market Basket Analysis
  - Campaign ROI
- **Service & Contact Center**
  - Service Effectiveness
  - Customer Satisfaction
  - Resolution Rates
  - Service Rep Efficiency
  - Service Cost
  - Service Trends

### ERP Analytics
- **Financials**
  - General Ledger
  - Accounts Receivable
  - Accounts Payable
  - Cash Flow
  - Profitability
  - Expense Management
- **Procurement & Spend**
  - Direct & Indirect Spend
  - Buyer Productivity
  - Contract Compliance
  - Supplier Performance
  - Purchase Cycle Time
  - Employee Expense
- **Supply Chain & Order Mgmt**
  - Revenue & Backlog
  - Inventory Analysis
  - Fulfillment Status
  - Customer Status
  - Order Cycle Time
  - BOM Analysis

### Price
- Price Segments
- Price Waterfall Analysis
- Deal Life Cycle
- Deal Desk Analysis
- Product Pricing Performance

### Loyalty
- Member Demographics
- Program Revenue
- Membership Trends
- Promotion Effectiveness
- Points Analysis

### Projects
- Project Funding and Budget
- Product Cost
- Project Revenue
- Project Billing
- Project Profitability

### Human Resources
- Employee Productivity
- Compensation
- Talent Management
- Recruiting Analysis
- Learning Analysis
- Workforce Profile

### Oracle BI Suite Enterprise Edition Plus
**Source Adapters:** Oracle, PeopleSoft, Siebel, JD Edwards, SAP and Other Operational and Analytic Sources
Oracle BI Applications
Prebuilt Solutions for EBS, PeopleSoft, Siebel, JD Edwards, and more

- Add insight to CRM and ERP applications
- Easy to adapt and extend
- Tight integration with OLTP systems
- Works with existing IT environment
- Fast time to value; Low TCO
- Over 2,000 customers

<table>
<thead>
<tr>
<th>CRM Analytics</th>
<th>ERP Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Financials</td>
</tr>
<tr>
<td>Service &amp; Contact Center</td>
<td>Human Resources</td>
</tr>
<tr>
<td>Marketing</td>
<td>Procurement &amp; Spend</td>
</tr>
<tr>
<td>Loyalty</td>
<td>Supply Chain &amp; Order Mgmt</td>
</tr>
<tr>
<td>Price</td>
<td>Projects</td>
</tr>
</tbody>
</table>

Common Enterprise Information Model
Oracle BI Server
Common Enterprise Information Model
Single Consistent View and User Self-Sufficiency

<table>
<thead>
<tr>
<th>PRESENTATION LAYER</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Roles, Preferences</td>
</tr>
<tr>
<td>Simplified View</td>
</tr>
<tr>
<td>Logical SQL Interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEMANTIC OBJECT LAYER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>Hierarchies</td>
</tr>
<tr>
<td>Measures</td>
</tr>
<tr>
<td>Calculations</td>
</tr>
<tr>
<td>Aggregation Rules</td>
</tr>
<tr>
<td>Time Series</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHYSICAL LAYER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map Physical Data</td>
</tr>
<tr>
<td>Connections</td>
</tr>
<tr>
<td>Schema</td>
</tr>
</tbody>
</table>

Role-Based Views of the Information Relevant to the User

Consistent Definition of Business Measures, Metrics, Calculations

Model Once, Deploy Everywhere
Best Practice Analytic Workflows

Example: Financial Analytics

Business Objectives/Issues

Maximize cash flow

Is DSO on target?

Are payment terms in compliance?

What is the aging of due balances?

Drill to due balances by region

Is DPO on target?

Business Function
Receivables

Role
Director, Credits & Collections

Objectives
- Maximize cash flow
- Control risk of receivables portfolio

Gain Insights

Is overdue balances trending up?

How long is the underlying overdue balance pending?

Who are the customers and collectors?

Drill to overdue invoice detail

Target collection efforts to reduce overdue balances

Take Action
Best Practice Analytic Workflows
Example: Financial Analytics

**Business Objectives/Issues**

- Maximize cash flow
  - Is DSO on target?
  - Is overdue balances trending up?
  - How long is the underlying overdue balance pending?

**Gain Insights**

- Who are the customers?
  - Drill to overdue invoice detail

**Take Action**

- Target collection efforts to reduce overdue balances

**Drill to Detail**

<table>
<thead>
<tr>
<th>Days Sales Outstanding</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR Due Amount to Total %</td>
<td>74.6%</td>
</tr>
<tr>
<td>AR Overdue Amount to Total %</td>
<td>25.4%</td>
</tr>
<tr>
<td>AR Due1-30 Amount</td>
<td>$10,280,983</td>
</tr>
<tr>
<td>AR Avg Invoice Amount</td>
<td>$10,734</td>
</tr>
<tr>
<td>AR Invoice Count</td>
<td>61</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Name</th>
<th>AR Overdue 31-60 Amount</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy S</td>
<td>$1,687,482</td>
<td>50.6%</td>
</tr>
<tr>
<td>World of Business</td>
<td>$1,812,482</td>
<td>54.4%</td>
</tr>
<tr>
<td>Lauri Reilly</td>
<td>$522,873</td>
<td>15.7%</td>
</tr>
<tr>
<td>General Motors</td>
<td>$522,873</td>
<td>15.7%</td>
</tr>
</tbody>
</table>
BI Publisher
Reporting Challenges
Requirements are Diverse

- High Fidelity Reports
- Partner Reports
- Financial Statements
- Government forms
- Marketing materials
- Contracts
- Checks, Labels
- XML
- EFT / EDI
- Multiple destinations
Reporting Challenges
Complex Infrastructure

- Multiple reporting solutions
- Highly-skilled engineers required to maintain servers and report formats

- Costly
- Time consuming
- Complex systems
- Expensive maintenance
- Labor intensive
Reporting Challenges
Slow Development

Iterate on Report Requirements

Report files

Report Requirements

Report Output

Must be same geometry, font, margin size, etc.
Reporting Challenges
Difficult to Maintain

Combined query, layout, and translation

- Data logic
  - 1 Query

- Layout
  - 10 Layouts
  - 1 Query
  - 10 Layouts
  - 10 Translations
  = 100 report files

- Translation
  - 10 Translations
  - High development cost
  - High customization cost
  - Difficult upgrade
Reporting Challenges
Other Issues

• Production Issues
  • Huge load on the transactional Data Base, shuts down the operation
  • Output file size, time to produce the reports …
  • High maintenance, proprietary report programming languages require expensive specialists and consultants

• Global Deployment Issues
  • Multiple Instances required for different character sets
  • Insufficient support for Bi-Directional Languages
  • Dependence on Printer Character sets require language specific printers
BI Publisher Benefits
Simplified Maintenance

Separate query, layout, and translation

- Flexibility
- Reduced maintenance
All your Reports and Documents

- Purchase Orders
- Labels / Bar Codes
- Collateral
- Government Forms
- eText
- Invoices
- Operational Reports
- Correspondence
- Financial Statements
- Checks
Bursting Delivery – Use Scenario

- Oracle Reports
- FSG
- PL/SQL
- Other XML Sources
- XML
- EDI
- HTML
- PDF
- Oracle Reports
- FSG
- PL/SQL
- Other XML Sources
- XML
- EDI
- HTML
- PDF
- PDF
- XML
- PDF
- XML
- PDF

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Oracle BI Publisher Enterprise – Technical Architecture

- **Design Data Models, Administer server**
- **View & Schedule Reports, Office Integration, Build Report Layouts**
- **Company Portal, SAP, MSFT CRM, Oracle EBS-PSFT-JDE-CRM**

**Core Engine**

- **Data Extraction**
- **Layout Rendering**
- **Document Delivery**

**Security**

**Scheduling / Archiving**

**Report Repository**

**Caching Services**

**Output Formats**
- PDF, HTML, RTF, Flash
- Excel, EFT, EDI, XML, PS

**Delivery Channels**
- Printer, FAX, Email, Web DAV, FTP, B2B

**Web Services, XML, HTTP, Custom Applications**

**Data Sources**
- Oracle DB, Oracle BI EE, SQL Server, DB2, …JDBC

**Security**
- SSO, OID, LDAP, Oracle BI, EBS, JNDI Interface

**Report Repository**
- Oracle DB or File System

**Scheduling & Archiving**
- Any DB; Oracle, DB2, SQL Server, …
Oracle OLAP

Oracle OLAP

Hyperion Essbase
Oracle OLAP Option

• MOLAP server residing inside-DB OLAP server.

• The OLAP option IS NOT a separate application or process. IT IS inside the Oracle Database kernel therefore it uses the same resources.

• An OLAP user session connected to the database can be managed, traced, restricted the same as you would any other session or process.

• Data access via Excel add-in, Discoverer, BIEE, BIP etc

• Data loading via AWM/OWB/FILERead
Benefits of inside-DB OLAP Server

• Uses the same DB resources, plus scalability benefit.
• SQL access for reporting
• OLAP cubes can replace Materialized-Views
• Query-Rewrite functionality is available
• No separate certification of OLAP server for various Operating Systems or for various reporting tools.
• Administered by same Oracle DBA
• No additional server, other than the Oracle database server
Role of OLAP Option in DW

- For the performance and access layer there are different approaches
- Oracle OLAP is one of the mechanisms for managing dimensional data for analysis
- Star / Snowflake + Materialized Views
- + OLAP represents a new, optimised method
Innovative Unique Feature of Oracle Database

**Cube-Organized Materialized Views**

```
dbms_mview.refresh('CB$UNIT_CUBE', 'F')
```
Benefits of inside-DB OLAP Server

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Cube-based Materialized Views in Summary

Breakthrough Manageability & Performance

• A single cube provides the equivalent of thousands of summary combinations
  • Transparently accessed via SQL Query Optimizer rewrite
  • Applications do not need to be rewritten
  • Refreshed using standard MV procedures

• Benefits over traditional MVs
  • More manageable as fewer objects
  • Faster to build and maintain
  • Smaller in size
  • Improved query performance
Essbase
Oracle Essbase
Leading M-OLAP Server

• Self-Service and Departmental Analysis
  – Forward-looking: Prediction & what-if analysis
  – Simple to model complex business scenarios
  – Sophisticated, cross-dimensional calculations
  – Procedural, financial, time series & custom calculations
  – Custom analytic applications
  – Multi-user write-back

• Best M-OLAP Performance & Scalability
  – Flexible storage – Block, Aggregate & Hybrid
  – Optimized load performance, trickle feed
  – High-availability clustering
  – Benchmarked sub-second response time with 20,000 concurrent users, 15 dimensions, 1 billion records

• Integrated with Oracle BI and Oracle EPM
  – Shared metadata, calculations, dimensions, security
Essbase

- Oracle Essbase is an industry-leading MOLAP server, which is part of Oracle BI Foundation.
- Essbase server is a component of Oracle EPM Applications.
- It can also be used independently to build custom complex analytic applications.
- Unlike Oracle Inside-database OLAP option, it is installed as a separate server outside Oracle database.
- Essbase server allows users to write-back data to an application under security.
- Supports Multi-processor and Multi-threading data-processing.
- Partitioning capabilities (Replicated, Transparent, Linked).
- Cell-level security.
- ETL tools – Informatica and ODI – can be used for data loading.
- Multiple hierarchies support for each dimension via shared-members.
Essbase

• Accessed via Hyperion Visual Explorer, Excel Add-in or Smart View, BIEE, BIP and Essbase APIs (Java, C, VB)
• Generally bought and administered by business and not IT
• Preferred by customers who already use Hyperion Applications
• Excel UI is preferred choice of financial users
• Scalable
• Detail, detail, detail
• *Instantaneous calculation times*, OK, virtually instantaneous calculation times
• Customizable – *look at things my way*
• Data is natively in *EXCEL*
<table>
<thead>
<tr>
<th><strong>Oracle OLAP</strong></th>
<th><strong>Essbase</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Maintenance - IT</td>
<td>▪ Maintenance - Business</td>
</tr>
<tr>
<td>▪ Source – Oracle databases</td>
<td>▪ Source – Multiple &amp; heterogenous</td>
</tr>
<tr>
<td>▪ Existing Investment – Oracle DW</td>
<td>▪ Existing Investment – Hyperion PM</td>
</tr>
<tr>
<td>▪ Considerations -</td>
<td>▪ Considerations –</td>
</tr>
<tr>
<td>Better query performance from SQL tools</td>
<td>MS Office usage</td>
</tr>
<tr>
<td>Replace MVs with OLAP cube based MV</td>
<td>Non Oracle security (say MS based )</td>
</tr>
<tr>
<td>simplifying maintenance</td>
<td></td>
</tr>
<tr>
<td>▪ Data Access – Discoverer, BIEE, Excel etc</td>
<td>▪ Data Access – SmartView, Visual Explorer, BIEE</td>
</tr>
</tbody>
</table>
Real Time Decisions RTD
Make the Most of Each Customer Attention

Customer Intentions

Customer Attention

Content

Interactions
Example: Oracle RTD for Intelligent Offer Generation

Linda Johnson is recognized as a student living in San Mateo

... based on Linda’s customer and usage profile, RTD predicts that Linda currently has no significant risk of churning, and therefore no retention treatment is warranted, and ...

... that the “Easy Pay Saving Plan” is the marketing offer that is most appropriate for Linda.
RTD for Optimizing Customer Interactions

Analytical Domain

- Campaign & Product Catalogs
  - Offers
  - Products
- Content Management
  - Creatives
  - Content
- Catalogs
  - Promotions
  - Ads
- Transaction Data
  - Profiles
  - Messages

Interaction Optimization

- Goals
- Rules
- Predictive Models
- Choices
- Eligibility
- Automation
- Reports

Operational Domain

- Messages & placements
- Interactions

Millions of personalized interactions
Process of Real-time Offer Recommendation

1. Send customer id
2. Create session & load customer data
3. Send context info
4. Request offers
5. Determine eligible offers
6. Score eligible offers
7. Return ranked offers
8. Send response
9. Learn from response