

Integrating Oracle's "Hot Pluggable" Business Intelligence Technology with Teradata

ORACLE

TERADATA
Raising Intelligence

Agenda

- Oracle/Teradata Alliance
- Data Modeling
- Oracle EPM System & Teradata
 - Oracle Data Integrator
 - Oracle Business Intelligence
 - Oracle Business Intelligence Applications
 - Oracle Hyperion Essbase
 - Oracle EPM Applications
- How to Learn More / Q & A

ORACLE

TERADATA.
Raising Intelligence

Oracle and Teradata Alliance

Partnership with a history and a strong future

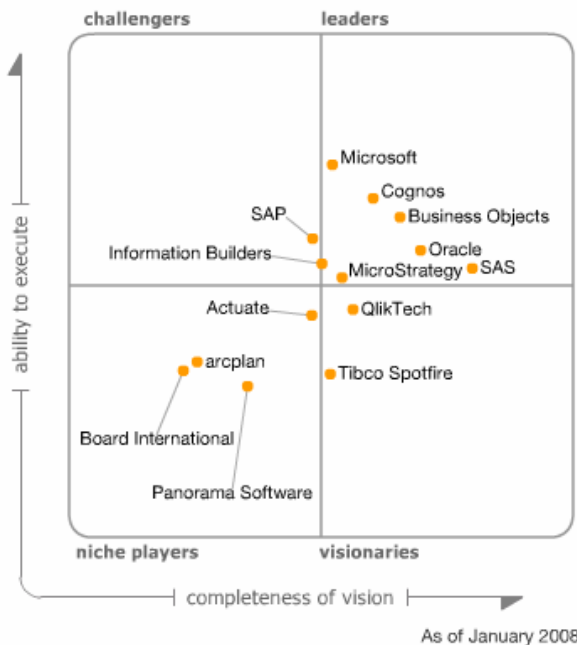
- Teradata had strong relationship with former companies now core to Oracle BI, Data Integration and Performance Management offerings
- Building on past activity to offer more future value
- 200+ joint customers
- Provide customers enterprise view of their business
 - Teradata Enterprise Data Warehouse
 - Oracle Business Intelligence and Data Integration technology integration and optimization with Teradata
 - Oracle Business Intelligence Applications and Enterprise Performance Management (EPM) Applications

ORACLE

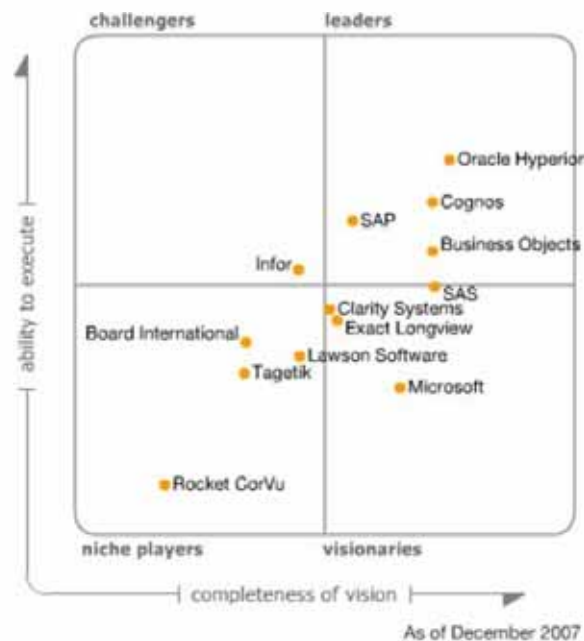
TERADATA.
Raising Intelligence

A Partnership of Domain Leaders

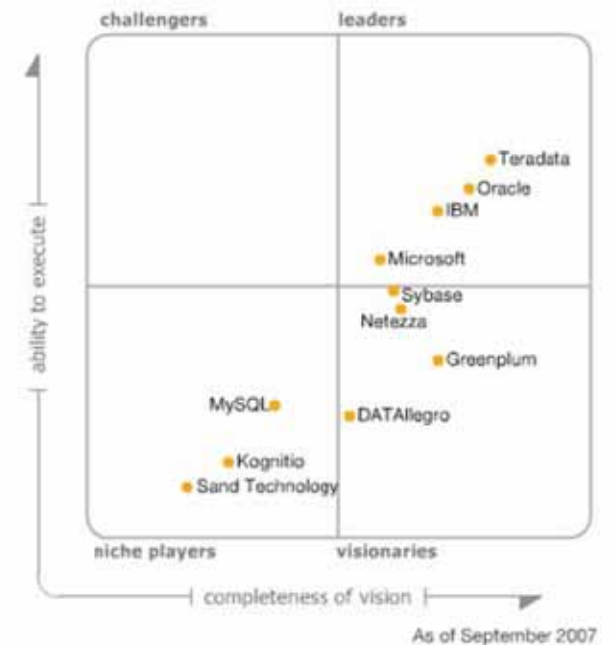
Magic Quadrant for BI Platforms, Jan-2008



Magic Quadrant for CPM Suites, Dec-2007



Magic Quadrant for DWH & DBMS, Sep-2007



The Magic Quadrant is copyrighted 2007 by Gartner, Inc. and is reused with permission. The Magic Quadrant is a graphical representation of a marketplace at and for a specific time period. It depicts Gartner's analysis of how certain vendors measure against criteria for that marketplace, as defined by Gartner. Gartner does not endorse any vendor, product or service depicted in the Magic Quadrant, and does not advise technology users to select only those vendors placed in the "Leaders" quadrant. The Magic Quadrant is intended solely as a research tool, and is not meant to be a specific guide to action. Gartner disclaims all warranties, express or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.

These Magic Quadrant graphics were published by Gartner, Inc. as part of larger research notes and should be evaluated in the context of the entire reports. The Gartner reports are available upon request from Oracle.

Sources: Gartner, Inc., "Magic Quadrant for Business Intelligence Platforms, 2008" by James Richardson, Kurt Schlegel, Bill Hostmann, Neil McMurchy, 1 February 2008

Gartner, Inc., "Magic Quadrant for CPM Suites, 2006" by Nigel Rayner, Neil Chandler, John E. Van Decker, 19 December 2007

Gartner, Inc., "Magic Quadrant for Data Warehouse Database Management Systems, 2007" by Donald Feinberg and Mark A. Beyer, 10 October 2007

ORACLE

TERADATA
Raising Intelligence

Hot-Pluggable With Existing IT Investments

PORTALS



Any JSR 168 Portal

DATA MINING



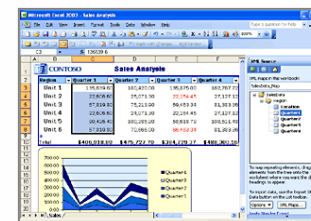
Oracle Data Mining,
SPSS, SAS

APPLICATIONS



Oracle EBS, Siebel, SAP,
PeopleSoft, JD Edwards...

DESKTOP TOOLS



Excel, Outlook,
Lotus Notes...

Oracle Enterprise Performance Management System Oracle Business Intelligence Foundation

SECURITY



Oracle Kerberos
iPlanet
MSFT AD
Novell
Custom
Others...

DATA ACCESS



Oracle RDBMS
Oracle OLAP Option
Microsoft SQL Server
Microsoft Analysis Services
IBM DB2
Teradata
Essbase
SAP BW
XML, Excel, Text

DATA INTEGRATION

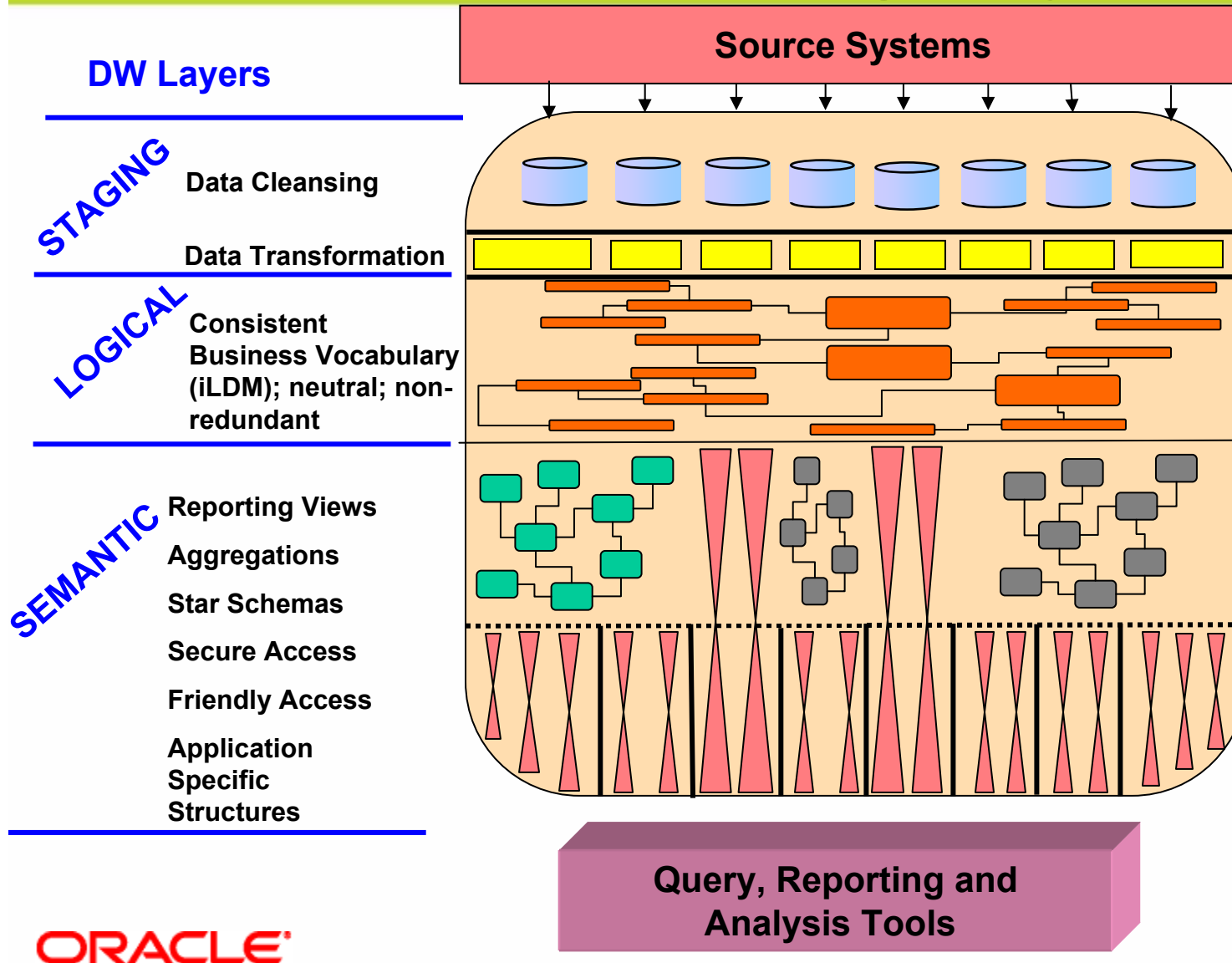


Oracle Data Integrator
(Sunopsis)
Oracle Warehouse
Builder
Informatica
Ascential
Others...

ORACLE

TERADATA
Raising Intelligence

Data Warehousing Layers



Data Modeling Techniques

- A *Enterprise Logical Data Model* (ELDM) defines the business relationships in the enterprise information independent of a specific analytic application or departmental view
- A *Physical Data Model* (PDM) defines the implementation design of tables in the data warehouse
- A *Semantic Data Model* (SDM) defines the easy to use business view of information for end users, hiding the complexity of the PDM

Dimensional Modeling

A form of semantic data modeling, which may or may not be materialized in a physical Star or Snowflake Schema

- Central table/entity containing facts, metrics, quantities, measures, i.e. Fact Table
- Dimensions with a hierarchy of levels provide organization to the facts
- Produces a model to support reporting and analytical applications

PDM Extensions for High Performance

Advanced indexing techniques in Teradata can provide significant performance acceleration for Oracle applications. Evaluate Primary Index, Consider Partitioned Primary Index, Add Secondary Indexes, Add Join Indexes, Add Aggregate Join Indexes.

- Better build times for OLAP cubes (from 42 to 3 minutes)
- Faster response for ROLAP queries
- Better response times for analytic queries (from 95 to 3 seconds)
- All maintained by Teradata

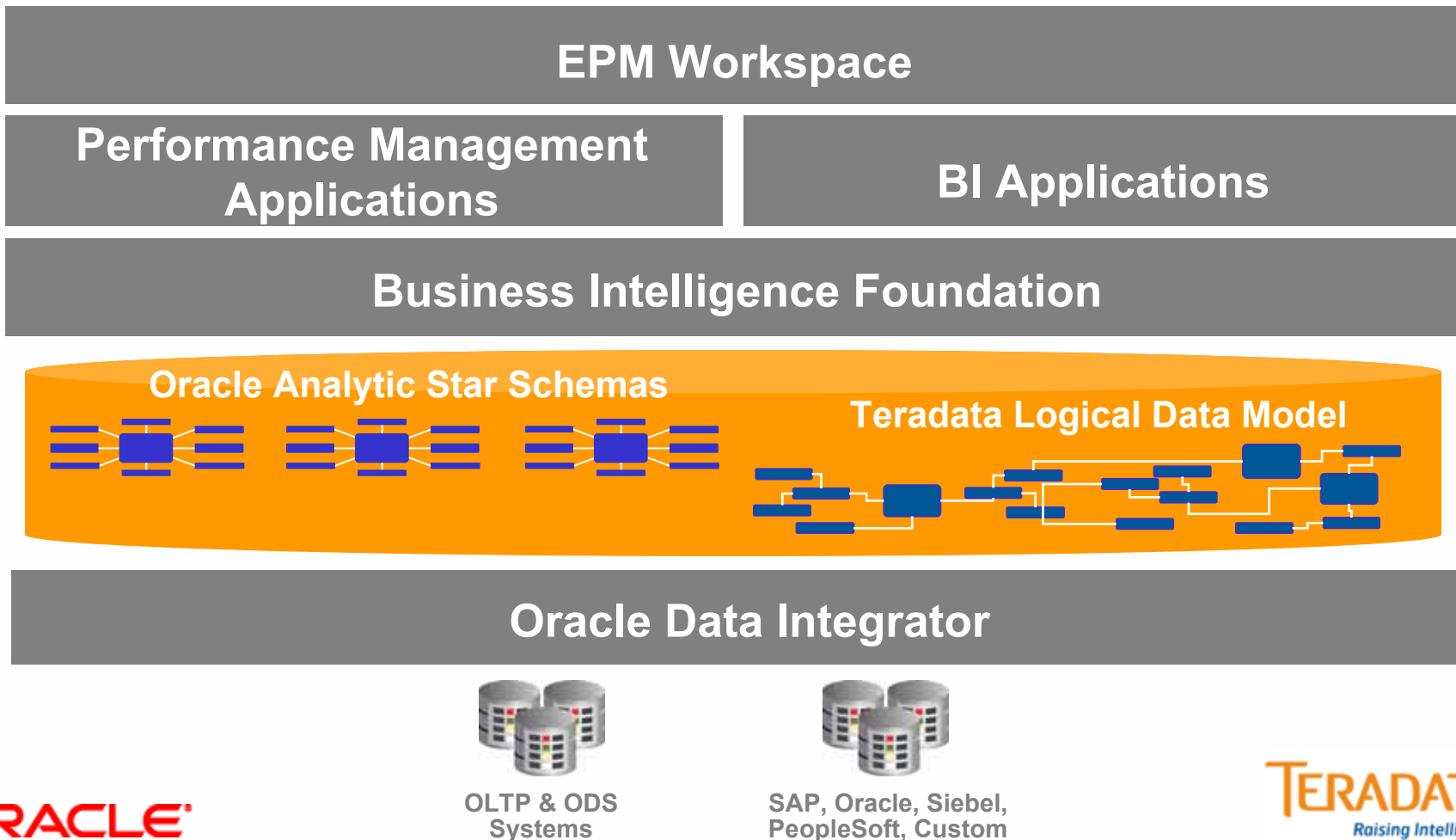
Platform Integration Options

- Extract Load and Transform (ELT)
- Direct Relational Access
 - Query, analysis, and enterprise reporting directly from the EDW via Oracle Business Intelligence, Hyperion Interactive Reporting and Hyperion SQR Production Reporting
- Multi Dimensional Applications (Essbase) Integration
 - Drill down from summary data in an Essbase multidimensional analytic application to the relational source in the EDW
 - Drill-through Reports from an intersection of data in an Essbase application and automatically run a relational report in the EDW
- EPM Application Integration
 - 2-way data movement between the Teradata EDW and Oracle EPM applications - budgeting/planning, financial consolidation, and performance scorecards

ORACLE

TERADATA
Raising Intelligence

Oracle's EPM System & Teradata



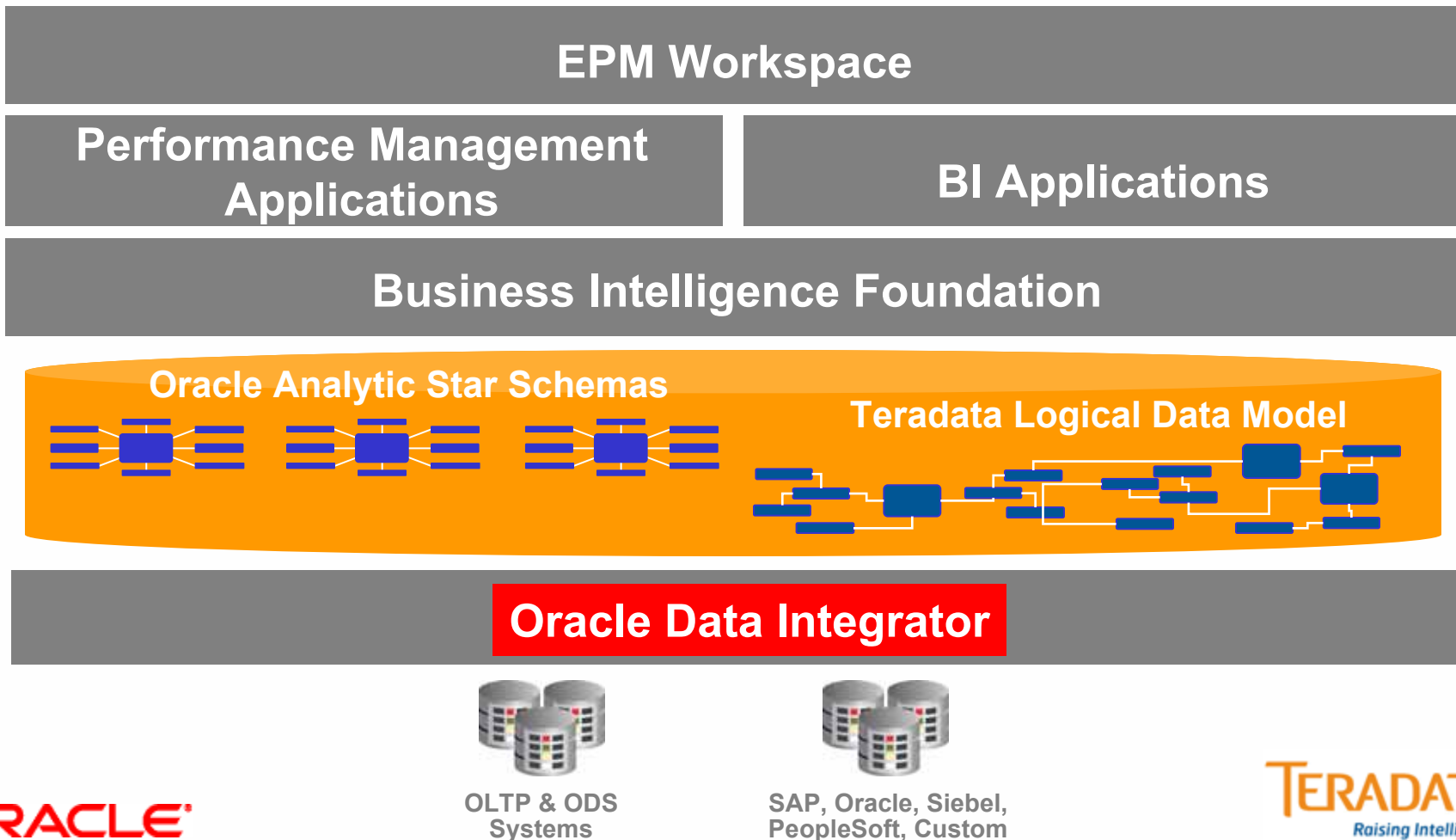
ORACLE

OLTP & ODS
Systems

SAP, Oracle, Siebel,
PeopleSoft, Custom

TERADATA
Raising Intelligence

Oracle Data Integrator



Differentiator: **E-LT Architecture**

Conventional: Separate ETL Server

- Proprietary ETL Engine
- Poor Performance
- High Costs for Separate Standalone Server
- IBM & Informatica's approach

Oracle: No New Servers

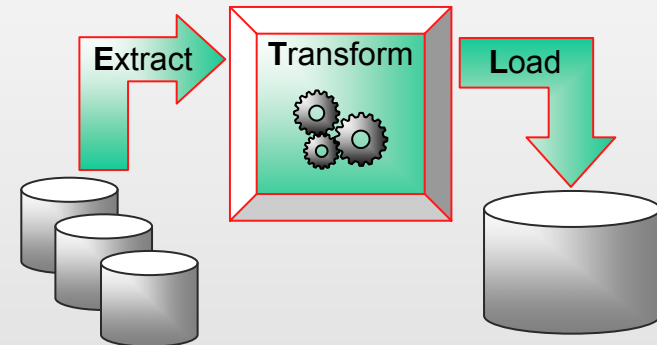
- Lower Cost: Leverage Compute Resources & Partition Workload efficiently
- Efficient: Exploits Database Optimizer
- Fast: Exploits Native Bulk Load & Other Database Interfaces
- Scalable: Scales as you add Processors to Source or Target

Benefits

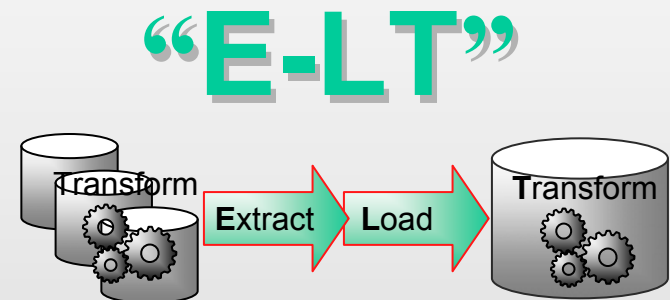
- Optimal Performance & Scalability
- Better Hardware Leverage
- Easier to Manage & Lower Cost

ORACLE

Conventional ETL Architecture



Next Generation Architecture



raising intelligence

Best for Teradata

Highest Performance Data Integration

- With ODI the ETL Server is NEVER a bottleneck – loading & transformation performance is always a function of the Teradata system itself, not 3rd party hardware or inefficient row-by-row processing.

ODI's E-LT is Superior to Pushdown ETL

- ODI eliminates needless network hops, centralized ETL processing, requires no new hardware, supports all transformation complexities and fully optimizes for differentiated Teradata features, including:
 - **MultiLoad, FastLoad, TPump, FastExport, parallel processing, merge joins, hash joins, nested joins, complex sort algorithms**

On-Ramp to SOA, MDM and ERP Applications

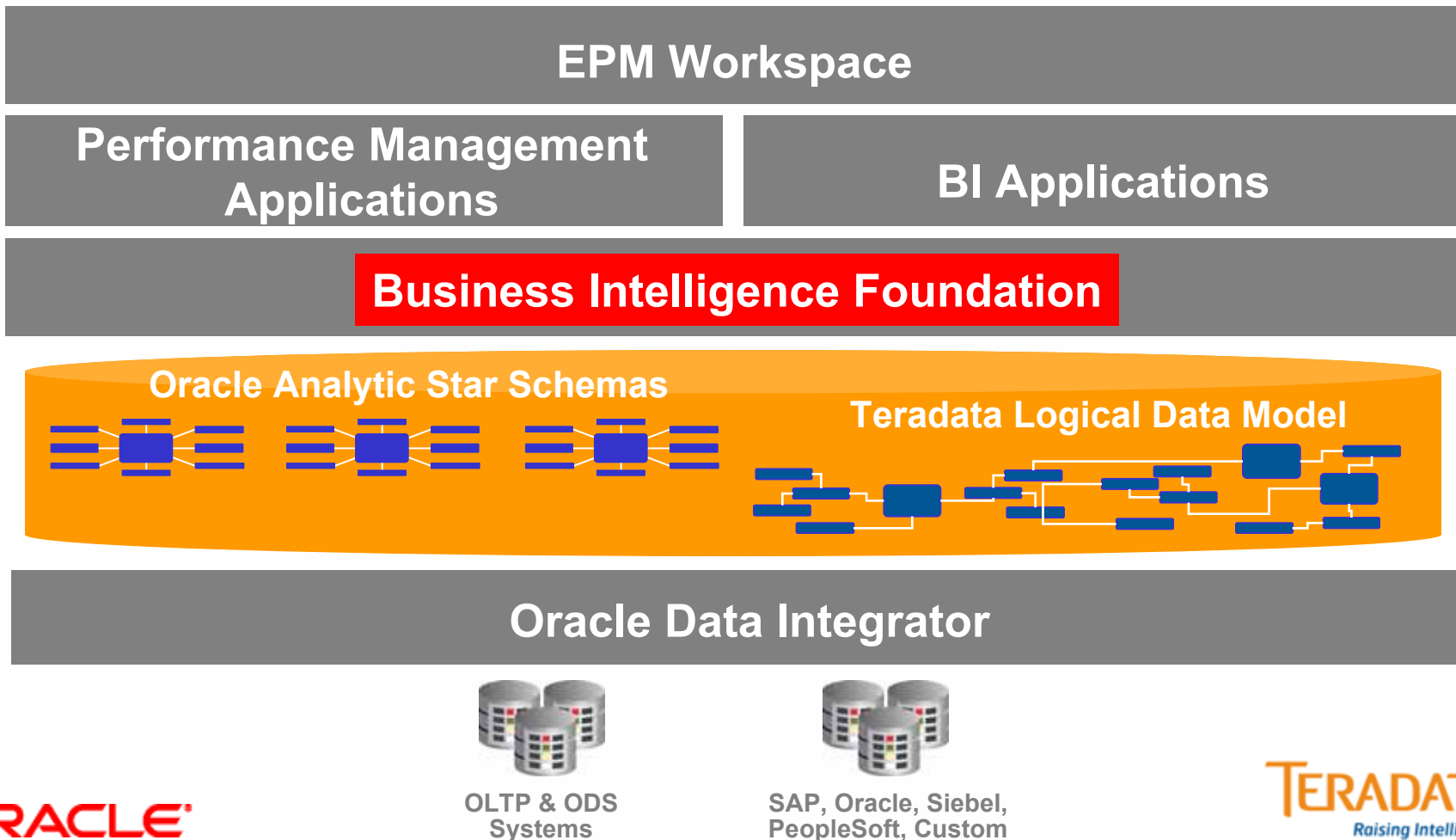
- ODI is 100% Java & SOA Native – ODI is deeply integrated into Oracle's SOA fabric and can share runtime with any Java-based SOA infrastructure
- ODI is Integrated/Packaged with Leading MDM Applications – ODI is deeply integrated with market leading MDM and supplies key MDM features
- ODI is Integrated/Packaged with Leading ERP Applications – ODI supports all popular ERP Applications and is essential for Oracle Fusion Applications

 ORACLE TERADATA.
Raising Intelligence

Customer Success Story

- Sabre or Overstock?

Oracle's EPM System & Teradata



ORACLE

OLTP & ODS
Systems

SAP, Oracle, Siebel,
PeopleSoft, Custom

TERADATA
Raising Intelligence

Common Enterprise Information Model

PRESENTATION LAYER

- User roles, preferences
- Simplified view
- Logical SQL interface

Role-Based Views of the Information Relevant to the User

SEMANTIC OBJECT LAYER

- Dimensions
- Hierarchies
- Measures
- Calculations
- Aggregation Rules
- Time Series

Consistent Definition of Business Measures, Metrics, Calculations

PHYSICAL LAYER

- Map Physical Data
- Connections
- Schema

Model Once, Deploy Everywhere

Across Any Data Sources

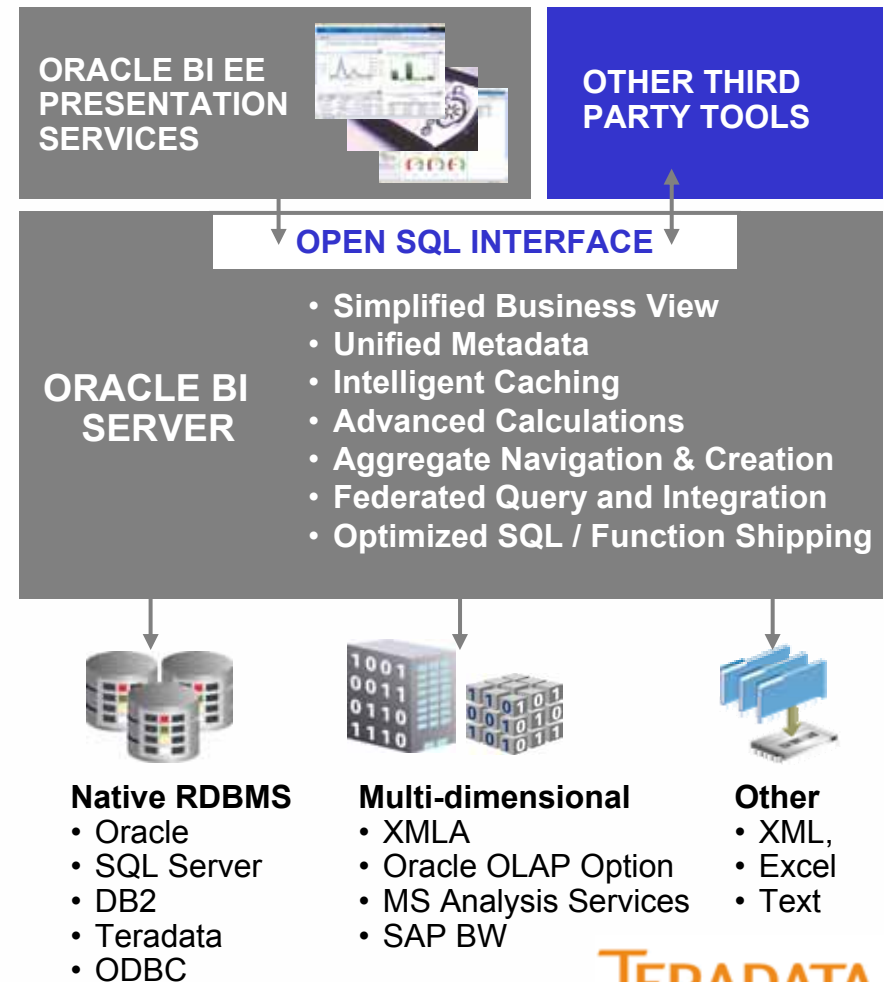


ORACLE

TERADATA
Raising Intelligence

Oracle BI Server

- Simplified Business Model View
- Advanced Calculation and Integration Engine
- Intelligent Request Generation and Optimized, Distributed Data Access
- Mission Critical Scalability and Performance
- Foundation for all OBIEE Presentation Services



ORACLE

TERADATA
Raising Intelligence

OBI EE – Teradata Optimization

- Native SQL query optimization
- Extensive usage of derived tables and sub-queries
- Exploits 3NF schemas (no schema requirements imposed)
- High degrees of parallel processing leveraged across all tiers

Smart Connectivity to Teradata

- Better performance, scalability & security
- Managed pooling of connections
- Synchronous and asynchronous access
- Query governing including SQL Cancellation
- Support Various database isolation levels
- Bulk data fetching via ODBC
- Unicode character set for global user support
- Bulk row insert via ODBC for efficient write back

ORACLE

TERADATA.
Raising Intelligence

Teradata Specific SQL Code Generation Engine

Oracle BI Server generates Teradata specific SQL

- Function shipping to Teradata for optimal query processing, examples include:
 - Ranking, Statistics, Set Operations
 - Create tables ... with data, insert into table <select-stmt>
 - Derived Tables, Outer Joins, nested outer joins, Group-by-Expression
 - Case-When and Case-If, Union/Intersect/Except
 - Better calendaring using Timestamp Add/Diff functions
 - Subquery

ORACLE

TERADATA.
Raising Intelligence

Union Pacific Railroad Reduces Expenses with Oracle BI



COMPANY OVERVIEW

- Largest railroad in North America
- Industry: Transportation

CHALLENGES

- Improve railroad track maintenance activities
- Make better allocation of maintenance dollars
- Improve employee safety
- Increase levels of customer satisfaction

SOLUTIONS

- With Oracle BI Enterprise Edition, deployed 300+ analytic applications for Maintenance, Safety, and Business Performance Management.
- Over 4,000+ users accessing multiple terabytes of data spanning Oracle, Teradata and 3rd party sources
- Analyzing track usage information and send maintenance alerts before problems arise

CUSTOMER PERSPECTIVE

“The payback in terms of dollars saved, increased use of existing information assets and employees understanding of key business benchmarks ... have been significant.”

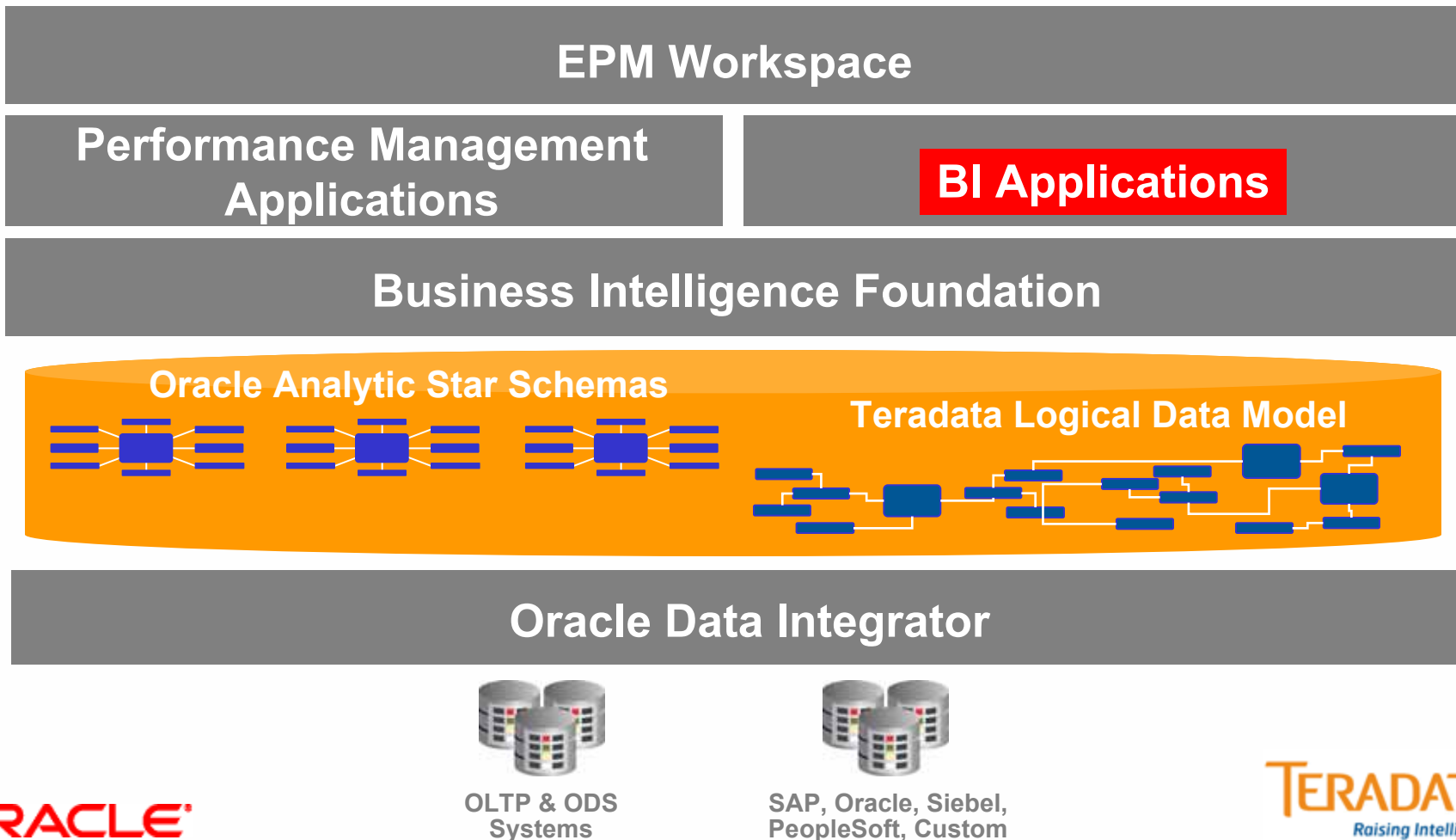
– Jim Holder, Director of Engineering Systems

RESULTS

- **Maintenance issues detected before track shutdowns are required**
- **Improved on-time deliveries and customer satisfaction**
- **Reduced operating expenses**

ORACLE**TERADATA.**
Raising Intelligence

Oracle's EPM System & Teradata



Oracle BI Applications



Sales	Service & Contact Center	Marketing	Order Management & Fulfillment	Supply Chain	Financials	Human Resources
Pipeline Analysis	Churn Propensity	Campaign Scorecard	Order Linearity	Supplier Performance	A/R & A/P Analysis	Employee Productivity
Triangulated Forecasting	Customer Satisfaction	Response Rates	Orders vs. Available Inventory	Spend Analysis	GL / Balance Sheet Analysis	Compensation Analysis
Sales Team Effectiveness	Resolution Rates	Product Propensity	Cycle Time Analysis	Procurement Cycle Times	Customer & Product Profitability	HR Compliance Reporting
Up-sell / Cross-sell	Service Rep Effectiveness	Loyalty and Attrition	Backlog Analysis	Inventory Availability	P&L Analysis	Workforce Profile
Cycle Time Analysis	Service Cost Analysis	Market Basket Analysis	Fulfillment Status	Employee Expenses	Expense Management	Turnover Trends
Lead Conversion	Service Trends	Campaign ROI	Customer Receivables	BOM Analysis	Cash Flow Analysis	Return on Human Capital

Prebuilt adapters:

ORACLE

PeopleSoft

SIEBEL

SAP

Other Operational
& Analytic Sources

Oracle BI Suite Enterprise Edition Plus

Pre-Built, Pre-Mapped, Pre-Packaged Insights

1

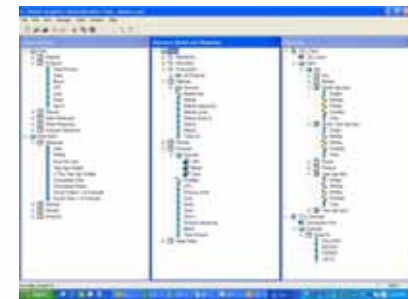
Pre-built warehouse with star-schemas designed for analysis and reporting



3

Pre-mapped metadata, including embedded best practice calculations and metrics

- Presentation Layer
- Logical Business Model
- Physical Sources



2

Pre-built ETL to extract data from hundreds of operational tables and load it into EDW



4

A “best practice” library of over 360 pre-built metrics, Intelligent Dashboards, 200+ Reports and alerts



ORACLE

TERADATA
Raising Intelligence

OBI Apps – Teradata Optimization

- Jointly designed for performance by Teradata and Oracle engineers
- Specialized Teradata indexing strategies
- Exploits Teradata's high-performance load utilities – Fast Load and TPUMP

Oracle BI Applications Database Optimizations for Teradata

- Teradata specific index strategy for query performance
 - Unique Primary Indices and Non-Unique Primary Indices implemented to facilitate data distribution
 - Specialized Secondary Indices implemented for more efficient AMP operations
 - Single-table Join Indices eliminates the need to redistribute large tables
 - Multiple-table Join Indices eliminate the need to redistribute large tables and perform joins
- Physical Schema Support
 - Optimized for analytical applications and overall performance by both Teradata and Oracle Engineers
 - Fully normalized fact tables
 - Normalized aggregate fact tables, where appropriate, as determined jointly by Teradata and Oracle engineers
 - Only select de-normalized dimension tables as applicable

 ORACLE TERADATA
Raising Intelligence

Oracle BI Applications ETL Optimizations for Teradata

- Business Analytics Warehouse (BAW) ETL modified to improve data movement
 - Reduced data movement in the middle tier to increase performance
 - Enhanced transformations to move data from stage to final tables (Load → Transform)
 - Created DAC tasks to execute in-place transformations
 - Built SQL statements as DAC tasks (insert into ... Select ...)
- Enhanced Data Warehouse Application Console
 - Improved index management feature for Teradata support
 - New set of tasks to manage Join indexes and transform data in-place
 - Certified Connectivity to Teradata Warehouse

Oracle BI Applications ETL Optimizations for Teradata

- Optimized Load and Update techniques using Teradata Utilities
 - Use Fast Load for the Full load and building staging tables
 - TPUMP as appropriate for update, insert, and upsert processing
 - Utilization of parallel loading and updating techniques
 - Use FASTLOAD for Initial Load & Stage Tables Load
 - Use named pipe during benchmark where appropriate
 - Use TPUMP for Incremental Load
 - Use named pipe during benchmark phase where appropriate
 - ETL Routine Optimization
 - Pre-package a number of customized SQLs (insert into ... Select ...).
 - These SQLs replace INFA mapping to load from Stage into the DW,
- These SQLs are available for loading large tables respectively

ORACLE**TERADATA.**
Raising Intelligence

Verizon Achieves Marketing and Sales Transformation



COMPANY OVERVIEW

- Provider of advanced IP, data, voice and wireless solutions to large businesses and government
- Industry: Communications

CHALLENGES

- Incomplete and inconsistent sales forecasting
- Operational inefficiencies resulting from disparate sales reporting and poor internal distribution
- Regulatory visibility required to allow for Verizon Business (formerly MCI) to come out of bankruptcy

SOLUTIONS

- Implemented Oracle BI Sales and Service Analytics to 3,000+ users in 3 ½ months
- Currently, over 14,500 users in Sales, Customer Service, and Sales Support, Marketing, Finance, Revenue Operations, and Business Development

CUSTOMER PERSPECTIVE

"With Oracle's pre-built Analytic solutions for Sales, Marketing and Service, we were able to deploy a powerful BI solution in under three months. Verizon Business employees, across the enterprise, are now empowered with relevant, complete information tailored to their role."

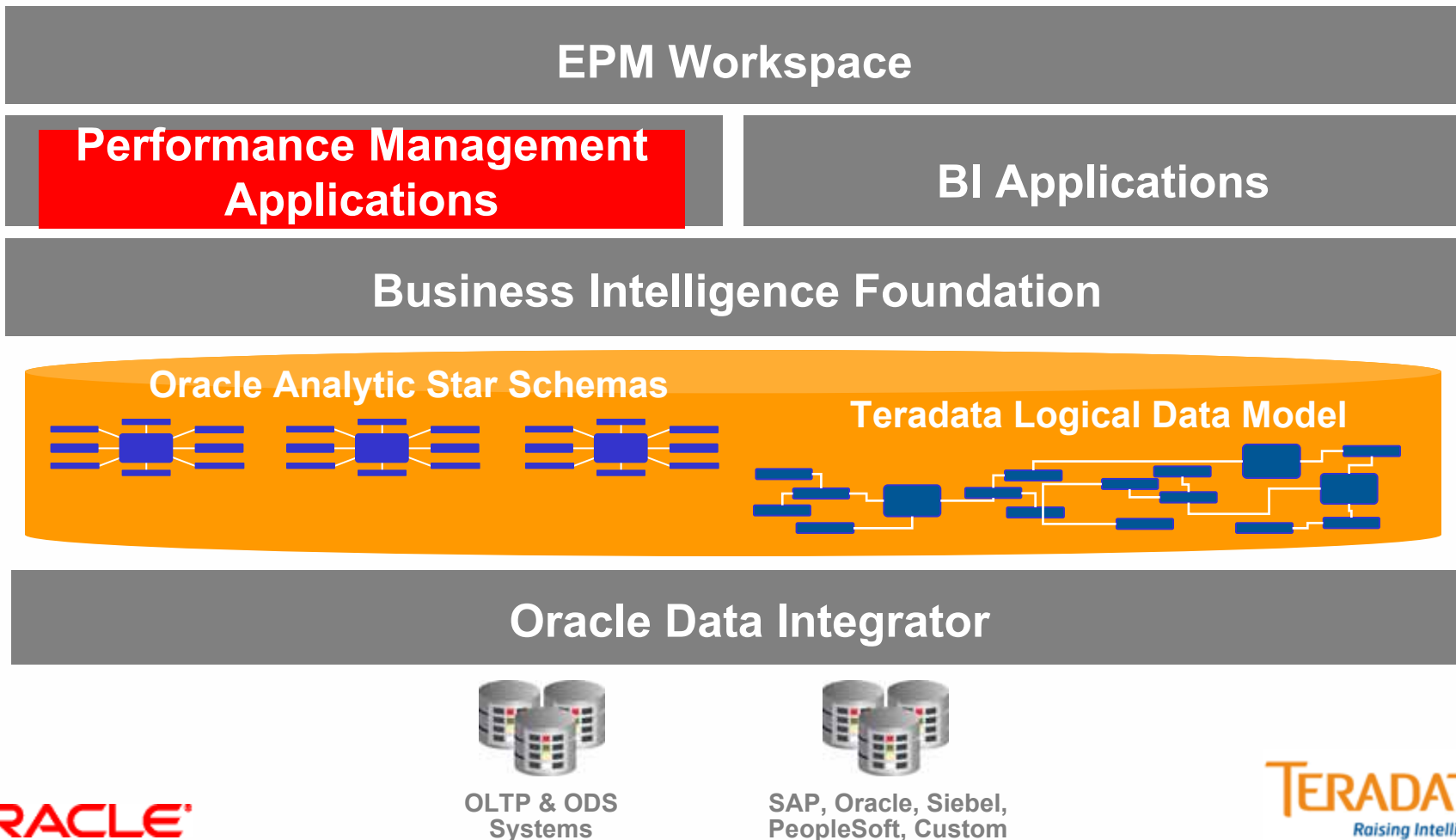
– Rob Moore, Executive Director

RESULTS

- Enabled SOX and regulatory compliance to be achieved while gaining transparency into the Sales and Marketing organizations business processes that fell under new regulatory review.



Oracle's EPM System & Teradata



Oracle's Hyperion Essbase

Richest Business User Experience

- Superior Tools for the Business User
- Broadest Analytic Functionality
- "Speed of Thought" Response

Most Highly Advanced Calculation Engine

- Superior Calculation Power
- Comprehensive Library of Functions
- Extensive Financial and Time Intelligence

Best Custom Analytic Environment

- Optimized Storage
- Enterprise scale Forward Looking Applications
- Premium Performance

ORACLE

TERADATA.
Raising Intelligence

Essbase Relational Integration

- SQL Interface
 - Custom SQL
 - Teradata Parallel Transport API
- Essbase Integration Services
 - OLAP Model and Metaoutline (XML)
 - Hybrid Analysis (Drill Down)
 - Drill-Through Reports

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions.

The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

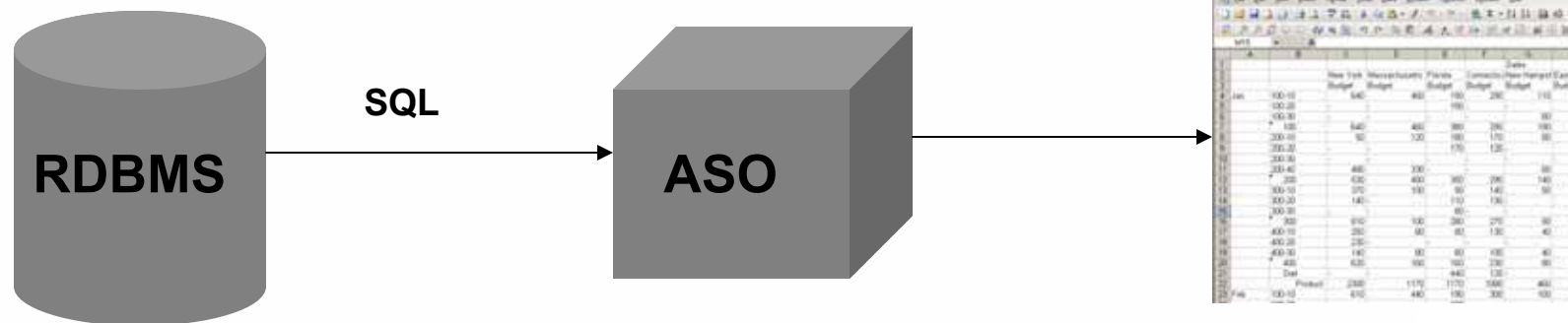
XOLAP

eXtending OLAP on Relational Database

- Application construction (Dimensional Modeling of Database tables/columns) using Essbase Studio
- Essbase as OLAP Application framework with database remaining in relational storage
- OLAP Aware tools – Reporting and Analysis
 - Office – Smart View
 - BI+ tools – WA / FR / IR / OBI EE
 - Visual Explorer (Tableau Software)

XOLAP

- ASO/ XOLAP outline created using Essbase Studio
- Query Essbase (e.g. from Smart View)
- Essbase will dynamically generate SQL to fetch data from RDBMS



ORACLE

TERADATA
Raising Intelligence

XOLAP Functional Summary

- ASO-style application – aggregation then calculation
- Complete Outline built
 - no automatic refresh from dimension table changes
- Data retrieval by issuing SQL on demand
 - no caching (yet)
- Aggregate awareness – support for summary tables
- RDBMS friendly (read fewer/simpler) SQL queries
- “Hybrid” aggregation strategy
- Transparency of Access
 - query interfaces/calculations/partitions/Drill-thru



Burlington Northern Santa Fe (BNSF)

Railroad Leader Tracks Performance



Merger of Burlington Northern and Santa Fe railroads
32,000 route miles across 28 states and 2 provinces
40,000 employees / \$13 billion in revenue

Needs

- Integrate multiple data from multiple business systems to gain a single view of operational company performance
- Ability to evaluate trends and standards of performance to understand root causes
- Provide intuitive access to all levels of users, from CEO to operations managers



After

- Performance information centralized in a single Essbase repository
- Corporate dashboard comprising 43 key operational measures with drill down into each measure
- Ability to graphically analyze performance by geography
- Flexible views that provide personalization, alerts and notifications

ORACLE

TERADATA
Raising Intelligence

BNSF Railway



Customer Description

- Created September 22, 1995 from the merger of Burlington Northern Inc. and Santa Fe Pacific Corporation. Operates 32,000 route miles covering 28 states and two Canadian provinces.
- Among the world's top transporters of intermodal traffic. Largest grain-hauling railroad in the U.S.
- 2005 freight revenues of \$12.6B; approximately 40,000 employees.

Problem

- Planning process was based upon a spider-web of 2000+ Excel spreadsheets creating a slow, manually-intensive process which was inflexible, difficult to maintain and lacked security.
- Forecasts generally based upon high-level trends with little relationship to key business drivers

Solution

- On-Track Forecasting and Planning system built on a foundation of Teradata, DB2, Hyperion ESSBASE, Alphablox Reports, and Excel spreadsheets.

ORACLE

Customer Benefits

- Forecast process simplified and accuracy increased through focus on key value drivers such as crew starts, train miles, headcount, healthcare cost increases, and work days in a month
- Improved ongoing performance measurement; managers once had access to results only 30 days after they happened; now have next day access to exceptions
- Turn time for preparing for the next forecast has been reduced from a week to approximately 3 hours. Time saved shifted to analysis of variances at a detailed level enabling corrective action

TERADATA
Raising Intelligence

BNSF

A single view of Performance Management

“Our corporate dashboard takes 43 of our key operational measures and displays them in a format that makes it easy to identify change. It enables us to drill down in any of these critical areas. By building a corporate dashboard with Hyperion Essbase, we’ve made business performance much easier to understand and act upon.”

Bart Boudreaux
Director, Business Intelligence

EPM Application Integration Options

1. Oracle Data Integrator (ODI - Sunopsis)

- Integration platform covering key data integration requirements — from high-volume, high-performance batches, to event-driven, trickle-feed integration processes.

2. Data Integration Management (DIM - Informatica PowerCenter)

- Integration platform that enables companies to access, integrate, transform, and move any type of data between EPM applications and other systems.

3. Data Relationship Management (DRM)

- Facilitates rationalization of attributes, dimensions and hierarchies for complex enterprise financial & analytical master data in heterogeneous IT environments. Recommended for EPM master data management.

4. Financial Data Quality Management (FDM)

- Hyperion Financial Data Quality Management - A packaged application with a highly intuitive graphical user interface that enables non-technical end users to handle GL trial balance data loading/mapping process with ease. Built-in functionality includes key Sarbanes-Oxley controls such as audit trail documentation, document management, full auditing of entire data flow process, 80 pre-built reports, and preventative controls. Preferred tool for HFM and Hyperion Enterprise.



EPM Application Integration

Data Integration Management

- Informatica 7.1.4 supports Teradata V2R5.1 and V2R6.0
- Informatica 8.1 supports Teradata V2R6.0 and V2R6.1
- Informatica support for Teradata ODBC, FastLoad, TPump, MultiLoad, FastExport and TPT (via named pipe or staged file)
- Data Driven load with TPump and MultiLoad (using Update Strategy Transformation)
- PowerCenter 8 ease of use features for generating and applying modifications to the Teradata loader control files
- XConnect for Teradata – Informatica's Metadata visualization and management tool (PowerCenter Advanced Edition)
- ELT (Extract, Load, Transform) Support:
 - With **Pushdown Optimization Option**, PowerCenter 8 generates Teradata SQL to perform transformations within Teradata instead of the Informatica server



Nationwide



Nationwide®
On Your Side™

Customer Description

- One of the largest insurance and financial services companies in the world
- Over \$157B in statutory assets
- Fortune 100 company

Problem

- Disparate, fragmented financial systems environment
- Ineffective forecasts were poor predictors of performance
- No single view of enterprise financial performance
- System complexity limited ability to adapt to environmental and strategic change

Solution

- FOCUS (Faster, Online, Customer-driven, User-friendly, Streamlined) initiative launched to redefine the role and operating model of Nationwide's core finance functions, processes and systems
- Teradata Enterprise Data Warehouse (EDW) established as the foundation of the FOCUS initiative – providing single view of enterprise data in conjunction with Hyperion Essbase
- Hyperion Planning and Budgeting system

ORACLE

Customer Benefits

- Standard data definitions and well defined data governance instituted across 200 source systems and 2,000 users
- Finance liberated from manual reconciliations and “data custodian” tasks, now spending more time on value-adding analysis
- Improved planning and variance analysis process – driver-based plans, consistent definitions, and roll-up methodologies across the enterprise
- Close process reduced from 15 days to 7
- Finance now has flexibility to quickly integrate acquisitions and adjust to change

TERADATA
Raising Intelligence

How to Learn More?

- Oracle Data Integrator for Teradata
 - <http://www.teradata.com/t/pdf.aspx?a=83673&b=175691>
- Teradata and Oracle Business Intelligence, Achieving Optimal Performance on Teradata
 - <http://www.teradata.com/t/pdf.aspx?a=83673&b=175706>
- Improving your Analytics through Oracle/Hyperion and Teradata - Hybrid Analysis
 - <http://www.teradata.com/t/pdf.aspx?a=83673&b=150445>
- Contact us:
 - Andy Heller, Andy.Heller@Oracle.Com , 805.845.4357
 - Todd Cannaday, Todd.Cannaday@Teradata.Com, 262.246.9368