ORACLE

Oracle Exalytics Product Overview

Joe Thomas

Sr Director, Business Intelligence

Safe Harbor Statement

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Introducing Oracle Exalytics In-Memory Machine

Extreme Insights into Business Performance

First engineered system to combine:

- proven in-memory technology
- advanced analytics
- unconstrained data visualization

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Business Challenges

IT Constraints Can Impede Timely Decision Making

Grow Revenue

Product Innovation

Risk Reduction

Unplanned Events

Time to Market

LOB Challenges

IT Constraints

Reduce Complexity

Accelerate Deployments

Simplify Management

Service Levels

Reduce Costs

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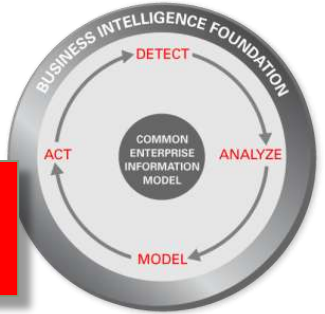
Market Drivers and Technology Enablers

Consumerization of BI

Market Drivers

- Better decisions
- Productivity
- Efficiency
- Simplicity
- BI Adoption

Embedded Intelligence



In-Memory Analytics

Technology Enablers

Engineered Systems

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Extreme performance with lower TCO

Smarter Analytic Applications

Lowers application migration risk

Visualization Without Limits

See what you think anytime, anywhere

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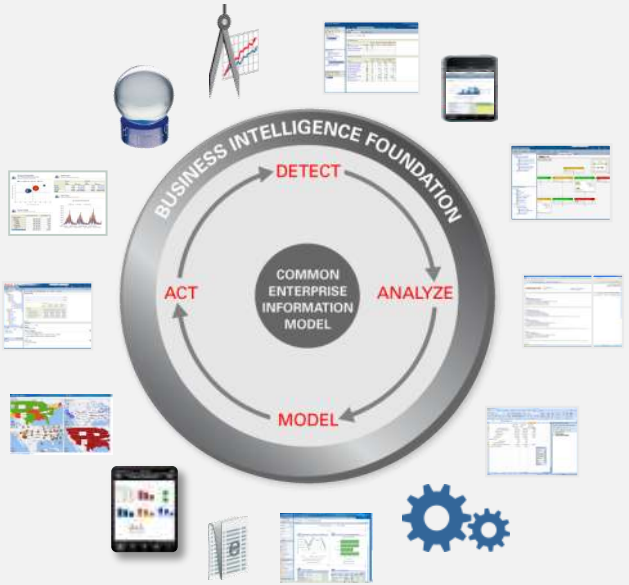
Oracle Exalytics: Under the Hood



Optimized Oracle Business Intelligence Foundation Suite

TimesTen for Exalytics

Memory Optimized Essbase

Adaptive In-Memory Tools

In-Memory Analytics Software

1 TB RAM
40 Processing Cores
High Speed Networking

In-Memory Analytics Hardware

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Exalytics Unique Features

Business Intelligence Foundation Suite

Product	Feature	Description
Oracle Business Intelligence Administrator	Summary Advisor	Summary advisor monitors Business Intelligence usage patterns, analyzes them and recommends the optimal data mart for best overall performance improvement.
Oracle Business Intelligence Server	Aggregate Persistence (“CREATE AGGREGATES”, and “DELETE AGGREGATES” commands) when run against the TimesTen In-Memory Database for Exalytics	The Aggregate Persistence feature enables automated creation of data marts via BI server commands.
Oracle Business Intelligence Server	Exalytics specific optimizations enabled by “Oracle Hardware acceleration” flags	Optimizations to match system architecture resulting in higher query throughput, lower latencies in query processing. Enhanced memory usage for cache.
Oracle Business Intelligence Presentation Server	Exalytics specific optimizations enabled by “Oracle Hardware acceleration” flags	Optimized default configuration to use large footprint memory to speed up page rendering and caching.
Oracle Essbase	Exalytics specific optimizations enabled by “Oracle Hardware acceleration” flags	Memory usage optimizations for loading entire data into memory, concurrency improvements to match Exalytics architecture enabling efficient distribution of processing.

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TimesTen In-Memory Database for Exalytics

What's new in Oracle TimesTen for Exalytics 11.1.2.2.2

- OLAP Grouping Operators: CUBE, ROLLUP, GROUPING SETS
- Columnar Compression
- WITH Clause
- Analytic Functions: RANK, DENSE_RANK, SUM, AVG, ORDER BY NULLS FIRST|LAST
- Time functions: TIMESTAMPADD, TIMESTAMPDIFF

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Essbase 11.1.2.2.000

Enhancements for Exalytics

- Take advantage of Exalytics hardware
- Performance optimization
- Higher level of parallelism across all processes
  - Parallel calc
  - Parallel restructure
  - Parallel load
  - Parallel export
  - Calcparallel limit raised to 64 (32-bit) and 128 (64-bit)
- MDX query performance
  - MDX NonEmptyCount optimization, NONEMPTYCOUNT(set, measure, exclude_missing)
  - Optimized when using exclude_missing
  - MDX - Concurrent queries, also while calc/updates occur
- Scalability
  - Improved performance with high user concurrency
- Better utilization of memory
  - Support for larger than 4GB cache size (64-bit)

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Scalable Hardware Architecture

Extreme Insights

COMPUTE

4 Intel E7-4870
40 cores total

NETWORKING

40 Gbps InfiniBand (2 ports)
10 Gbps Ethernet (2 ports)
1 Gbps Ethernet (4 ports)

MEMORY

1 TB RAM
1033 MHz

STORAGE

3.6 TB HDD

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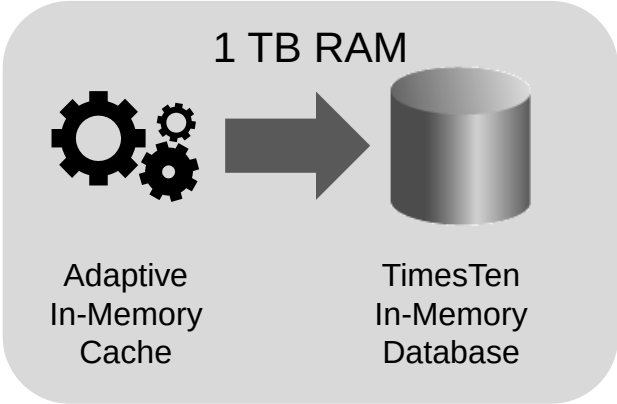
In-Memory Analytics

Adaptive In-Memory Cache

- Decides what gets stored in-memory
- Adapts to change in analytic workload
- Optimizes performance for best responsiveness

In-Memory Database

- Efficiently manages in-memory data
- Proven technology
  - TimesTen In-Memory Database
  - Enhanced with columnar compression
  - Enhanced with analytic functions



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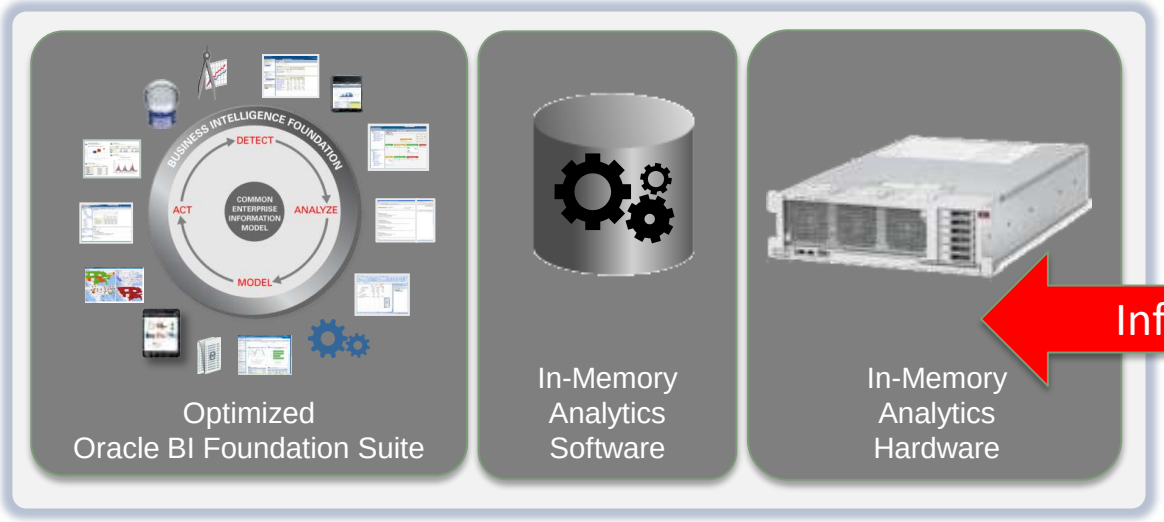
Fully Optimized Analytical Solution

Engineered to Work Together



Exalytics
"Speed of Thought" Enterprise Business Intelligence Delivery Platform

+

Exadata Database Machine
Extreme Data Management

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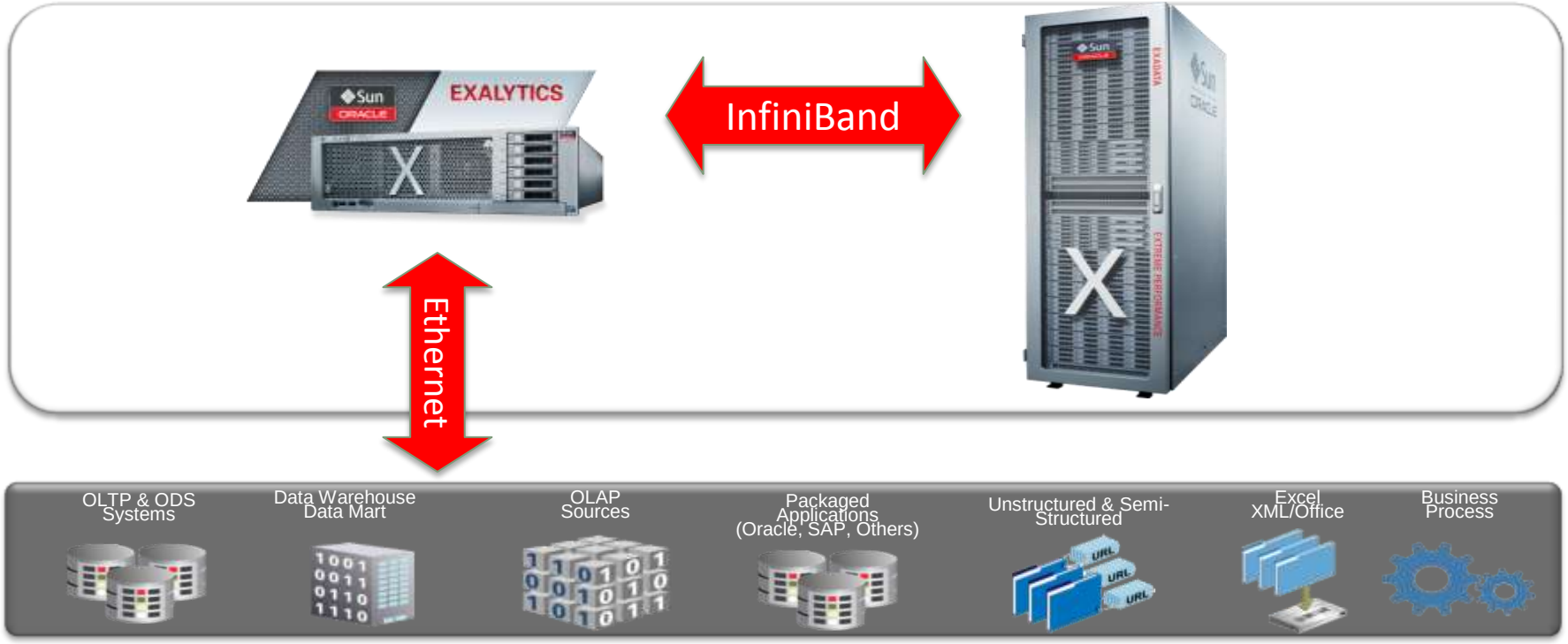
Optimized for Exadata…

Open to All Data Sources



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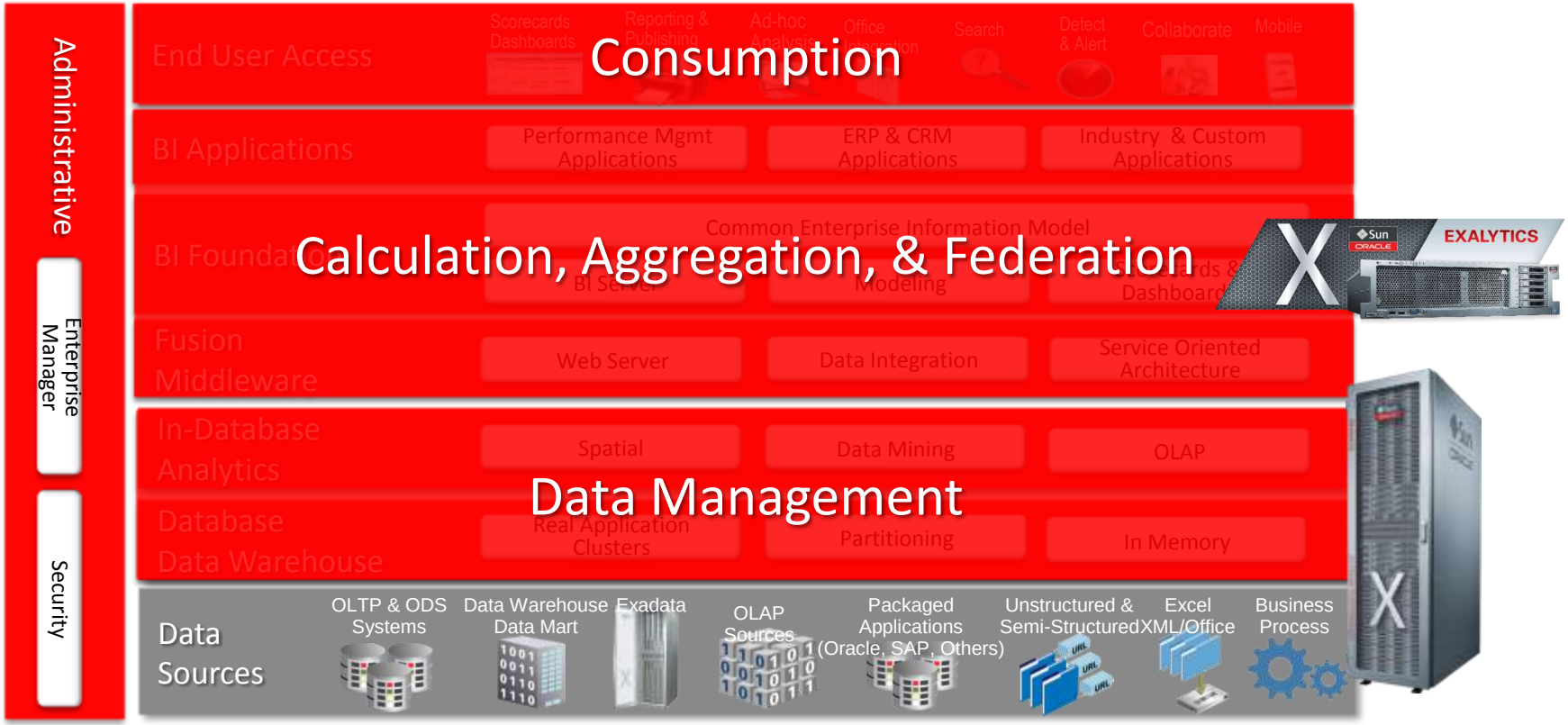
Complete End-to-End BI & DW Solutions



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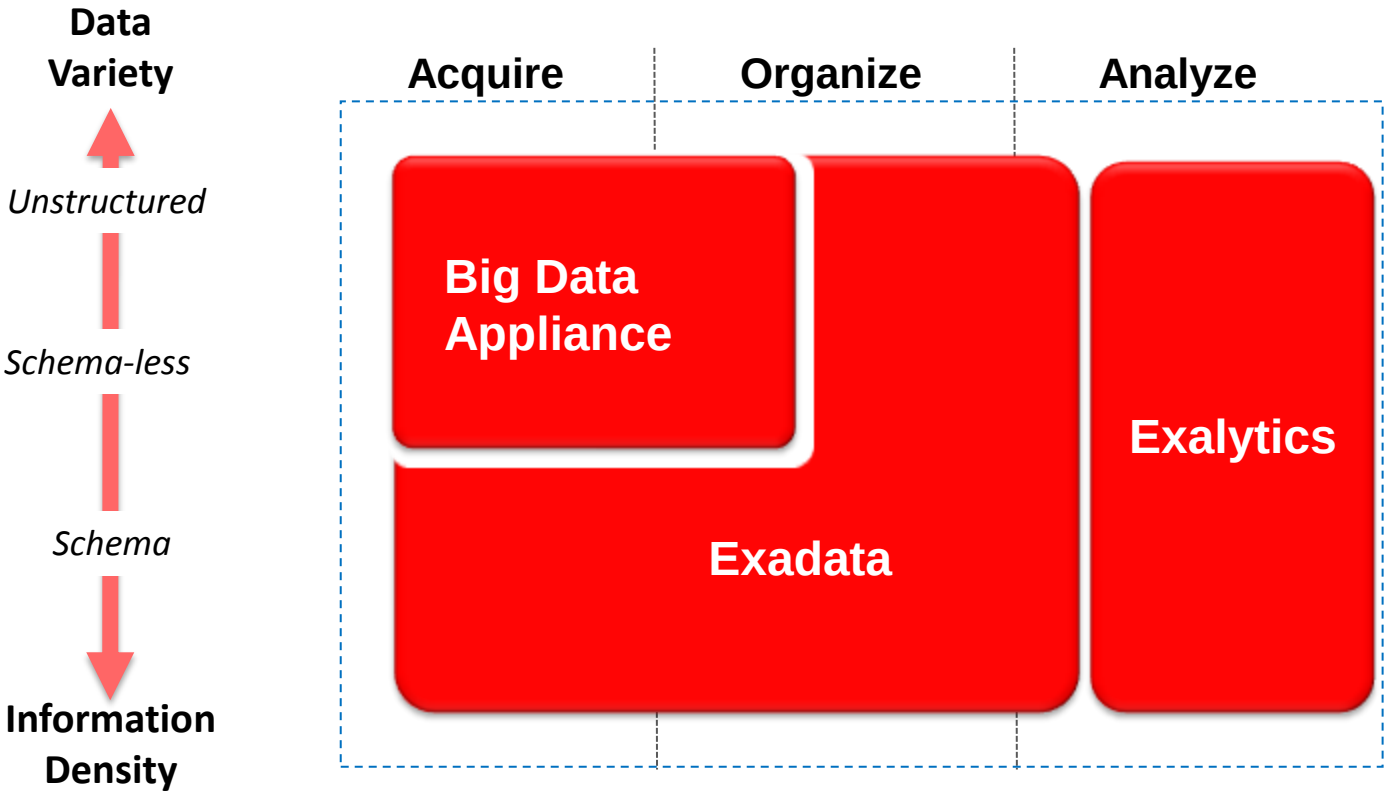
Oracle's Engineered End to End Solutions



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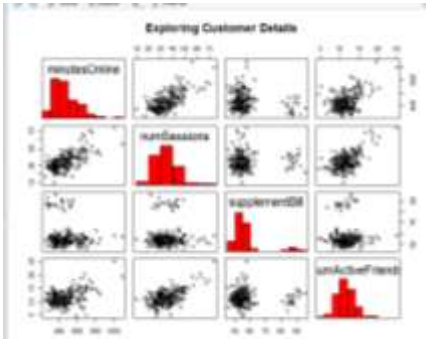
Oracle Database Advanced Analytics Option

Oracle R Enterprise

- The R open source environment for statistical computing and graphics is the next “big thing” in advanced analytics
- Colleges and universities use R for statistics classes
(replacing more traditional software tools)
- R can be run locally on personal computing platforms or R packages can be offloaded and run in parallel with powerful Oracle Engineered Solutions
- Augment your Oracle results with powerful graphics
- Integrate R results and graphics with OBIEE dashboards



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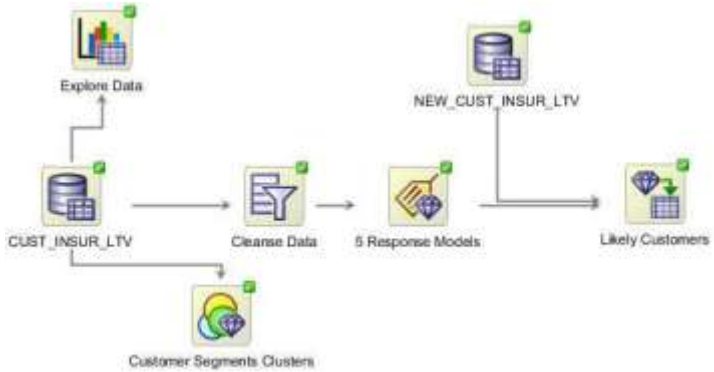
Oracle Database Advanced Analytics Option

Oracle Data Mining

- Eliminate data movement
- Build predictive applications
- Maintain security during analysis
- Multiple Algorithms
  - Clustering: Enhanced K-Means, Orthogonal Planning
  - Classification: Decisions Tree, Logistical Regression, Naïve Bayes, Support Vector Machine
  - Regression: Multiple Regression, Support Vector Machine
  - Feature Extraction: Non-negative Matrix Factorization (NMF)
  - Attribute Importance: Minimum Description Length
  - Association: Apriori
  - Anomaly Detection: One-Class Vector Machine



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Exadata Hardware Architecture

Scaleable Grid of industry standard servers for Compute and Storage

- Eliminates long-standing tradeoff between Scalability, Availability, Cost

Database Grid

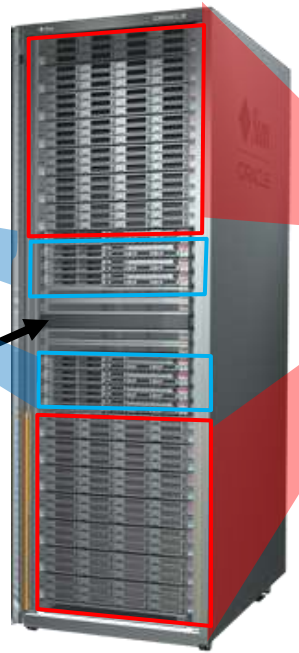
- 8 Dual-processor x64 database servers

OR

- 2 Eight-processor x64 database servers

InfiniBand Network

- Redundant 40Gb/s switches
- Unified server & storage network



Intelligent Storage Grid

- 14 High-performance low-cost storage servers

- 100 TB High Performance disk, or 504 TB High Capacity disk
- 5.3 TB PCI Flash
- Data mirrored across storage servers

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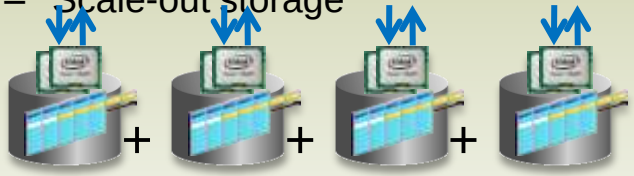
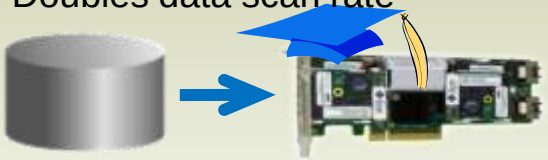
Exadata Innovations

Exadata Storage Server Software

- **Intelligent storage**
  - Smart Scan query offload
  - Scale-out storage

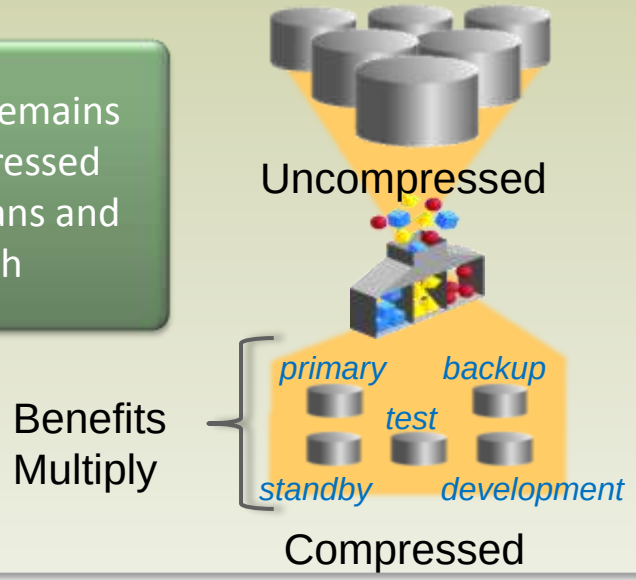


- Smart Flash Cache
  - Accelerates random I/O up to 30x
  - Doubles data scan rate



- Hybrid Columnar Compression
  - 10x compression for warehouses
  - 15x compression for archives

Data remains compressed for scans and in Flash



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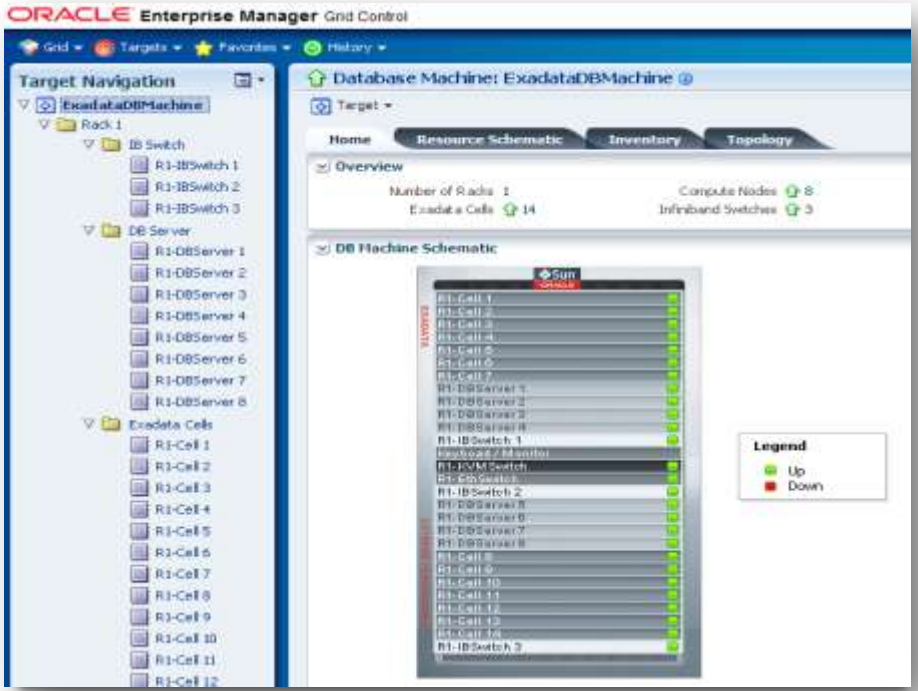
Comprehensive & Deep Engineered Systems Management

- Integrated view of hardware and software in a single pane of glass
- Hardware Management
  - Schematic of cells, compute nodes and switches, network fabric and storage
  - Hardware components alerts
  - Management of infiniband switches,
- Integrated Software/System view
  - Performance, availability, resource usage by databases, applications
- Configuration view
  - Version summary of all components along with patch recommendations



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Oracle's Strategy

Hardware and Software

ORACLE

Engineered to Work Together

- Tested together
- Certified together
- Packaged together
- Deployed together
- Upgraded together
- Managed together
- Supported together

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Extreme Results for Early Adopters

	Supplies automotive industry with market intelligence “Polkinsight”

“When we began the testing for the BI machine, we saw on cache misses, about a 10x improvement out of the box. In extreme cases, we saw about 100x improvement on certain drill paths that were very poor performing."

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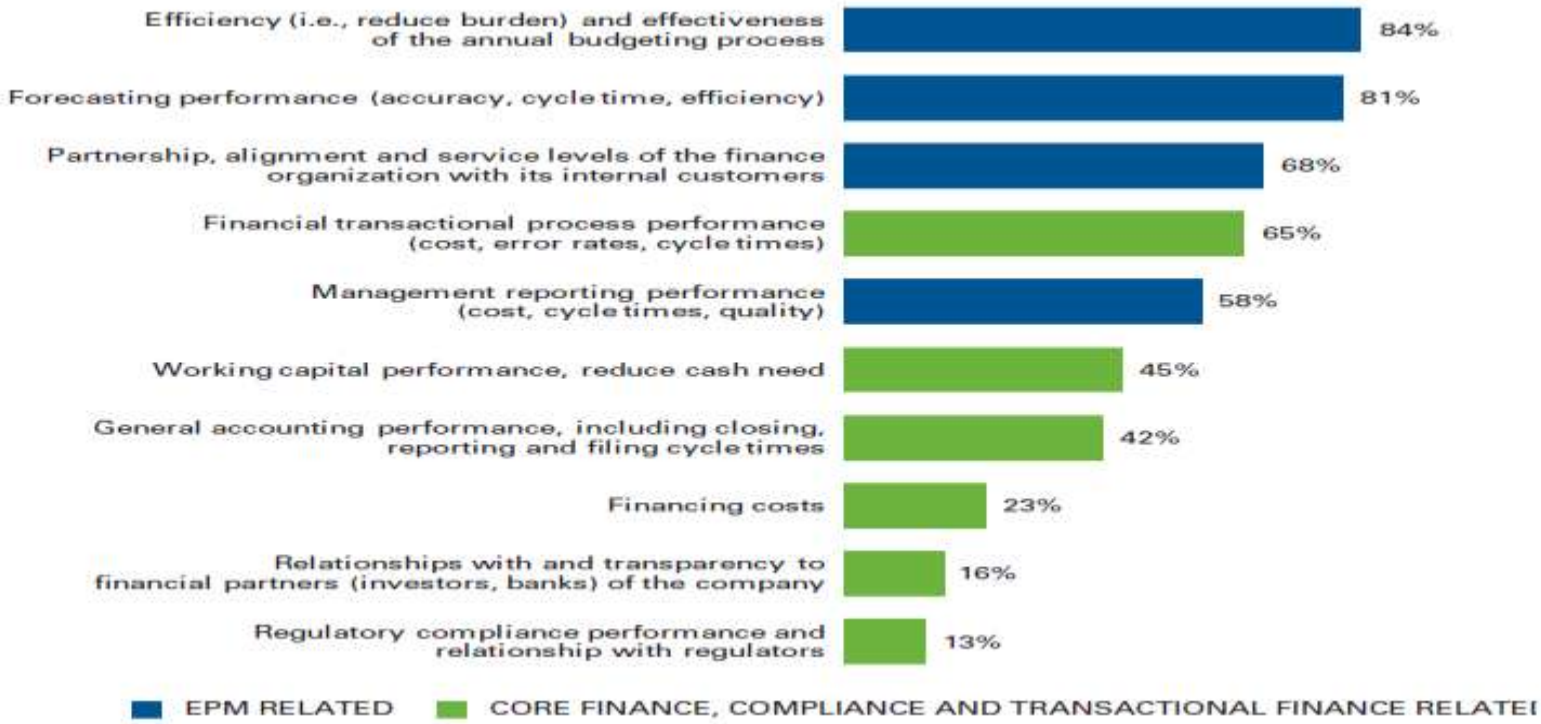
Planning Cycles Are Too Long



The Hackett Group
World-Class Defined and Enabled

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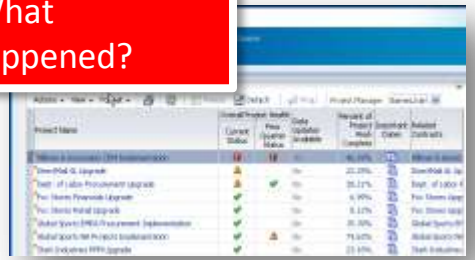
Intelligent Decision Cycle

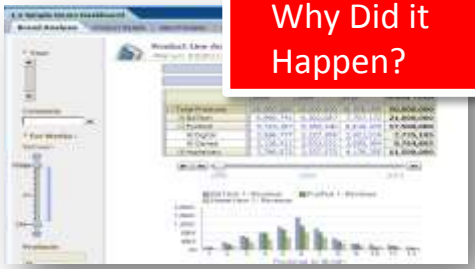
Analytics Power Intelligent Decision Processes

1 What Happened?



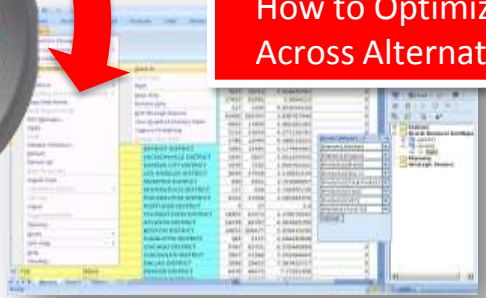
Exception-based Management

2 Why Did it Happen?



Embedded Business Intelligence

3 How to Optimize Across Alternatives?



Scenarios / What if?

4 Take Action – Who Does What?

Embedded Collaboration

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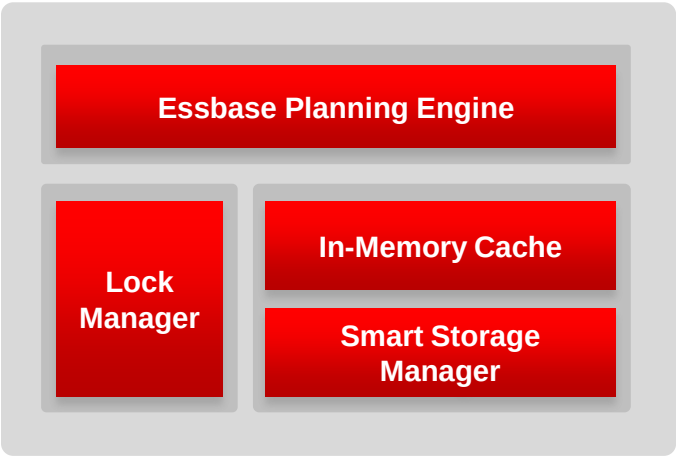
High Performance Planning with Exalytics



- **Smart Storage Manager** stores frequently accessed blocks in-memory
- **In-Memory Cache** optimizes block access
- Lock Manager improves parallelism
- **80x Faster** Reads; **20x Faster** Writes

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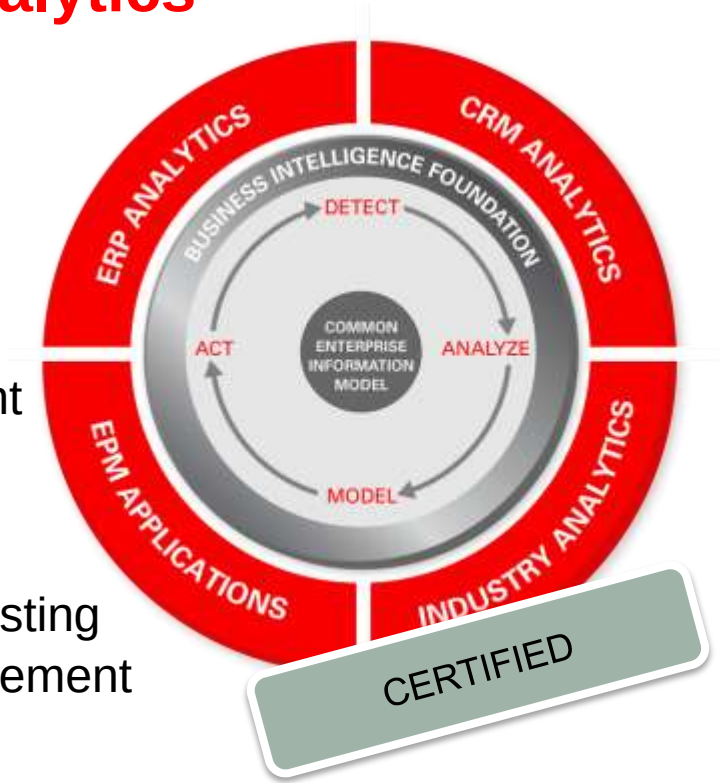
Oracle Analytic Solutions

Certified for Exalytics

- Financials
- HR
- Procure & Spend
- Projects
- Supply Chain
- Order Management
- Logistics

- Strategic Planning
- Planning & Forecasting
- Profitability Management



- Sales
- Marketing
- Service
- Contact Center
- Price
- Loyalty

- Financial Services
- Communications
- Healthcare
- Retail

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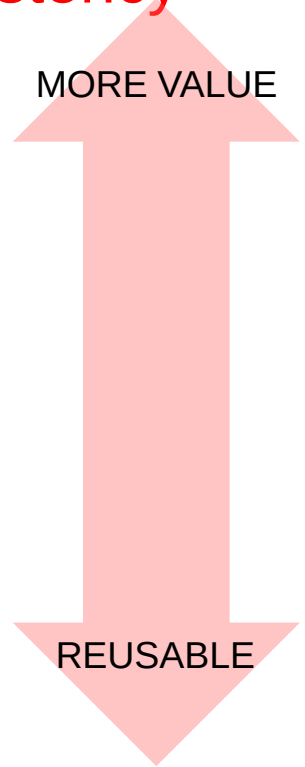
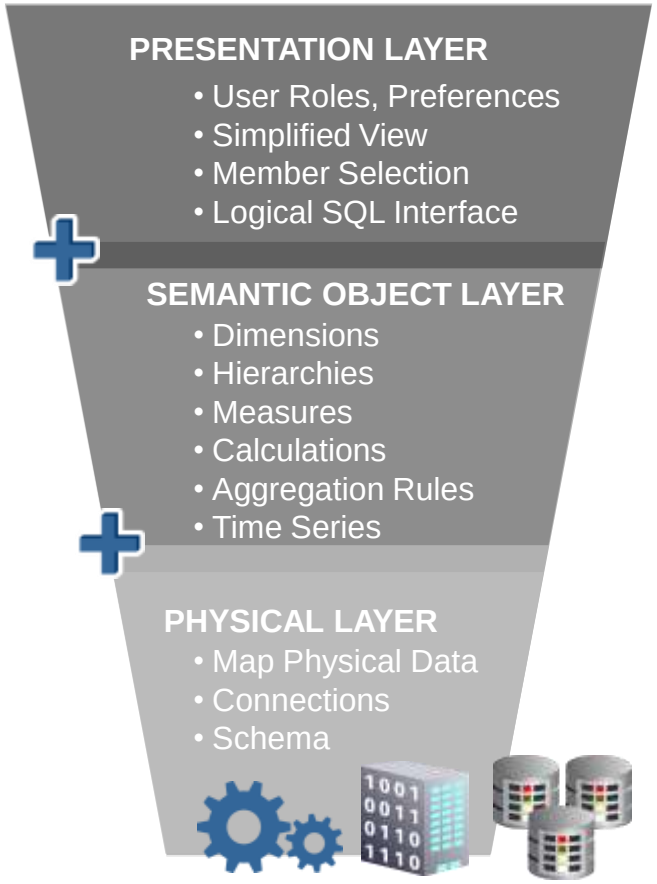
Integrated Information Model

Fewer Silos – More Consistency

- Insulates Users from Complexity
- Consistent Definition of Business Metrics & Calculations
- Easier Maintenance
- Model Once, Deploy Everywhere
- Any Set of Data Sources





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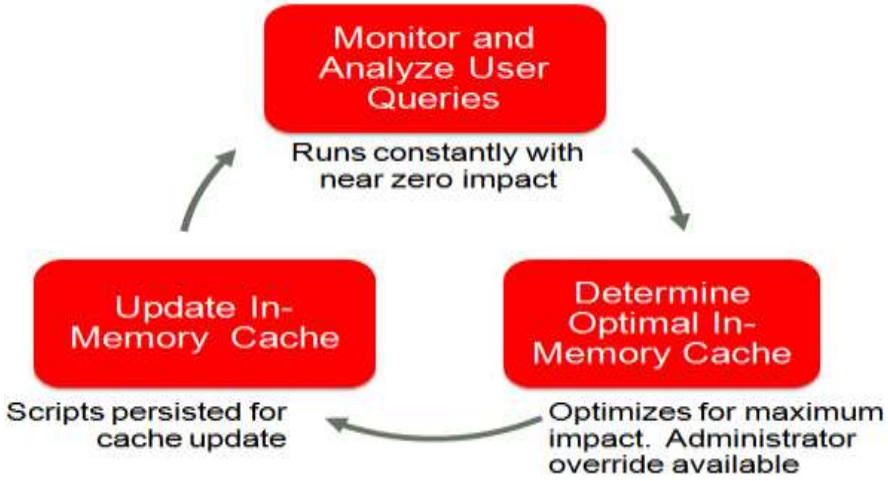
Smarter Analytic Architecture

Summary Advisor Determines Optimal Cache

- In-Memory TimesTen based analytics delivers better and faster insights
- Optimized memory use with usage based aggregate design
- Compensate for sub-optimal data source design
- Avoid complex joins with intelligent cache generation



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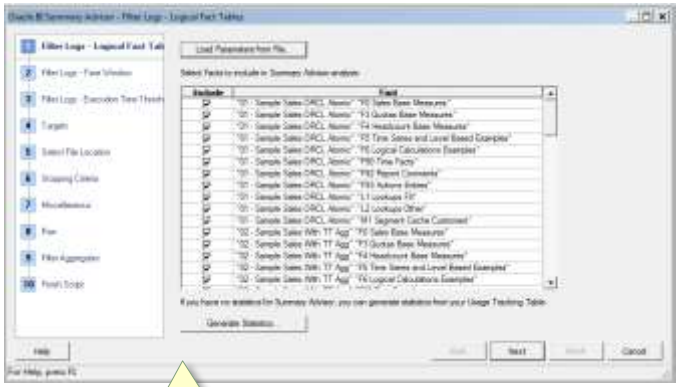
Summary Advisor

- Analyzes query workload captured over time
- Recommends minimal set of aggregates to improve query response
- Wizard-driven UI launched from the BI Server Administration Tool
- Creates script that is fed to the Aggregate Persistence Engine
- Exalytics-only feature



Benefit: Optimized performance based on adaptive understanding of analytic workload

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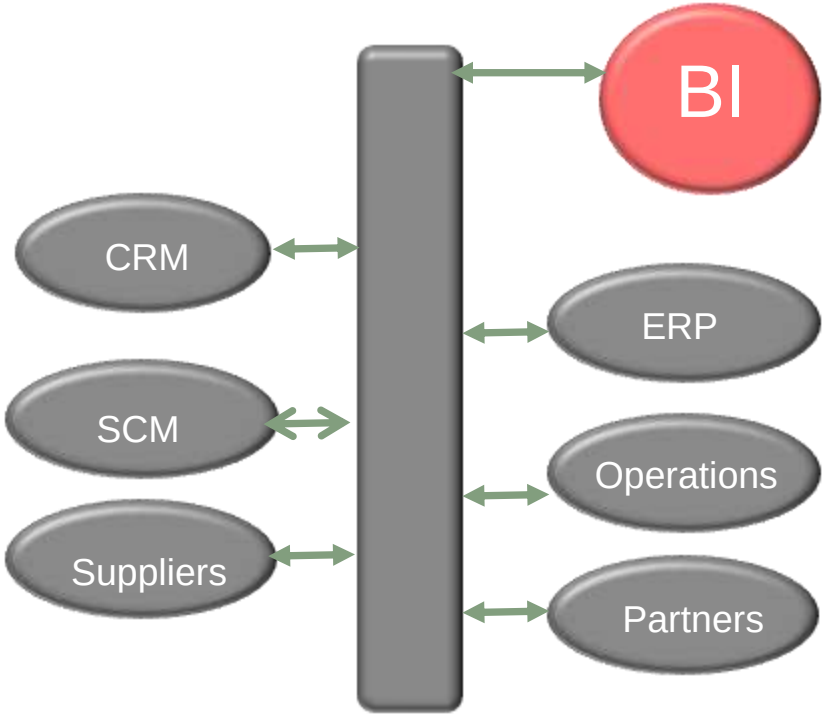
BI as a Service to the Business

BI as an Enterprise Class System



- Operationally significant BI
  - Fed from every system
  - Feeding every system
- Supports enterprise scale BI
  - Scales on demand
  - Robust component of infrastructure
  - Fully manageable
- Delivered with Exadata + Exalytics

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Extreme Results in Early Adopter Program

	Large oilfield services company with over 860 rigs deployed around the world

"With Oracle Exalytics, we were able to develop a performance dashboard in one-fifth the estimated time it would take to develop otherwise."

5x shorter time to develop; 50x faster than a custom report

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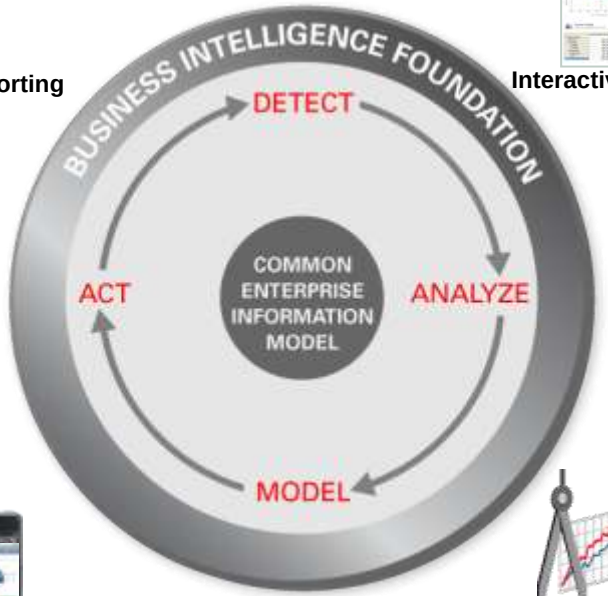
Integrated Suite of Tools Improves Decisions

Oracle BI Foundation Suite

Predictive Analysis

Production Reporting



Interactive Dashboards

Strategy Maps

Secure Search

Embedded in Applications

Scorecards

Geographic Visualization

Business Processes

Tablet

Mobile

Scenario Analysis

Ad-hoc Analysis

Office Integration

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Unconstrained Visualization

Smart charts so you can see what you think

- Highly Interactive Analysis
- Free Form Data Exploration
- High Density Visualizations
- View Auto Suggestions
- Contextual Actions
- All on Mobile

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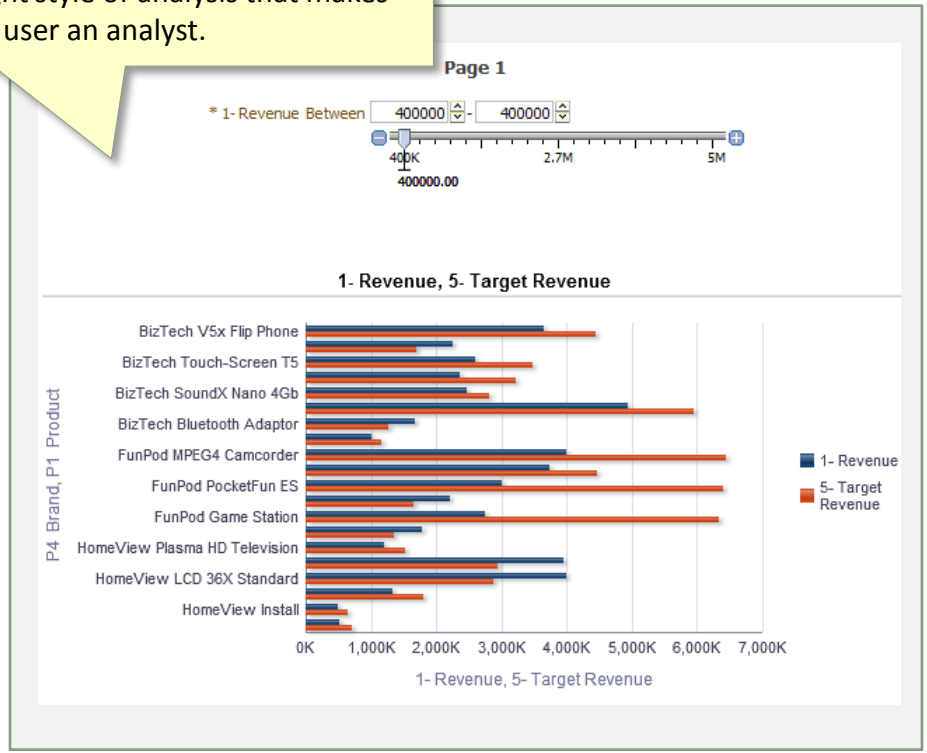
Go-less Prompts

- Optional “Apply/Reset” button for Dashboard Prompts
- Enable
  - Rapid feedback and responsive user interaction
  - Performant cascading updates of dependent prompts
- Administrator can enable/disable via instanceconfig entry
- Or set always ON (regardless of BI Machine Flag)

Go-less Prompts promote a speed-of-thought style of analysis that makes every user an analyst.



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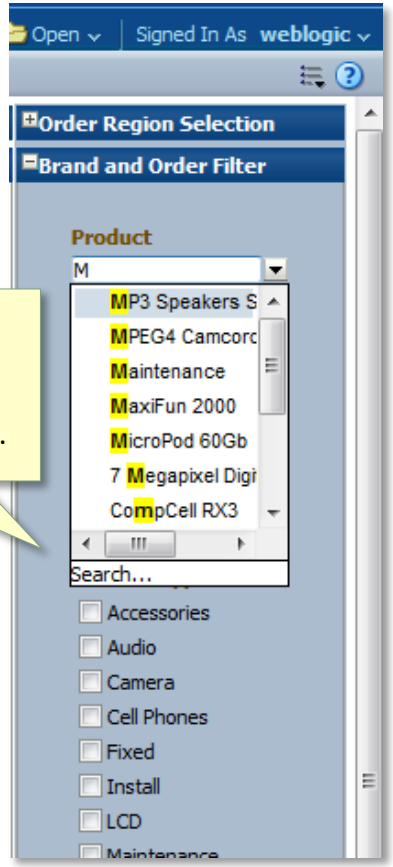
Auto-complete Prompt

- Auto-complete for
  - Dashboard Prompts (similar to recommendation on Web)
  - Prompt Search Dialog
- Available for
  - Choice List with typing enabled
  - Alpha-numeric (varchar) data only
- Administrator can
  - Enable/Disable in InstanceConfig file
  - Specify query criteria
    - Case sensitive/insensitive
    - Matching Level(StartsWith, WordStarts and MatchAll)
    - Result Limit (Number or recommended records
  - True if BI Machine Flag is True otherwise False



Auto-complete is well-suited for retrieving desired values from lengthy prompt picklists.

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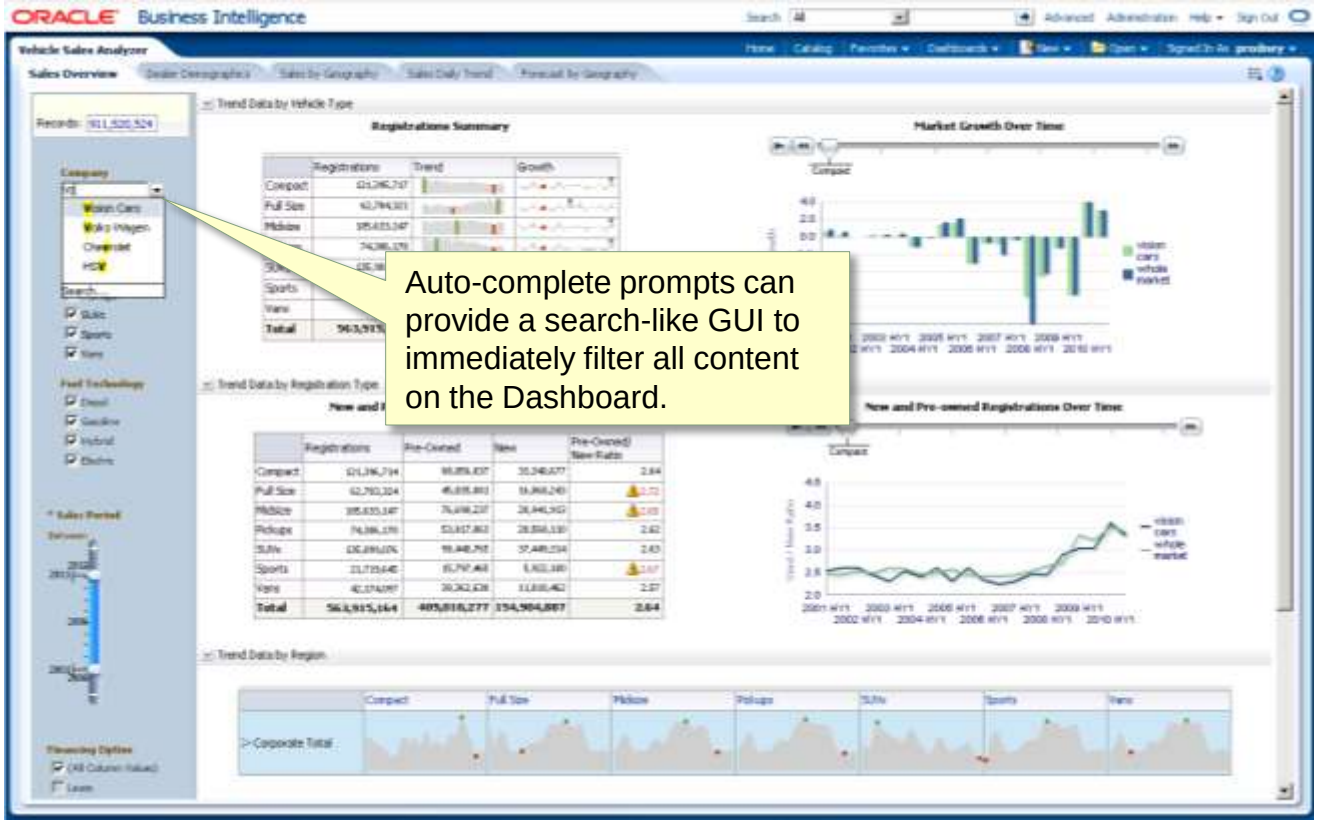
Auto-complete Prompt



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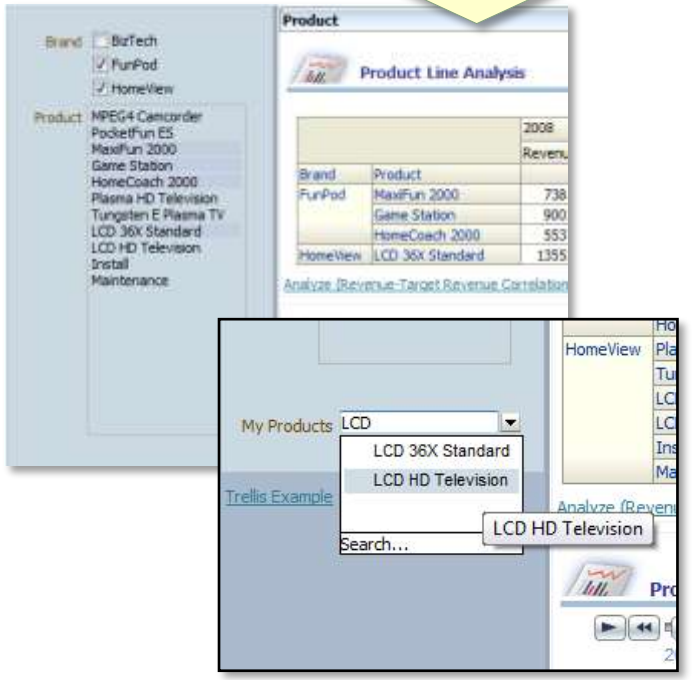
Master Detail Scalability & Partial Page Refresh

- Master Detail Linking Scalability
  - Available for more data points
    - 100's of values instead of 10's
  - InstanceConfig setting to specify data range
- Partial Page Refresh
  - Componentize the Dashboard UI elements
  - Re-load only views that are listening to the prompt
  - Enables:
    - Highly performant updates
    - Intuitive contextual analysis
    - Modern application feel

These features underpin a dynamic user interface that complements Exalytics' large volumes of data.



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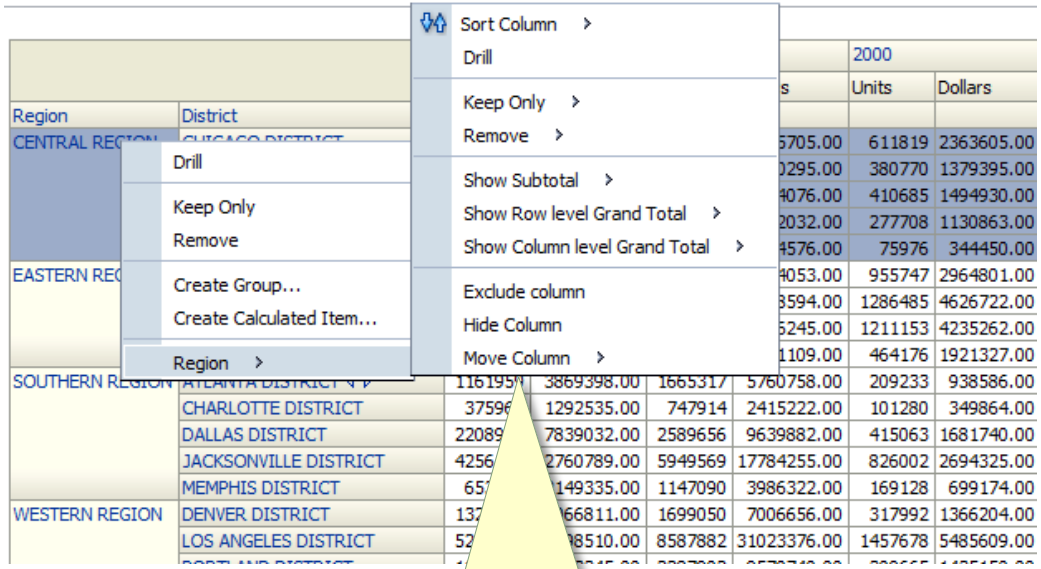
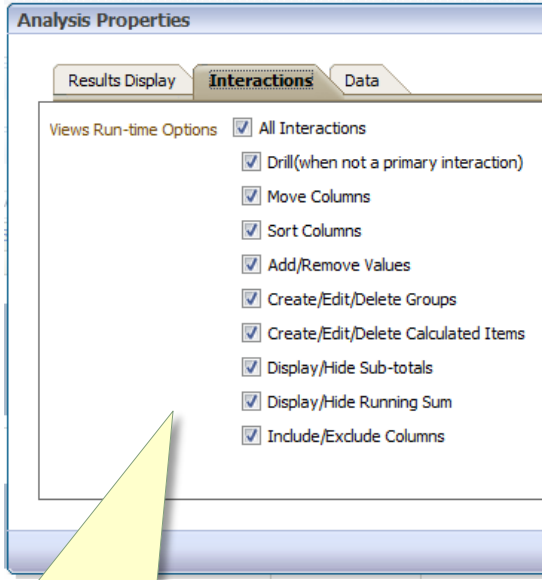
Contextual / Right-Click Interactions

Deliver ad hoc capabilities to the masses





Multitude of options on the right click menu for Selections, Totals, Including/Excluding columns, etc.

Each right click option has the ability to be turned on/off per analysis.

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Immersive Mobile Experience with Exalytics

Fastest Time to Mobile Value. No Additional Development

- Exalytics user experience extended to iPad
- All BI content instantly available to mobile users with zero extra development
- Speed-of-thought analysis available anywhere

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Extreme Results in Early Adopter Program

	Large cloud infrastructure company

“Exalytics demonstrated speed-of-thought interactivity that was so far only possible in desktop solutions – we are ready to move from desktop to Exalytics…

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Enhancing the Intelligent Decision Cycle

Exalytics Provides Value Across the BI & EPM Solution

- **Accelerated Planning & Profitability Analysis**
  - More scenario iterations completed faster
  - Greater levels of analysis detail for better planning
  - Analyze larger and more complex models faster
- **Accelerated BI Applications**
  - Speed of thought LOB analyses
  - More iterations faster driving better LOB decisions
- **Intelligent data placement for optimum decision making**
  - “Smart” Real Time and Historical Data
  - No limits to data availability
  - Highest performing platform across heterogeneous data sources
  - Leverage the power of integrated, engineered systems

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Extreme Results in Early Adopter Program

Nykredit	• Largest mortgage provider in Denmark, major private bond issuer in Europe • Need to deliver outstanding performance for summary and transaction grain analysis • **35X to 70X** faster with Exadata + Exalytics
Polk	• Supplies automotive industry with market intelligence "*PolkInsight*" • Need highly interactive dashboards and visualizations for global analyst community • **> 10X** faster on average and up to **100X** faster in specific cases
Key Energy Services	• Large oilfield services company with about ~860 rigs deployed around the world • Need to drive usage of packaged BI Applications across the organization • **5X** shorter time to develop; **50X** faster than a custom report (without tuning)
SAVVIS	• Large cloud infrastructure services company • Need highly interactive visualizations for large numbers of individual analyst data sets • Consistent **Sub-second** interactivity on par with **desktop tools** down from ~30 secs
A Global CPG Company	• Global consumer pre-packaged foods company • Need more frequent planning and budgeting cycles for 2000+ users • **6X** faster cycle time - **4 hours** down from more than **24 hours**

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Hardware and Software

ORACLE

Engineered to Work Together

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