Designing an Analytics Strategy for the 21st Century

Session ID#: 10452

Prepared by:
Tim and Dan Vlamis

Vlamis Software Solutions
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Vlamis Software Solutions

- Founded 20+ years ago by Dan Vlamis
- Headquartered in Liberty (Kansas City), MO
- Oracle “Gold” Partner and Oracle University Partner
- Focused on Oracle Business Intelligence and Analytics
- Led more than 200 Oracle BI/Analytics implementations
- Specialize in the analytical options to the Oracle DB
  - Oracle Advanced Analytics
    - Oracle Data Mining
    - Oracle R Enterprise
  - Oracle OLAP
  - Oracle Spatial & Graph
  - Oracle In-Memory
Tim Vlamis and Dan Vlamis

- **Tim Vlamis**
  - 25+ years experience in business modeling and valuation, forecasting, and scenario analyses
  - Oracle ACE
  - Instructor for Oracle University’s Data Mining Techniques and Oracle R Enterprise Essentials Courses
  - Professional Certified Marketer (PCM) from AMA
  - Adjunct Professor of Business Benedictine College
  - MBA Kellogg School of Management (Northwestern University)
  - BA Economics Yale University

- **Dan Vlamis**
  - Founded Vlamis Software Solutions in 1993
  - 25+ years in business intelligence, dimensional modeling
  - Oracle ACE Director
  - Developer for IRI (expert in Oracle OLAP and related)
  - BA Computer Science Brown University
# Vlamis Collaborate Sessions

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<td>Dan and Tim Vlamis</td>
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<td>Data Visualization for Oracle Business Intelligence 11g</td>
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# COLLABORATE 15

- Technology and Applications Forum for the Oracle Community
Agenda

- What we will talk about
  - Underlying technologies
  - Underlying platforms and systems
  - How things fit together
  - Your opinions, corrections/additions, and questions

- What we will not have time to talk about
  - Details of how specific applications function
  - Will not have time to discuss all vertical and function specific applications (BI Apps and EPM)

Your comments, questions, opinions, and ideas are more important to this session than our prepared PowerPoint slides!
Good News!

- Analytical tools are readily available, very powerful.
- Significant performance gains are being achieved through advanced analytics.
- Everyone has a basic grounding in analytical thinking.
I. Operational Effectiveness Is Not Strategy

For almost two decades, managers have been learning to play by a new set of rules. Companies must be flexible to respond rapidly to competitive and market changes. They must benchmark continuously to achieve best practice. They must outsource aggressively to gain efficiencies. And they must nurture a few core competencies in the race to stay ahead of rivals.

What Is Strategy?

by Michael E. Porter

The quest for productivity, quality, and speed has spawned a remarkable number of management tools and techniques: total quality management, benchmarking, time-based competition, outsourcing, partnering, reengineering, change management. Although the resulting operational improvements have often been dramatic, many companies have been fragmented by their tactics.
Strategy involves choices
Strategy = Design
Database Landscape is Complex
We have LOTS of data

Every day, we create 2.5 quintillion bytes of data – so much that 90% of the data in the world today has been created in the last two years.

2,500,000,000,000,000,000
Analytics Data Warehouses are large

- Oracle Business Intelligence implementations average:
  - About 3000 users
  - Approximately 5 terabytes of data
Main Uses of BI Reports & Dashboards

Exploration

Explanation

xkcd.com
Three Different Major Perspectives Used for Developing Analytics Strategy

- Data Centric View
- Resource Centric View
- Process Centric View
Data Centric View

- Think of data as you would a building, piece of equipment, key staff member, cash, inventory, etc.
- You have to do something with data at some point in time in order for it to generate returns.
- Most data is perishable.
- Data loses value at different rates.
- Some is important because of its age.
- What data do we have?
- What data do we desire?
- How secure is our data?
- How do we create new data from existing data?
- How do we turn data into knowledge and actionable insights?
Single Source of the Truth vs. Data Discovery

- **Common Enterprise Information Model**
  - Consistent, clean, auditable
  - Drives coherence and coordination in large organizations
  - Reduces internal disagreements about “what are the numbers?”
  - Allows for the development of a greater shared understanding of the organization’s position and performance

- **Data Discovery and BYOD**
  - Allows for faster development of new insights and opportunities
  - Extremely “hot” in the business intelligence and big data fields
  - Allows for new, broader data sources to be included in analyses
  - Promotes a larger number of individual discoveries and insights
  - Allows for user driven data mashups
Process Centric View

- Sees analytics as an integral part of business processes
- Focus on application of analytics to improving functionality of business
- Focuses on data flows and getting information to decision makers (often customer facing positions)
- Often focused on applications for different business functions and responsibilities
- What information do different positions need?
- How fast do they need information?
- What do customers (external and internal) require from different positions and functions?
Business vs. IT

- Analytics savvy business functions don’t want to deal with IT “just give me my data”
- Other business functions rely too much on IT for analytics
- IT may not understand the business issues driving analytic workflows designs
- IT doesn’t feel respected by business
- Business believes that IT is slow and power hungry
Resources Centric View

- Sees data and data as a potential source of competitive advantage
- Highly focused on ROI
- Often seeks to leverage strengths in terms of systems strengths and individual talents
- More grounded in reality than other two perspectives
- Better able to justify investments in new technologies and systems
- What are the sources of our analytic capabilities?
- What’s most important: Probability of positive return? Size of expected return? Minimization of potential loss?
Buy vs. Build

- Why spend money on expensive systems when commodity hardware and open-source software are available?
- Why take on problems that others have solved?
- Why hire expensive talent when we have smart people that we can train?
- Why take on the expense and time to train?
- Speed of results versus cost of build/train.
Best in Suite vs. Best in Class

- Easier process integration
- Consistent data model
- Common user interface
- “One throat to choke”
- Favored by IT

- Richer function set
- Deeper development
- Better industry focus
- Easier to use
- Favored by business
What’s the Right Speed of Analytics Adoption?*

- Be conservative if:
  - Your competitors aren’t doing much with analytics.
  - Technology hasn’t driven industry transformation in the past.
  - You don’t have much data on customers or other business entities.
  - Your firm typically isn’t a first mover.

*Adapted from “big data @ work” by Thomas Davenport.
What’s the Right Speed of Analytics Adoption?*

Be moderately aggressive if:

- You industry is already active with analytics.
- You want to stay ahead of competitors.
- Your firm is good with technology and data.
- You have some internal analytical talent.

*Adapted from “big data @ work” by Thomas Davenport.
What’s the Right Speed of Analytics Adoption?*

Be aggressive if:

- Someone in your industry is already being aggressive.
- You have been an analytical competitor in the past.
- You have used technology to transform your industry in the past.
- You have assembled all the necessary capabilities.

*Adapted from “big data @ work” by Thomas Davenport.
Overview on Oracle

- Oracle Software Fits into 1 of 3 Categories
  - Database
  - Middleware
  - Applications

- Oracle offers many industry/function specific solutions
  - Analytic Applications for business role
  - Analytic Applications for industry
  - Analytic Applications for product (ERP)

- BI “Bundles”

- Oracle “Engineered Systems” strategy
  - Hardware and software are optimized for each other

- Oracle’s “Open Source / Open Standards” strategy
  - Oracle stresses how it embraces “open”
Oracle’s Products Are About Analytics

Results as of 3/2/2015
Your Database Platform Strategy

is

Your Analytics Strategy
Analytical Options to Oracle Database

- Oracle Advanced Analytics (Data Mining & R)
  - Predictive and statistical analytics.
  - Series of highly advanced algorithms and workflows.
  - Extends the “R” language to the Oracle Database

- Oracle Spatial and Graph
  - Provides the capability of relating data to geo positional coordinates, objects, and constructs.
  - Allows the construction and analysis of network topologies.

- Oracle In-Memory
  - Provides lightning fast aggregations

- Oracle OLAP
  - Defines a multi-dimensional data structure that allows information for highly complex calculations to be done quickly.
## Spectrum of Oracle DB BI & Analytics

<table>
<thead>
<tr>
<th>OLAP</th>
<th>Data Mining</th>
<th>Spatial</th>
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<tbody>
<tr>
<td>Summaries and drills by dimensions</td>
<td>Knowledge discovery of hidden patterns</td>
<td>Spatial relationships between data</td>
</tr>
<tr>
<td>“Analysis”</td>
<td>“Insight &amp; Prediction”</td>
<td>“Location”</td>
</tr>
<tr>
<td>What is the average duration of phone calls, by region, by year?</td>
<td>Who is likely to answer the phone at certain times of day and why?</td>
<td>Where were stores with the highest answer rates in the last 3 years?</td>
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Competitive Advantage of BI & Analytics

Optimization
Predictive Modeling
Forecasting/Extrapolation
Statistical Analysis
Alerts
Query/drill down
Ad hoc reports
Standard Reports

What’s the best that can happen?
What will happen next?
What if these trends continue?
Why is this happening?
What actions are needed?
Where exactly is the problem?
How many, how often, where?
What happened?

Degree of Intelligence

Source: Competing on Analytics, by T. Davenport & J. Harris
What is Data Mining?

- Automatically sifts through data to find hidden patterns, discover new insights, and make predictions

Data Mining can provide valuable results:

- Predict customer behavior (*Classification*)
- Predict or estimate a value (*Regression*)
- Segment a population (*Clustering*)
- Identify factors more associated with a business problem (*Attribute Importance*)
- Find profiles of targeted people or items (*Decision Trees*)
- Determine important relationships and “market baskets” within the population (*Associations*)
- Find fraudulent or “rare events” (*Anomaly Detection*)
Oracle Data Miner

- **Easy to Use**
  - Oracle Data Miner GUI for data analysts
  - “Work flow” paradigm

- **Powerful**
  - Multiple algorithms & data transformations
  - Runs 100% in-DB
  - Build, evaluate and apply models

- **Automate and Deploy**
  - Save and share analytical workflows
  - Generate SQL scripts for deployment
What is R?

- Popular alternative to SAS, SPSS & other proprietary statistical environments
- Around 2 million R users worldwide
- Thousands of R packages available
Oracle R Enterprise

- Part of the Advanced Analytics Option to the Oracle Database Enterprise Edition
- Provides transparent access to database-resident data from R
- Embedded R script execution through database managed R engines with SQL language integration
- Provides data and task parallelism and full power of Oracle database for R
- Enables advanced statistics for in-database execution
- Integrates R into the IT software stack
- Extends and enhances open source R
Oracle R Distribution

- Improved scalability at client and database for embedded R execution
- Enhanced linear algebra performance using Intel’s MKL, AMD’s ACML, and Solaris Sun Performance Library
- Enterprise support for customers of Oracle Advanced Analytics option, Big Data Appliance, and Oracle Linux
- Available as a free download from Oracle
- Oracle to contribute bug fixes and enhancements to open source R
Other R Offerings

- **ROracle**
  - Open source Oracle database interface driver for R
  - Based on OCI
  - Maintained by Oracle, optimizations and bug fixes released to open source community

- **Oracle R Advanced Analytics for Hadoop (ORAAH)**
  - R interface to Oracle Hadoop Cluster on Big Data Appliance
  - Access/manipulate data in HDFS, database, and file system
  - Write and execute MapReduce functions using R

- **Rstudio**
  - Popular open source user interface for R
  - Integrated Development Environment
Understanding SQL vs. NoSQL

- Hardened, strident acolytes on both sides.
- Both have good use cases for analytics.
- Different sets of advantages and disadvantages for analytics.
Data Capture and Storage vs. Usage

- Data storage has never been cheaper
- Clean, consistent, well-structured data is easy to use
- Identify your “cornerstone” data
  - Data that is used often
  - Data that is significant impact on many analyses
  - Identify internal sources, storage, and processing
  - Identify external sources, storage, and processing
Five Phases of Value (Big Data Discovery)

- **Find:** Identify relevant data
- **Explore:** Understand data potential
- **Transform:** Intuitive, user-driven data wrangling
- **Discover:** Unleash creativity
- **Share:** Drive collaboration
Predictive Analytics is not Benign

"With great power comes great responsibility."

Uncle Ben to Peter Parker, Spiderman 2002
How Companies Learn Your Secrets
Frameworks for Analysis

- Stakeholder analysis
- Negotiations/shared interests
- Fiduciary responsibility
- Risk management
- Security
- Data governance and Master Data Management
- Distributive Justice, Ethics, and Moral Philosophy
- Legal framework (HIPAA, EU Data Protection Directive, FCRA, etc.)
- Data Mining Frameworks (KDD, CRISP-DM, etc.)
- Complex Adaptive Systems, Systems Dynamics,
- Your favorite framework
Who Is Entitled to Information?
Economic Profit Analysis

**Economic Profit** = NOPAT – (WACC x Capital)

\[
= \left( 1 - \text{tax rate} \right) \times \left( \frac{(Sales-COGS)}{Sales} - \frac{SG\&A}{Sales} \right) - WACC \times \frac{\text{Capital}}{Sales} \times \text{Market Share} \times \text{Market Size}
\]

**Superior Economic Profit**

- Higher Gross Margin
  - COGS Advantage
  - Price Premium due to Benefit Advantage
- Lower SG&A to Sales Ratio
  - Superior efficiencies in marketing or administration
- Lower Capital to Sales Ratio
  - Superior management of working capital
- Higher Market Share
  - Benefit advantage
  - Lower prices due to cost advantage
  - Ability to dominate niches
Analytics Strategies

- Cost Reduction
- Time Reduction
- Sales Increase
  - Market Penetration
  - Market Development
  - Product Development
  - Diversification
4 Different Dimensions of Analytics

**Longevity of Decision**

- Years
- Days

**Latency of Decision**

- Reaction
- Planned/Guided

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<th>Latency of Decision</th>
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<tr>
<td>Exception and Anomaly Detection</td>
<td>Planned/Guided</td>
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<tr>
<td>Prescriptive Analytics and Real Time Decisions</td>
<td>Real Time Decisions</td>
</tr>
<tr>
<td>Scenario Analysis and Statistical Modeling</td>
<td>Predictive Analytics and Workflow Optimization</td>
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McKinsey’s Take on Analytics Talent

“There will be a shortage of talent necessary for organizations to take advantage of big data. By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions.”

McKinsey Global Institute 2014
Assessing Returns on Analytics Projects

- Think Likelihoods and Distributions
- Don’t think “single point” estimates

- Broad strategies and investments require broad measures
- Design metrics for specific initiatives

- Match the time scale of the investment with the longevity of the technology
- Compare the scale of the investment with the risk scale of not investing
BIWA Summit 2016, Jan 26-28
Oracle HQ Conference Center

Business Intelligence, Warehousing and Analytics
and Spatial
IOUG Special Interest Group
www.biwasummit.org
Drawing for Free Book

- Add business card to basket or fill out card

Data Visualization for
Oracle Business Intelligence 11g

Create Highly Visual Presentations of BI Data

Dan Vlamis
Oracle ACE Director

Tim Vlamis

ORACLE

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Please complete the session evaluation
We appreciate your feedback and insight!

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