Case Study of Improving BI Apps and OBIEE Performance

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Prepared by:
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@VlamisSoftware
Manufacturer of fiber optic and transmission products to Telco, Broadband, and Electric Utility industries.

Oracle Gold Partner and expert consultants in Oracle Business Intelligence, analytics, and data warehousing.

Producers of APE Diagnostics, a tool for BI performance diagnostics.
Vlamis Software Solutions

- Vlamis Software founded in 1992 in Kansas City, Missouri
- Developed more than 200 Oracle BI and Analytics systems
- Specializes in ORACLE-based:
  - Business Intelligence & Analytics
  - Data Mining and Predictive Analytics
  - Data Visualization
  - Data Warehousing
- Expert presenter at major Oracle conferences
- www.vlamis.com (blog, papers, newsletters, services)
- Co-authors of book “Data Visualization for OBI 11g”
- Co-author of book “Oracle Essbase & Oracle OLAP”
- Oracle University Partner
- Oracle Gold Partner
Mike Caskey

- Mike (IT Architect and hands-on expert)
- 20+ years in data warehousing, software engineer and OLAP
- 10+ years of this time in Healthcare BI as co-founder and lead architect of a software company, developing 6 product solutions
- Expert in multiple Enterprise Data Warehouse design and implementations across industries
Jeff McBride

• 20 plus years experience in the areas of Information Technology, Project Management, Finance, and Business Operations.

• Currently the Manager of Business Intelligence at AFL
  – Joined AFL in 2012
  – Focused on Delivering End Users with Highly Interactive visual content to meet their reporting and analysis needs

• Holds an MBA from Emory University and BS in Computer Science from The Citadel.
AFL Background

- Global provider of innovative and scalable fiber optic solutions, engineering expertise and integrated services to service provider, utility and enterprise markets
- Financially sound: $1 billion in revenue
- 4,000+ associates worldwide
- Products in use in 120+ countries
- Operations in US, Canada, Mexico, Europe, Australia
- AFL is a wholly owned subsidiary of Fujikura headquartered in Tokyo, Japan
AFL Business Intelligence Environment

• Tools
  – Oracle Enterprise Business Suite
  – OBIEE 11.1.1.9.5x
  – BI Apps 7.9.6.4
    • Sales Order Management and Inventory
    • Financials
    • Procurement and Spend

• Utilization
  – 120+ Users (Up from 10 in 2012)
  – 25k Queries per month (Up from 5k per month in 2012)
  – 36 Custom Built Dashboards
  – 30 AFL Customized Subject areas

• Support Team
  – 3 RPD and Informatica Developers
  – 3 Business Analyst/Dashboard developers
Background

- **Hardware – DB & Application Server**
  - 2 Quad cores – 16 cores @3.3GHz
  - 96 Gig of Ram
- **Software**
  - Database – Oracle 11.2.0.4.0
  - Troype APE Diagnostics

<table>
<thead>
<tr>
<th>Configuration</th>
<th>SMALL</th>
<th>MEDIUM</th>
<th>LARGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Volume</td>
<td>Up to 200 Gb</td>
<td>200 Gb to 1 Tb</td>
<td>1 Tb and higher</td>
</tr>
<tr>
<td># CPU cores</td>
<td>16</td>
<td>32</td>
<td>64*</td>
</tr>
<tr>
<td>Physical RAM</td>
<td>32-64 Gb</td>
<td>64-128 Gb</td>
<td>256+ Gb*</td>
</tr>
<tr>
<td>Storage Space</td>
<td>Up to 400 Gb</td>
<td>400 Gb – 2 Tb</td>
<td>2 T b and higher</td>
</tr>
<tr>
<td>Storage System</td>
<td>Local (PATA, SATA, iSCSI), or NAS, preferred RAID configuration</td>
<td>High performance SCSI or SAN with 16 Gbps HBA or higher, connected over fiber channel / 2xGb Ethernet NIC</td>
<td>High performance SCSI or SAN with 24 Gbps HBA or higher, connected over fiber channel / 2xGb Ethernet NIC</td>
</tr>
</tbody>
</table>

### Oracle BI Enterprise Edition / ETL Tier

<table>
<thead>
<tr>
<th># CPU cores</th>
<th>8</th>
<th>16</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical RAM</td>
<td>8 Gb</td>
<td>16 Gb</td>
<td>32 Gb</td>
</tr>
<tr>
<td>Storage Space</td>
<td>100 Gb local</td>
<td>200 Gb local</td>
<td>400 Gb local</td>
</tr>
</tbody>
</table>
Problem Statement

Problem

• User experience suffering because of degrading performance
• Several analyses running in excess of one minute
• ETL processes struggling to fit into a tight overnight window

Goal

• Systematic improvement of the environment
• User experience top priority
Approach

Work Top Down
- Catalog
- RPD
- Database
- Infrastructure
Process

• Have users show us their problem children
• Look at the analyses under the hood
• Analyze -
  ▪ Logical and physical SQL being generated
  ▪ RPD
  ▪ Warehouse schema objects
  ▪ Database and middle tier configuration
  ▪ Hardware
• Establish good baselines
Baselines

- Set a good before baselines!
What did we find?

Database parameter – MK_OBI_GO_FAST was set to NO
Infrastructure & Configuration

- No evidence that they were wildly under resourced
- Parameters and configuration conform to guides for most part
ETL

- Bottlenecks
  - Indexes
  - Lookups
  - Concurrency
  - I/O

- Time spent on unused indexes and aggregates
Physical Analysis

- Review of indexes, row counts and distinct keys
- Troype APE Diagnostics Software used
RPD

- Excessive warnings in RPD
  - 350+ warning right out of the box

- A nice to have!
RPD

- Dimensions
- Facts
- Aggregate navigation
- Proper aggregate tables
Catalog

Unnecessary Complex Predicates
More Unnecessary Complex Predicates

<table>
<thead>
<tr>
<th>Column Formula</th>
<th>Bins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folder Heading</td>
<td>Product Class</td>
</tr>
<tr>
<td>Column Heading</td>
<td>Product Class 2</td>
</tr>
<tr>
<td>Aggregation Rule</td>
<td>(Totals Row)</td>
</tr>
</tbody>
</table>

Available Subject Areas:
- AP - Accounts Payable
- AR - Accounts Receivable
- AS - Accounts Payable - Receivable
- CM - Customer Master
- CP - Credit Policy
- CP - Credit Policies
- CP - Credit Policy Change
- CP - Credit Policy Change History
- CP - Credit Policy Change History
- CP - Credit Policy Change History
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WITH SAWITH0 AS (select sum(T91940.UNIT_STD_COST * T91940.IN_TRANSIT_QTY * T91940.GLOBAL1_EXCHANGE_RATE) as c3,
    sum(case
        when concat(concat(T95031.BUSN_LOC_NUM,
            '-'),
            substr(T94704.PARENT_LOC_NUM,
            5)) in ('BRN-MRB',
            'BRN-RAWSTORES',
            'BRN-SHOPFLOOR',
            'BRN-UPS2',
            'DOR-MRB',
            'DOR-OFFSITE',
            'DOR-QA HOLD',
            'DOR-RAWSTORES',
            'DOR-SHOPFLOOR',
            'DOR-WAREHOUSE',
            'LAB-FETL',
            'LAB-FOV',
            'LAB-MRB',
            'LAB-OSP',
            'LAB-RAWSTORES',
            'LAB-XDK',
            'LDC-OFFSITE',
            'MTY-CABLE',...
What did we do?

• Properly configured dimension levels in RPD
  – Time Hierarchies
• Turned complex case statements into a dimension
• Built an aggregate table
• Reworked the indexing strategy
• Exposed proper fields for aggregate navigation
• Laid out plan for continuous improvement
Catalog

Improved Predicates

Inventory Balance Reporting Last 2 Full Months

Criteria: Subject Areas

Selected Columns:
Double click on column names in the Subject Areas pane to add them to the analysis. Once added, drag-and-drop columns to reorder properties, formula and filters, apply sorting, or delete by clicking or hovering over the button next to its name.

Selected Columns:
Balance Details
Product Class
Date Details

Filters:
Add filters to the analysis criteria by clicking on the Filter option for the specific column in the Selected Columns pane, or by clicking on the filter button in the Filter pane header. Add a saved filter by clicking on add button after selecting its name in the catalog pane.

BJ is equal to / is in OCA
AND Org is not equal to / is not in DOR
AND ("Date Details", Inv Cal Julian Month < VALUEOF(CURRENT JULIAN_MONTH)) AND ("Date Details", Inv Cal Julian Month > VALUEOF(CURRENT JULIAN_MONTH) - 2)
AND Product Class 2 is not equal to / is not in Cable; MicroCore; R&D
## Results

<table>
<thead>
<tr>
<th>SAW_SRC_PATH</th>
<th>Baseline</th>
<th>Spot Check</th>
<th>Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premise Excess Inventory</td>
<td>4.1</td>
<td>2.8</td>
<td>1.4</td>
<td>34%</td>
</tr>
<tr>
<td>Inventory Balance Prev to Current Top N Part changes FG</td>
<td>6.8</td>
<td>1.9</td>
<td>4.9</td>
<td>72%</td>
</tr>
<tr>
<td>Inventory Balance Reporting Last Full Month_Agg</td>
<td>30.4</td>
<td>0.5</td>
<td>29.9</td>
<td>98%</td>
</tr>
<tr>
<td>USAC Inventory Values_Agg</td>
<td>26.9</td>
<td>-</td>
<td>26.9</td>
<td>100%</td>
</tr>
<tr>
<td>ACS On Hand Inventory_Agg</td>
<td>14.9</td>
<td>5.0</td>
<td>9.9</td>
<td>66%</td>
</tr>
<tr>
<td>ACS WOP Value</td>
<td>0.9</td>
<td>1.0</td>
<td>(0.1)</td>
<td>-6%</td>
</tr>
<tr>
<td>FGI Inventory_Agg</td>
<td>0.8</td>
<td>3.5</td>
<td>(2.7)</td>
<td>-338%</td>
</tr>
<tr>
<td>GL Scrap Cable Graph YEARS_NeedsRewrite</td>
<td>249.4</td>
<td>6.0</td>
<td>243.4</td>
<td>98%</td>
</tr>
<tr>
<td>SCRAP_NeedsRewrite</td>
<td>134.5</td>
<td>109.0</td>
<td>25.5</td>
<td>19%</td>
</tr>
<tr>
<td>SCRAP years_NeedsRewrite</td>
<td>93.7</td>
<td>87.0</td>
<td>6.7</td>
<td>7%</td>
</tr>
<tr>
<td>OCA Expense Details - GL Balance Sheet_Agg</td>
<td>55.8</td>
<td>14.4</td>
<td>41.4</td>
<td>74%</td>
</tr>
<tr>
<td>P &amp; L Report Trend ACS 4_Agg</td>
<td>25.4</td>
<td>1.1</td>
<td>24.2</td>
<td>95%</td>
</tr>
</tbody>
</table>
Conclusions

• Don’t try to eat the whole elephant at once

• Look for the simple solutions first

• Move the heavy lifting away from the catalog

• Prioritize

• Start at the top

• It’s probably you
Sources for performance tuning

OBIEE 11g Infrastructure Performance Tuning Guide
(Doc ID 1333049.1)

Oracle Business Intelligence Applications Version 7.9.6.x Performance Recommendations
(Doc ID 870314.1)

Oracle Business Intelligence Applications Version 11g Performance Recommendations
(Doc ID 1963225.1)

Database Performance Tuning Guide

Database Data Warehousing Guide

http://www.odtug.com/bi
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