Case Study of Improving BI Apps and OBIEE Performance

Session ID: 10847

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

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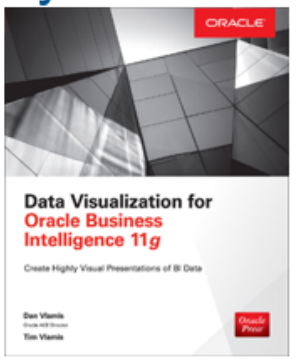
TECHNOLOGY AND APPLICATIONS FORUM FOR THE ORACLE COMMUNITY

- 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



ORACLE EDUCATION RESELLER

ORACLE Gold Partner
Specialized
Oracle Business Intelligence
Foundation Suite 11g

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

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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 headquarted 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

Configuration	SMALL	MEDIUM	LARGE
Target Tier			
Target Volume	Up to 200 Gb	200 Gb to 1 Tb	1 Tb and higher
# CPU cores	16	32	64*
Physical RAM	32-64 Gb	64-128 Gb	256+ Gb*
Storage Space	Up to 400 Gb	400 Gb – 2 Tb	2T b and higher
Storage System	Local (PATA, SATA, iSCSI), or NAS, preferred RAID configuration	High performance SCSI or SAN with 16 Gbps HBA or higher, connected over fiber channel / 2xGb Ethernet NIC	High performance SCSI or SAN with 24 Gbps HBA or higher, connected over fiber channel / 2xGb Ethernet NIC
Oracle BI Enterprise Edition / ETL Tier			
# CPU cores	8	16	32
Physical RAM	8 Gb	16 Gb	32 Gb
Storage Space	100 Gb local	200 Gb local	400 Gb local

Problem Statement

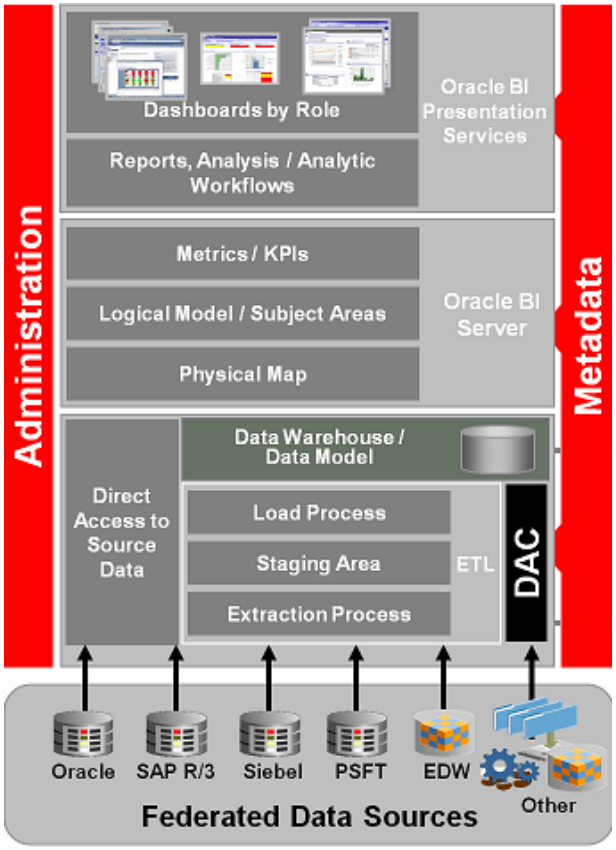
Problem

- 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 to Bottom

Work Top Down

- Catalog
- RPD
- Database
- Infrastructure

Probability of Issues

Process

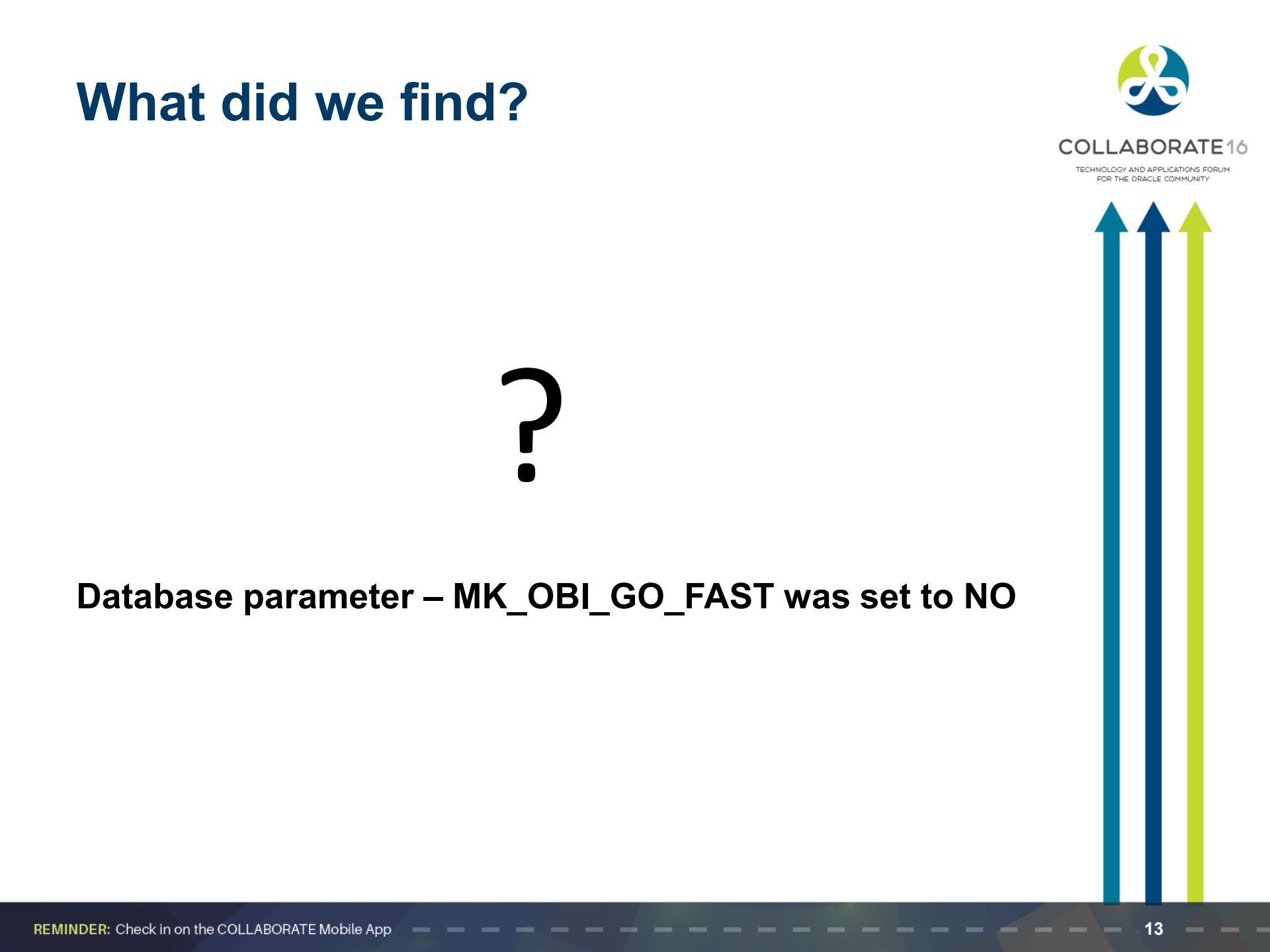
- Have users show us their problem children
- Look at the analyses under the hood
- Analyze -
  - Logical and physical SQL being generated
  - RPD
  - Warehouse schema objects
  - Database and middle tier configuration
  - Hardware
- Establish good baselines

Baselines

- Set a good before baselines!

1 Average	Premise Excess Inventory	4.1
2 Average	Inventory Balance Prev to Current Top N Part changes FG	6.8
3 Average	Inventory Balance Reporting Last Full Month_Agg	30.4
4 Average	USAC Inventory Values_Agg	26.9
5 Average	ACS On Hand Inventory_Agg	14.9
6 Average	ACS WOP Value	0.9
7 Average	FGI Inventory_Agg	0.8
8 Average	GL Scrap Cable Graph YEARS_NeedsRewrite	249.4
9 Average	SCRAP_NeedsRewrite	134.5
10 Average	SCRAP years_NeedsRewrite	93.7
11 Average	OCA Expense Details - GL Balance Sheet_Agg	55.8
13 Average	P & L Report Trend ACS 4_Agg	25.4

What did we find?

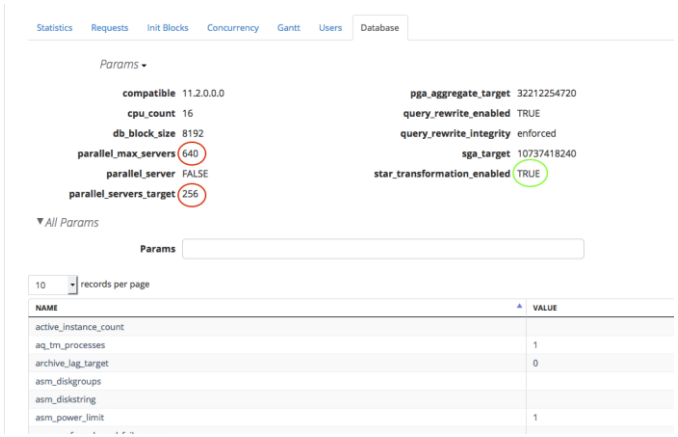


?

Database parameter – MK_OBI_GO_FAST was set to NO

Infrastructure & Configuration

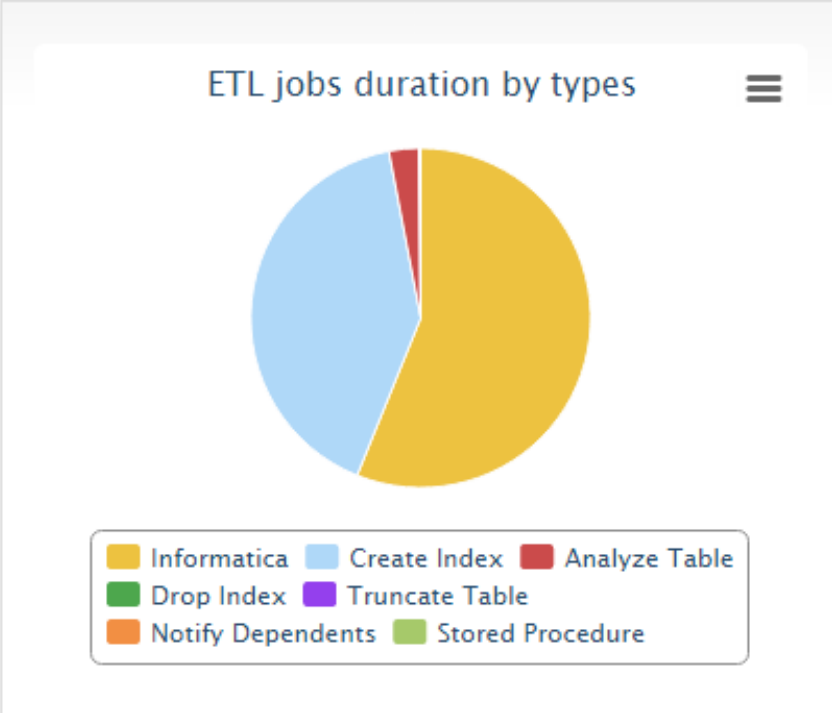
- No evidence that they were wildly under resourced
- Parameters and configuration conform to guides for most part




```
Initializing WebLogic Scripting Tool (WLST) ...

Welcome to WebLogic Server Administration Scripting Shell

Type help() for help on available commands


--- Reading properties file tuningGuide.properties ---
    tcp_fin_timeout=/proc/sys/net/ipv4/tcp_fin_timeout
    WLPassword=******
    limitsconf=/etc/security/limits.conf
    WLstUrl=t3://localhost:8001
    httpdconf=/oracle/user_projects/epmsystem1/httpConfig/ohs/config/OHS/ohs_component/httpd.conf
    tcp_max_syn_backlog=/proc/sys/net/ipv4/tcp_max_syn_backlog
    essbase_application_log=/oracle/biee/instances/instance1/diagnostics/logs/Essbase/essbaseserver1/essbase/app/BISAMPLE/BISAMPLE.log
    mod_wl_ohsconf=/oracle/user_projects/epmsystem1/httpConfig/ohs/config/OHS/ohs_component/mod_wl_ohs.conf
    WLUsername=weblogic
    solarissystem=/etc/system
    essbase_cfg=/oracle/biee/instances/instance1/Essbase/essbaseserver1/bin/essbase.cfg
    sslconf=/oracle/user_projects/epmsystem1/httpConfig/ohs/config/OHS/ohs_component/ssl.conf

--- OS where wlst is running ---
os.name : Linux
os.arch : amd64
os.version : 2.6.32-300.21.1.el5uek
```

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

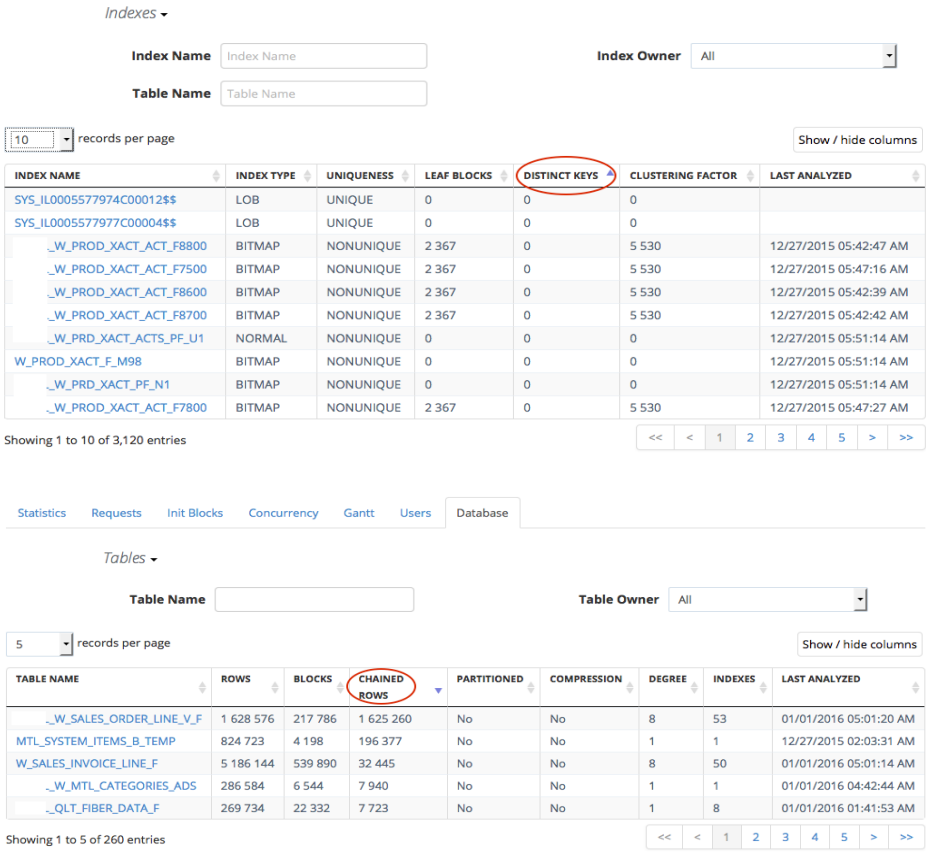
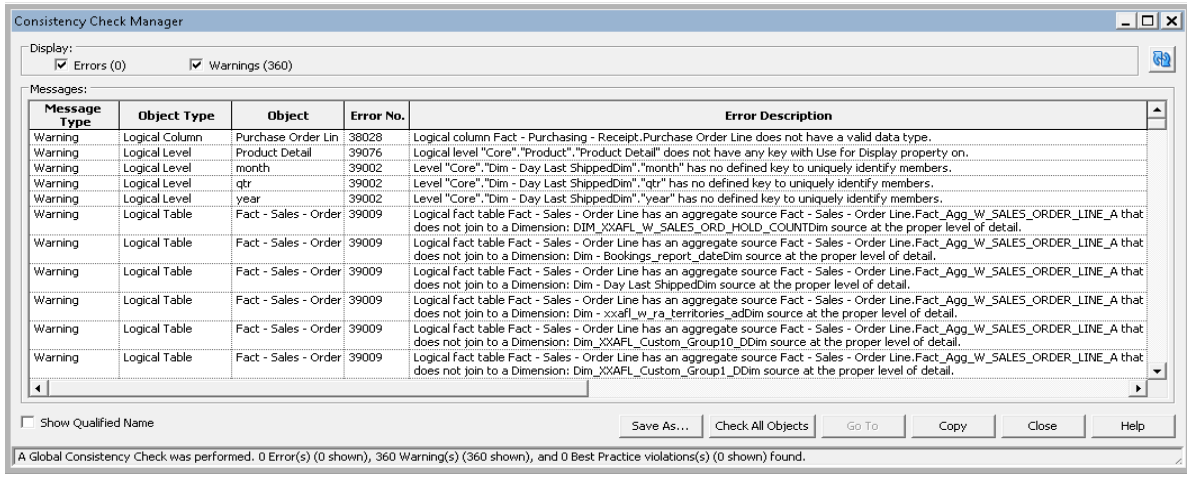


TABLE NAME	ROWS
W_PRODUCT_XACT_PF	99 311 748
W_INVENTORY_DAILY_BAL_F	47 888 706
XXAFL_W_PRODUCT_XACT_ACCTS_PF	32 533 388
W_GL_OTHER_F	17 854 452
XXAFL_W_WIP_TRANSACTIONS_F	17 218 831
W_GL_OTHER_F_07092015	16 062 634
TMP_W_PRODUCT_XACT	15 817 233
W_GL_LINKAGE_INFORMATION_G	14 248 823
XXAFL_QLT_FIN_ASS_TESTS_F	13 181 120
XXAFL_W_WIP_PERIOD_BALANCES_F	11 763 447
XXAFL_W_WIP_ENTITIES_D	11 171 120
W_GL_BALANCE_F	9 858 492
W_GL_BALANCE_A	9 186 076

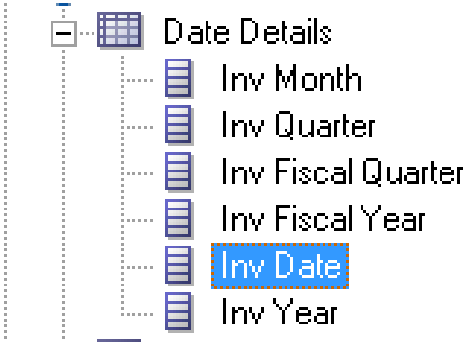
RPD

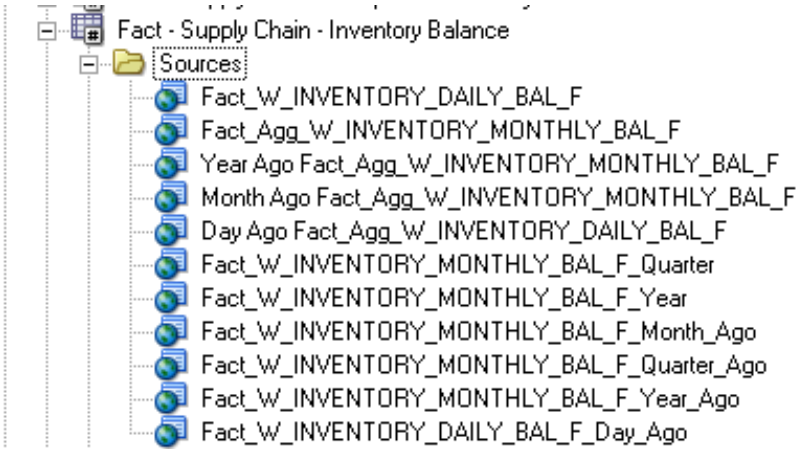
- Excessive warnings in RPD
  - 350+ warning right out of the box
- A nice to have!

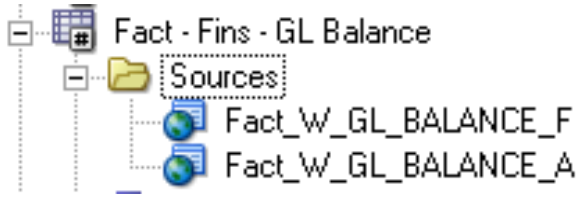


RPD

- Dimensions
- Facts
- Aggregate navigation
- Proper aggregate tables

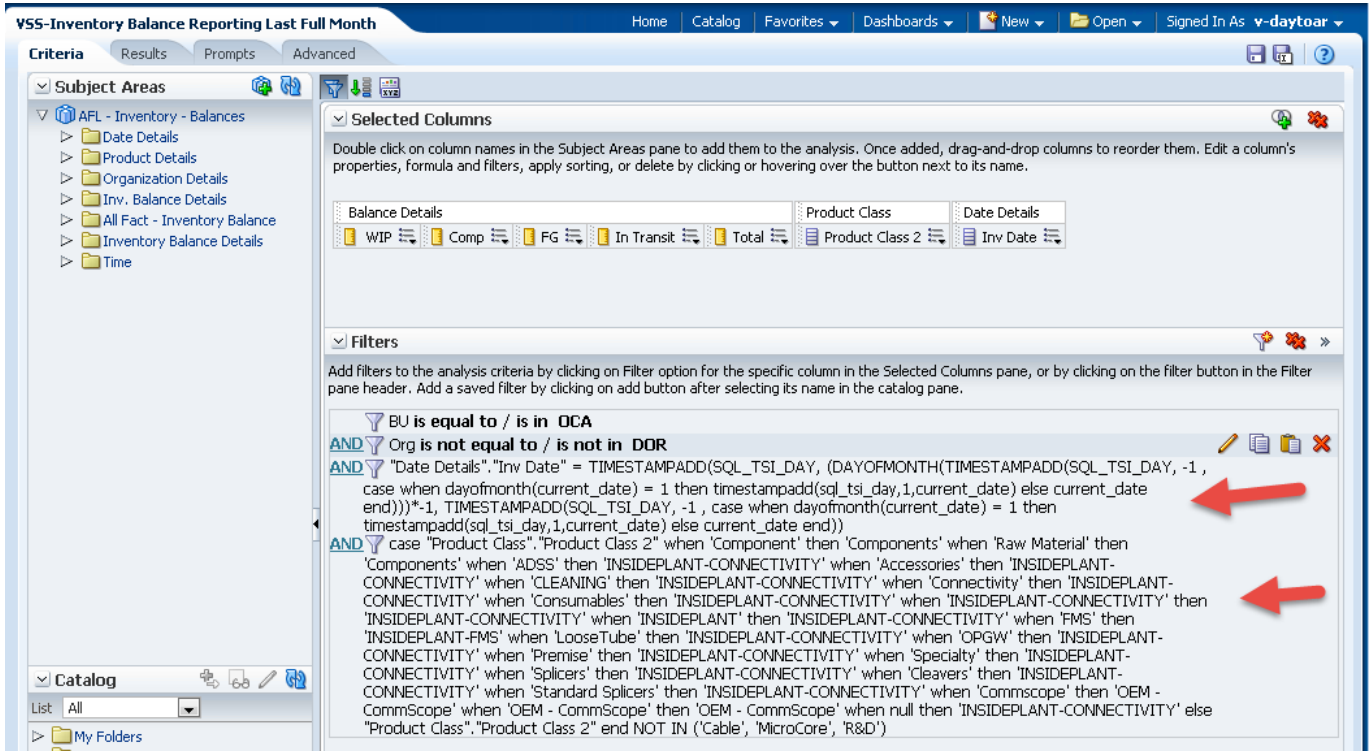






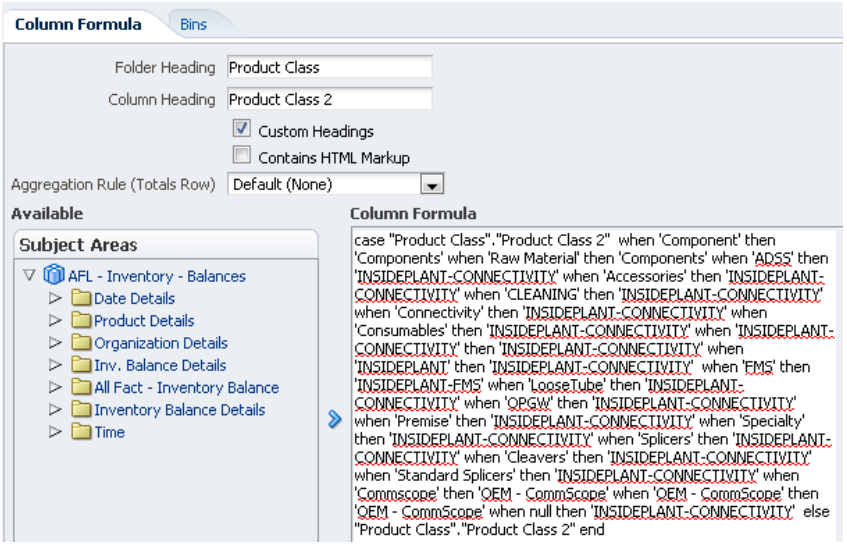
Catalog

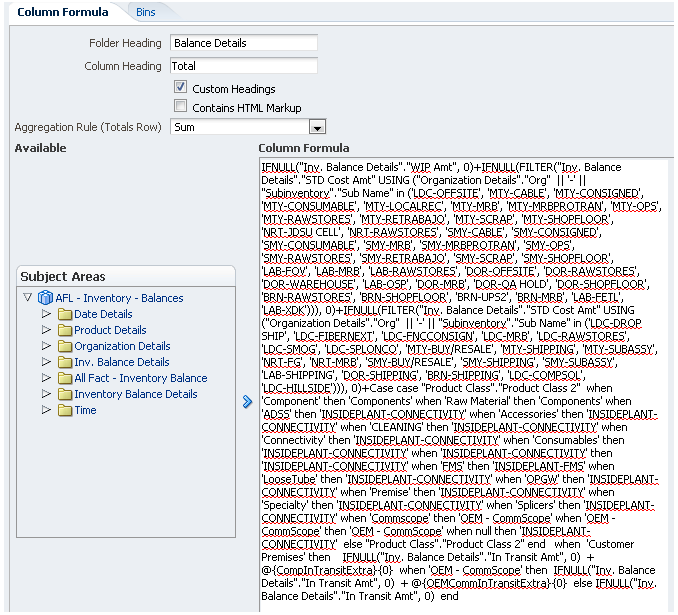
Unnecessary Complex Predicates



Catalog

More Unnecessary Complex Predicates





Result of complex predicates

```
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',
          'MTX CABLE'
```

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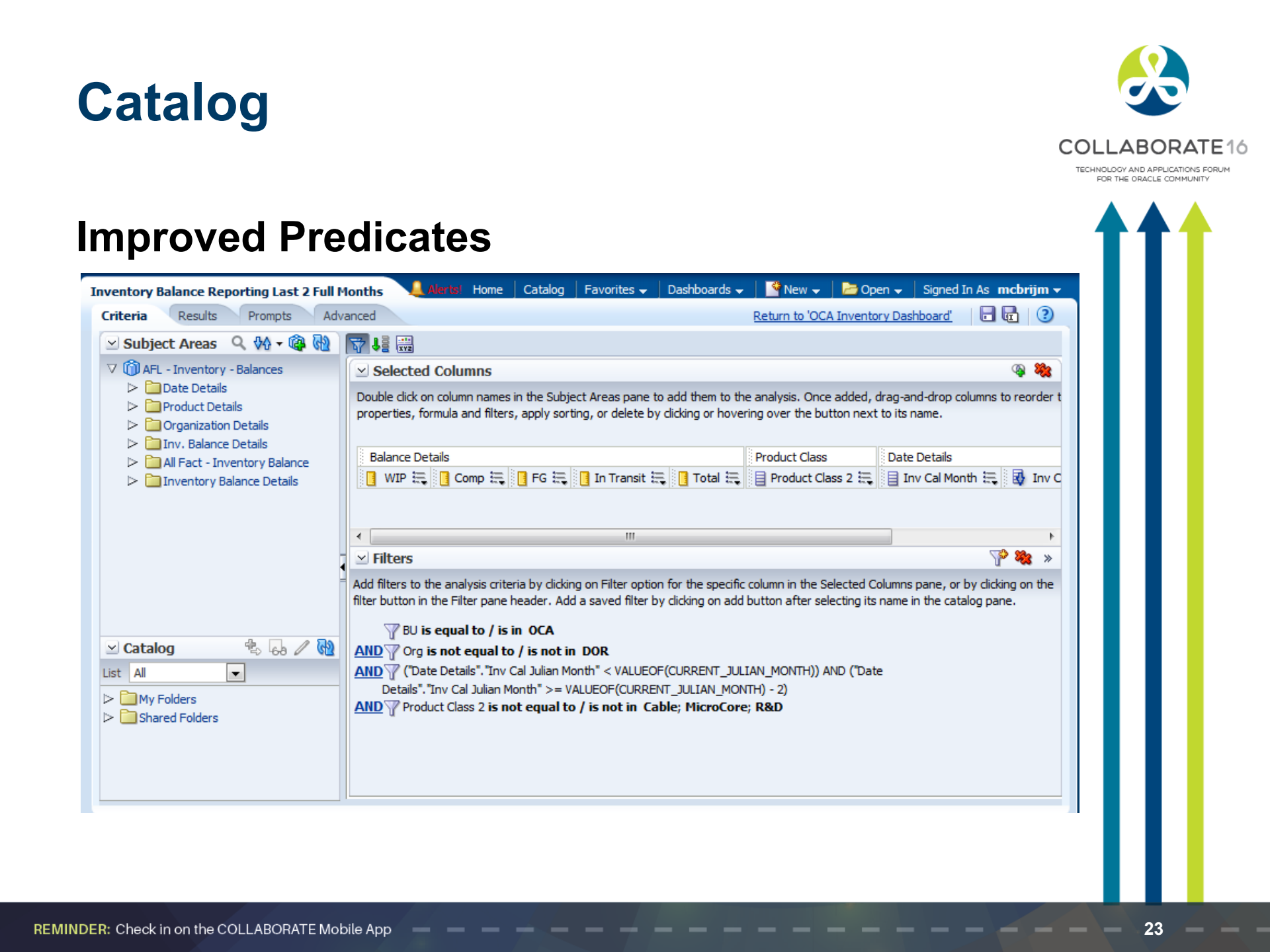
What did we do?

- 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

Results

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

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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