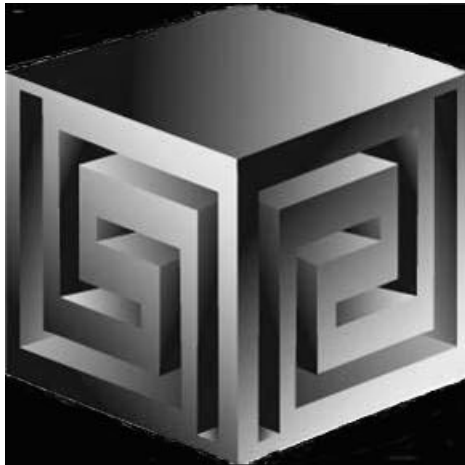


Using Warehouse Builder for Business Intelligence

Collaborate '07

Session #226



Chris Claterbos

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Vlamis Software Solutions, Inc.

<http://www.vlamis.com>

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Vlamis Software Solutions, Inc.

- **Founded in 1992 in Kansas City, Missouri**
- **Oracle Partner and reseller since 1995**
- **Specializes in ORACLE-based:**
 - ☐ **Data Warehousing**
 - ☐ **Business Intelligence**
 - ☐ **Data Transformation (ETL)**
 - ☐ **Web development and portals**
 - ☐ **Express-based applications**
- **Delivers**
 - ☐ **Design and integrate BI and DW solutions**
 - ☐ **Training and mentoring**
- **Expert presenter at major Oracle conferences**



Who Am I?

- **Chris Claterbos, Development Manager**
 - ❑ DBA and applications developer for Oracle products, since 1981.
 - ❑ Beta tester and early adopter of - including Oracle 8i, 9i, 10g and 11g, JDeveloper and BIBeans, Oracle AS, Portal , and Reports.
 - ❑ Speaker and author.
 - ❑ Previous IOUG Focus Area Manager for Data Warehousing and BI
 - ❑ Consulting and Development Manager for Vlamis Software Solutions, Inc.



Using OWB to Create OLAP Databases

- Introduction
- Oracle 10g and OLAP
- What is OWB?
- What is New in Paris?
- Oracle 10g Integration
- Design objects
- The Process
- Demonstration
- Managing an OLAP project
- Getting Started
- Questions



**2006 and 2007 have been
important years for Business
Intelligence!**

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Technology Center**

updated August 24, 2005

Only Oracle delivers a complete, pre-integrated technology foundation to reduce the cost and complexity of building and deploying enterprise business intelligence.

What's New

Take a BI Deep Dive at Oracle OpenWorld X-Treme (Sept. 17-18)

This exclusive two-day program, open to OpenWorld attendees and non-attendees alike, consists of highly technical, deep-dive content not typically available in the regular OpenWorld agenda. Click here to see the "Business Intelligence & Data Warehousing" track description.

Read the New Oracle Business Intelligence Blog

Read Abhinav Agarwal's musings about Oracle Discoverer, OLAP, and other Oracle BI products, technologies, and tools.

Explore New Oracle Data Mining Sample Code

Download new sample PL/SQL and Java applications that illustrate each of the algorithms supported by Oracle Data Mining.

Oracle Database 10g Release 2: Top New Data Warehousing Features

Oracle ACE Arup Nanda presents his analyses of top Release 2 features for data warehousing, including query rewrite with multiple MVs, LONG to LOB conversion online, and more.

Using Oracle Business Intelligence Discoverer with the OLAP Option

Learn the advantages of adding the Oracle Database Enterprise Edition OLAP Option to your Oracle BI Discoverer reporting and analysis, and the steps required to make OLAP

Learn More

- [Oracle Business Intelligence Technical Overview \(PDF\)](#)
- [Oracle Business Intelligence Demo](#)
- [Oracle by Example: Online BI Tutorials](#)
- [Data Warehousing & BI Discussion Forums](#)

Downloads

- [Oracle Business Intelligence 10g](#)
- [Analytic Workspace Manager](#)
- [Oracle Warehouse Builder](#)
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Customers need a Unified View

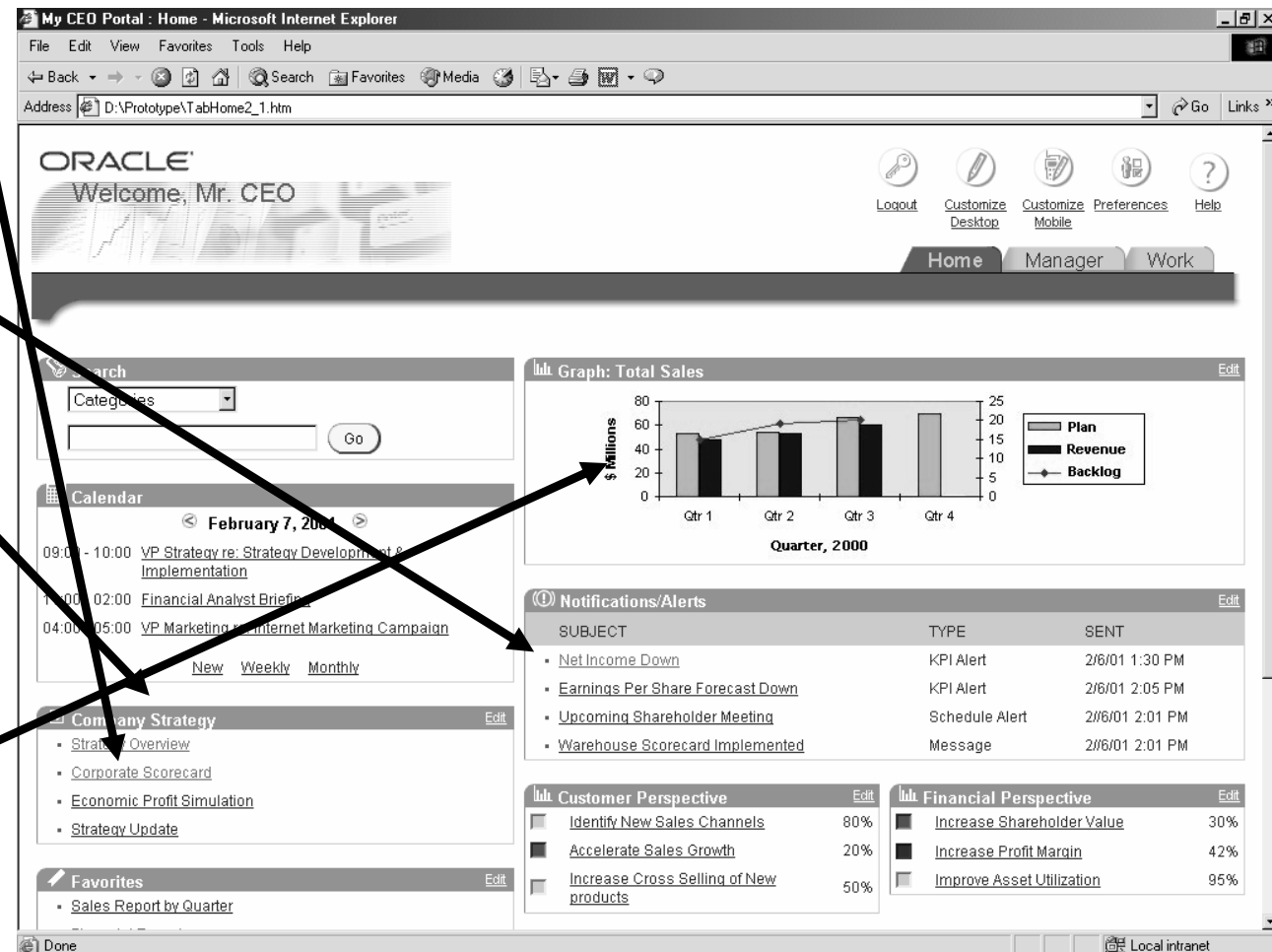


Planning

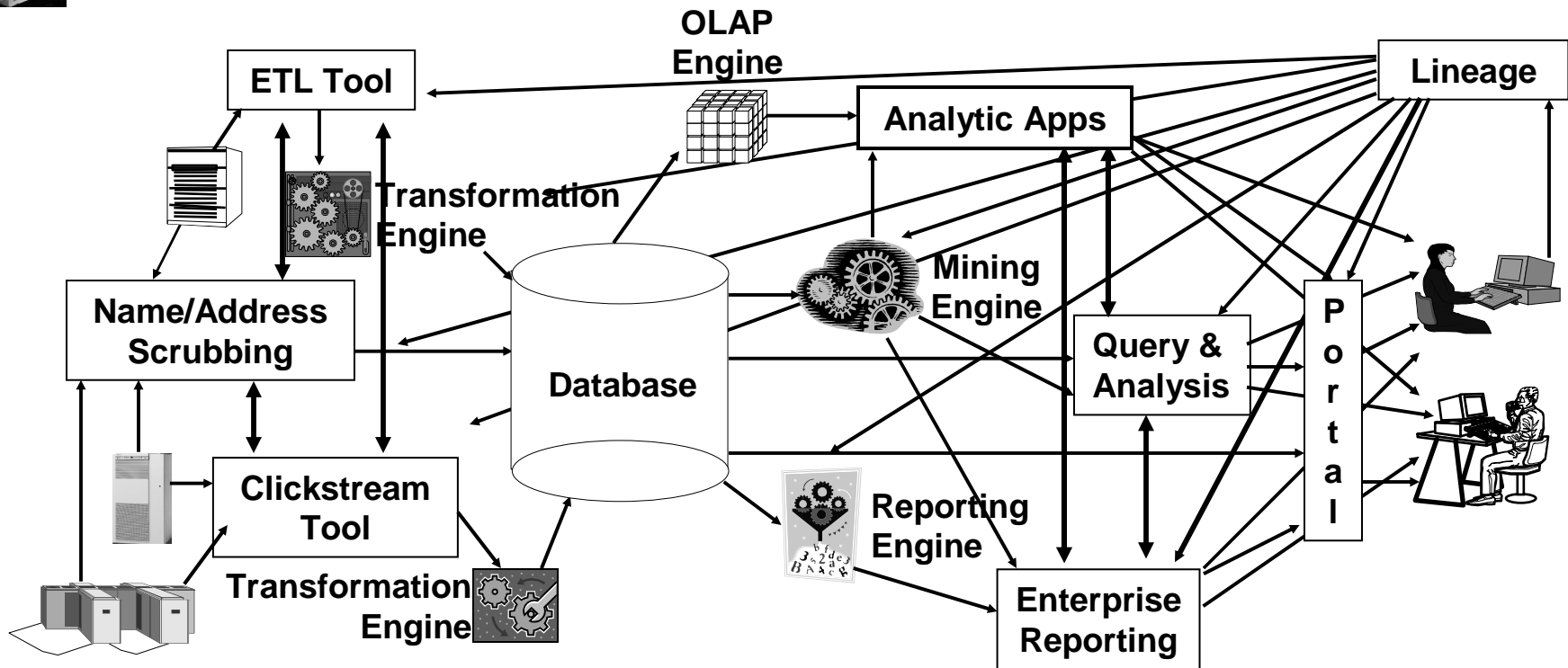
Monitoring

Analysis

Reporting

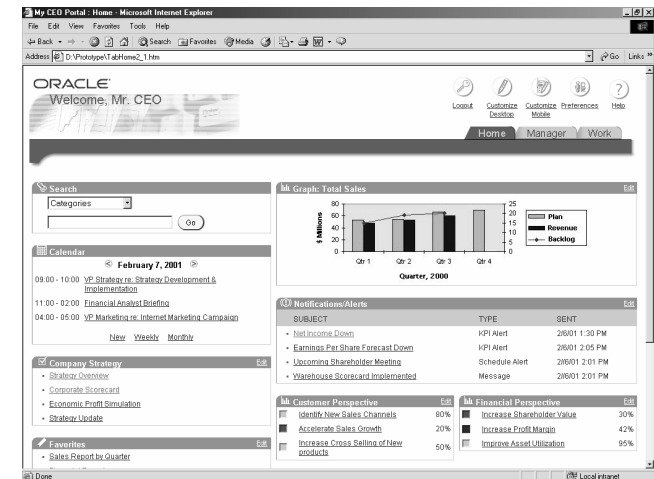
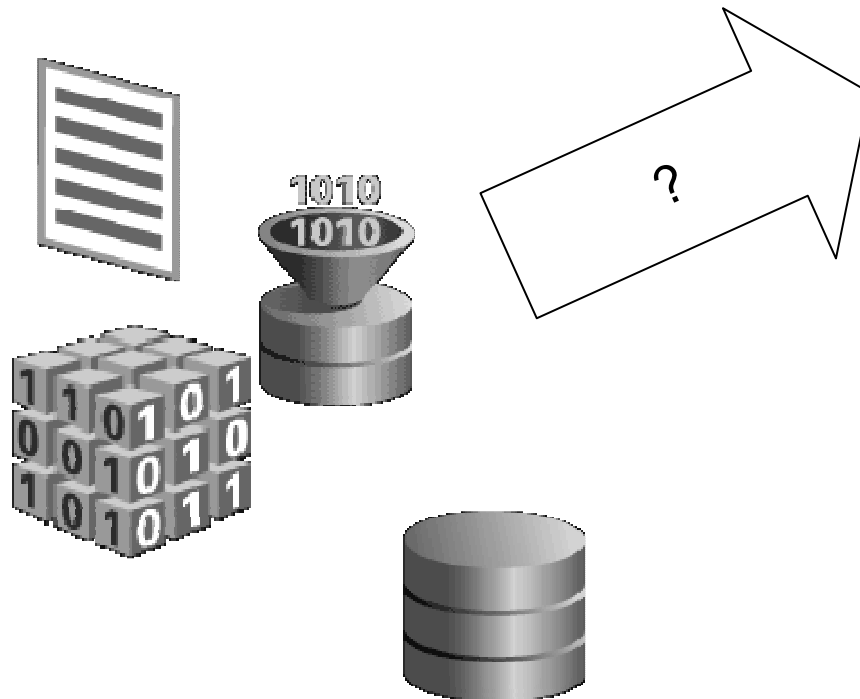


Business Intelligence Market Multi-Vendor, Un-integrated

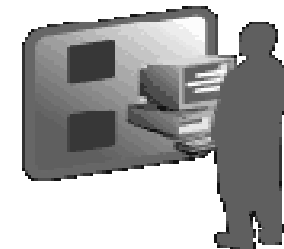
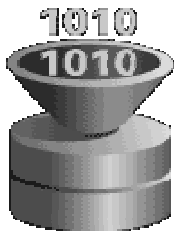
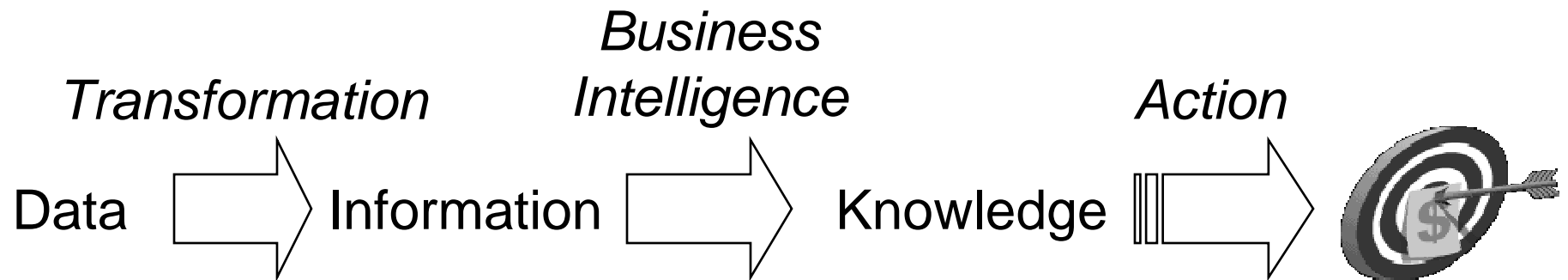


- Protracted and complex implementation
- Escalating maintenance costs
- Software ***and Metadata*** Integration is key!

How do I get from Raw Data to a Unified View?

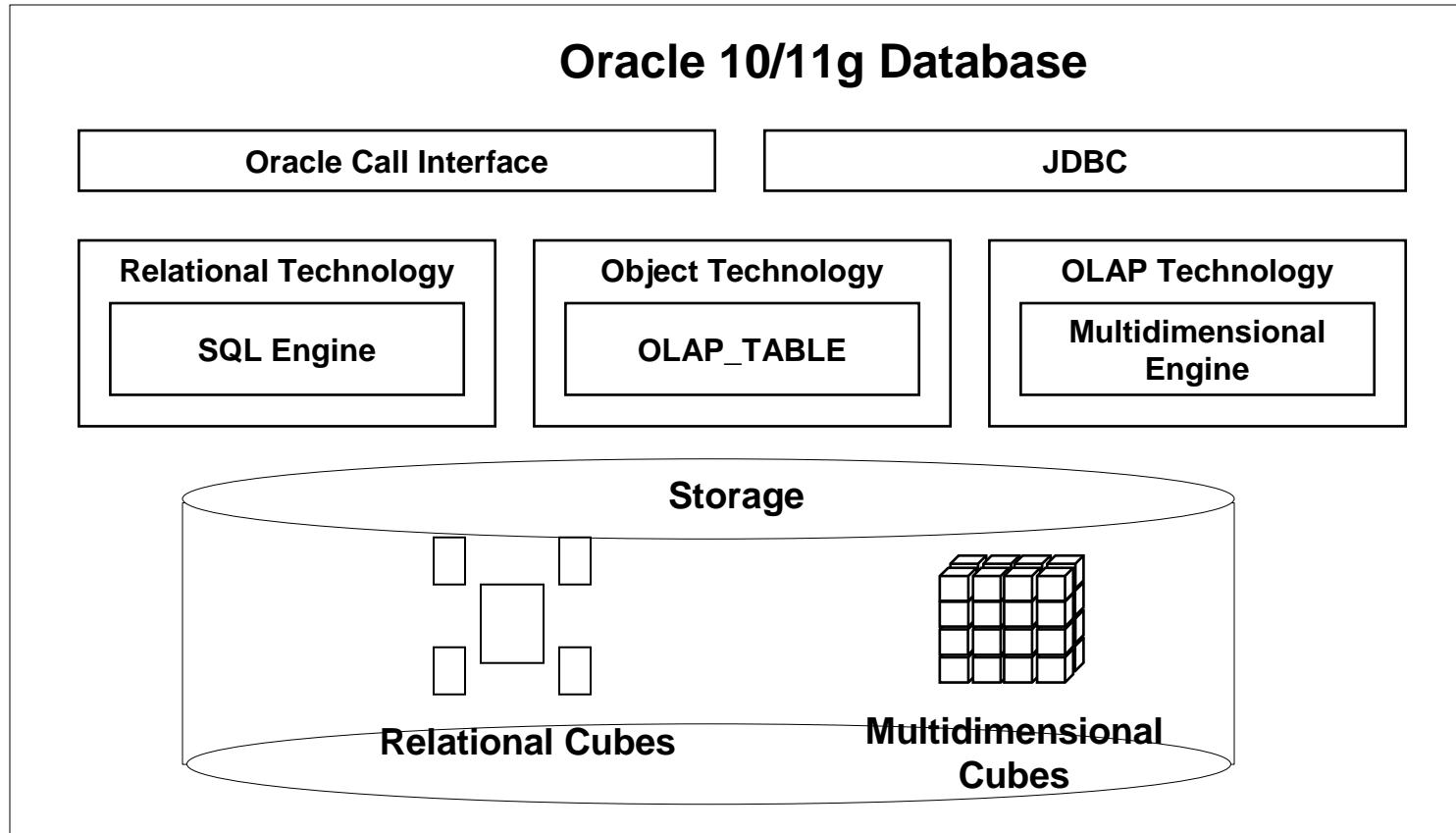


Turning Data into Profit....





Oracle RDBMS - MDDS





What Does Oracle OLAP Add?

- **Multidimensional user view of data**
- **Users create own reports**
- **Users create own measures**
- **Easy drill-down, rotate**
- **Iterative discovery process (not just reports)**
- **Ad-hoc analysis**
- **Easy selection of data with business terms**
- **What-if, forecasting**



What Makes a DW OLAP-Ready?

- **Star or Snowflake schema design**
- **Simple or complex dimension tables (level-based)**
- **Each child has single parent (no many-to-many)**
- **Total level at top of each dimension (except Time?)**
- **End_date and Timespan attributes for TIME**
- **Unique descriptions across all levels**
- **Fact tables with additive measures**



Why OWB to build OLAP?

- **Integrated with entire Oracle stack**
- **Graphically designs, generates, and deploys**
- **Only ETL tool that understands Oracle OLAP**
- **Uses 10g PL/SQL for transformations**
- **One-click deployment of 10g OLAP AW**



What is Oracle Warehouse Builder?

- **Integrated Tool for Data Warehousing**
- **Based on Common Warehouse Metadata Standard (OMG)**
- **Supports Design and ETL Functions**
- **Enterprise Framework for Designing and Deploying Datawarehouses and Datamarts**
- **Future integration platform for Express**



Key OWB themes

- **Improved User Interface**
- **Enabling Quality Information**
- **Enabling Business Intelligence**
- **Enabling Expertise capture**
- **Signification improvements in usability and functions over previous releases**



Sources & Targets

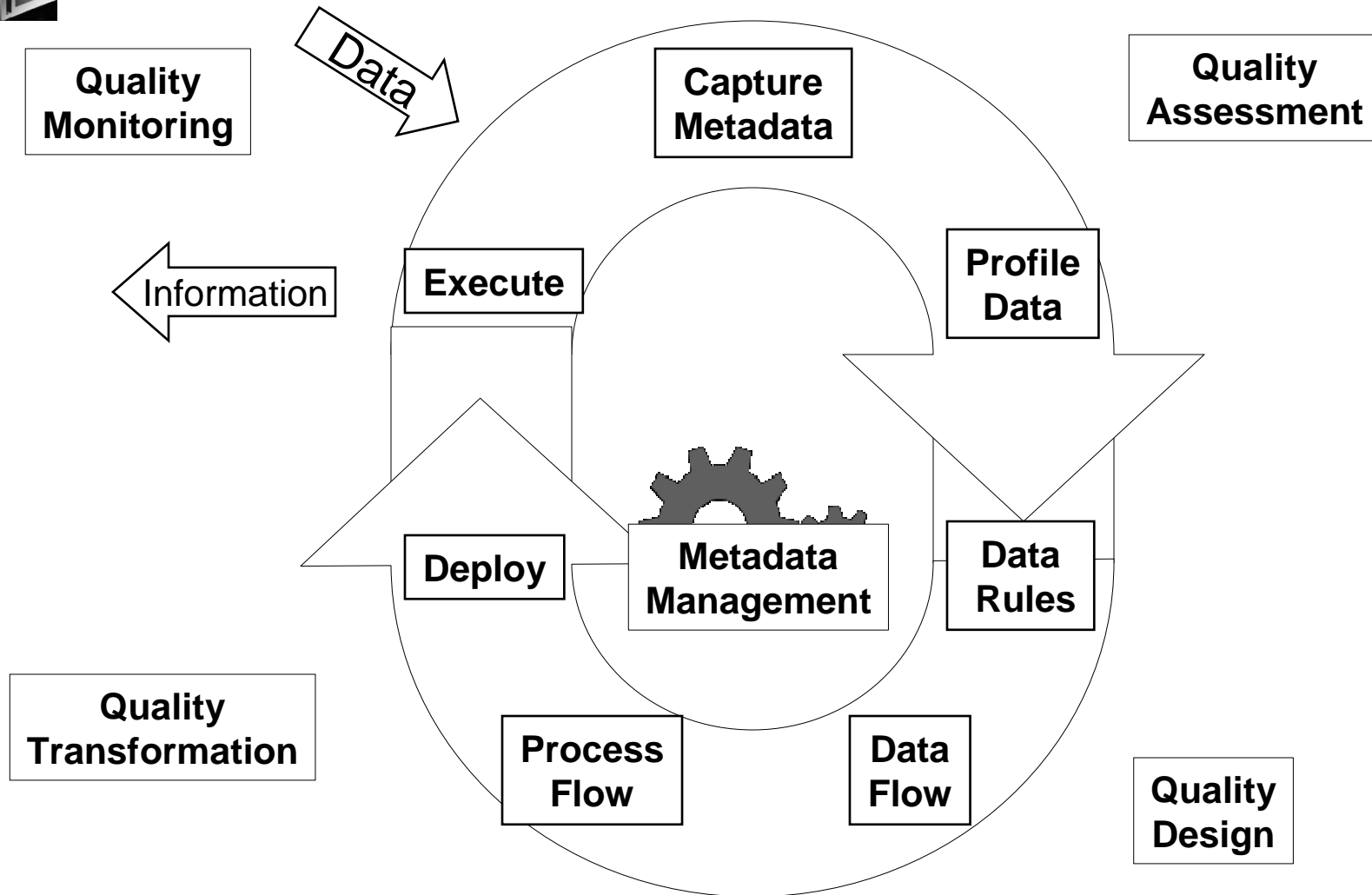
Sources

- Oracle
 - ❑ Tables, Views, MViews, Queues, External Tables, Table Functions, Streams, PL/SQL API's, Sqlloader...
- DB2, Sybase, SQLServer, Informix, ... (Oracle Transparent Gateways)
- Any ODBC source
- Flat Files
- Applications
 - ❑ Oracle Apps
 - ❑ SAP
 - ❑ Custom SQL App

Targets

- Oracle
 - ❑ Tables, Streams, OLAP, Table Functions, PL/SQL API's
- DB2, Sybase, SQLServer, Informix, ... (Oracle Transparent Gateways)
- Flat files

Enabling Information Quality

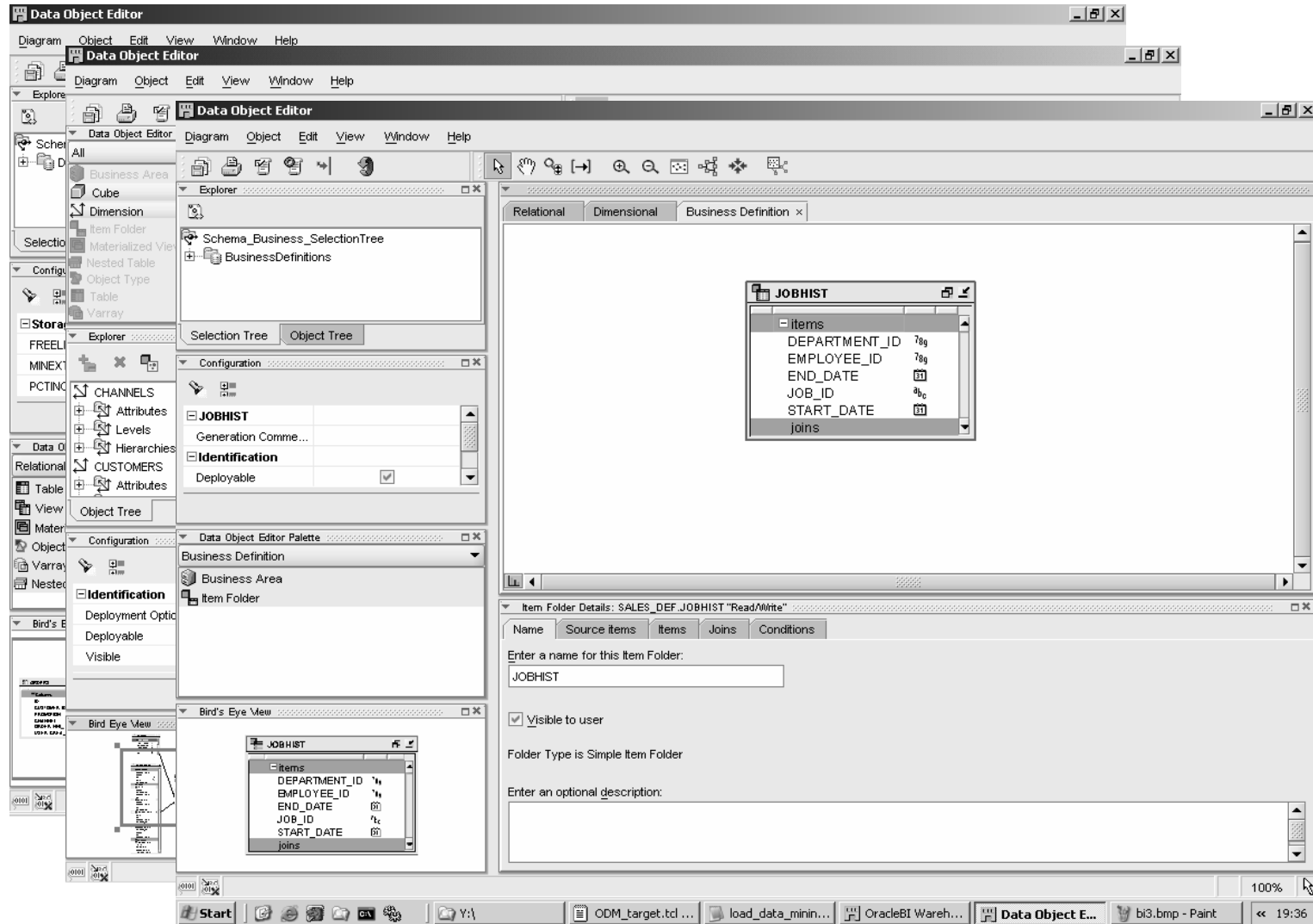


Data Object Design – One Editor

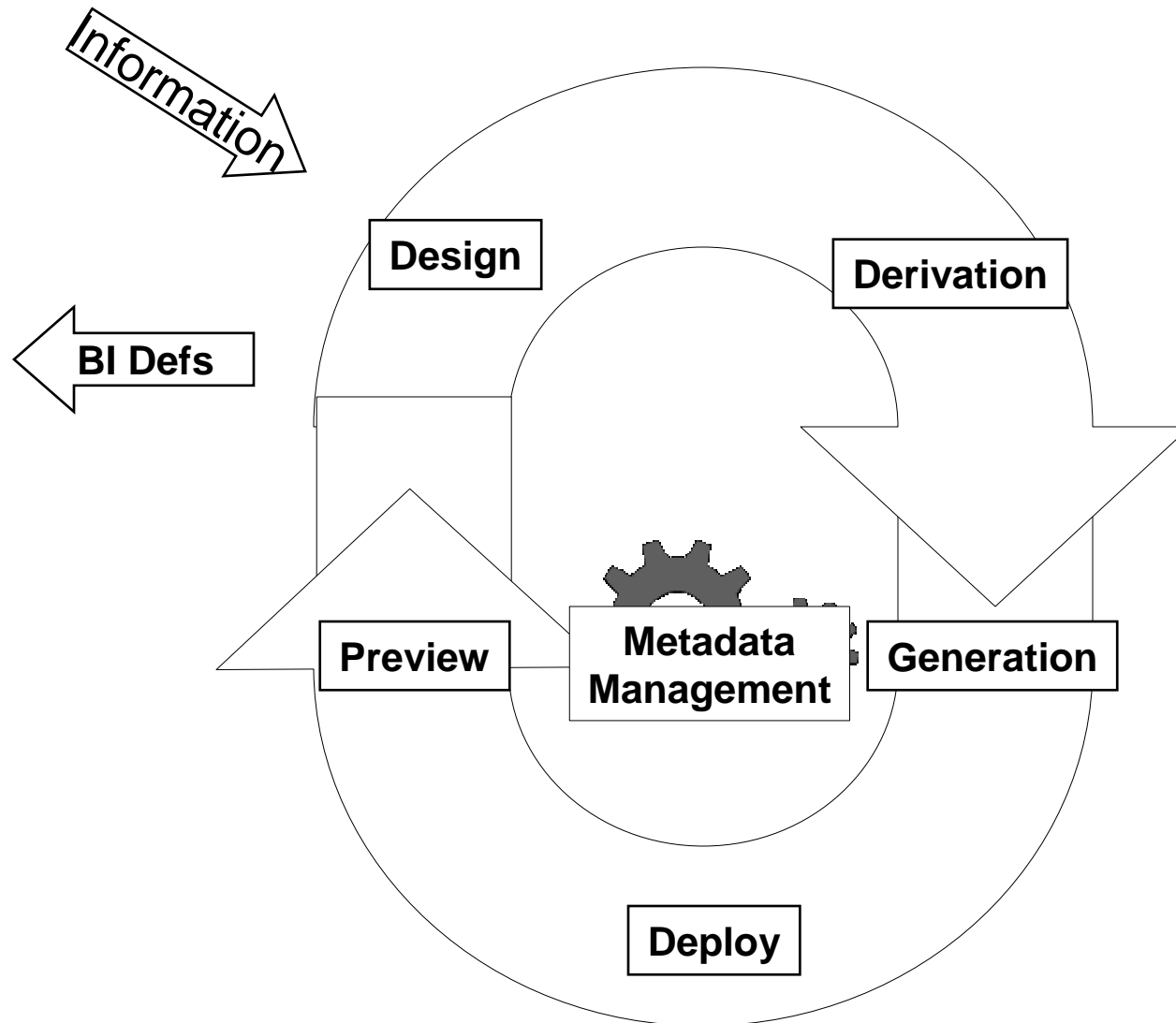


- Dimensions, cubes, tables, views, complex objects, ...
- Support for Star, Snowflake, Skip-Level, calculated measures, ...
- One editor for creation, configuration, validation, code generation, impact analysis, deployment, data viewing

Data Object Editor



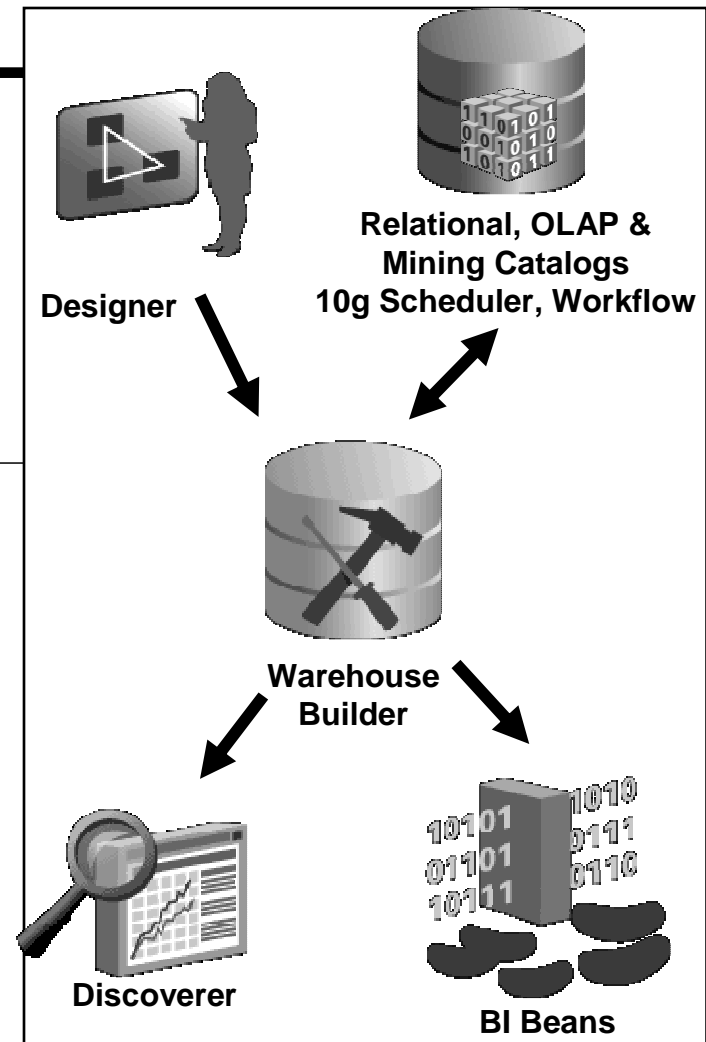
Enabling Business Intelligence



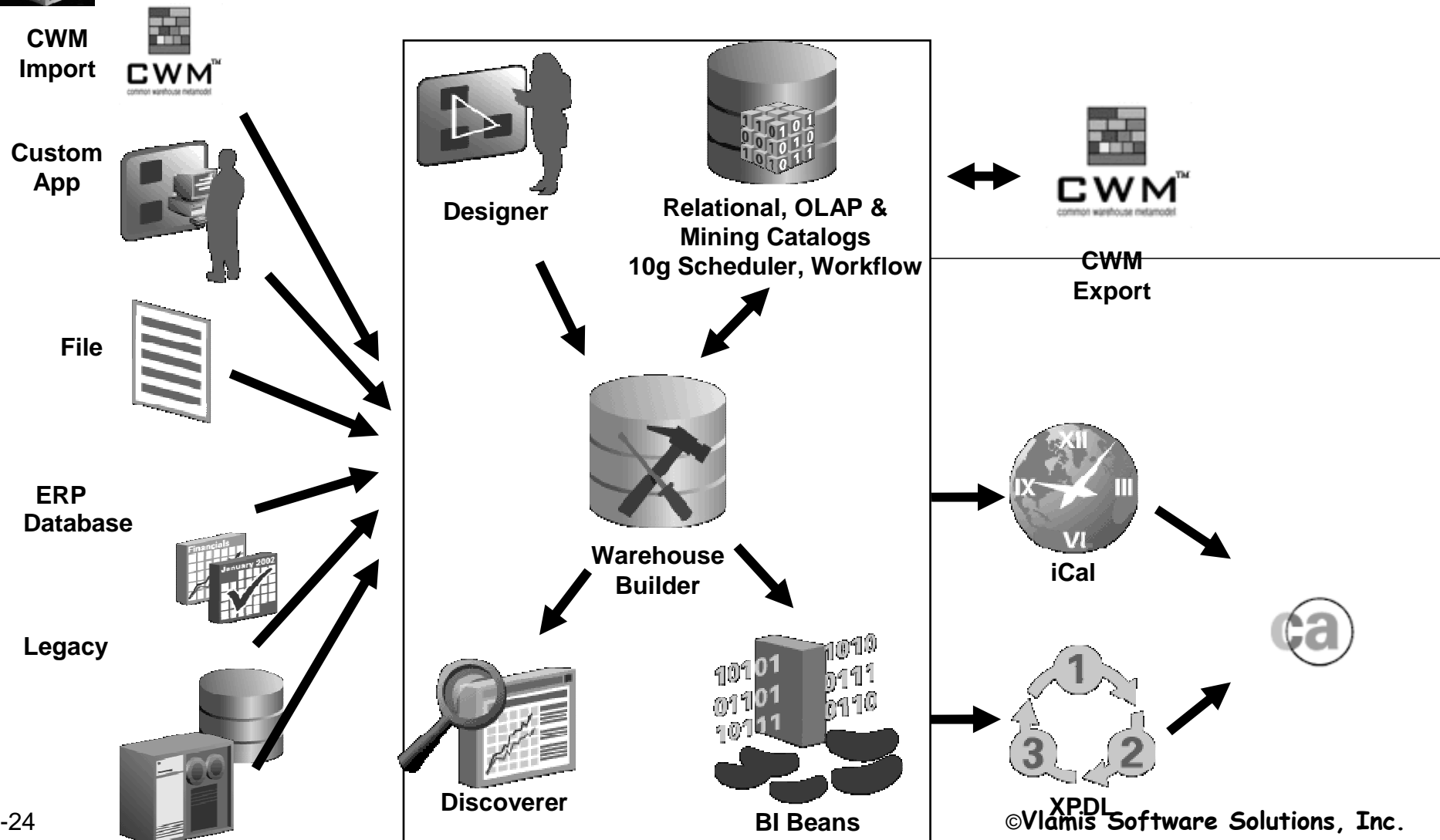
Business Intelligence Object Derivation



- Create and Derive Business intelligence objects
 - Oracle OLAP Cubes & Dimensions
 - OracleBI Discoverer EUL
 - OracleBI Beans Reports
- Included in Lineage and Impact analysis!



End-to-End Meta Data Integration





Platforms, Packaging

- **Available On:**
 - ☐ Win32(Windows NT/2000/XP/2003), Win64(XP/2003), Linux x86, Linux Itanium, Solaris, HP-UX (RISC), HP-UX (Itanium), AIX, Tru64
- **Packaging:**
 - ☐ Oracle Developer Suite (iDS)
 - ☐ Oracle Business Intelligence
- **Release date CY 2006**

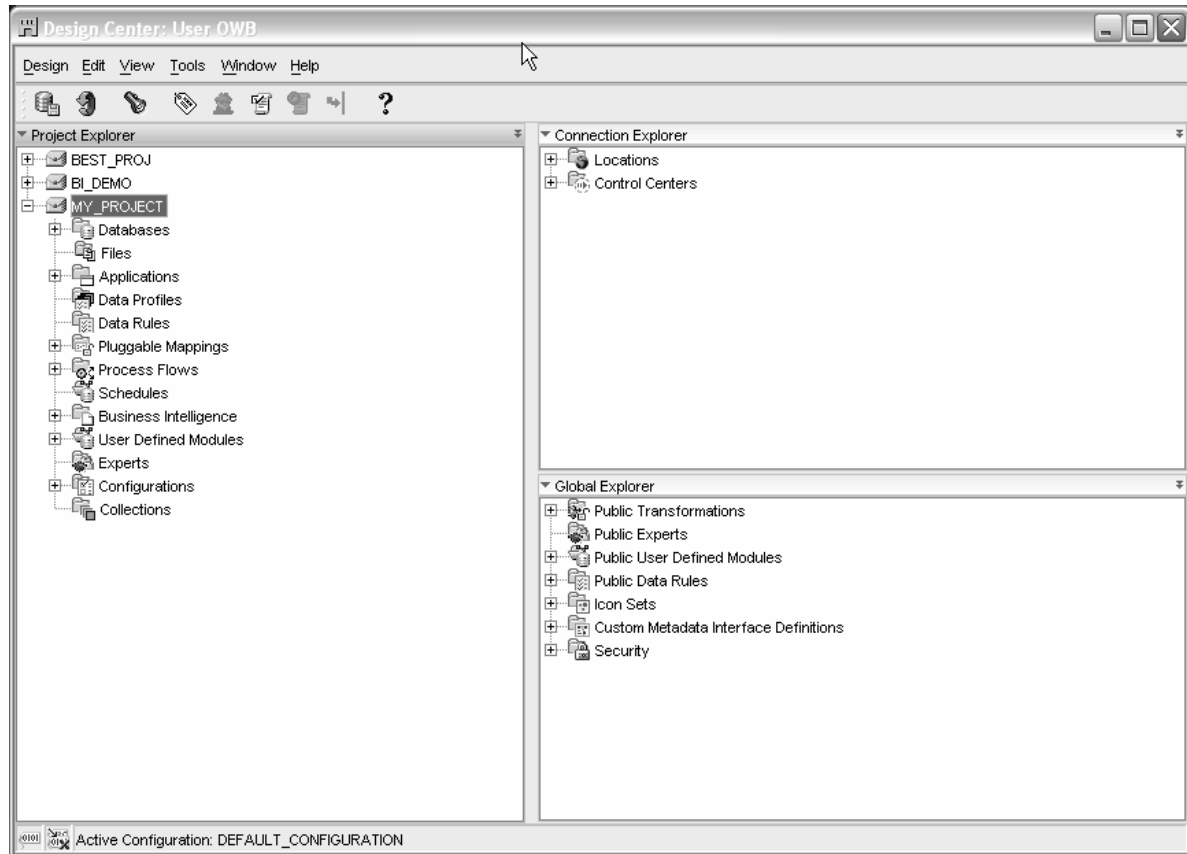


Components: *OWB User Interface*

Java Based

**Same look and
feel as Designer**

**Significantly
simplified over
previous
versions**





Components: *OLAP Wizards*

- **Full Integration support for OLAP AWs**
- **Supports 10g OLAP as a Target**
- **Full Life Cycle support**
- **Viewing data is integrated into new interface**



10g OLAP Integration

- **OWB metadata to Oracle OLAP Metadata**
- **Create ROLAP or MOLAP objects**
- **Creates links to Relational Data for Facts and Dimensions (views or tables)**
- **Creates Scripts for building Materialized Views that are BI Beans OLAP friendly (ROLAP only)**
- **Creates Scripts to build and populate Analytic Workspaces**
- **User can use AWM to make changes (but cannot reverse engineer)**

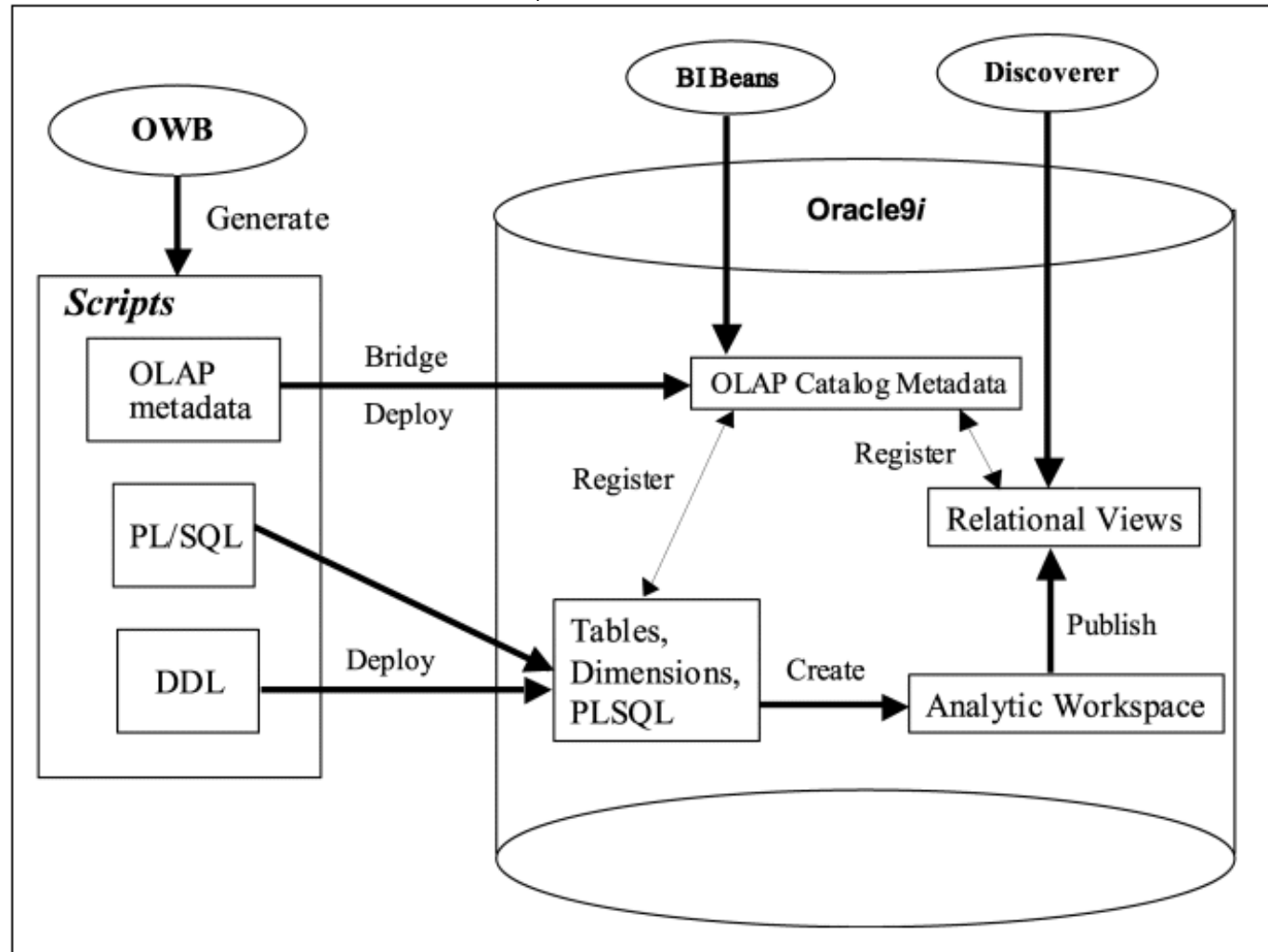


10g R1 – Uses Bridge to Integrate

- **OWB metadata to Oracle OLAP Metadata**
- **Create ROLAP or MOLAP objects**
- **Creates links to Relational Data for Facts and Dimensions (views or tables)**
- **Creates Scripts for building Materialized Views that are BI Beans OLAP friendly (ROLAP only)**
- **Use Bridge to Build AW Cubes and Dimensions**
- **Or use AWM to Map to Tables (BEST WAY)**
- **Used Pre-Defined Process to populate AW**



OWB OLAP Bridge





The Process

- **Design or Import Relational Schema**
 - ☐ **Define Fact Table(s)**
 - ☐ **Define Dimensions**
 - ☐ **Define Cubes (collection of like measures)**
- **Create Physical Schema**
- **Create Script for 10g OLAP or JUST DEPLOY!**
- **View/Modify in OWB**
- **Run Application**
- **Gather Statistics / Tune**

Design and Generate Schema



The screenshot displays two overlapping windows from the Oracle Business Intelligence Enterprise Edition (OBIEE) Design Center.

Design Center: User.OWB (Left Window): This window shows a hierarchical tree structure of the project. The tree includes folders for BEST_PROJ, BI_DEMO, MY_PROJECT, and Databases. Under Databases, there is an Oracle folder containing GLOBAL, LEV, and SALES_MART_MODULE. The SALES_MART_MODULE folder is expanded, showing sub-folders for Mappings, Real-Time Mappings, Transformations, Data Auditors, Dimensions, Cubes, Tables, External Tables, Views, Materialized Views, Sequences, UserDefinedTypes, and Queues. The SALES cube is selected.

Data Object Editor (Right Window): This window is used for designing data objects. It has a menu bar (Diagram, Object, Edit, View, Window, Help) and a toolbar. The Explorer pane on the left shows the project structure. The Configuration pane shows the selected object, GEOGRAPHY, under the SALES_MART_MODULE. The Data Object Editor Palette shows the Dimension and Cube objects. The Bird's Eye View shows a small overview of the data model. The main Canvas area shows a dimensional model with three dimensions: GEOGRAPHY, SALES, and PRODUCT. The GEOGRAPHY dimension is selected, and its details are shown in the Dimension Details pane.

Dimension Details: SALES_MART_MODULE.GEOGRAPHY "Read/Write"

The Dimension Details pane has tabs for Name, Attributes, Levels, Hierarchies, SCD, Orphan, Storage, and Data Viewer. The Attributes tab is selected, showing a table of attributes:

Name	Description	Identifier	Data Type	Length	Precision
1 ID		Surrogate	VARCHAR2	25	
2 NAME		Business	VARCHAR2	25	

The bottom status bar indicates the Active Configuration: DEFAULT_CONFIGURATION.



Creating Dimensions

- Use OWB to Create Dimensions
- Use the following “Special” Attributes when building OLAP Dimensions

Physical Level Attribute Name Suffixes in Warehouse Builder	Dimension Attribute Created
_NAME or NAME	Short_Description or Long_Description
_END_DATE or END_DATE	End_Date
_TIME_SPAN or TIME_SPAN	Time_Span
_PRIOR_PERIOD or PRIOR_PERIOD	Prior_Period
_YEAR_AGO_PERIOD or YEAR_AGO_PERIOD	Year_Ago_Period



Creating Dimensions

Table Properties: OWB_TIMEDIM_DATA_TABLE [Read/Write]

Name Columns Constraints Attribute Sets User Defined Properties

Table Columns

Name	Position	Data Type	Length	Precisi...	Scale	Not Null	Note
WEEK_OF_YEAR	15	NUMBER		0	0	<input type="checkbox"/>	
WEEK_START_DA...	16	DATE				<input type="checkbox"/>	
WEEK_END_DATE	17	DATE				<input type="checkbox"/>	
WEEK_TIME_SPAN	18	NUMBER		0	0	<input type="checkbox"/>	
MONTH_ID	19	NUMBER		0	0	<input type="checkbox"/>	
MONTH_OF_QUA...	20	NUMBER		0	0	<input type="checkbox"/>	
MONTH_OF_YEAR	21	NUMBER		0	0	<input type="checkbox"/>	
MONTH_START_D...	22	DATE				<input type="checkbox"/>	
MONTH_END_DATE	23	DATE				<input type="checkbox"/>	
MONTH_TIME_SPAN	24	NUMBER		0	0	<input type="checkbox"/>	
QUARTER_ID	25	NUMBER		0	0	<input type="checkbox"/>	
QUARTER_OF_YE...	26	NUMBER		0	0	<input type="checkbox"/>	

Add Remove

Help OK Cancel



Creating Time Dimensions

- Time Dimensions are “Special” Dimensions that allow for several analytic analyses such as “Sales last month compared with same month last year”
- Requires special attributes
- OWB has sample definition and SQL scripts for “Best Practice”
- Always use “Time” or “_Time” in Dimension Name – Like “T_TIME” or “TIME”



Creating Time Dimension

New Wizard to Create!

Time Dimension Attributes:

Physical Level Attribute Name Suffixes in Warehouse Builder	Dimension Attribute Created
_YEAR	Year Level
_QUARTER	Quarter Level
_MONTH	Month Level
_DAY	Day Level

Note: Week is not included because week cannot neatly rollup into calendar year.



Creating Dimensions

OWB now Supports Slowly Changing Dimensions!

- **Type 1 – Do not save history (default)**
- **Type 2 – Save History**
- **Type 3 – Store only previous value**
- **Supported by 10g OLAP!**



Creating Dimensions

OWB now Supports Ragged and Skip Levels!

- **Must Load Dimension via Snowflake (now default)**
- **Can have Ragged and Skip in same Dim**
- **MUST use 10.1.0.4 Target to work – 10.2 preferred!**

Can be done NOW with AWM 10.2!



Time Dimension

The screenshot shows the 'Data Object Editor' application window. The title bar reads 'Data Object Editor'. The menu bar includes 'Diagram', 'Object', 'Edit', 'View', 'Window', and 'Help'. The toolbar contains various icons for file operations and editing.

Explorer Panel: Shows a tree view of databases: 'GLOBAL', 'LEV', and 'SALES_MART_MODULE'.

Selection Tree / Object Tree: Shows 'TIME' selected under 'Dimensional'.

Configuration Panel: Shows 'TIME' with 'Generation Comme...' and 'Identification' (checked) and 'Deployable' (checked).

Data Object Editor Palette: Shows 'Dimensional' and 'Cube'.

Bird's Eye View: Shows a small diagram of the 'SALES' cube with dimensions 'TIME' and 'PRODUCT'.

Canvas Panel: Shows 'Time Dimension Details: SALES_MART_MODULE.TIME "Read/Write"'. The 'Name' tab is selected. It contains a text box with 'TIME_SEQ' and a 'Select...' button. Below is a table of 'Dimension Attributes'.

	Name	Description	Identifier	Data Type	Length	Precision	Scale	Second...	Descriptor
1	ID		Surrogate	VARCHAR2	25				
2	CODE		Business	NUMBER		0	0		
3	CAL_MONTH_NUMBER			NUMBER		0	0		
4	START_DATE			DATE					
5	END_DATE			DATE					
6	TIME_SPAN			NUMBER		0	0		
7	MONTH_OF_QUARTER			NUMBER		0	0		
8	MONTH_OF_YEAR			NUMBER		0	0		
9	DESCRIPTION			VARCHAR2	2000				Long descripti
10	NAME			VARCHAR2	25				Short descripti
11	CAL_QUARTER_NUMB...			NUMBER		0	0		
12	QUARTER_OF_YEAR			NUMBER		0	0		
13	CAL_YEAR_NUMBER			NUMBER		0	0		



Defining Cubes

- **Cube is a collection of Measures (Data)**
- **All measures in a cube have the same dimensionality**
- **Use OWB Cube Wizard to build Cubes**
- **Cube can be ROLAP or MOLAP**

Cube: Dimension Order



**Think about sparsity and use of compression first.
(Compression means the use of compressed composites)**

Create Cube

General Implementation Details Rules Summarize To Cache

These settings affect the performance of an analytic workspace in both querying and maintenance processes, such as data loading and aggregation

Dimension Order and Sparsity:

Order	Dimension	Sparse
1	TIME	<input type="checkbox"/>
2	CUSTOMER	<input checked="" type="checkbox"/>
3	PRODUCT	<input checked="" type="checkbox"/>

☒ Use Compression (recommended only for extremely sparse Cubes)

Data Type of Cube: DECIMAL

☒ Partition Cube

Choose a level within a hierarchy of one dimension. One partition will be created for each member of the selected level

Dimension: TIME

Hierarchy: CALENDAR

Level: YEAR

Help Create Cancel

Cube Dimension (Advanced): Compression



- **What is a compressed composite?**
- **When can compression be used?**
- **How sparse is "extremely sparse"?**
- **Rules of thumb**



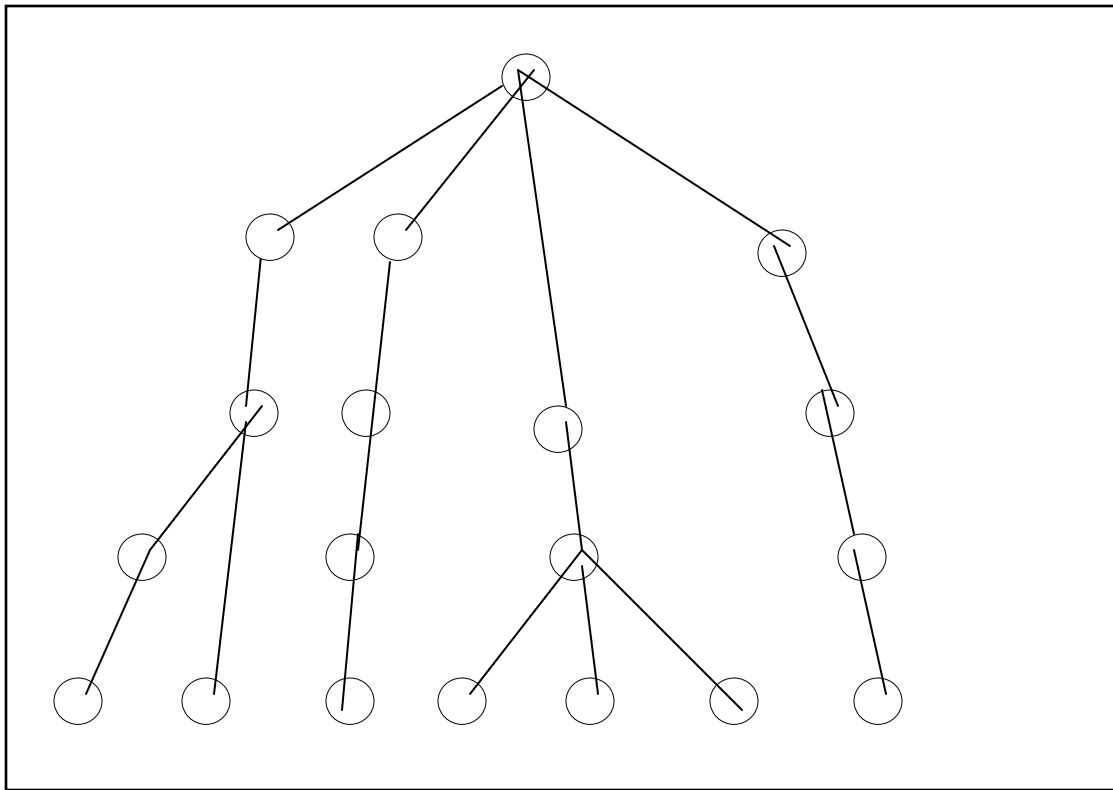
What Is a Compressed Composite

- **Normal composite has tuples for**
 - ☐ all the leaf values, and
 - ☐ all the precomputed aggregate values (aggindex no), or
 - ☐ all the aggregate values (aggindex yes)
- **With sparse data many aggregate tuples may have only a single child and hence have the same data value as their child.**

Single Child Situation Is Common



- Especially in a multidimensional situation.
- The red nodes can be compressed out.





Compressed Composite (CC) Knows

- **CC knows where these runs of single child parent tuples are.**
- **Stores the common value for these runs only once.**
- **Doesn't materialize the tuples in these runs.**
- **This is fabulous.**
- **Less footprint on disk and in memory, often much less.**
- **Faster aggregation, often much faster.**



CC Limitations in Current Release (10gR1)

- **The only thing you really need worry about is:**
 - ☐ **SUM method or NOAGG method of aggregation only.**

- **Less importantly but in the spirit of full disclosure:**
 - ☐ **No partial aggregation – CC's are so good this doesn't matter (usually).**
 - ☐ **A CC can dimension only a single variable – not a concern to you.**
 - ☐ **A CC's aggregate tuples cannot be updated once built**
 - **To make changes, the aggregates are thrown away.**
 - **CC's are so good this doesn't matter (usually).**



When Can Compression Be Used?

- **SUM method of aggregation**
- **Data are sparse.**
- **How sparse is sparse?**
- **Not as sparse as you might think.**



How Sparse Is Sparse? Use Case #1

- Existing OSA application
- 14 measures
- Time at week, month, year (260 values)
- Product (4,220), customer (7,804) and channel (22)
- Deepish hierarchies on product and customer
- 2.9M input rows
- 9i OSA build on 6Gb. Machine
 - ❑ 616 minutes
 - ❑ 100Gb. on disk



Use Case #1 With AWM10g

- **Slower single cpu machine with 2Gb. Memory**
- **All dimensions in a CC**
- **Partitioned on time at year level**
- **Built in 51 minutes, 1.6Gb. on disk**
- **12x faster, 1/60th of disk**

How Sparse Is Sparse? Use Case #2



TIME at month and year, 10 years, 130 values

CUST: 496,623 values, 2 hierarchies

- One is level based with 4 levels

- The other is parent-child with depth of 8

SEG: 2 levels, 5 values

RISK: 1,239 values

PRG: 2,658 values

DATA: 11 measures, 31 million input rows

DIMENSIONALITY: Time dense

Should SEG (low cardinality) be in CC or not?

- 40% dense at least (child and top)



Use Case #2 With AWM10g

- **In 9i:**
 - ☐ Year level data only with skiplevel aggregation.
 - ☐ Took >1 day to load and aggregate.
- **In 10g with AWM10g:**
 - ☐ 1 cpu, 2 Gb. RAM machine
 - ☐ Time dense, other dims in CC.
 - ☐ Partition on time at year level.
 - ☐ No parallelization
 - ☐ 89 min. load & upd. + 115 min. agg = 204 minutes
- **Note: daily load of data would take about 12 or 13 minutes.**
- **With SEG dimension out of the CC aggregation was significantly slower.**

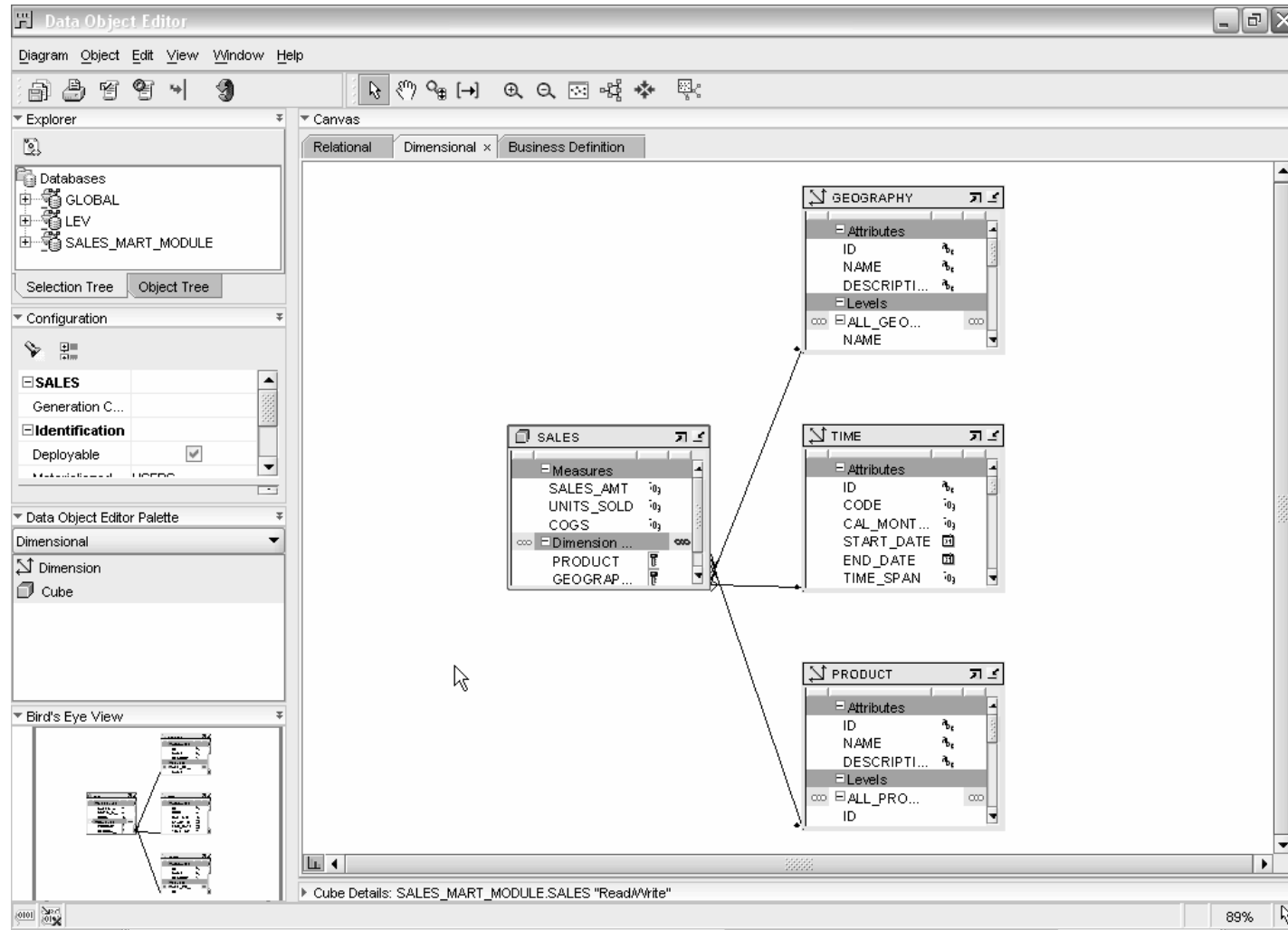


Moral of the story:

- **Our intuition needs to be adjusted.**
- **Experiment with low cardinality dimensions in and out of the CC.**



Finished Cube





Deploy

Design Center: User OWB

Design Edit View Tools Window Help

New... Ctrl-N ?

Add/Remove Experts Here

Import

Export Warehouse Builder Metadata...

Save All Ctrl-S

Revert to Saved

Configure...

Validate...

Generate...

Deploy...

Start...

Derive...

Set As Active Configuration

Snapshot

Exit Alt-F4

Global Explorer

- Public Transformations
- Public Experts
- Public User Defined Modules
- Public Data Rules
- Icon Sets
- Custom Metadata Interactions
- Security

Active Configuration: DEFAULT_CONFIGURATION

Metadata Export

Objects to be exported

Object Name	Object Type
MY_PROJECT	Project
DEMO	Business Presentation
SALES	Presentation Template
DEFAULT_CONFIGURATION	Configuration
DEFAULT_DEPLOYMENT	Location Specific Configuration
GLOBAL	Data Warehouse
CHANNEL_DIM	Table
CUSTOMER_DIM	Table
PRICE_AND_COST_HIST_FACT	Table
PRICE_AND_COST_UPD_FACT	Table
PRODUCT_CLASS_DSC	Table
PRODUCT_CLASS_MEMBER	Table
PRODUCT_DIM	Table
PRODUCT_FAMILY_DSC	Table
PRODUCT_FAMILY_MEMBER	Table
PRODUCT_ITEM_BUYER	Table
PRODUCT_ITEM_DSC	Table
PRODUCT_ITEM_MARKETING_MANAGER	Table
PRODUCT_ITEM_MEMBER	Table
PRODUCT_ITEM_PACKAGE	Table
PRODUCT_TOTAL_PRODUCT_DSC	Table

File Name: C:\Oracle\OraOWB\owb\bin\admin\MY_PROJECT-20050504_0702.mdl Browse...

☐ Export all object dependencies

Advanced...

Help Export Cancel

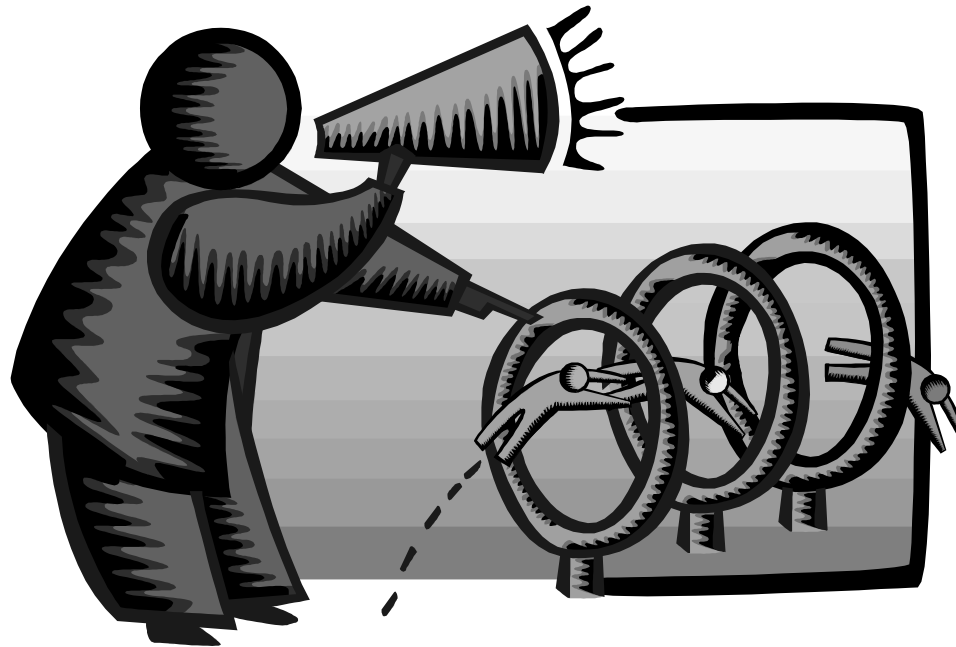


Loading AW Data

- OWB provides Transformations to Load Data into AWs
- Default behavior is to load the entire set of data
- Supports Sub-Setting with customize SQL i.e.

```
procedure ORDERS_LOAD_FILTER
BEGIN
  dbms_awm.create_awcubeload_spec ('ORDERS_FIL', USER, 'ORDERS',
    'LOAD_DATA');
  --- Define the Limiting Where Clause Here
  dbms_awm.Add_AWCubeLoad_Spec_Filter('ORDERS_FIL',USER,'ORD
    ERS',USER,'ORDERS',' month_id>33');
  dbms_awm.refresh_awcube (USER, 'AWS', 'AWORDERS', 'ORDERS_FIL');
  EXCEPTION
    WHEN OTHERS THEN
    NULL;
```

OWB Paris in Action





Managing an OLAP Project

- **Involve end-users early on**
- **Prototype, pilot, then phase 1**
- **Recruit "champion" users**
- **Lead from user community, not IT**
- **Develop in phases**
- **Provide value early on**
- **Keep it simple (at first)**
- **Need forum for users to share ideas**
- **Provide user guide with user's data**



OLAP Implementation Suggestions

- **Pick single first department**
- **Decide on set of terminology at beginning**
- **Use embedded-total objects**
- **Show instances in addition to "levels" in diagrams**
- **Prototype and design iteratively**
- **Pick small initial project. Deliver value quickly**
- **Involve users early on. Listen to feedback**



Conclusions

- **We can finally design OLAP Solutions**
- **Support for both ROLAP and MOLAP (AW)**
- **Strong Foundation for the Future**
- **Still Lacking all the Pieces**
 - ☐ **Complex models still not possible**
 - ☐ **Manual manipulations in ROLAP or MOLAP cubes not always reflected in OWB metadata**



Conclusions

- **If you tried or looked at OWB before and said NO. Take another LOOK!**
- **We finally have a full Featured Tool for OLAP end to end design and build!**
- **Lots of new Enterprise Features**
- **Very Low COST!**



How to Get Started?

- **Download OWB 10g R2**
- **Download and install Samples**
- **Read Reviewer's Guide if necessary**
- **Resources:**
 - ☐ **OTN**
 - ☐ **Discussion Forums**



Oracle 11G

Coming to a Server Near You Later This Year



- **Oracle Disclaimer goes here!**



Sneak Peek at Oracle OLAP 11g

- Oracle 11g is currently in Beta (Hope you all went to see it this morning!)
- Oracle OLAP has many NEW things Coming!
 - ☐ New CUBE_TABLE function in SQL
 - ☐ Tight integration with SQL (automatically generated views)
 - ☐ Tight integration with data dictionary
 - ☐ New Calc Wizard in AWM!
 - ☐ Easier to use and deploy
 - ☐ Ability to use OLAP for Materialized views (get MUCH FASTER response times!)



OLAP 11g Changes

- New CUBE_TABLE function simplifies access to AW data (replacing OLAP_TABLE)

The screenshot shows the Oracle SQL Developer interface. On the left, the 'Connections' pane shows a tree structure with 'Amazon', 'stack07 - global', and 'stack07 - global - main3'. Under 'stack07 - global - main3', there are 'Tables' and 'Views'. The 'Views' folder is expanded, showing 'CHANNEL_STANDARD_VIEW', 'CHANNEL_VIEW', and 'CUSTOMER_SHIPMENTS_VIEW'. The 'CUSTOMER_SHIPMENTS_VIEW' is selected, and its columns are listed: DIM_KEY, LEVEL_NAME, PARENT, TOTAL_CUSTOMER, REGION, WAREHOUSE, SHIP_TO, and CUSTOMER_VIEW.

The main window shows the 'Enter SQL Statement:' text area with the following query:

```
SELECT * FROM TABLE(CUBE_TABLE('GLOBAL.CUSTOMER;SHIPMENTS'));
```

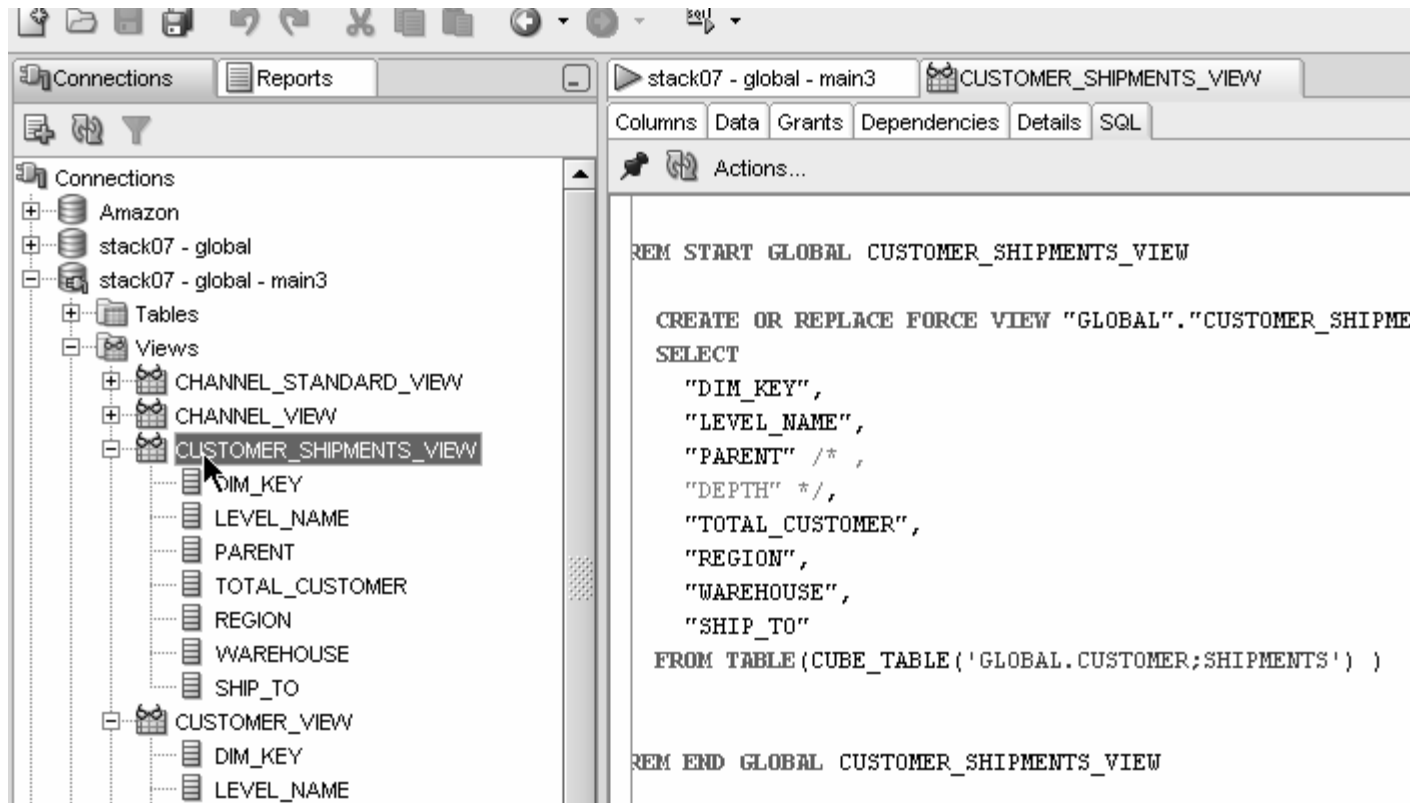
Below the query, the 'Results' tab is active, showing the following data:

	REGION	WAREHOUSE	SHIP_TO	LEVEL_NAME	LONG_DESCRIPTOR
1	(null)	(null)	(null)	REGION	Europe
2	(null)	(null)	(null)	REGION	North America
3	(null)	(null)	(null)	REGION	Asia Pacific
4	20	99	SHIP_TO		UK Env Dept Glasgow



OLAP 11g Changes

- Views automatically created for SQL access to AWs – Dimensions and Cubes!





OLAP 11g Changes

- Views easily accessed from SQL Developer

The screenshot shows the SQL Developer interface. On the left, the 'Connections' pane shows a tree structure with 'Amazon' and 'stack07 - global' connections. Under 'stack07 - global - main3', there are 'Tables' and 'Views'. The 'Views' folder is expanded, showing 'CHANNEL_STANDARD_VIEW', 'CHANNEL_VIEW', and 'CUSTOMER_SHIPMENTS_VIEW'. The 'CUSTOMER_SHIPMENTS_VIEW' is selected, and its columns are listed: DIM_KEY, LEVEL_NAME, PARENT, TOTAL_CUSTOMER, REGION, WAREHOUSE, and SHIP_TO. On the right, the 'Data' tab is active, displaying a table with the same columns. The table contains 16 rows of data.

DIM_KEY	LEVEL_NAME	PARENT	TOTAL_CUSTOMER	REGION	WAREHOUSE	SHIP_TO
1 9	REGION	1	1	9	(null)	(null)
2 10	REGION	1	1	10	(null)	(null)
3 8	REGION	1	1	8	(null)	(null)
4 99	SHIP_TO	20	1	9	20	99
5 46	SHIP_TO	21	1	10	21	46
6 89	SHIP_TO	21	1	10	21	89
7 59	SHIP_TO	21	1	10	21	59
8 91	SHIP_TO	20	1	9	20	91
9 90	SHIP_TO	21	1	10	21	90
10 49	SHIP_TO	16	1	9	16	49
11 95	SHIP_TO	21	1	10	21	95
12 72	SHIP_TO	11	1	8	11	72
13 47	SHIP_TO	14	1	9	14	47
14 60	SHIP_TO	18	1	8	18	60
15 74	SHIP_TO	15	1	8	15	74
16 75	SHIP_TO	16	1	9	16	75



OLAP 11g Changes

- Automatic views accessible from AWM

abases
stack07 (global)
Schemas
GLOBAL
Analytic Workspaces
GLOBAL (attached RW)
Dimensions
CUSTOMER
PRODUCT
TIME
CHANNEL
Levels
TOTAL_CHANNEL
CHANNEL
Hierarchies
STANDARD
Attributes
Unique Key Attributes
Mappings
Views
CHANNEL_VIEW - [Dimension ET]
VIEWNAME - [Hierarchy: STANDARD]
Data Security

General

Specify View Information

Dimension Name: CHANNEL
Hierarchy Name: STANDARD
View Name:

Column Name	Data Type	Object Type
DIM_KEY	VARCHAR2	Key
LEVEL_NAME	VARCHAR2	Level Name
PARENT	VARCHAR2	Parent
TOTAL_CHANNEL	VARCHAR2	Hierarchy Level
CHANNEL	VARCHAR2	Hierarchy Level



OLAP 11g Changes

- Query Rewrite knows about AWs now

General Translations Implementation Details **Materialized Views** Rules Summarize To Cache

Choose this option to manage refresh of the cube with the Materialized View refresh system

☒ Enable Materialized View Refresh of the cube

Choose how and when to refresh of the cube with the Materialized View refresh system

Refresh Method: Force Refresh Mode: On Demand

Start With: Modify...

Next Refresh: Modify...

Constraints: ☒ Trusted ☐ Enforced

☐ Parallel: Degree of Parallelism:

Choose this option to allow queries on the source tables of the cube to be automatically rewritten to use summary data in the cube

☒ Enable the Query Rewrite Materialized View

Materialized View Implementation Details

Refresh Rewrite

☒ Compatibility Check list ☐ Materialized View details

Status	Object	Check
--------	--------	-------



OLAP 11g Changes

- Optimizer pushes joins down to AW
- Enables efficient non-OLAP-aware SQL queries

```
FROM time_view t,  
     product_view p,  
     customer_view cu,  
     channel_view ch,  
     units_cube_view f  
WHERE t.dim_key = f.TIME  
      AND p.dim_key = f.product  
      AND cu.dim_key = f.customer  
      AND ch.dim_key = f.channel  
      AND t.long_description = '2000'  
      AND p.long_description = 'Total Product'  
      AND cu.long_description = 'All Customers'
```

DB Object Search

Results | Script Output | **Explain** | Autotrace | DBMS Output | OWA Output

Operation	Optimizer	Cost	Cardinality	Bytes	Part
SELECT STATEMENT	ALL_ROWS	1028	1	520	
HASH JOIN		1028	1	520	
MERGE JOIN(CARTESIAN)		407	1	380	
MERGE JOIN(CARTESIAN)		305	1	240	
MERGE JOIN(CARTESIAN)		203	1	160	
CUBE SCAN(OUTER) GLOBAL.CHANNEL					
BUFFER(SORT)		102	1	80	
CUBE SCAN(OUTER) GLOBAL.PRODUCT					
BUFFER(SORT)					

Standard Disclaimer - Beta software! No promises!



OLAP 11g Changes

- Views are stored in Oracle Dictionary
- Notice in SYS.USER_DIMENSION_VIEWS

The screenshot shows the Oracle SQL Developer interface. On the left, the 'Connections' pane shows a tree structure with 'stack07 - global - main3' selected, and 'Views' expanded. The 'Views' list includes: CHANNEL_STANDARD_VIEW, CHANNEL_VIEW, CUSTOMER_SHIPMENTS_VIEW, CUSTOMER_VIEW, PRODUCT_PRIMARY_VIEW, PRODUCT_VIEW, TIME_CALENDAR_YEAR_HIER_VIEW, and TIME_VIEW. The 'CUSTOMER_SHIPMENTS_VIEW' is highlighted. The main window shows the 'Enter SQL Statement' area with the query: `select * from sys.user_dimension_views;`. The 'Results' pane at the bottom displays the output of the query as a table with 4 rows and 4 columns: DIMENSION_NAME, VIEW_OWNER, VIEW_NAME, and VIEW_TYPE.

	DIMENSION_NAME	VIEW_OWNER	VIEW_NAME	VIEW_TYPE
1	TIME	GLOBAL	TIME_VIEW	ET
2	CHANNEL	GLOBAL	CHANNEL_VIEW	ET
3	PRODUCT	GLOBAL	PRODUCT_VIEW	ET
4	CUSTOMER	GLOBAL	CUSTOMER_VIEW	ET



OLAP 11g Changes

- **Cost-based presummarization balances aggregation time with performance**

Create Cube

General Translations Implementation Details Materialized Views Rules Summarize To Cache

Presummarization

Select the type of presummarization you wish to use

☐ No presummarization

☒ Cost-based presummarization

Percentage:

☐ Level-Based Presummarization

Choose the regions of the cube to be presummarized and stored in the analytic workspace.

Dimension:

	Levels
TIME	<input type="checkbox"/> ALL_TIMES
CUSTOMER	<input type="checkbox"/> CALENDAR_YEAR
PRODUCT	<input type="checkbox"/> MONTH
CHANNEL	<input type="checkbox"/> QUARTER



OLAP 11g Changes

- Native support for AWs with skip level and ragged hierarchies

Create Hierarchy

General Translations

Specify General Hierarchy Information

Name: CALENDAR_YEAR_HIER

Short Label: Calendar Year Hier

Long Label: Calendar Year Hier

Description: Calendar Year Hier

☒ Set as Default Hierarchy

☐ Skip Level

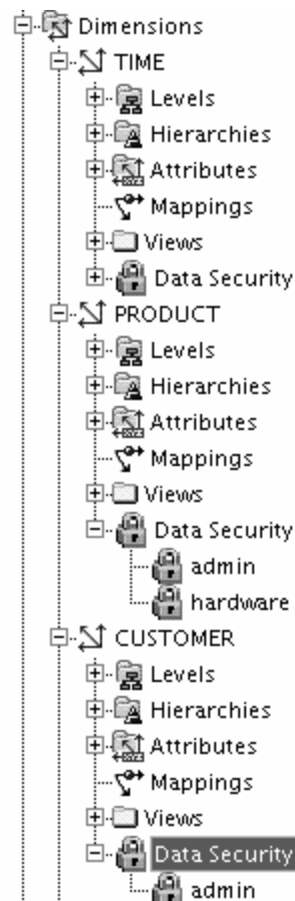
☐ Ragged

☒ Level Based Hierarchy ☐ Value Based Hierarchy



OLAP 11g Changes

- Create security policies based on hierarchies



Create Data Security Policy

General Member Selection

Choose Product From: 'Primary' hierarchy

Available:

Members Conditions

Selected:

Steps Members

1. Start with Hardware

2. Add Descendants of Hardware

Condition Expression:

GLOBAL.PRODUCT.DIM_KEY IN ('2') OR '2' GLOBAL.PRODUCT.PRIMARY LEVEL GLOB

Data Security Policy Name: north america

Select the access privileges for each user or role below

User or Role	Type	Select	Insert
SCOTT	User	<input checked="" type="checkbox"/>	<input type="checkbox"/>



OLAP 11g Changes

- Calc Wizard replaced by powerful "complete the sentence" wizard
- Expression language more SQL-like
- EQs of Calculated Measures in 11g-format AWs "read-only"

Choose a calculation type:

Rank

Calculation:

Rank members of the PRODUCT dimension and PRIMARY hierarchy based on measure UNITS_CUBE.UNITS (...)

. Calculate rank using RANK method with member's level in order lowest to highest.

member's level
member's parent
member's ancestor

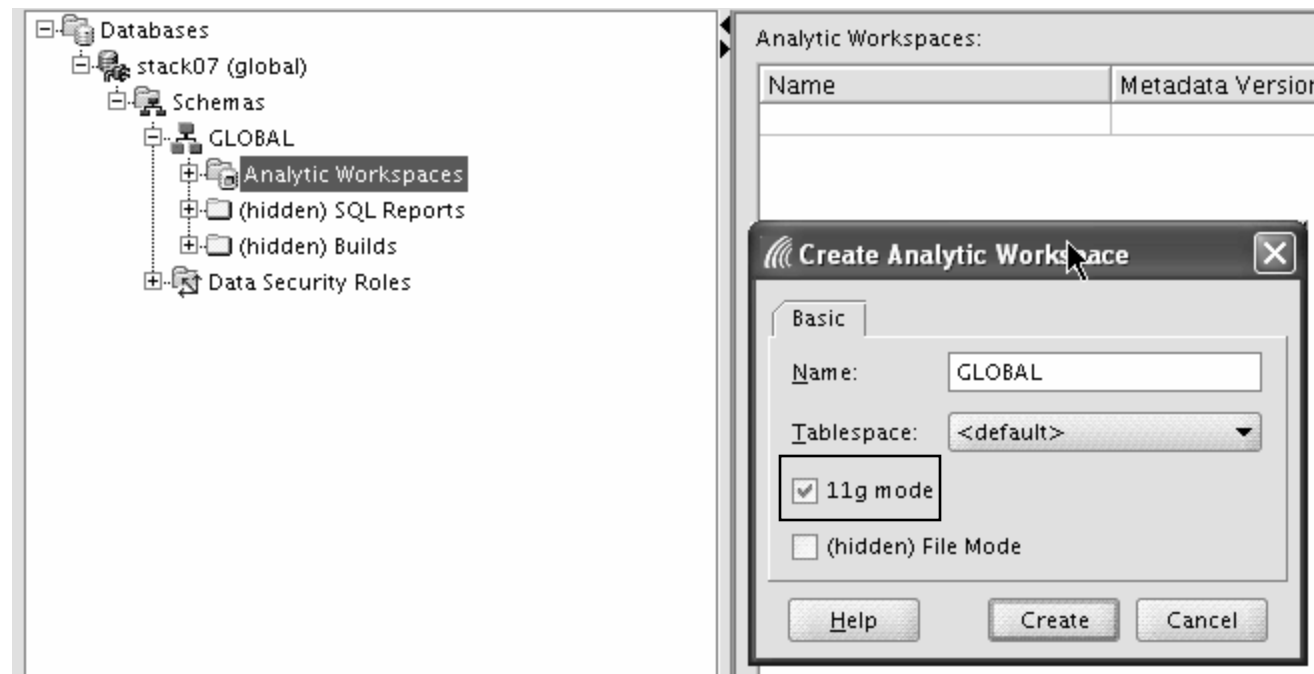
Expression:

RANK() OVER HIERARCHY (GLOBAL.PRODUCT.PRIMARY ORDER BY GLOBAL.UNITS_CUBE.UNITS WITHIN LEVEL)

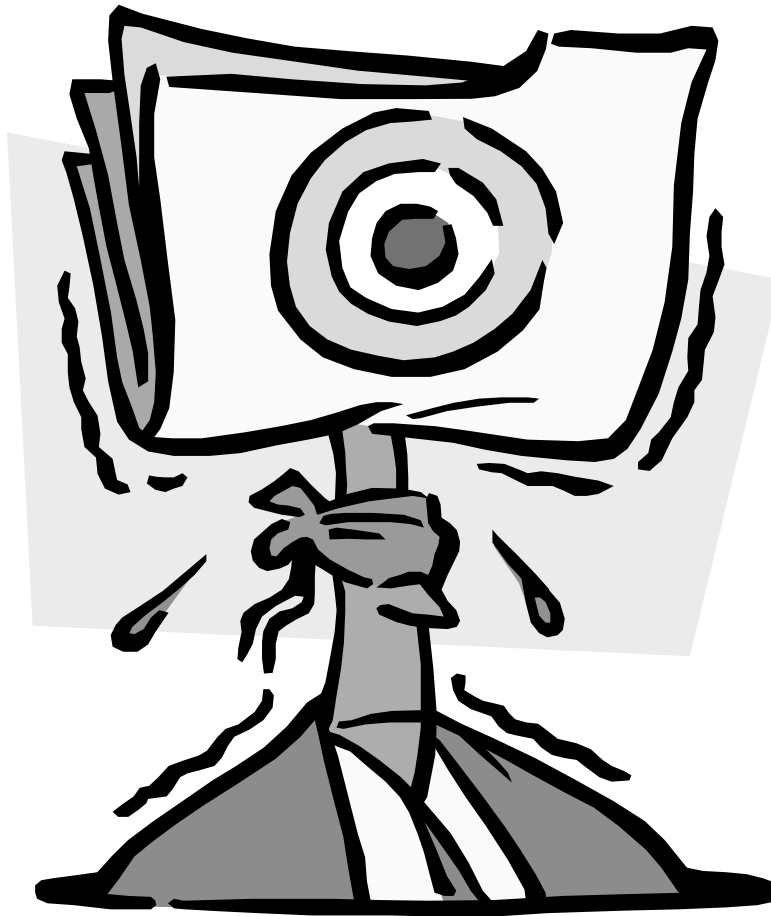


OLAP 11g Changes

- Can Create AWs in 11g mode (automatic views)
- If no 11g mode, have same flexibility as 10g



QUESTIONS?





Oracle BI and Vlamis Sessions



609: Working on Projects Remotely

Tuesday, April 17, 2007 9:45 AM - 10:45 AM (Surf D)



251: Oracle's Business Intelligence Roadmap

Tuesday, April 17, 2007 3:30 PM - 4:30 PM (Reef C)



453: Building Cubes, Analyzing Data in 2 Hrs (Hands-on)

Wednesday, April 18, 2007 11:00 AM - 12:45 PM (Palm B)



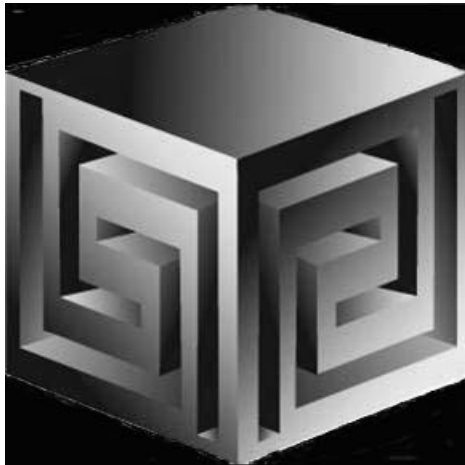
287 : Oracle Database 11g: DW and BI

Thursday, April 19, 2007 8:30 AM - 9:30 AM (Lagoon D)

Using Warehouse Builder for Business Intelligence

Collaborate '07

Session #226



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