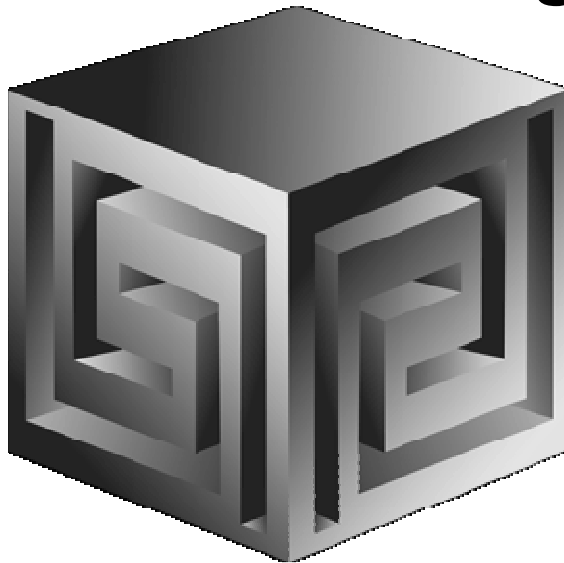# Using Warehouse Builder for Business Intelligence

Oracle OpenWorld '07

Session S291027

Chris Claterbos

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Vlamis Software Solutions, Inc.

http://www.vlamis.com

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, Consulting Manager**
  - ❑ Consulting and Development Manager for Vlamis Software Solutions, Inc.
  - ❑ 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

Using OWB to Create OLAP Databases

- Introduction
- Oracle 11g and OLAP
- What is OWB?
- What is New in OWB 11g?
- Oracle 10/11g Integration
- Design objects
- The Process
- Demonstration
- Managing an OLAP project
- Tips and Issues
- 11g OLAP New Features
- Questions

2006 and 2007 have been important years for Business Intelligence!

Market Position

QuickTime™ and a
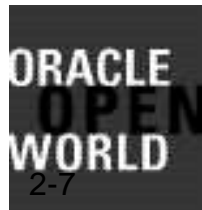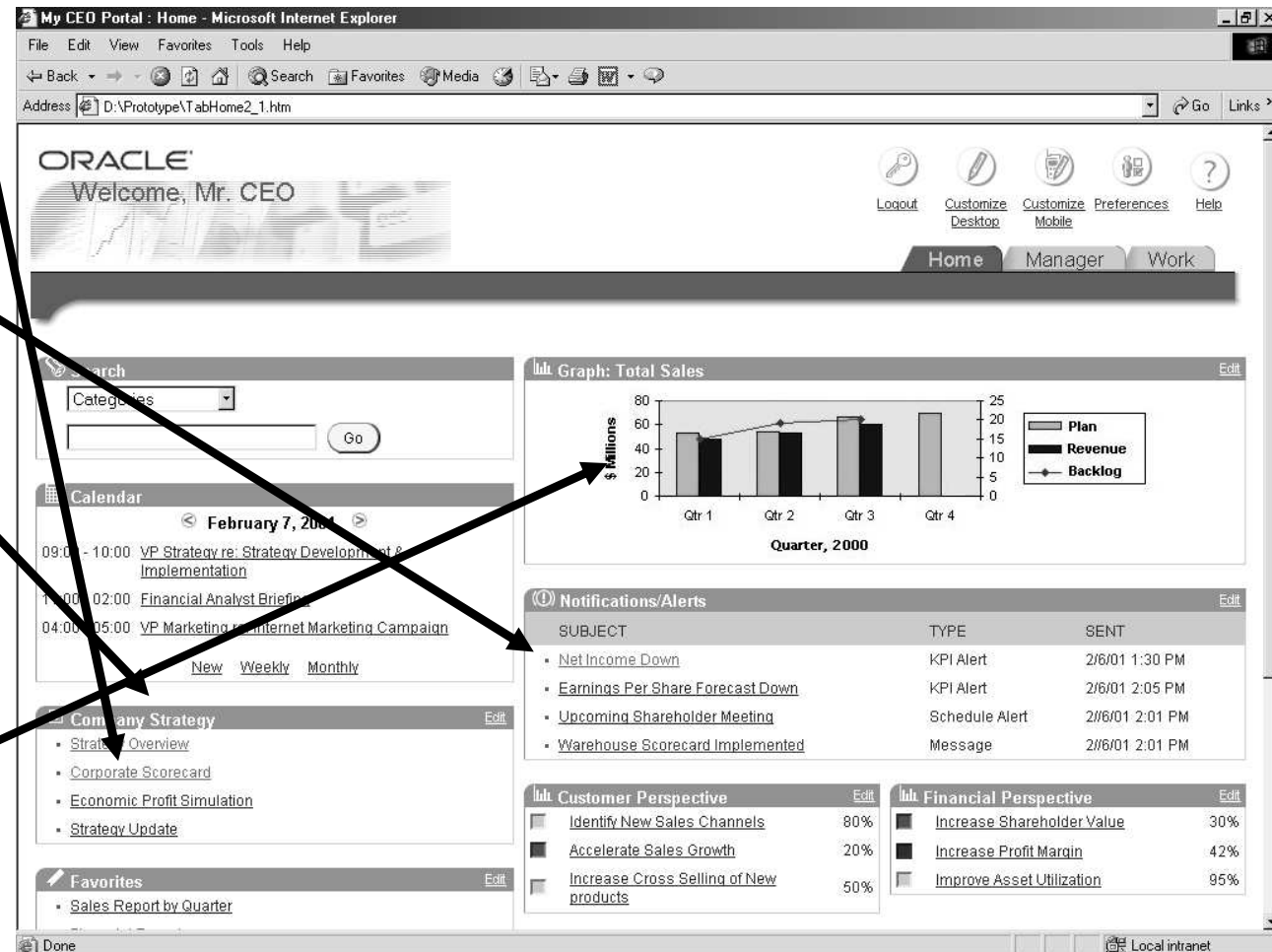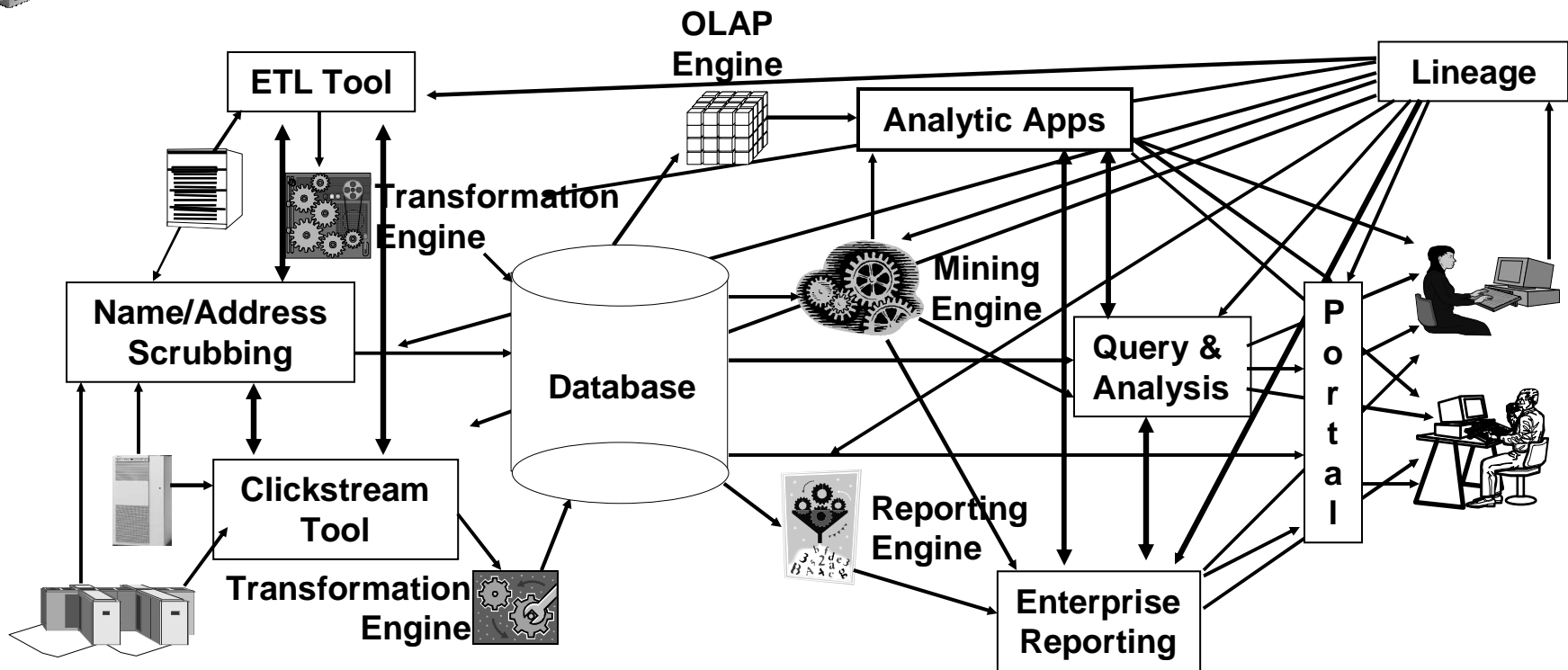decompressor
are needed to see this picture.

Customers need a Unified View
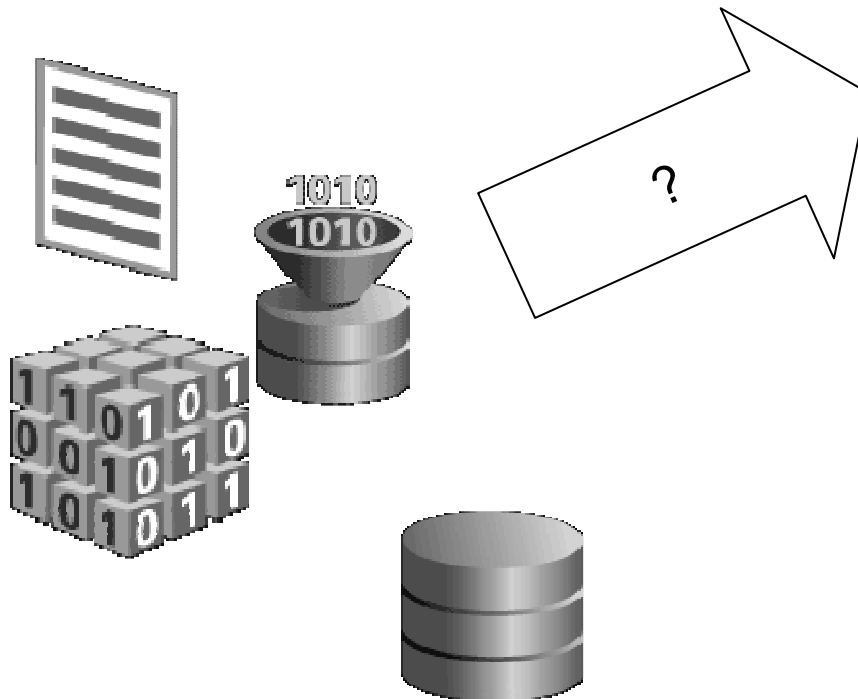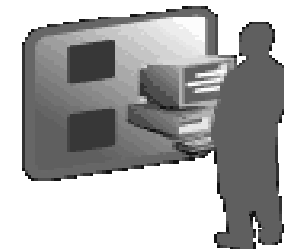

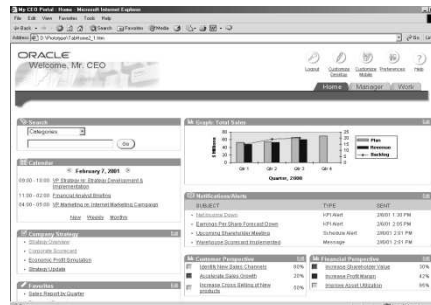Planning

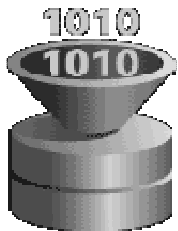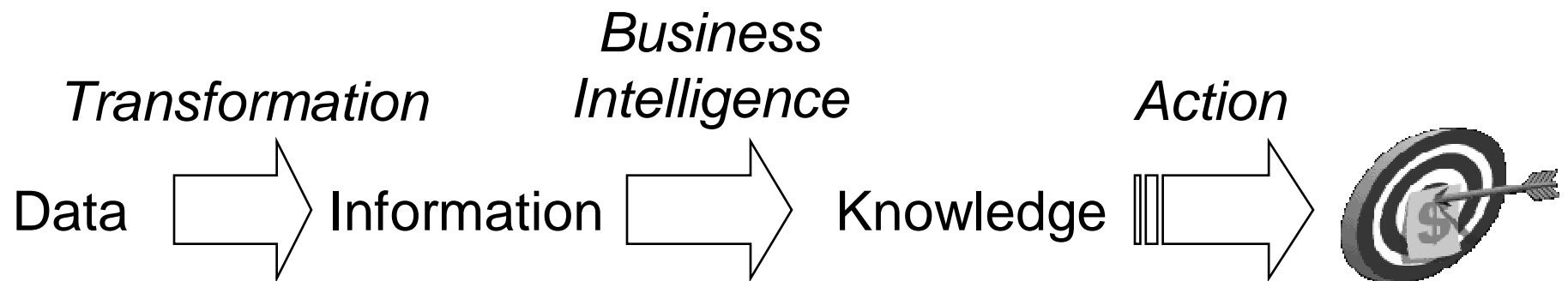Monitoring

Analysis

Reporting

Business Intelligence Market
Multi-Vendor, Un-integrated
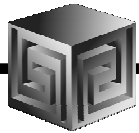

- Protracted and complex implementation
- Escalating maintenance costs
- Software *and Metadata* Integration is key!

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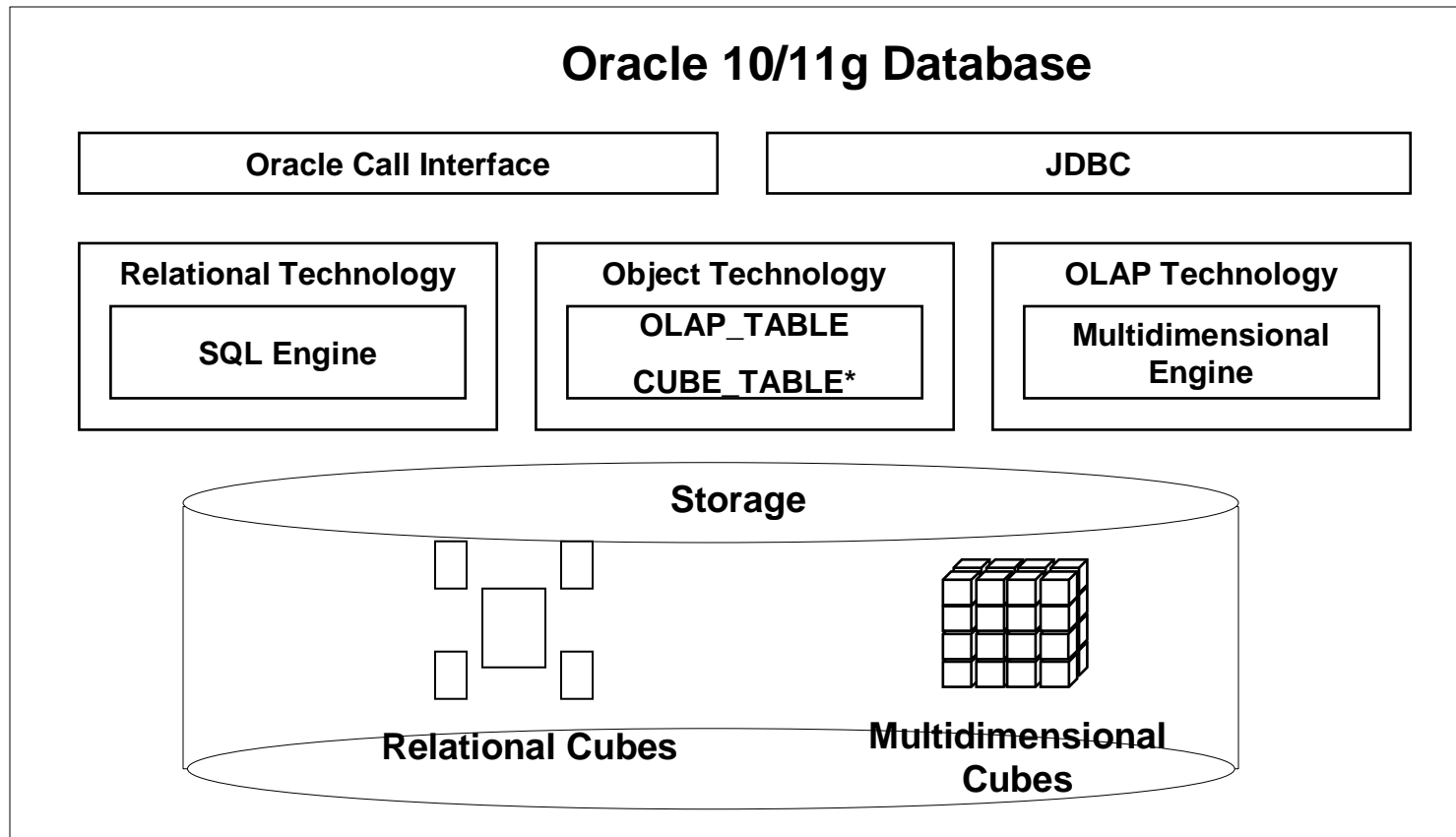
How do I get from Raw Data to a Unified View?

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Turning Data into Profit....

Data → Information → Knowledge → (target/profit)

Transformation   *Business Intelligence*   *Action*

ORACLE OPEN WORLD

Oracle RDBMS - MDDS

Oracle 10/11g Database

Oracle Call Interface	JDBC

Relational Technology

SQL Engine

Object Technology

OLAP_TABLE

CUBE_TABLE*

OLAP Technology

Multidimensional Engine

Storage

Relational Cubes

Multidimensional Cubes

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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
- OLAP Cube can replace Materialized Views (11g)

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

Some New Features in OWB 11g

- **New Connectivity Options**
  - ❑ **11g Database Support**
  - ❑ **Siebel (BIEE) Connector**
  - ❑ **Gateway 11g Support**
- **Simplified Installation**
  - ❑ **Installs with the DB**
  - ❑ **Includes Workflow with OWB install**
- **Enhanced SQL Generation**
  - ❑ **Advanced aggregation support (Cube/Rollup)**
  - ❑ **DML error logging in mappings**

Some New Features in OWB 11g

- **More Dimensional Support**
  - ❑ **Hierarchy versioning**
  - ❑ **Support for multiple hierarchies**

Next Release ADDS!

- **Support for OBI EE**
  - ❑ **Derive metadata from data models in OWB**
  - ❑ **Create Objects in OBI EE**
- **Generates OBI EE repository File**

Why OWB to build Dimensional Warehouse?

- Integrated with entire Oracle stack

- Graphically designs, generates, and deploys

- Only ETL tool that understands Oracle OLAP

- Uses 10/11g 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

Key OWB themes

- Improved User Interface

- Enabling Quality Information

- Enabling Business Intelligence

- Enabling Expertise capture

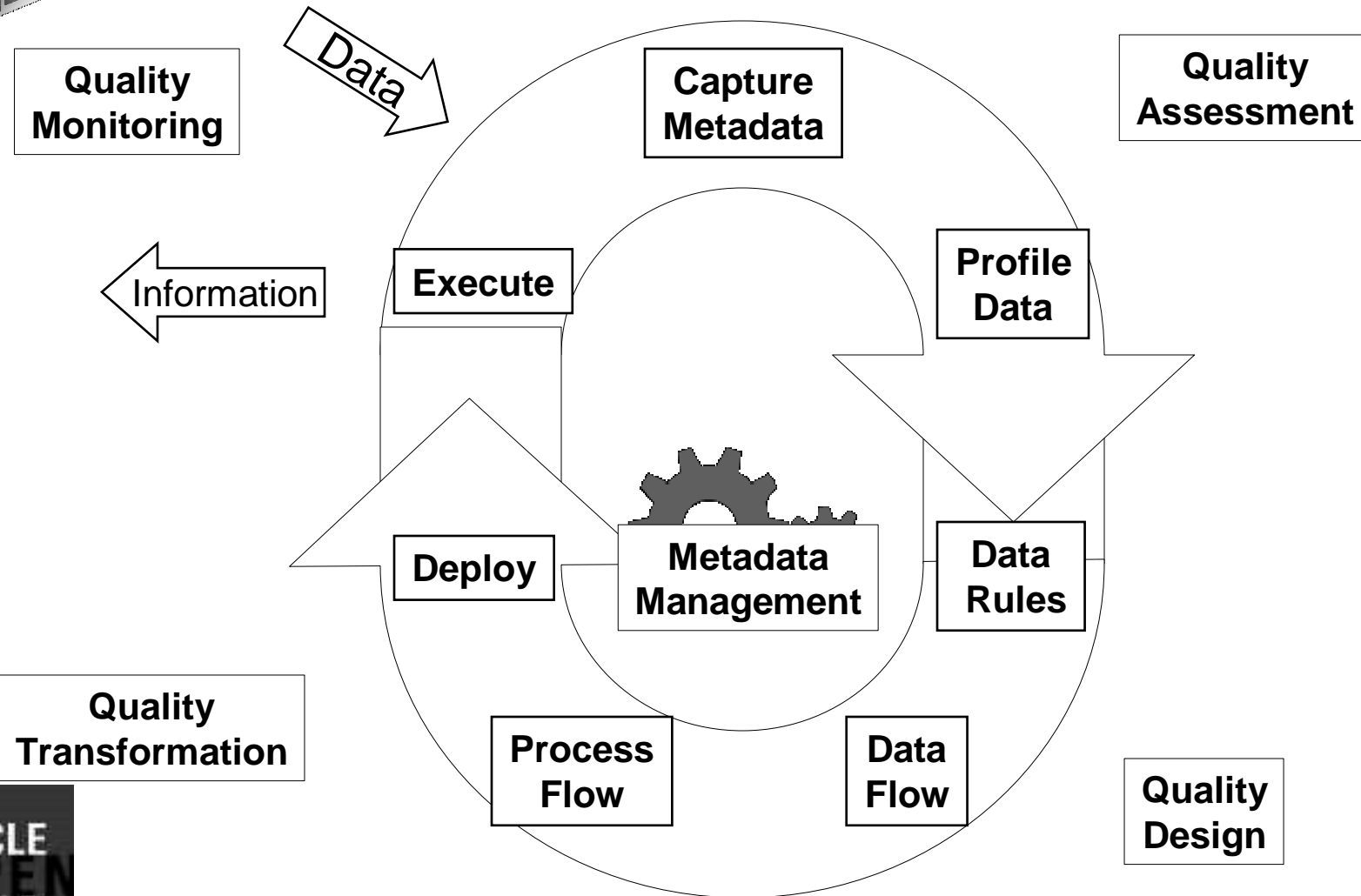- Signification improvements in usability and functions over previous releases

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

Quality Monitoring

Data

Capture Metadata

Quality Assessment

Information

Execute

Profile Data

Deploy

Metadata Management

Data Rules

Quality Transformation

Process Flow

Data Flow

Quality Design

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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

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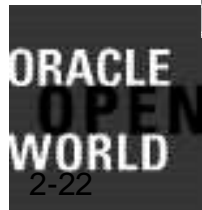
Business Intelligence Object Derivation

Create and Derive Business intelligence objects

- Oracle OLAP Cubes & Dimensions
- OracleBI Discoverer EUL
- OracleBI Beans Reports

Included in Lineage and Impact analysis!

Designer

Relational, OLAP & Mining Catalogs 10g Scheduler, Workflow

Warehouse Builder

Discoverer

BI Beans

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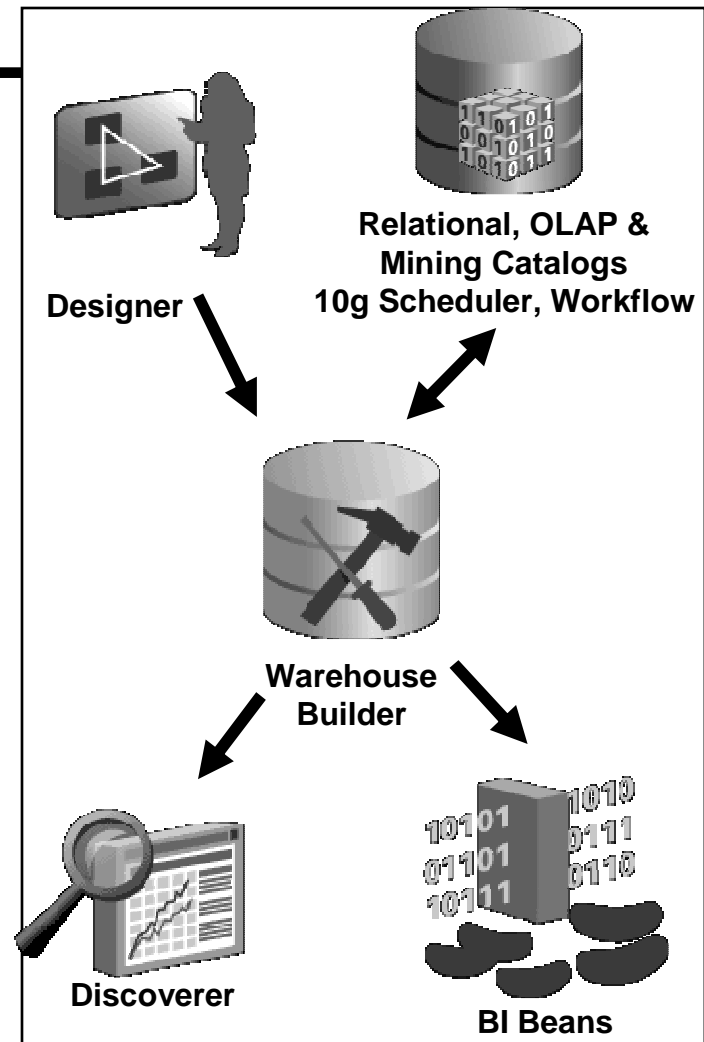
End-to-End Meta Data Integration

CWM
Import

Custom
App

File

ERP
Database

Legacy

Designer

Relational, OLAP &
Mining Catalogs
10g Scheduler, Workflow

CWM
Export

Warehouse
Builder

Discoverer

BI Beans

iCal

XPDL

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2-24

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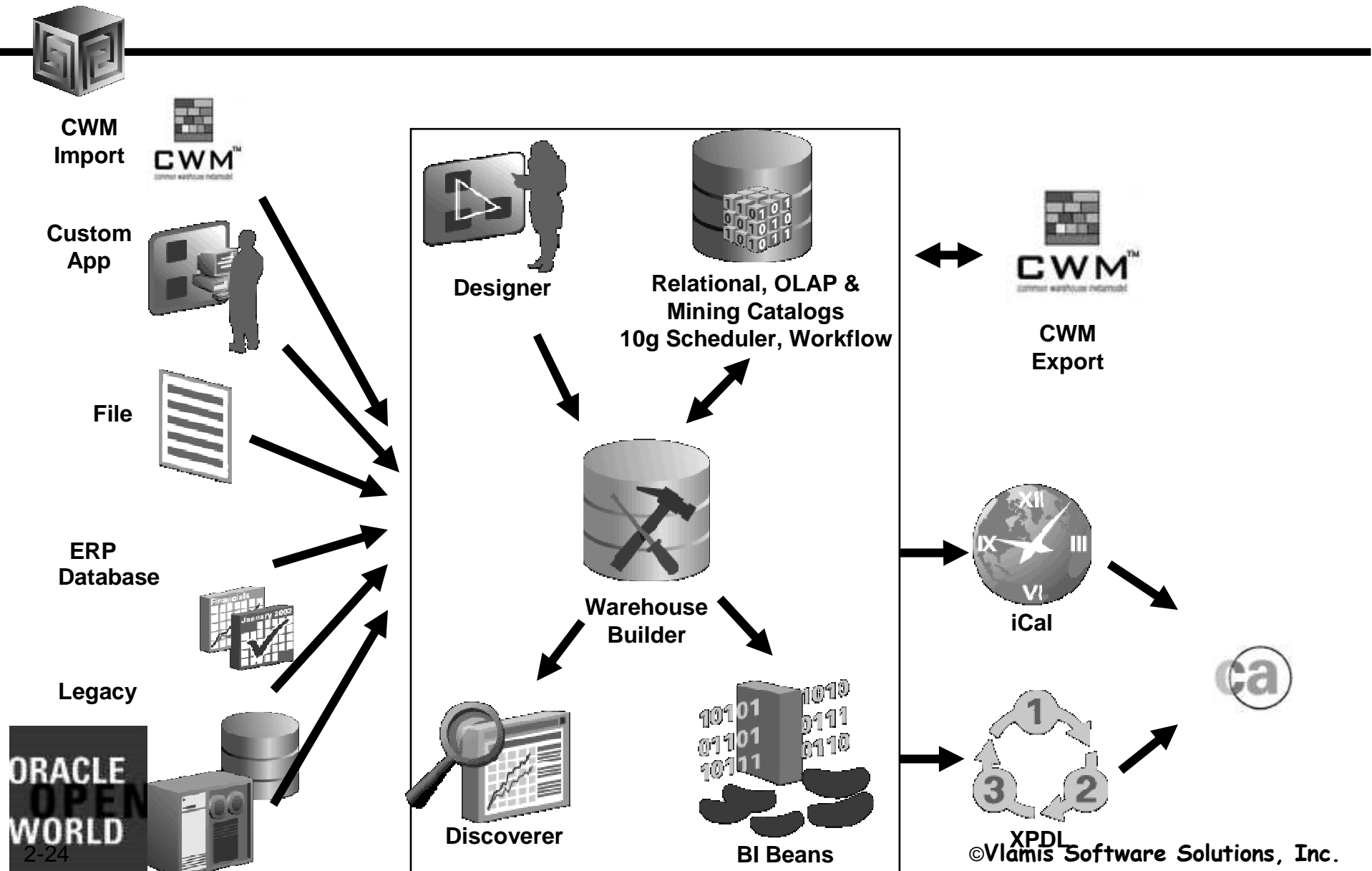
Components: Overview

Components of Oracle Warehouse Builder

- ❑ Repository (CWM)
- ❑ Graphical User Interface
- ❑ Code Generator
- ❑ Integrators
- ❑ Control Center

Components: *OWB User Interface*

Java Based

Same look and feel as Designer

Significantly simplified over previous versions
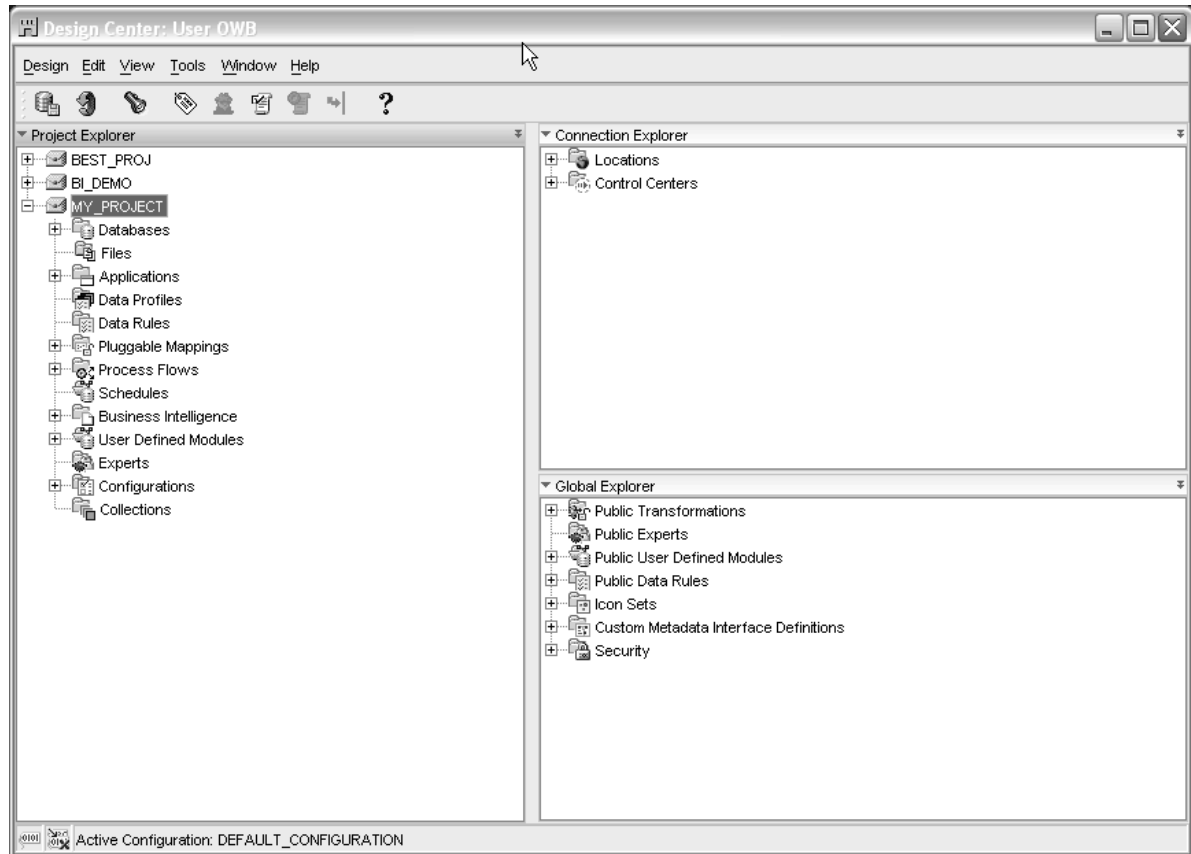
Components: *OLAP Wizards*

- Full Integration support for OLAP AWs

- Supports 10g OLAP as a Target and 11g in 10g mode for 11g

- Full Life Cycle support

- Viewing data is integrated into new interface

10/11g 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)

- Currently Scripts are not 11g Mode compatible

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 OLAP or JUST DEPLOY!**
- **View/Modify in OWB**
- **Run Application**
- **Gather Statistics / Tune**

Design and Generate Schema

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	☐	
WEEK_START_DA...	16	DATE				☐	
WEEK_END_DATE	17	DATE				☐	
WEEK_TIME_SPAN	18	NUMBER		0	0	☐	
MONTH_ID	19	NUMBER		0	0	☐	
MONTH_OF_QUA...	20	NUMBER		0	0	☐	
MONTH_OF_YEAR	21	NUMBER		0	0	☐	
MONTH_START_D...	22	DATE				☐	
MONTH_END_DATE	23	DATE				☐	
MONTH_TIME_SPAN	24	NUMBER		0	0	☐	
QUARTER_ID	25	NUMBER		0	0	☐	
QUARTER_OF_YE...	26	NUMBER		0	0	☐	

Add | Remove

Help | OK | Cancel

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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 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!

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Time Dimension

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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)**

Finished Cube

Deploy

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;
```

ORACLE OPEN WORLD

OWB in Action
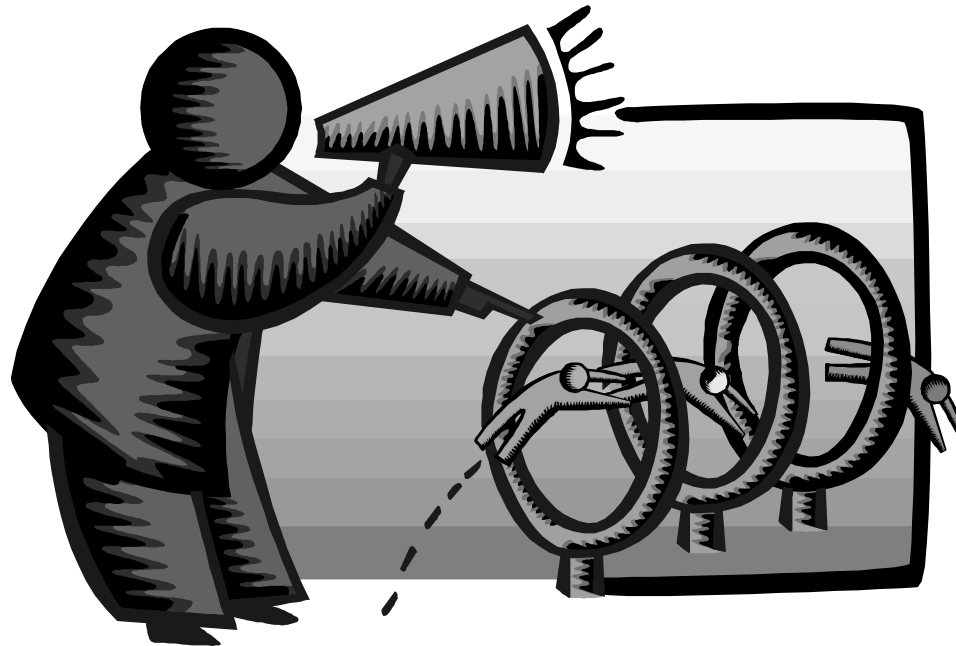
Issues with OWB and 11g OLAP

- OWB generated 10g mode Scripts

- Migration tools not available yet (Late '07 early '08)

- Can be done now but need to manually "Clone" 10g design

- Use AWM 11g to "Clone" 10g design (really not hard! --- see next slides)

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 small initial project. Deliver value quickly

- Decide on set of terminology at beginning

- Use embedded-total objects

- Show instances in addition to "levels" in diagrams

- Prototype and design iteratively

- Involve users early on. Listen to feedback

Oracle OLAP 11g What is New?

- **Oracle 11g is currently available for Linux and Windows (32bit)**

- **Oracle OLAP has many NEW Features!**

  - ❑ **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)**

OLAP 11g Changes

- **Views automatically created for SQL access to AWs – Dimensions and Cubes!**
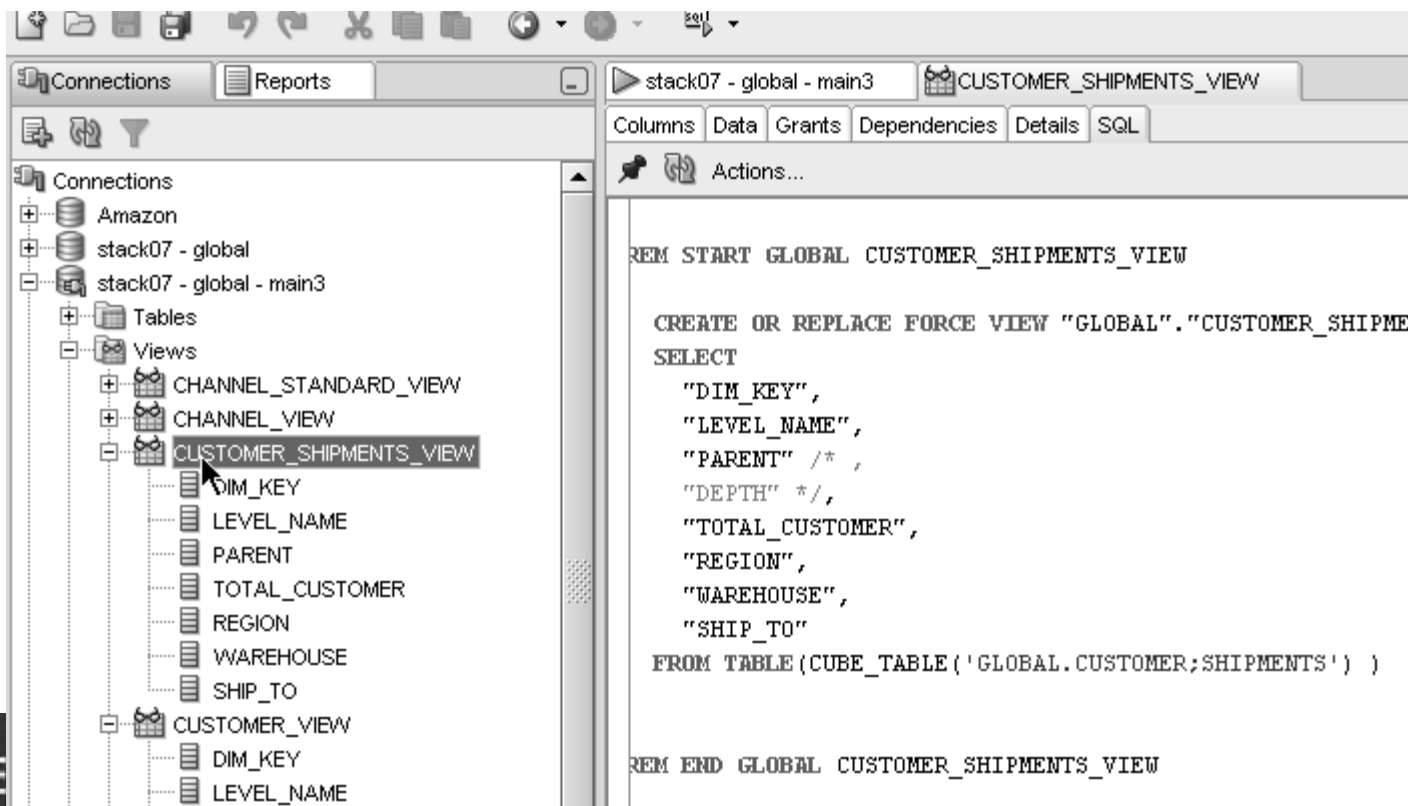
OLAP 11g Changes

- **Views easily accessed from SQL Developer**

OLAP 11g Changes

- **Automatic views accessible from AWM**

OLAP 11g Changes

- **Query Rewrite knows about AWs now**

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					

Standard Disclaimer – Beta software! No promises!

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OLAP 11g Changes

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

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: [slider] `21`

0   25   50   75   100

○ Level-Based Presummarization

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

Dimension:

| TIME |
| CUSTOMER |
| PRODUCT |
| CHANNEL |

	Levels
☐	ALL_TIMES
☐	CALENDA_YEAR
☐	MONTH
☐	QUARTER

OLAP 11g Changes

- **Native support for AWs with skip level and ragged hierarchies**

OLAP 11g Changes

- **Create security policies based on hierarchies**

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)

Standard Disclaimer – Beta software! No promises!

OLAP 11g Changes

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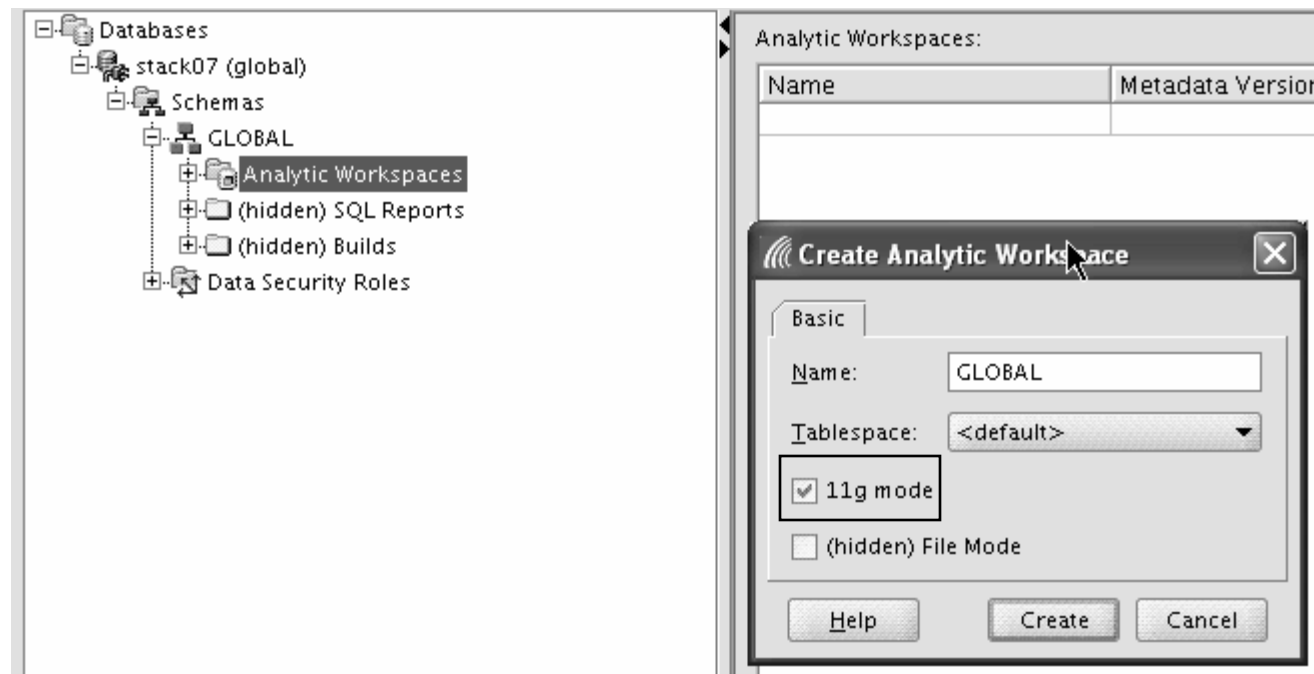
Conclusions

- **We can design complex 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**

  - ❑ **11g OLAP Mode not Supported yet!**

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!

Platforms, Packaging

- **Available On:**
  - ❑ **10g Win32(Windows NT/2000/XP/2003), Win64(XP/2003), Linux x86, Linux Itanium, Solaris, HP-UX (RISC), HP-UX (Itanium), AIX, Tru64**
  - ❑ **11g Linux and Windows**

- **Packaging:**
  - ❑ **Included with the Database!**
  - ❑ **Oracle Business Intelligence SE**

How to Get Started?

- **Download OWB 11g R1**

- **Download and install Samples**

- **Read Reviewer's Guide if necessary**

- **Resources:**
  - ❑ **OTN**
  - ❑ **Discussion Forums**

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Address http://www.oracle.com/technology/tech/bi/index.html

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Business Intelligence & Data Warehousing 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

Learn M
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  Technical Overvie
. Oracle Business
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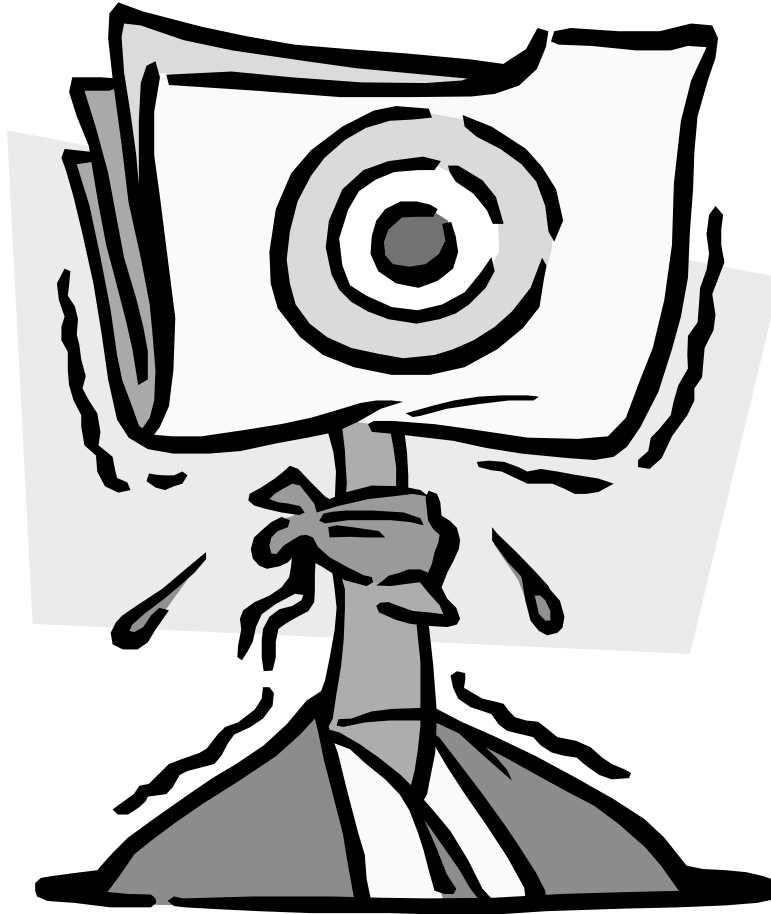. Oracle by Examp
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. BI Developer Trac

QUESTIONS?

Oracle BI and Vlamis Sessions

Integrating Oracle BI Enterprise Edition and SOA: Step-by-Step

November 13   3:15-4:15 PM   Moscone South 301

Mark Rittman, Rittman Mead Consulting

Oracle BI Financial Services ASaP

November 15   2:30-3:30 PM   Moscone West 3022

Dan Vlamis, Vlamis Software Solutions, Inc.

Save the Date!

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Technology and Applications Forum for the Oracle Community

April 13 – 17, 2008

Colorado Convention Center
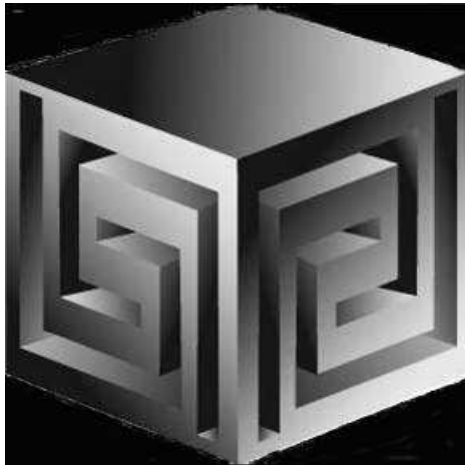
Denver, Colorado

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  - ❏ **Discussion Forums**
  - ❏ **Access to Local and Regional Users Groups**
  - ❏ **5 Minute Briefing:Oracle**
  - ❏ **Volunteer Opportunities**

Using Warehouse Builder for Business Intelligence

Oracle OpenWorld '07

Session S291027

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