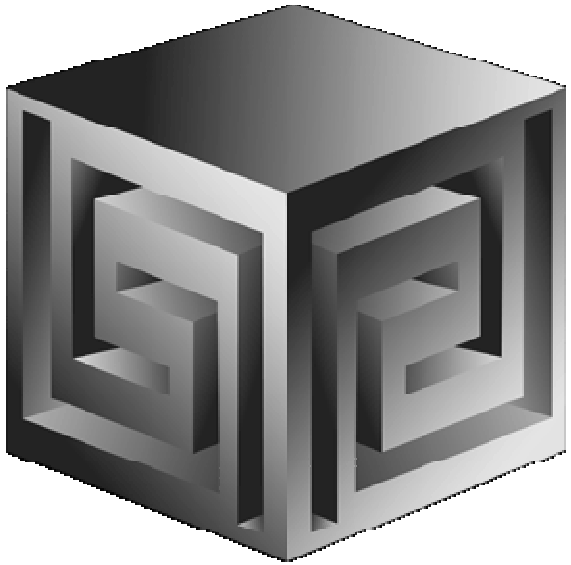
Oracle BI and Oracle OLAP—What's All This About?

October 2005



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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

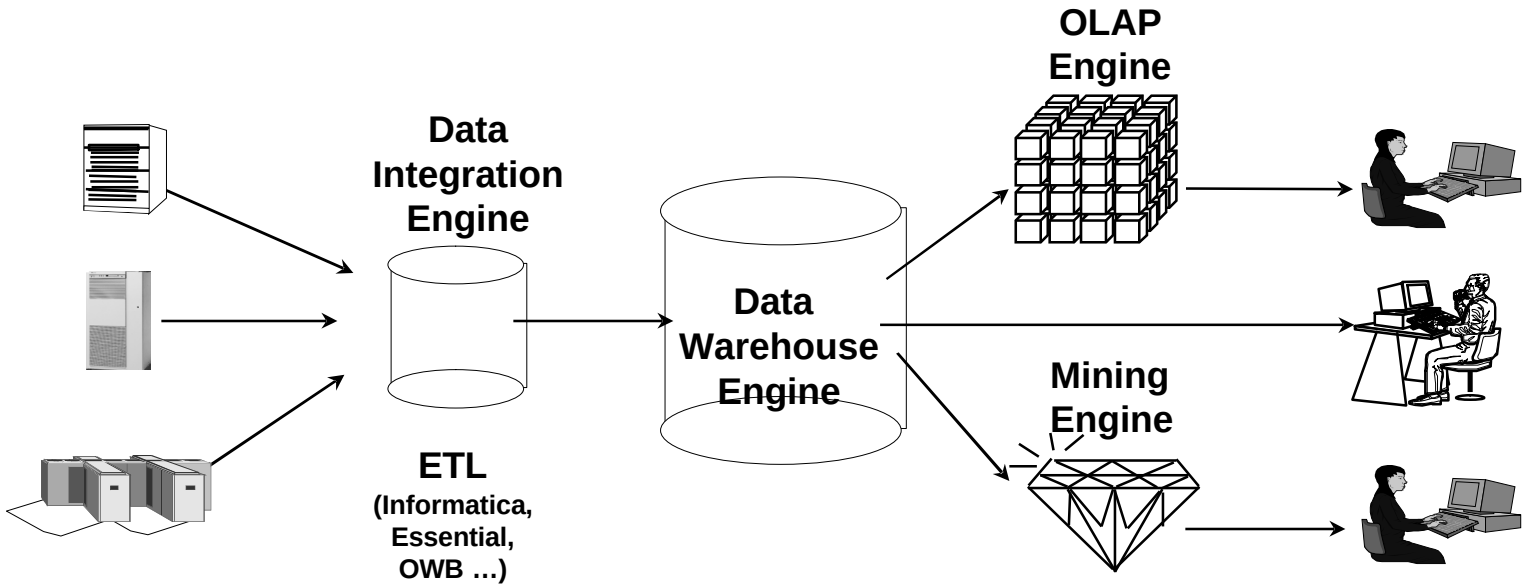
Who Am I?

- **Dan Vlamis, President of Vlamis Software**
  - **Developer for IRI (former owners of Express)**
  - **Founded Vlamis Software in 1992**
  - **Beta tester and early adopter of Oracle OLAP**
  - **Expert speaker and author**
  - **“Techie” on OLAP DML**
  - **Recognized expert in Express and OLAP industry**

Agenda

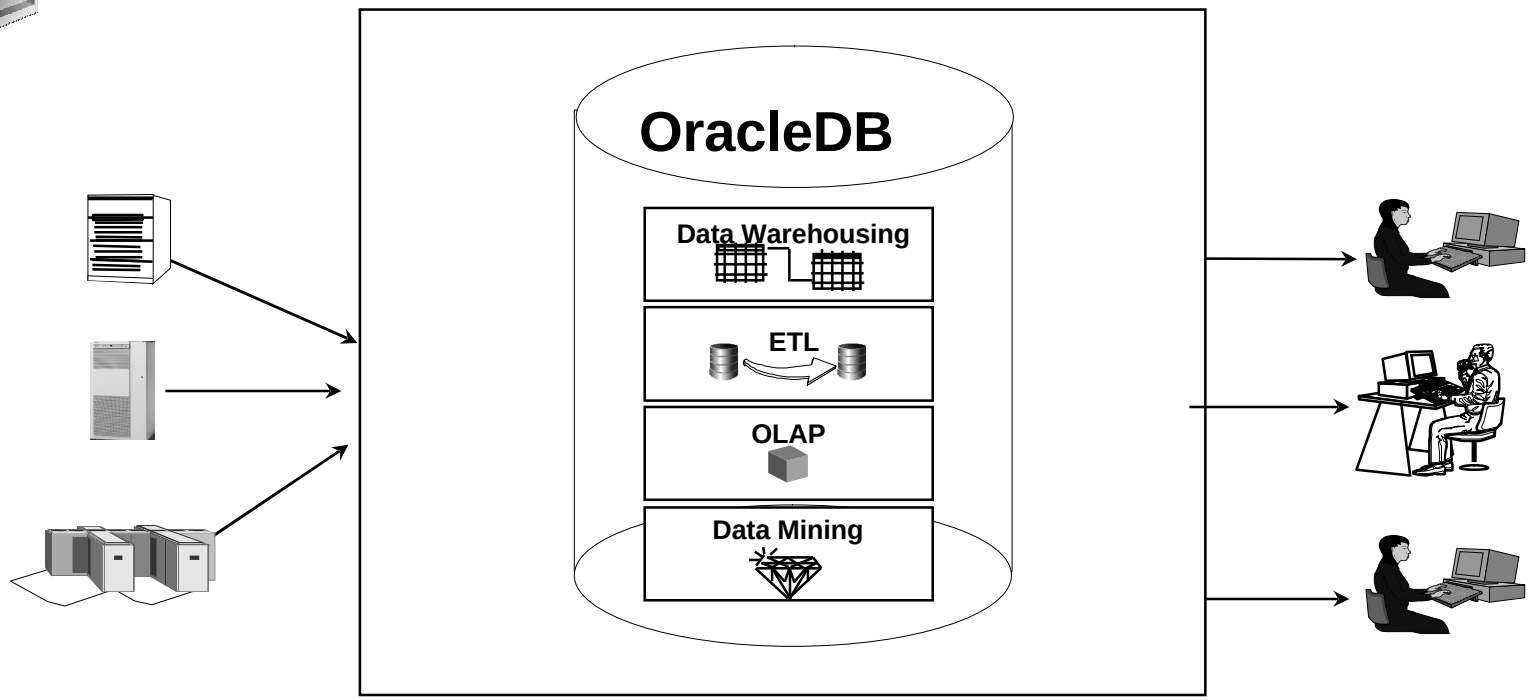
- What are the parts of Oracle BI?
- How does Oracle OLAP fit in?
- OLAP Cubes and Analytic Workspaces
- Building Analytic Workspaces
- Front-end options
  - Discoverer
  - BI Beans
  - Spreadsheet Add-in
- Case studies of Oracle OLAP in the "real world"

Business Intelligence the Old Way



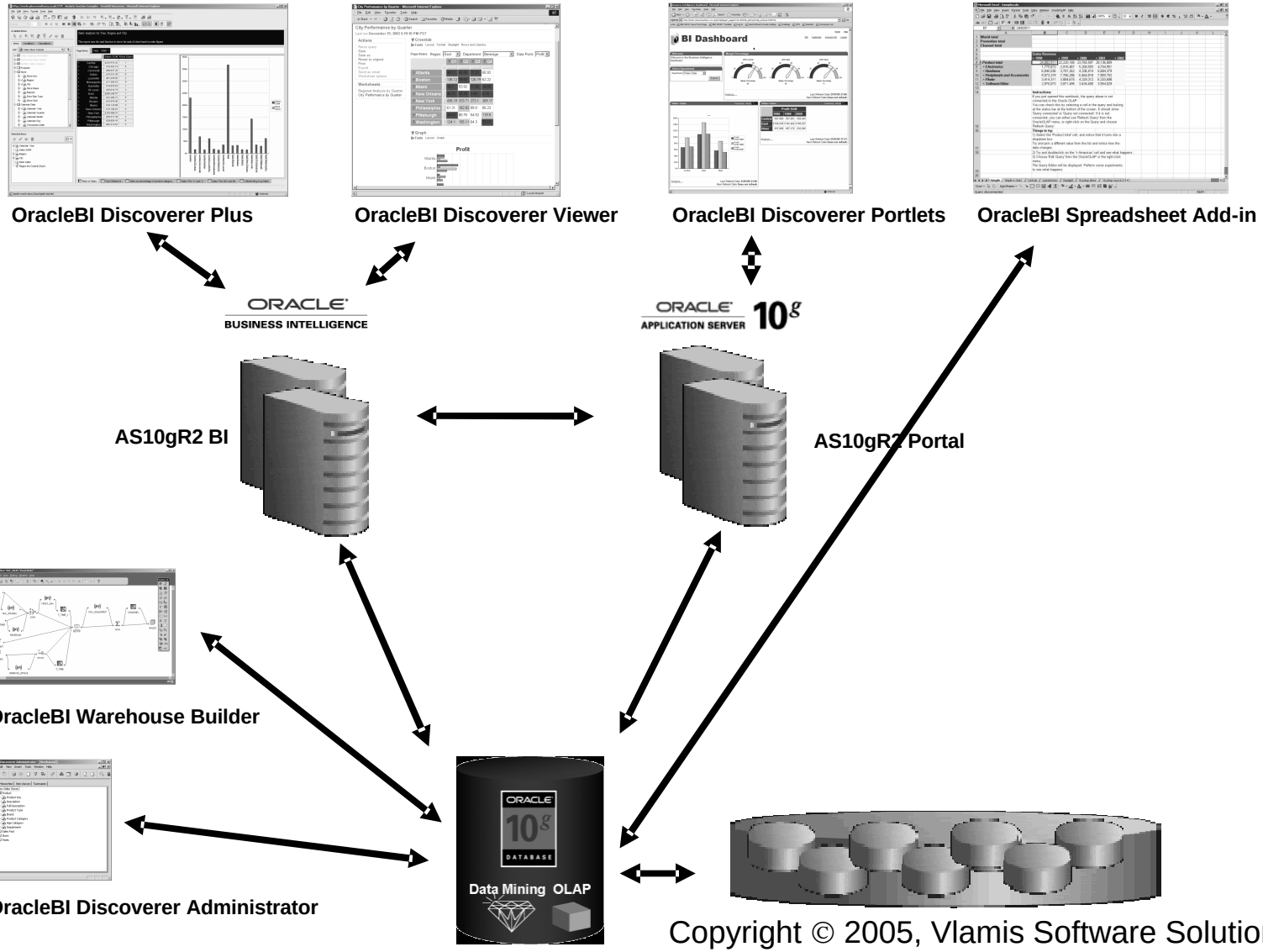
- Special purpose engines for differing tasks
- Metadata migration tools ease replication
- User interfaces generally different for different tools

BI the New Way: Oracle DB



- Single business intelligence platform
  - –Reduce administration, implementation costs
  - –Faster deployment & Improved scalability and reliability

Oracle BI Product Architecture



Definition of OLAP

OLAP stands for On Line Analytical Processing**.**
That has two immediate consequences: the *on line* part requires the answers of queries to be fast, the *analytical* part is a hint that the queries itself are complex.

i.e. Complex Questions with FAST ANSWERS!

Why a Separate OLAP Tool?

- Empowers end-users to do own analysis
- Frees up IS backlog of report requests
- Ease of use
- Drill-down
- No knowledge of SQL or tables required
- Exception Analysis
- Variance Analysis

What Does OLAP Add to a DW?

- 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 Does Oracle OLAP Add to a DW?

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- Easy selection of data with business terms
- OLAP DML with what-if, forecasting
- Platform for extensions

Not exposed with Discoverer

OLAP Option – High-level View

- Advanced analytics
- Integrated in RDBMS
- Easy to develop
- Easy to use
- Facilitate collaboration
- Flexible deployment
- Scaleable and performant
- True Relational – Multidimensional database

OLAP Option – Technical View

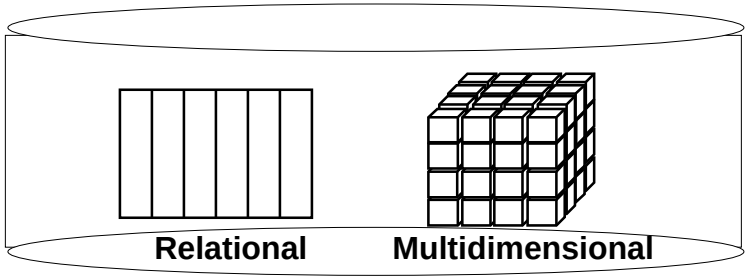
The OLAP Option consists of five key elements:

1. **Multidimensional data types, used for holding cubes and dimensions, temporary or stored permanently in LOBs within schemas**
2. **A multidimensional calculation engine**
3. **A Java development framework with reusable OLAP components**
4. **Extensions to SQL to allow SQL access to these multidimensional datatypes**
5. **An additional layer of OLAP-specific metadata known as the OLAP Catalog**

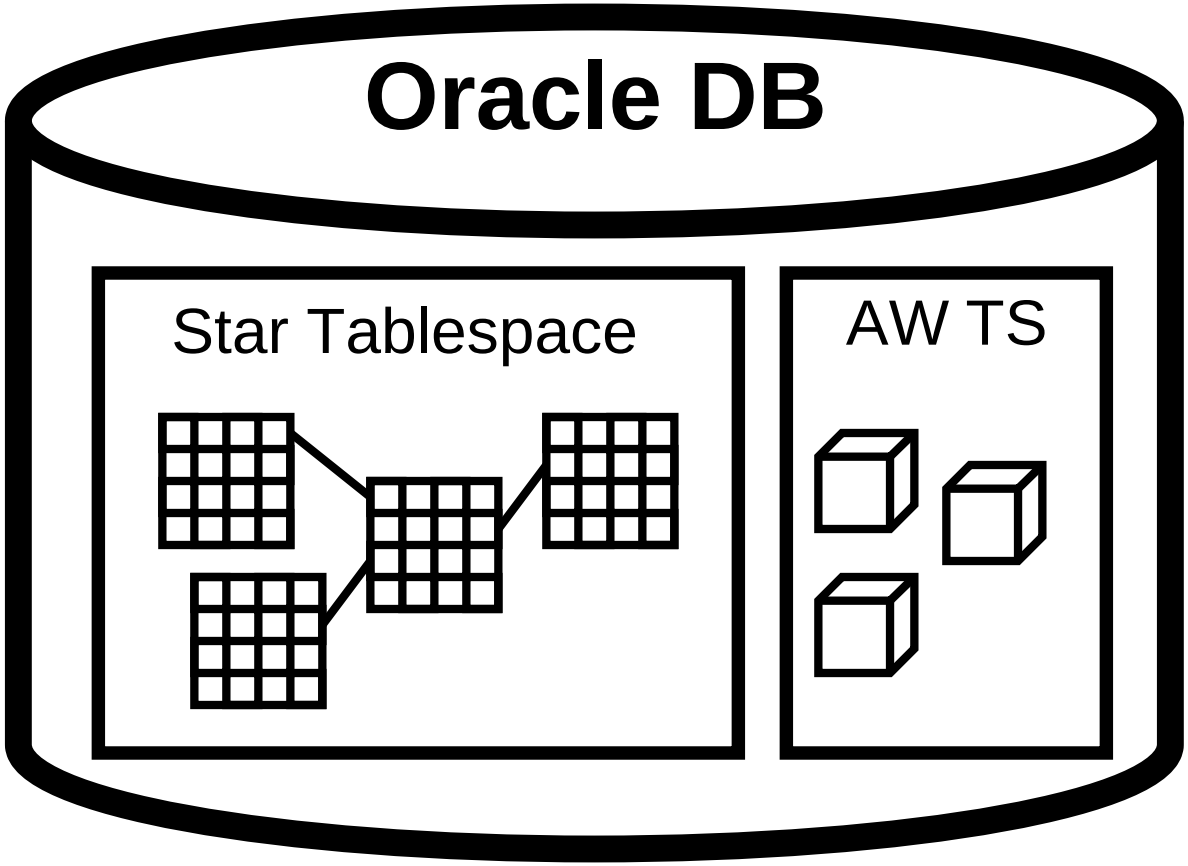
ROLAP vs. MOLAP

- **What is ROLAP? (Relational)**
- **What is MOLAP? (Multidimensional)**

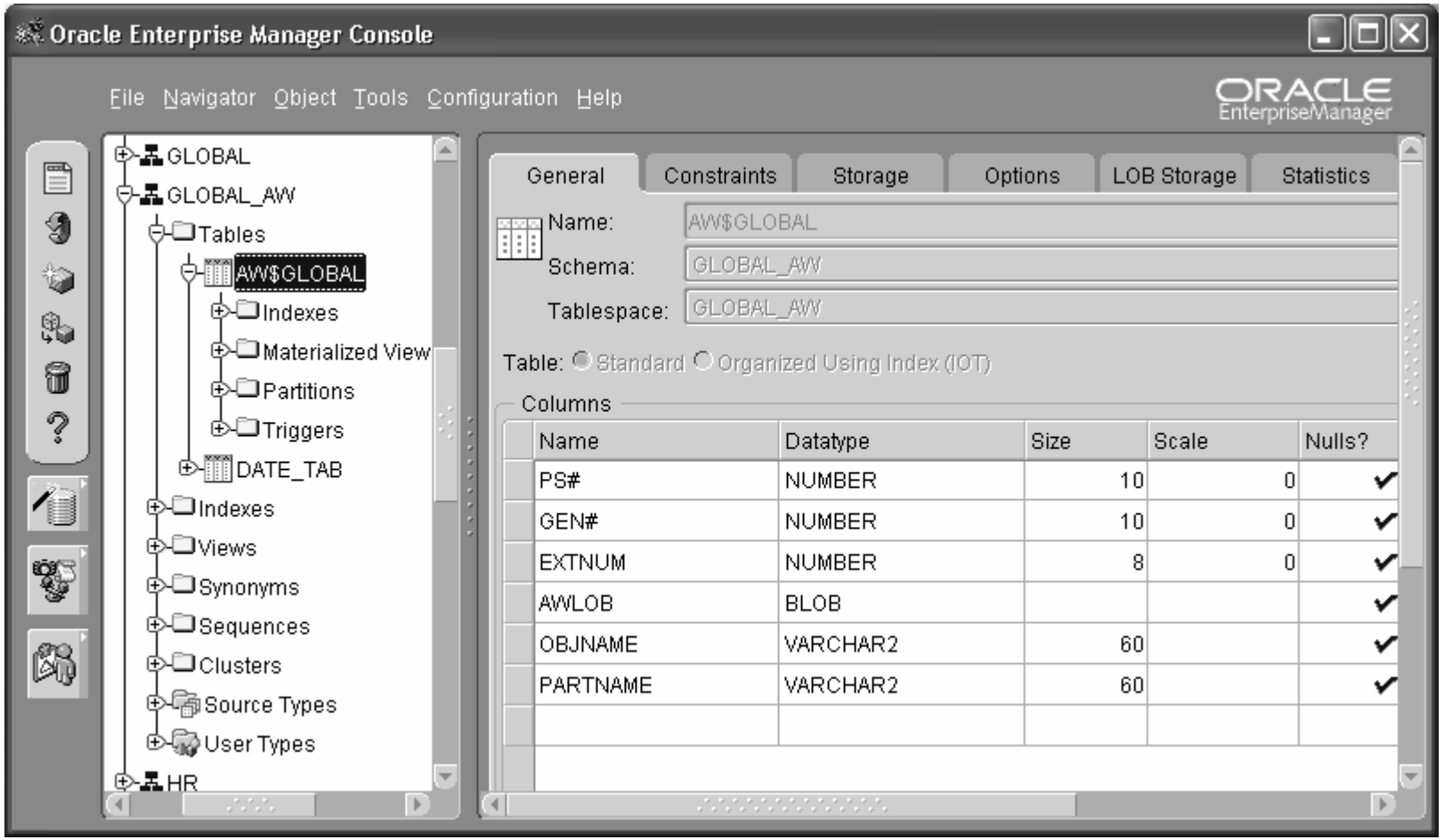
- **It's all in how the data is stored**



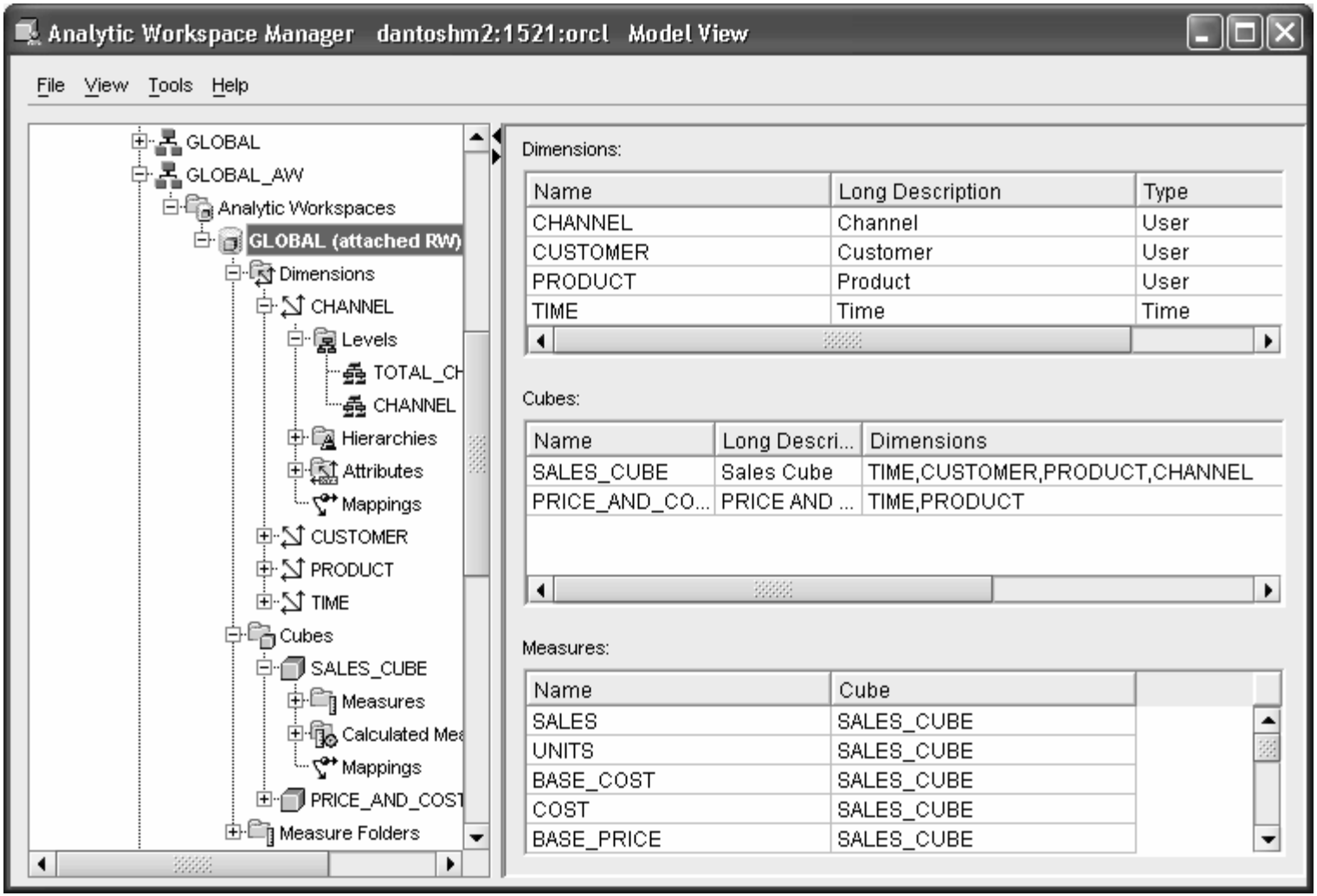
Analytic Workspaces Are Stored in Tablespaces in OLAP



What is an Analytic Workspace?

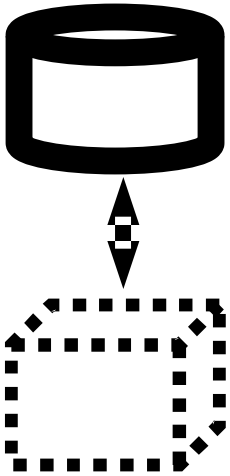


Managing Analytic Workspaces



Advantages of RDBMS Storage

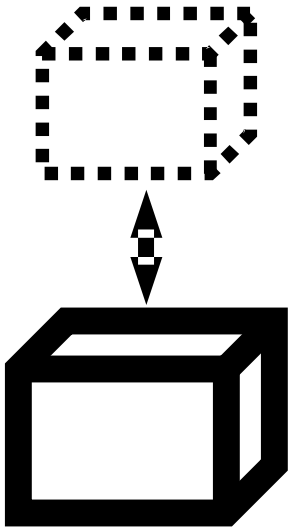
Oracle
Star Schema



- Store data in familiar RDBMS
- Easy access to data using SQL
- Can use materialized views
- Best for read-only applications
- Model with OWB
- Data may already be in schema

Advantages of AW Storage

- Faster multidimensional access
- Personal user workspaces
- Best for read/write applications
- Best for heavier analysis
- OLAP DML language



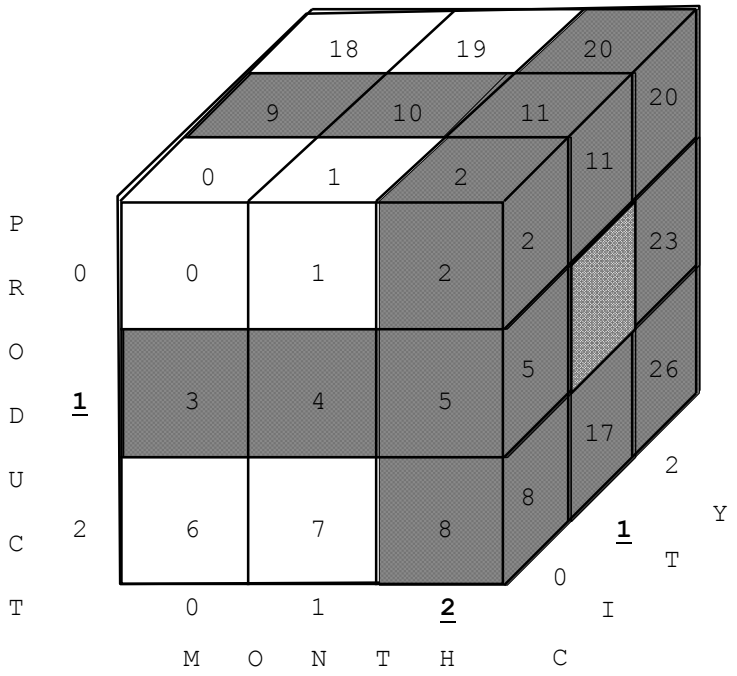
Analytic Workspace

Finding data is simple multiplication and addition

Formula for calculating cell offset:

month + product * (# of months) + city*(# of months * # of products)

2 + **1** * (3) + **1** *(3 * 3) = 14



Offset 14 * 8 bytes each = 112.
Fseek to byte 112 to find data.

See http://www.vlamis.com for
"How Does Express Really Work Anyway" for details.

Relational Cubes vs. AW Cubes

- Relational cubes include
  - **Star schema**
  - **OLAP catalog metadata**
  - **Summary data in materialized views**
- Analytic workspace cube include
  - **Analytic workspace built to the database standard form specification**
  - **OLAP catalog metadata in AW**

Cubes Defined

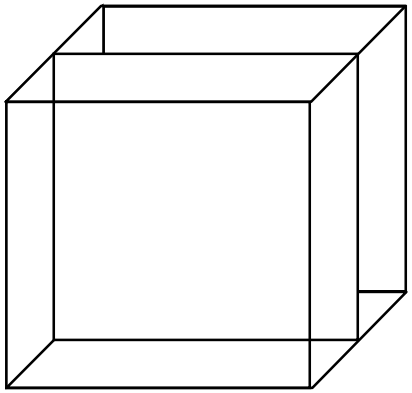
- **Definition:**
- **Cubes are collections of measures. They are a logical way to organize data. All measures in a cube share the same dimensionality**
- **Examples:**
  - **Sales_Cube (with Units, Dollars, Profit)**
  - **Finance_Cube (with Actual, Budget, Variance)**

What Are AW Cubes?

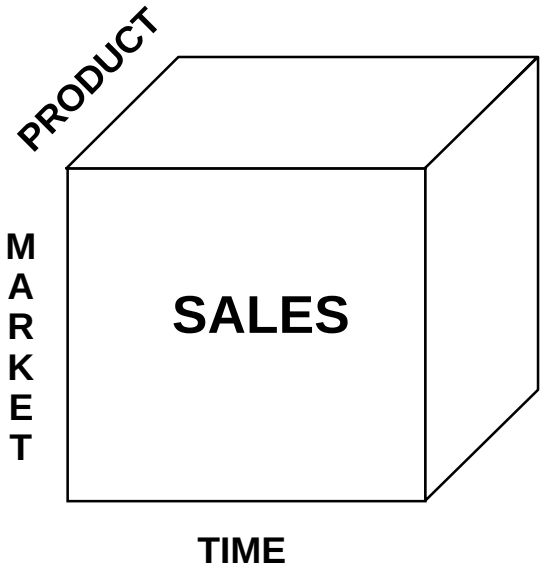
- Data stored as arrays
- Dimension values are internally integers
- Offset calculated using simple multiplication
- Offset tells exactly where to look for data
- Pages and segmentation complicate design
- Conjoints and composites handle sparsity

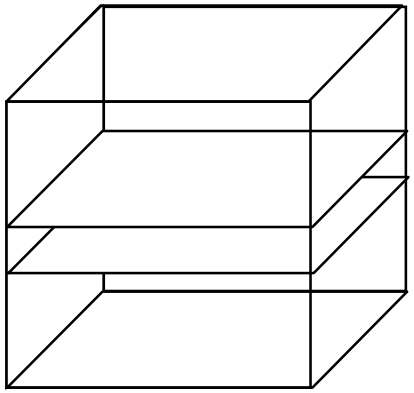
OLAP AW Stores Data in Cubes

Fast Flexible Access to Summarized Data

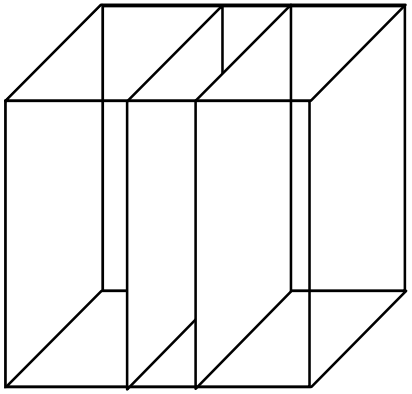


Product Mgr. View

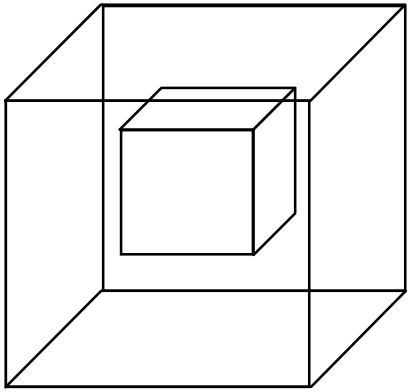




Regional Mgr. View

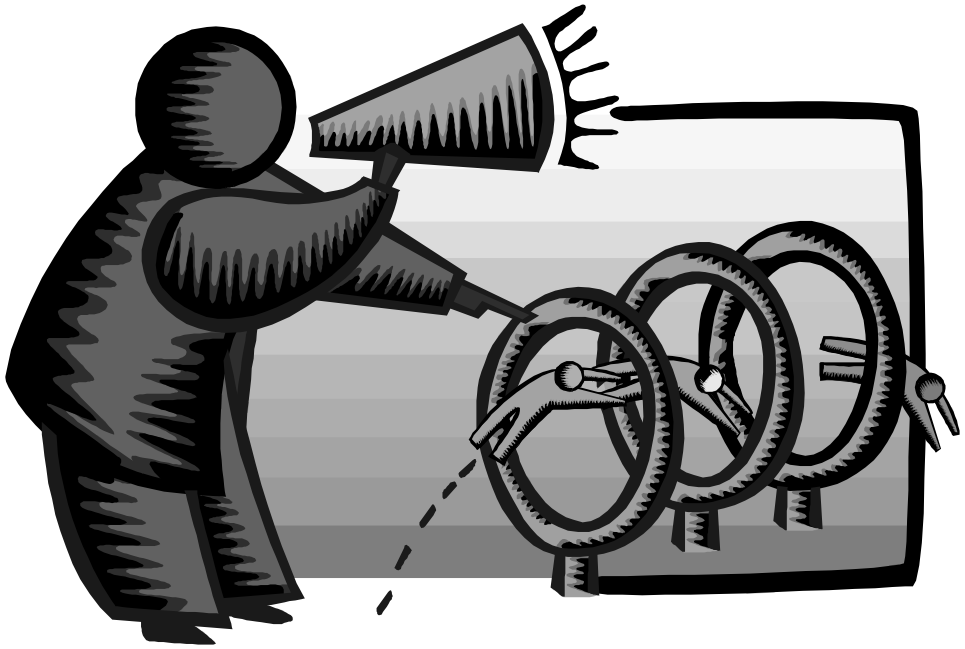


Financial Mgr. View



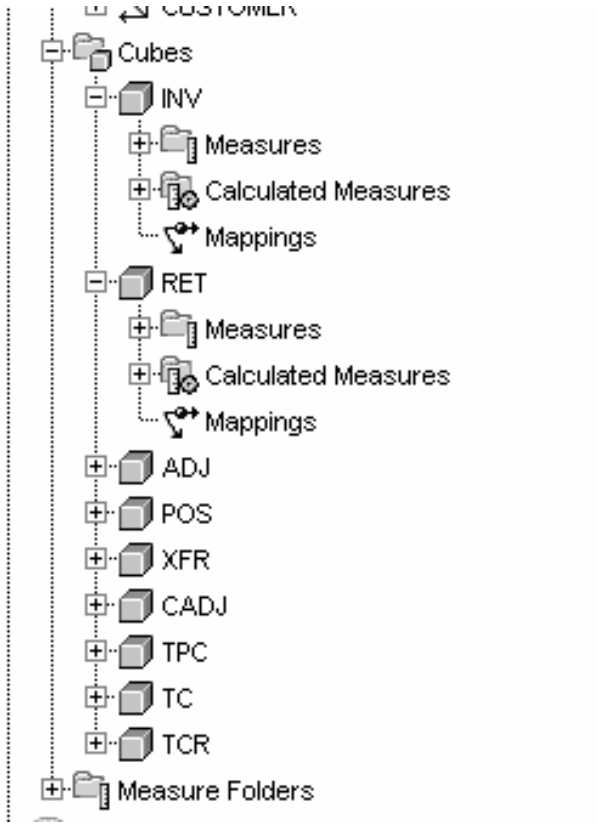
Ad Hoc View

Building Cubes in AWM

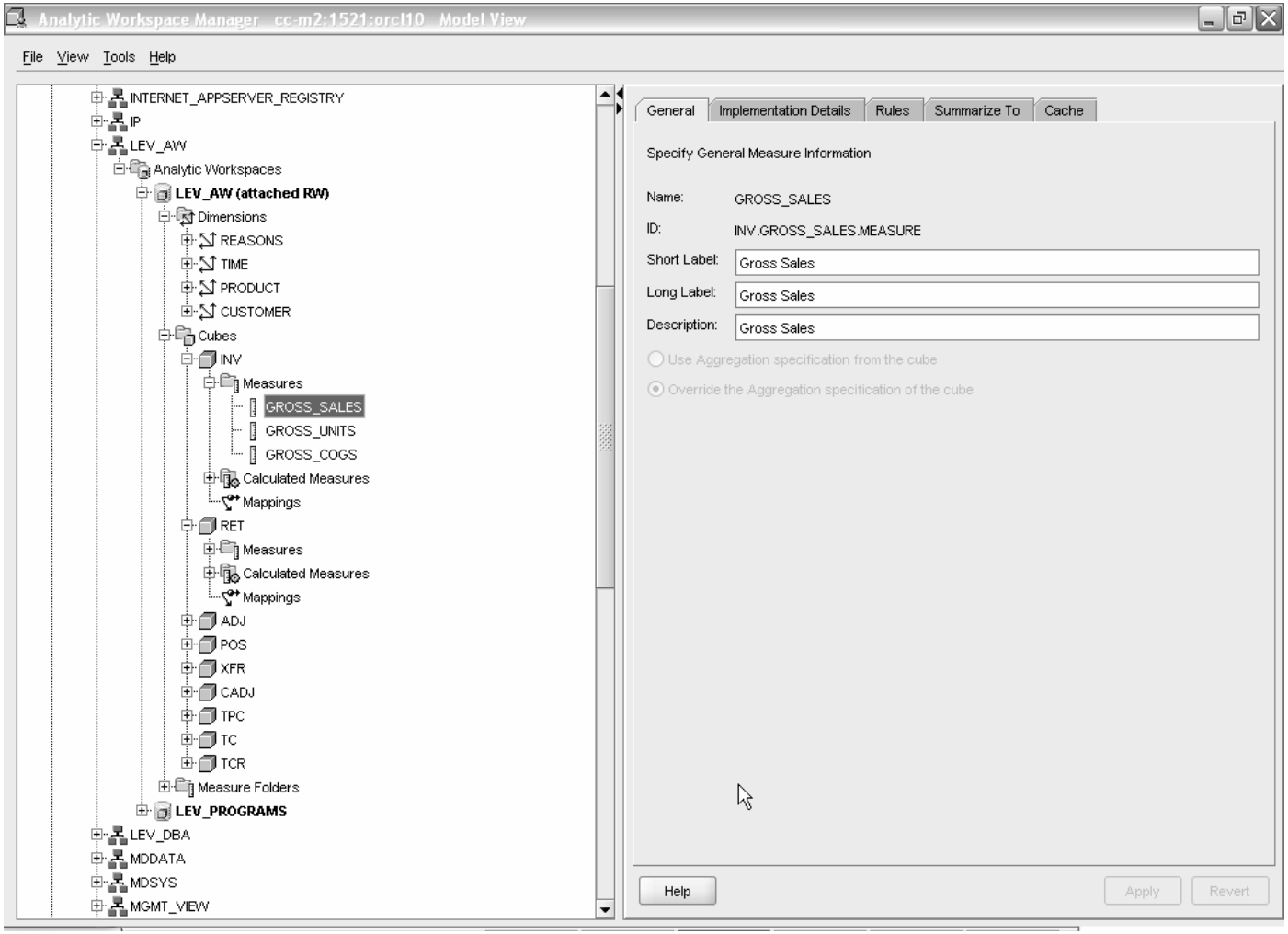


See November / December 2005 Oracle Magazine for 4-page article "Use Oracle AWM 10g to build analytic workspaces" with details

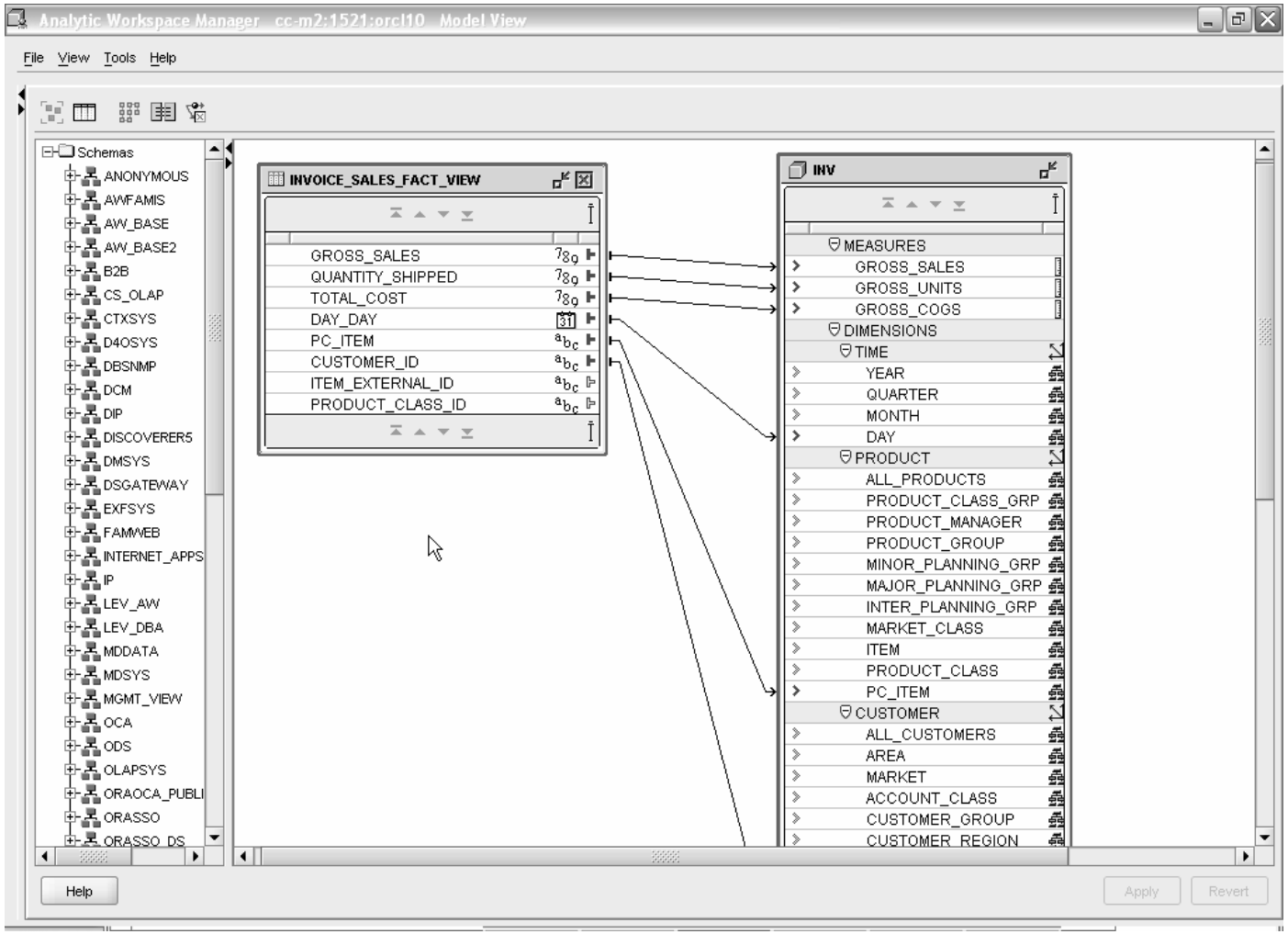
Cubes in AWM



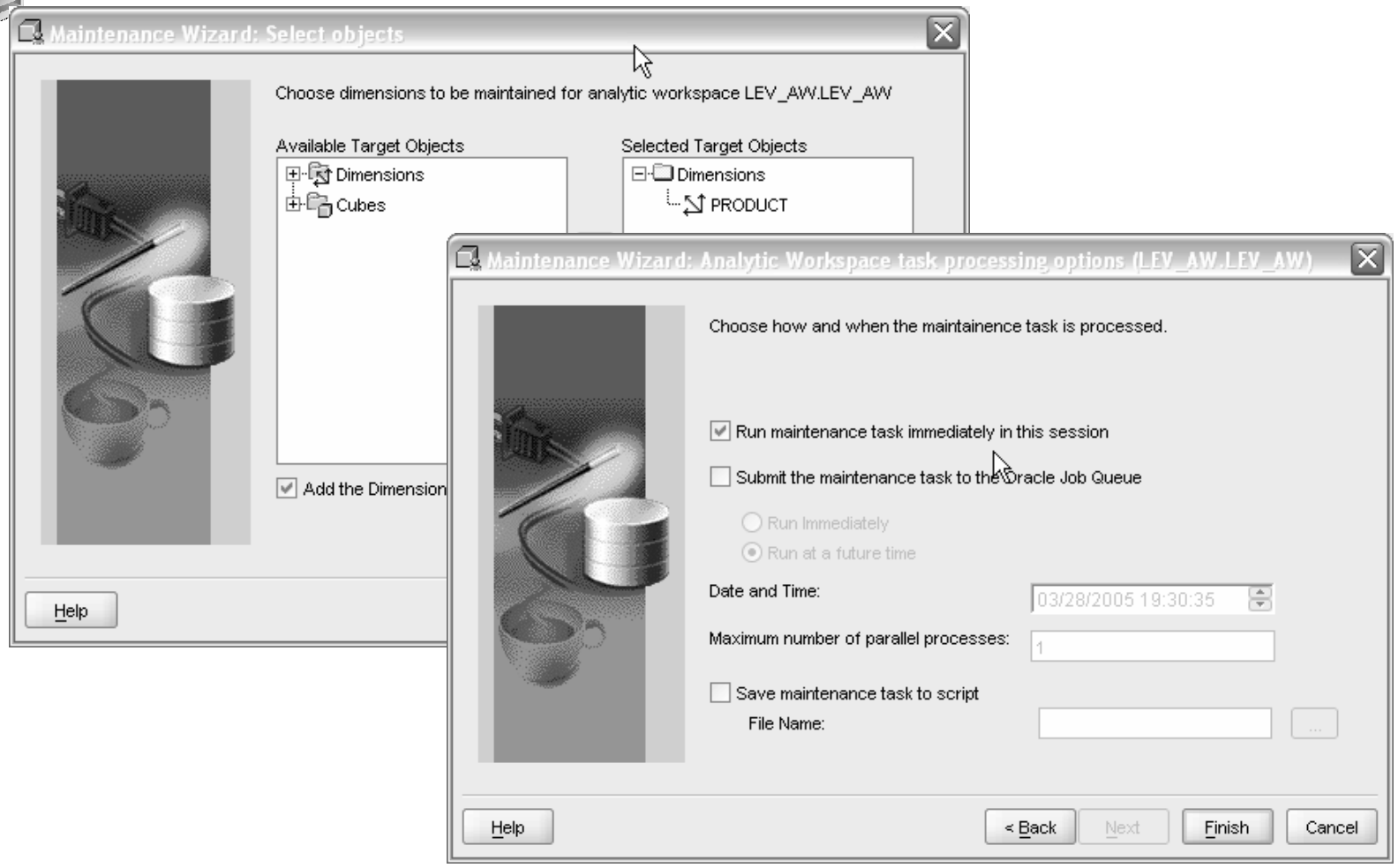
Define Measures



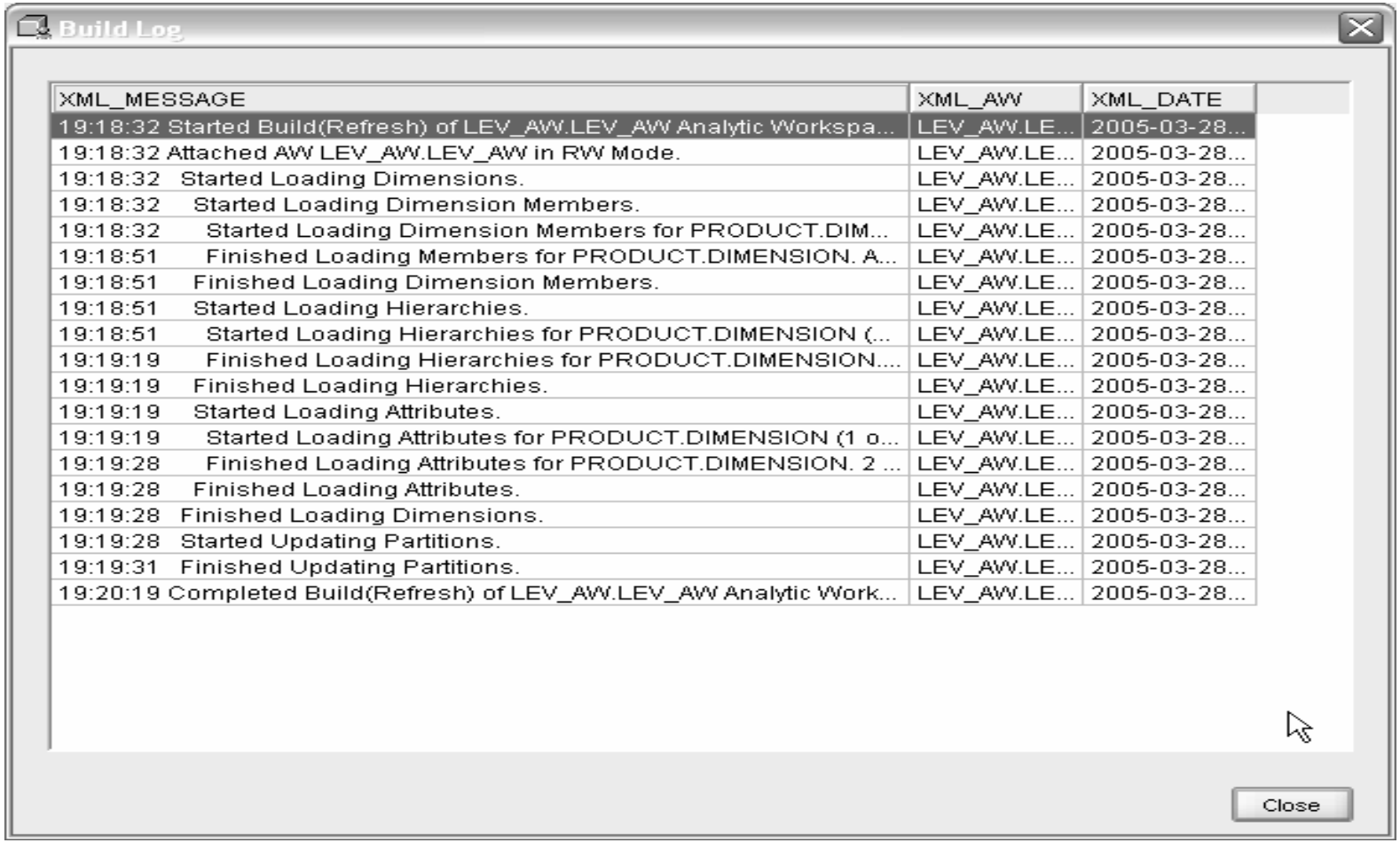
Map Cube



Maintaining Dims/Cubes

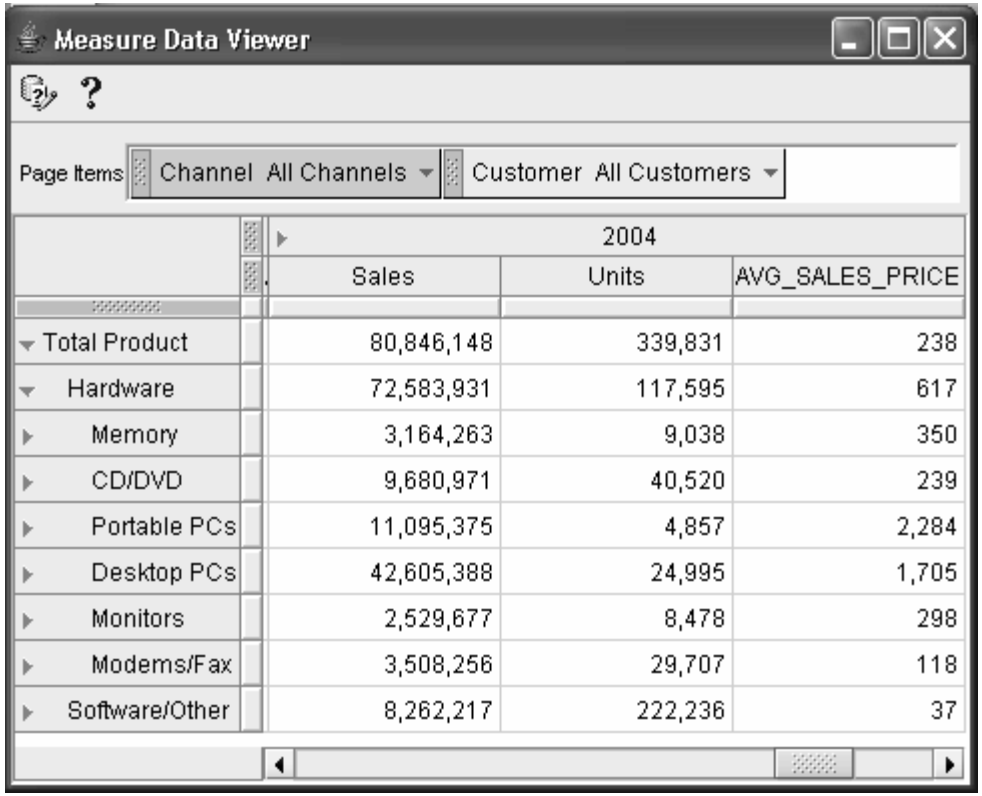


Maintaining Dims/Cubes



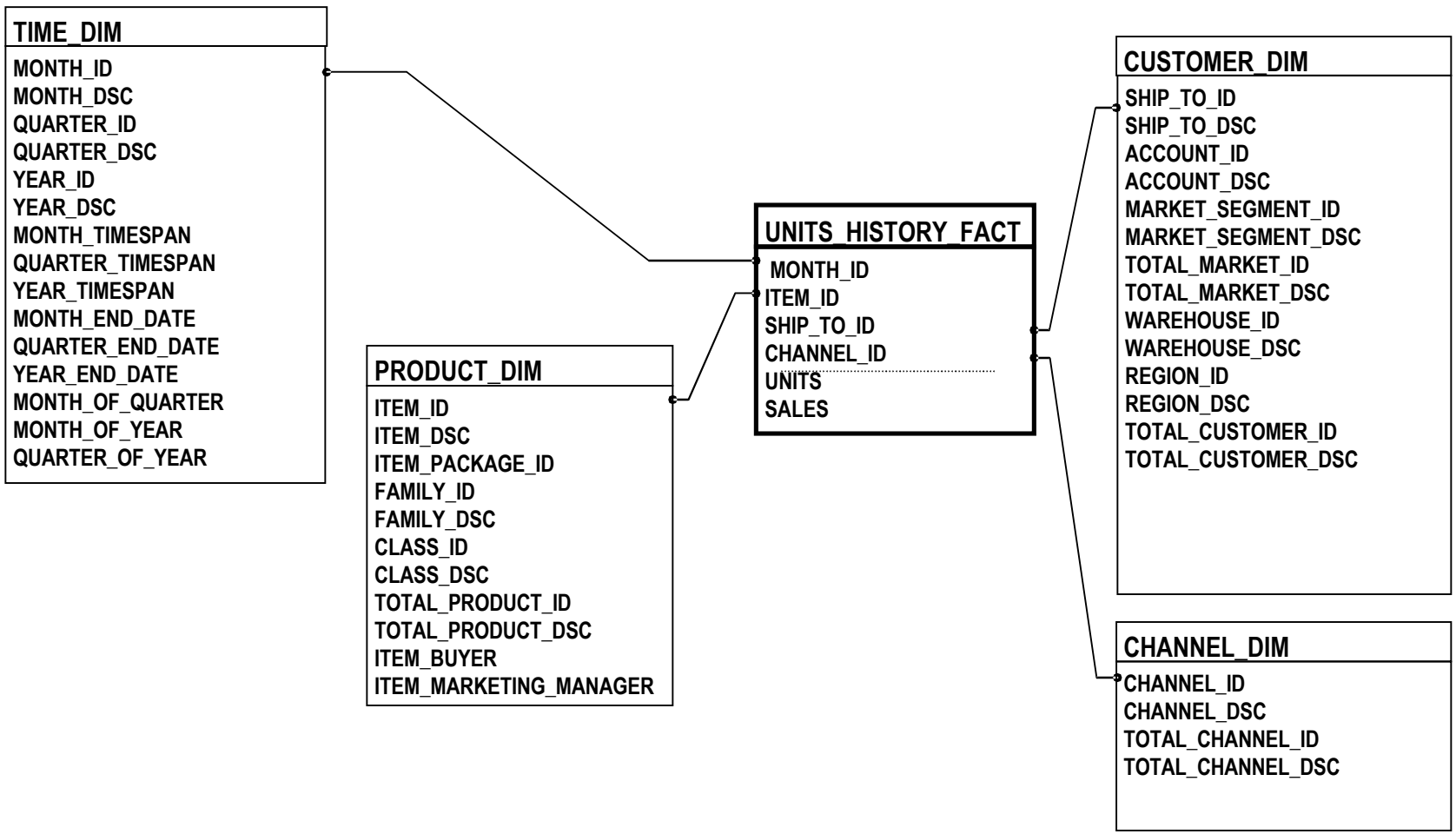
Understand Design

- **Data is Electronics Company**
- **Dimensions are:**
  - **Product**
  - **Channel**
  - **Customer**
  - **Time**
- **Measures are:**
  - **Sales**
  - **Units**
  - **Calc Price**

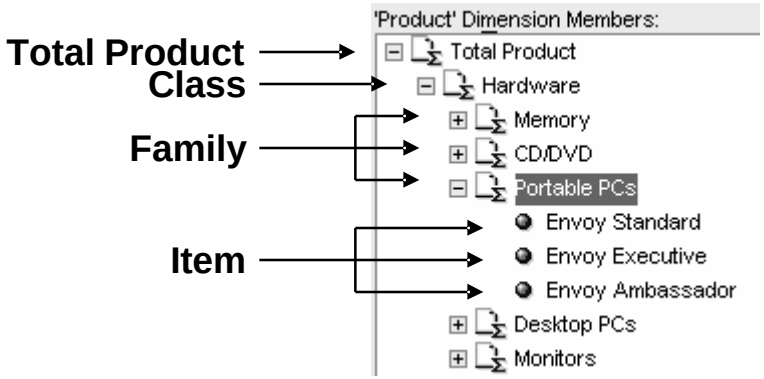


	2004		
	Sales	Units	AVG_SALES_PRICE
Total Product	80,846,148	339,831	238
Hardware	72,583,931	117,595	617
Memory	3,164,263	9,038	350
CD/DVD	9,680,971	40,520	239
Portable PCs	11,095,375	4,857	2,284
Desktop PCs	42,605,388	24,995	1,705
Monitors	2,529,677	8,478	298
Modems/Fax	3,508,256	29,707	118
Software/Other	8,262,217	222,236	37

Existing Star-Schema Tables



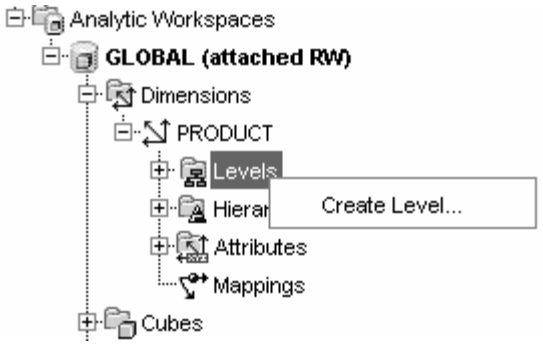
Adding Levels to Dimension

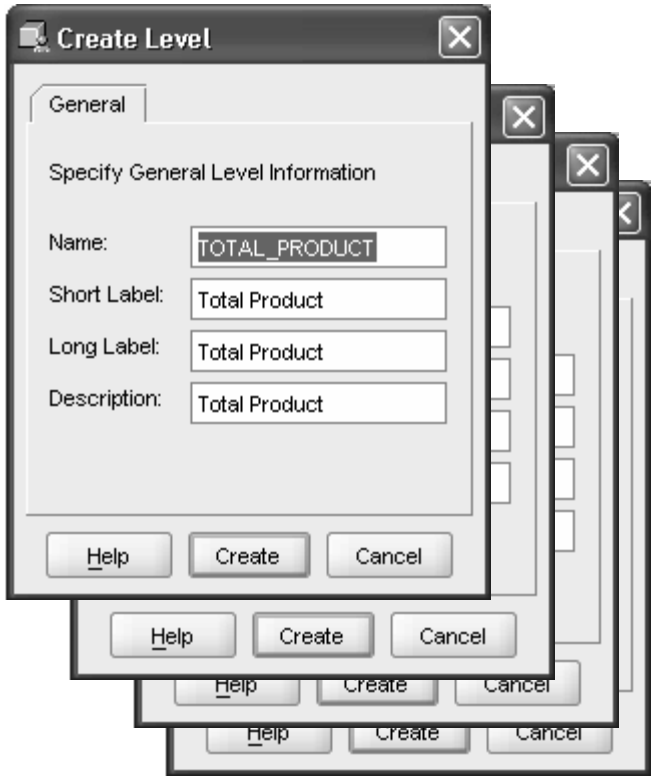


Right-click Levels and select Create Level…

Enter levels:

- **Total_Product**
- **Class**
- **Family**
- **Item**
- **(one at a time)**

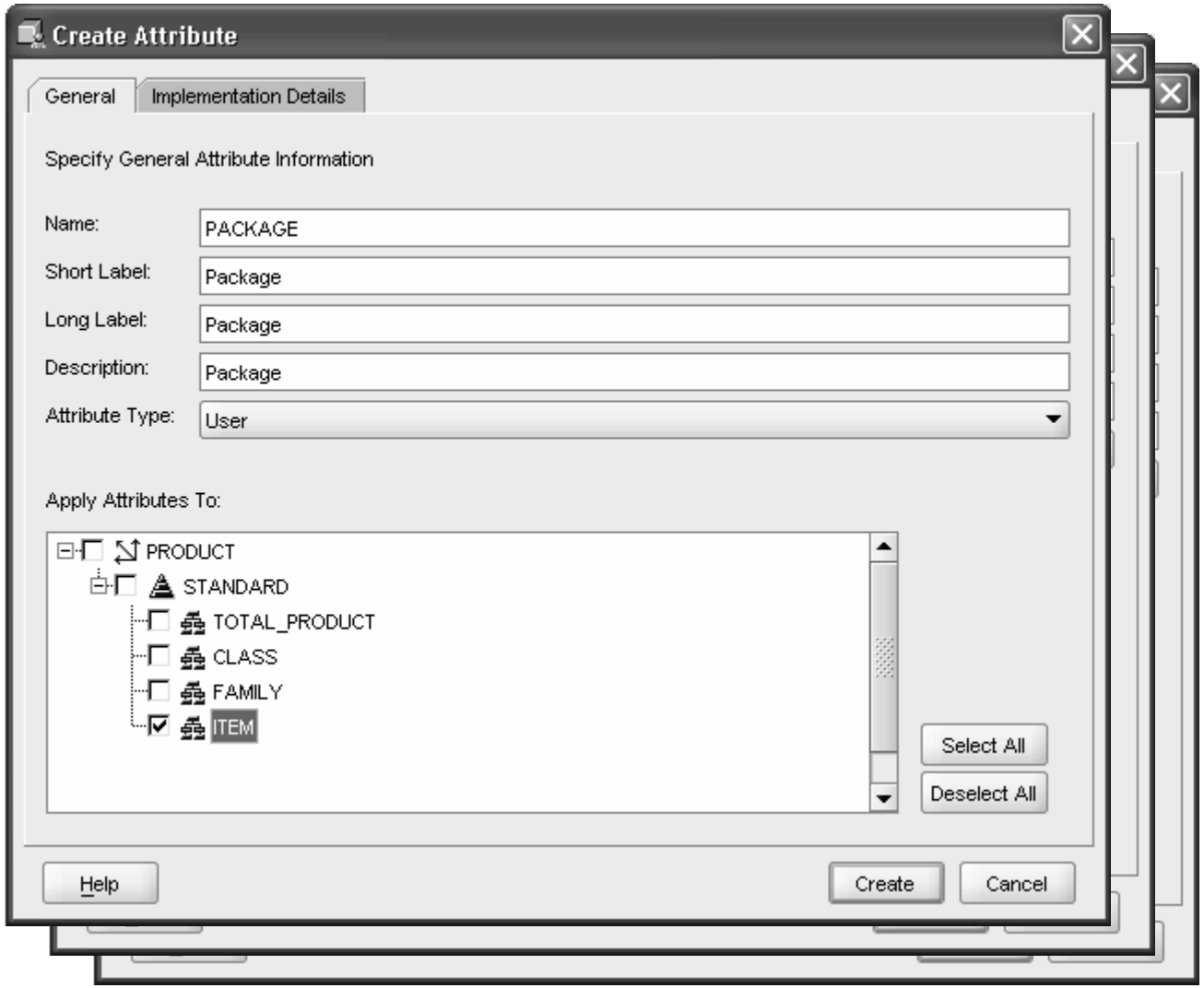




Adding Dimension Attributes

Attributes
- **Long Description and Short Description are automatically added.**

Add extra attributes:
- **Package**
- **Buyer**
- **Marketing Manager**
- **But only for ITEM level (the attributes don't apply to higher levels)**



AWM Cube Builder Tips

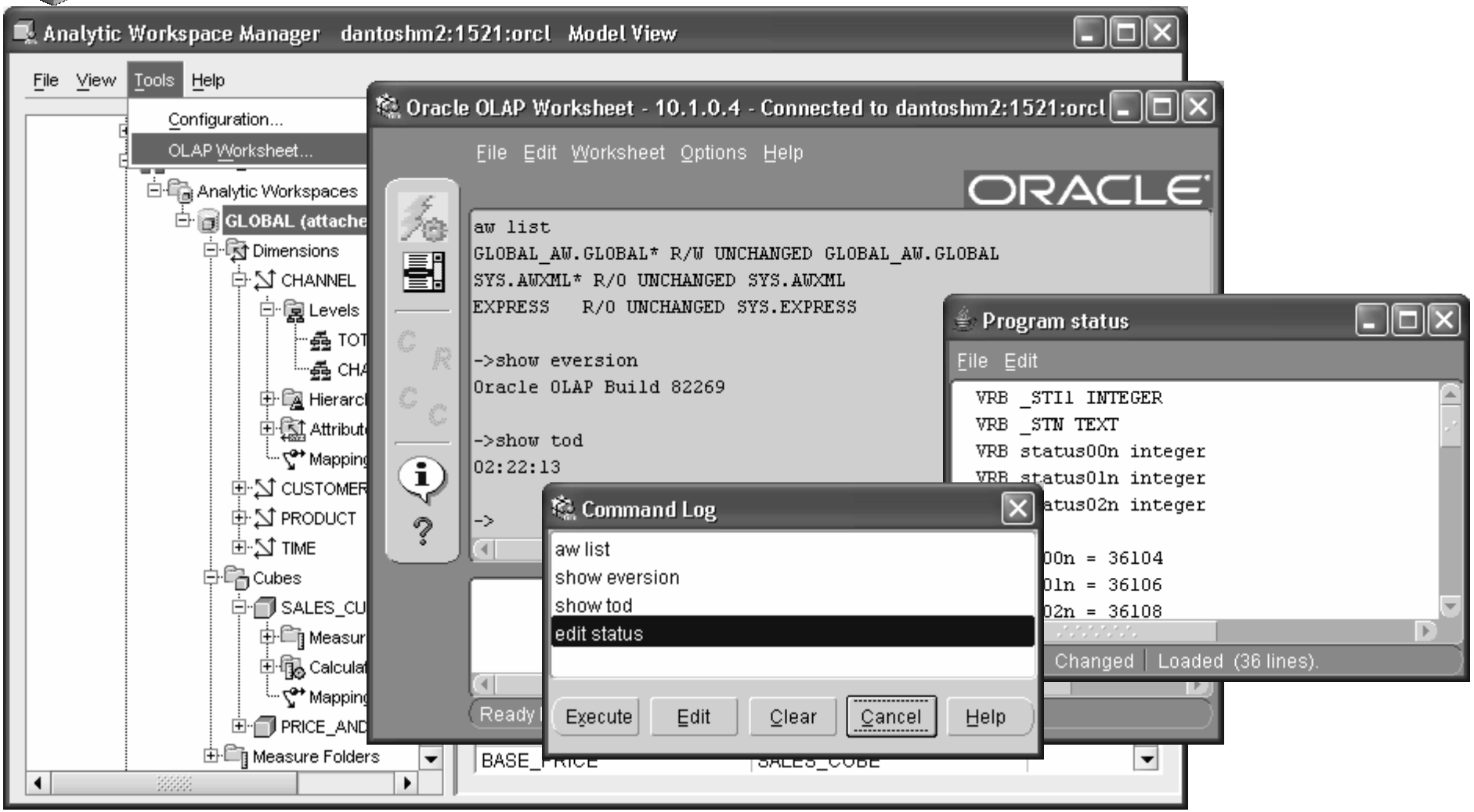
- **Remember to save Everything to XML files**
- **Remember this is Real-time…. So changes are nearly immediate (may need to reload data)**
- **Use “View” to see results in tool – No Need for BI Beans to validate success!**
- **Move Measures to Folders**
- **Can save Calculated Measures to XML – Then you can Edit!**

AW Creation in AWM10g

- **If create an AW in the Object view:**
  - **AW is NOT in standard form**
  - **AW won't be seen in the Model view**

- **If create an AW in the Model view:**
  - **Can define the AW using logical elements (dimensions, levels, hierarchies, cubes, measures, mappings)**
  - **AW can also be seen in the Object view which shows the physical implementation of standard form**

OLAP Worksheet (like SQL Worksheet) Launched from AWM



Oracle BI – Getting the Data In

- **Storing / calculating with the data**
  - **Oracle RDBMS**
  - **Oracle OLAP (an option to the RDBMS)**
- **Getting the data in / managing**
  - **Oracle Warehouse Builder**
  - **Oracle Enterprise Manager**
  - **Analytic Workspace Manager**

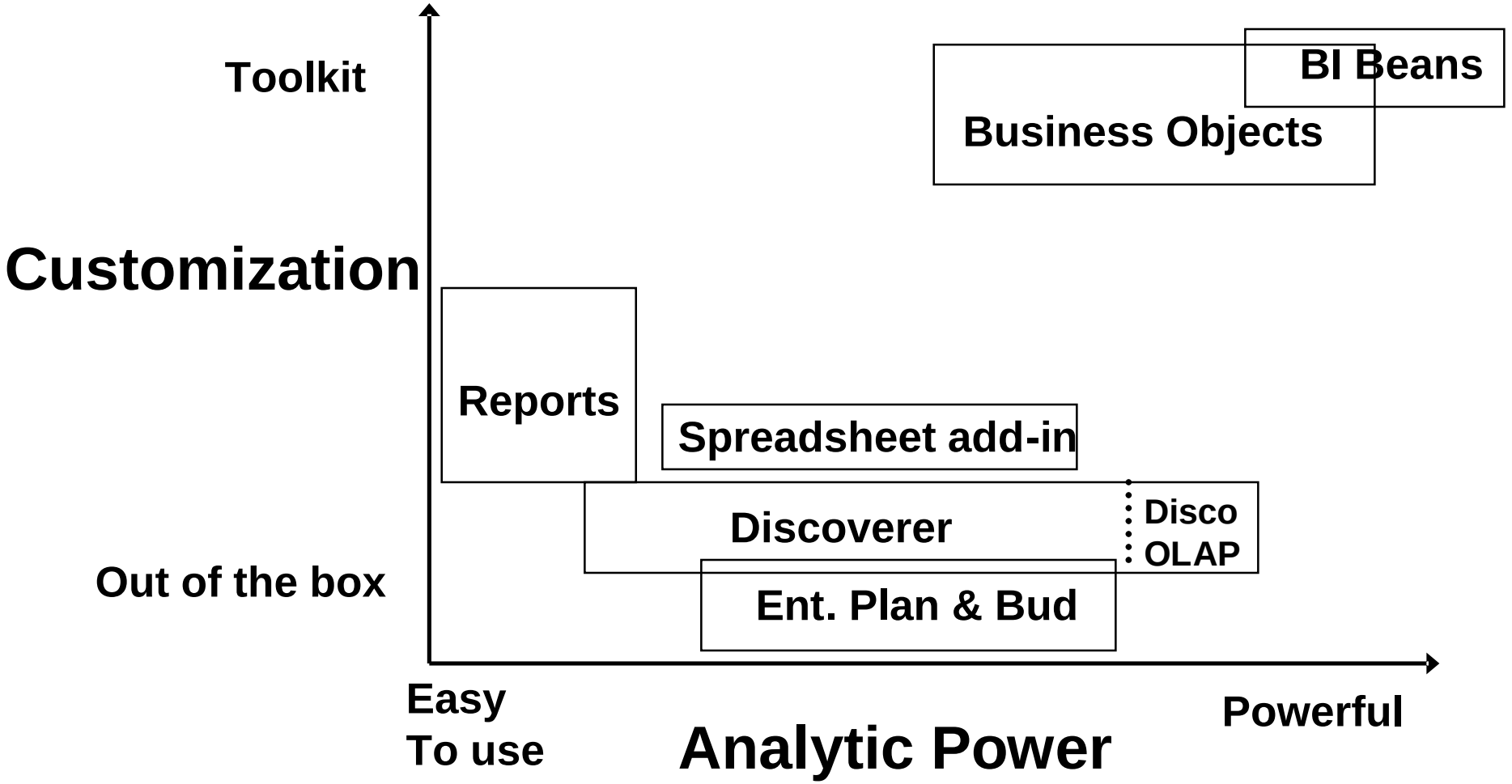
Getting the Data Out

- **Once the Data is in OLAP how do we get the data out?**
- **Alternatives**
  - **BI Beans applications (Custom or pre-built)**
  - **Discoverer**
  - **Oracle Reports**
  - **SQL Access from any SQL tool**
  - **Spreadsheet Add-in**
  - **Any except Spreadsheet add-in can be in a portal and with web interface**

What Access Tool?

- Java OLAP API designed for products
- Discoverer for ad hoc analysis
- BI Beans for custom applications (using JDev)
- Spreadsheet Add-in for access from Excel
- Oracle Reports for highly formatted reports
- Oracle Apps for analysis of Apps data
- 3rd Party tools fill in gaps

Choices for Viewing Data



What Are BI Beans?

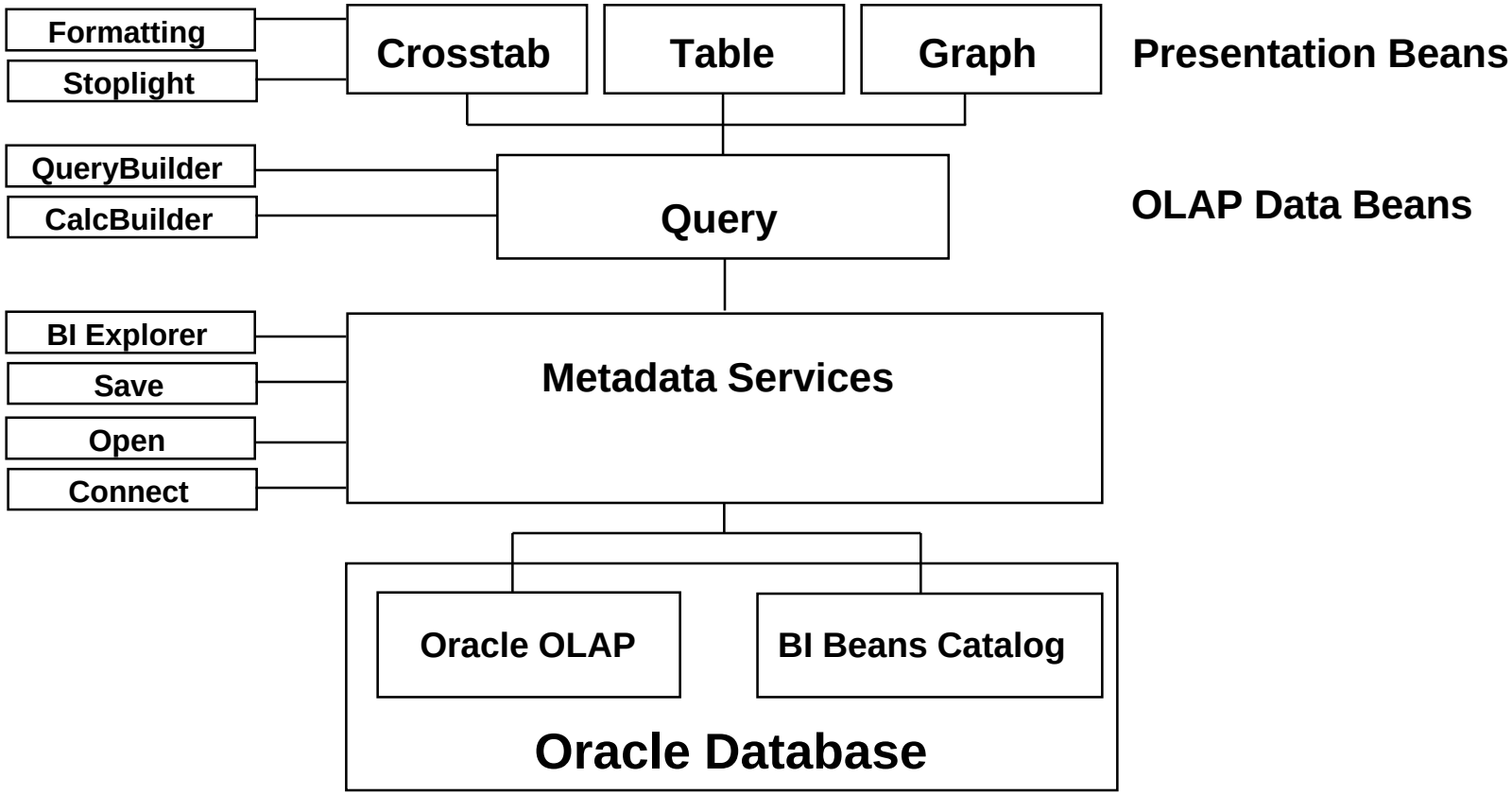
- BI Beans 9.0.2 first released in May 2002
- Beans 10.1.2.1 Current Ver.
- Part of Oracle10g Developer Suite and Oracle BI
- Integrated extension for Oracle9i/10g JDeveloper
- Set of Java Beans (API) and integrated BI Wizards (JDev)
- Integrated tightly with Oracle9i/10g Database
- Exploits the Analytics of the 9i/10g Database
  - SQL Analytics
  - OLAP Analytics

BI Beans Key Features

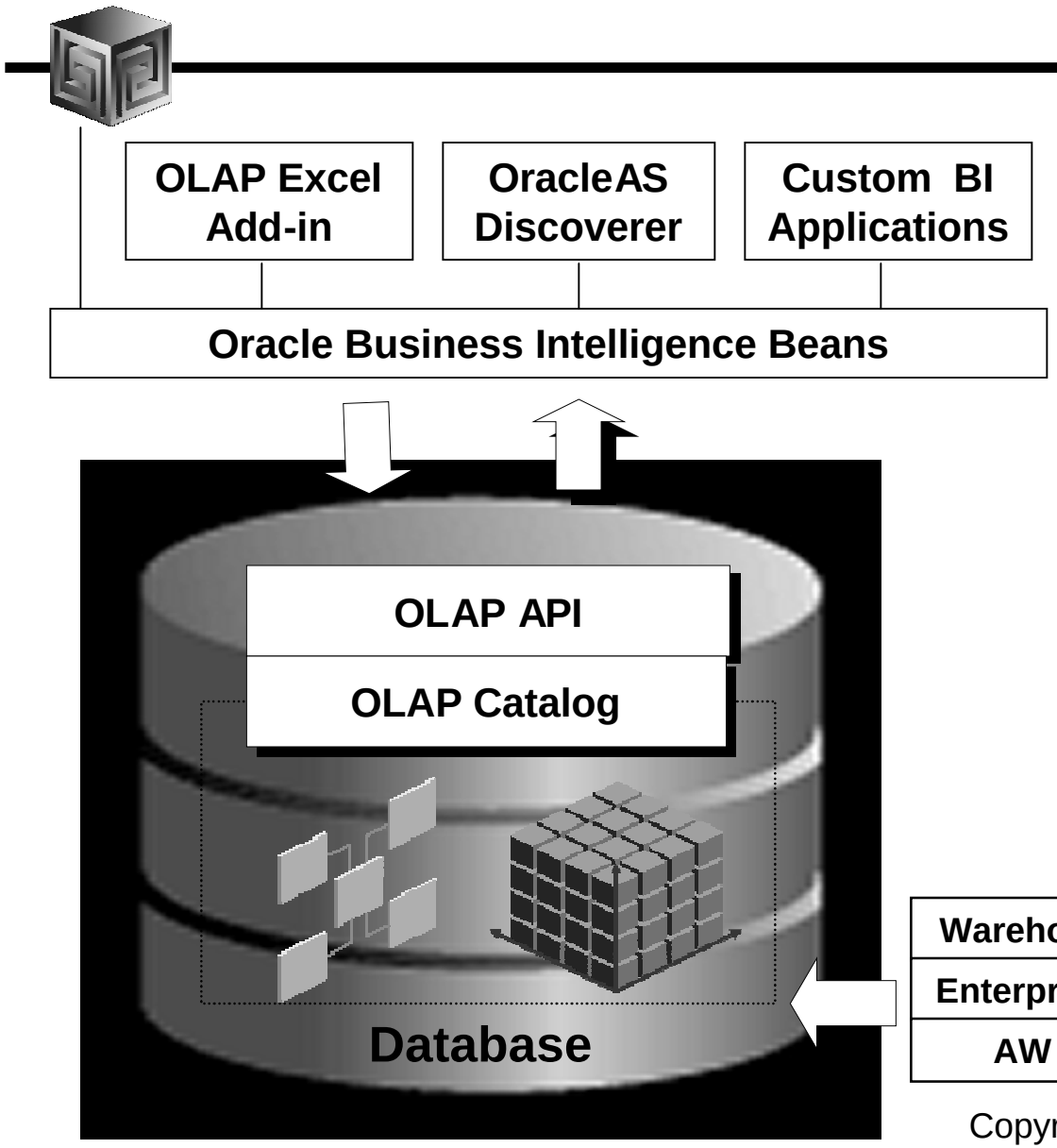
- **Leverage Integrated Oracle technology stack**
  - **Development**
  - **Administration**
- **High Developer Productivity**
  - **JDeveloper Wizards - object and 100% Java code generation**
  - **Live data access at design time**
- **Analytic Power**
  - **Simplified access to the power of Oracle**
    - **Multidimensional Engine**
    - **Relational Data Warehouse Schema**
- **Collaboration Support**
  - **Share analyses across user community**
  - **Secure**

BI Beans Components

High level components reflect business usage



Ad-hoc Access OLAP via Discoverer

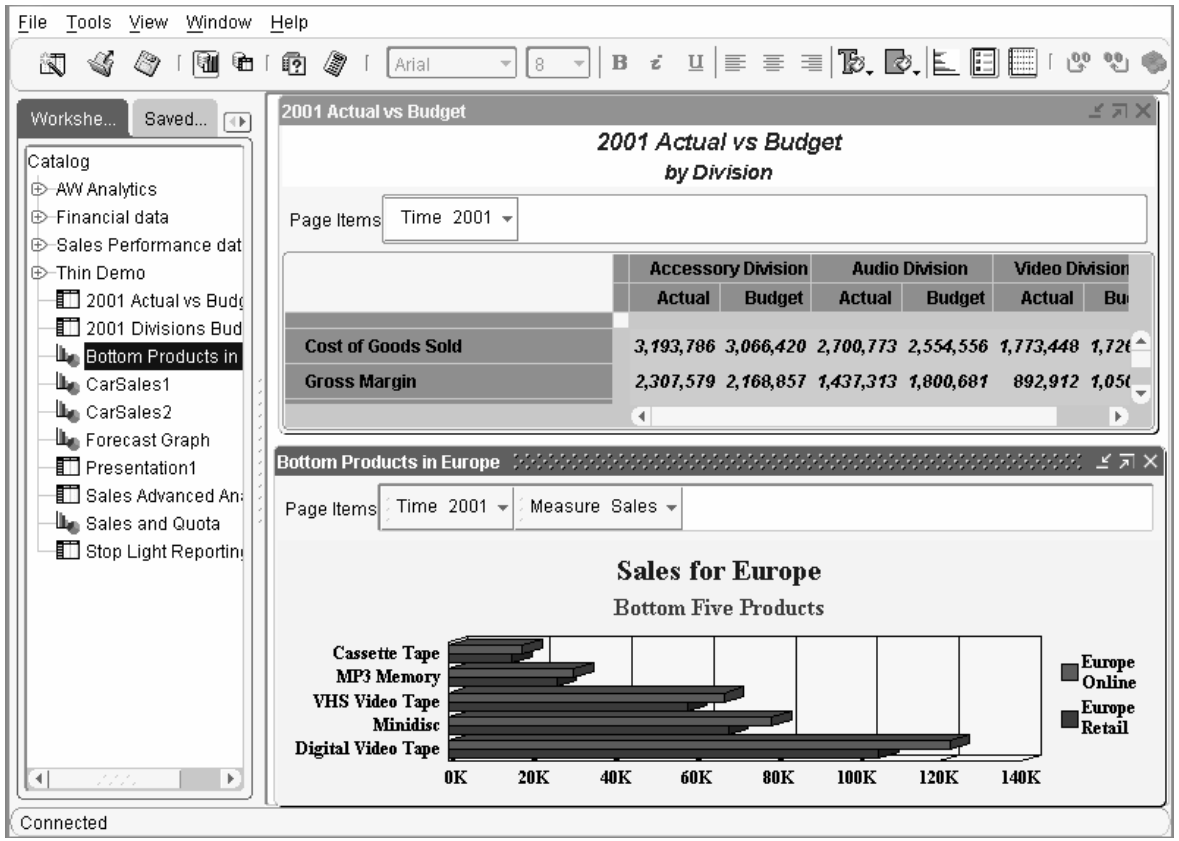


OracleAS Discoverer

- An intuitive ad-hoc query, reporting, analysis, and Web-publishing tool
- Enables advanced analyses on both operational and OLAP data sources

Discoverer 10g – Discoverer OLAP

- **Currently AWM creates EUL for SQL Access**
- **Disco 10g adds Direct Access to OLAP**

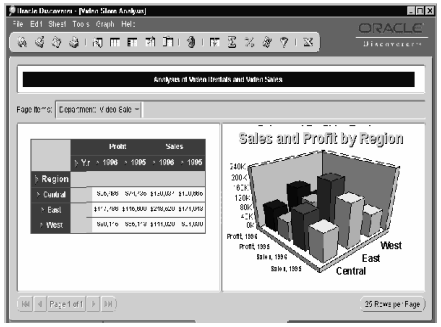


Discoverer Specifics

- Discoverer "Classic" still there
- Discoverer OLAP built with BI Beans
- Integrated Relational and Multidimensional access to data
- Discoverer OLAP uses BI Beans repository with Discoverer extensions
- Uses "Workbook" metaphor to organize crosstabs and graphs into screens

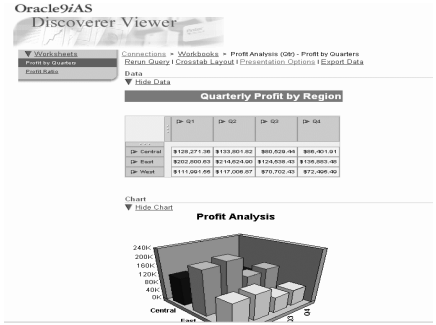
Three Deployments of Discoverer

Discoverer Plus



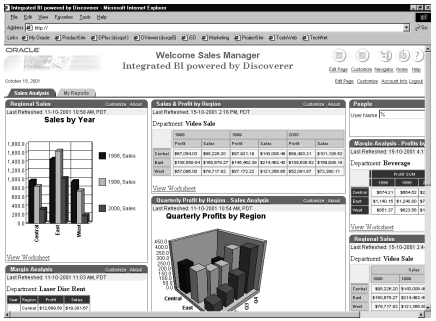
Power user tool
Creates new workbooks
Runs via applet

Discoverer Viewer



Casual user tool
Existing workbooks
Launched from Browser
Zero footprint

Discoverer Portlets

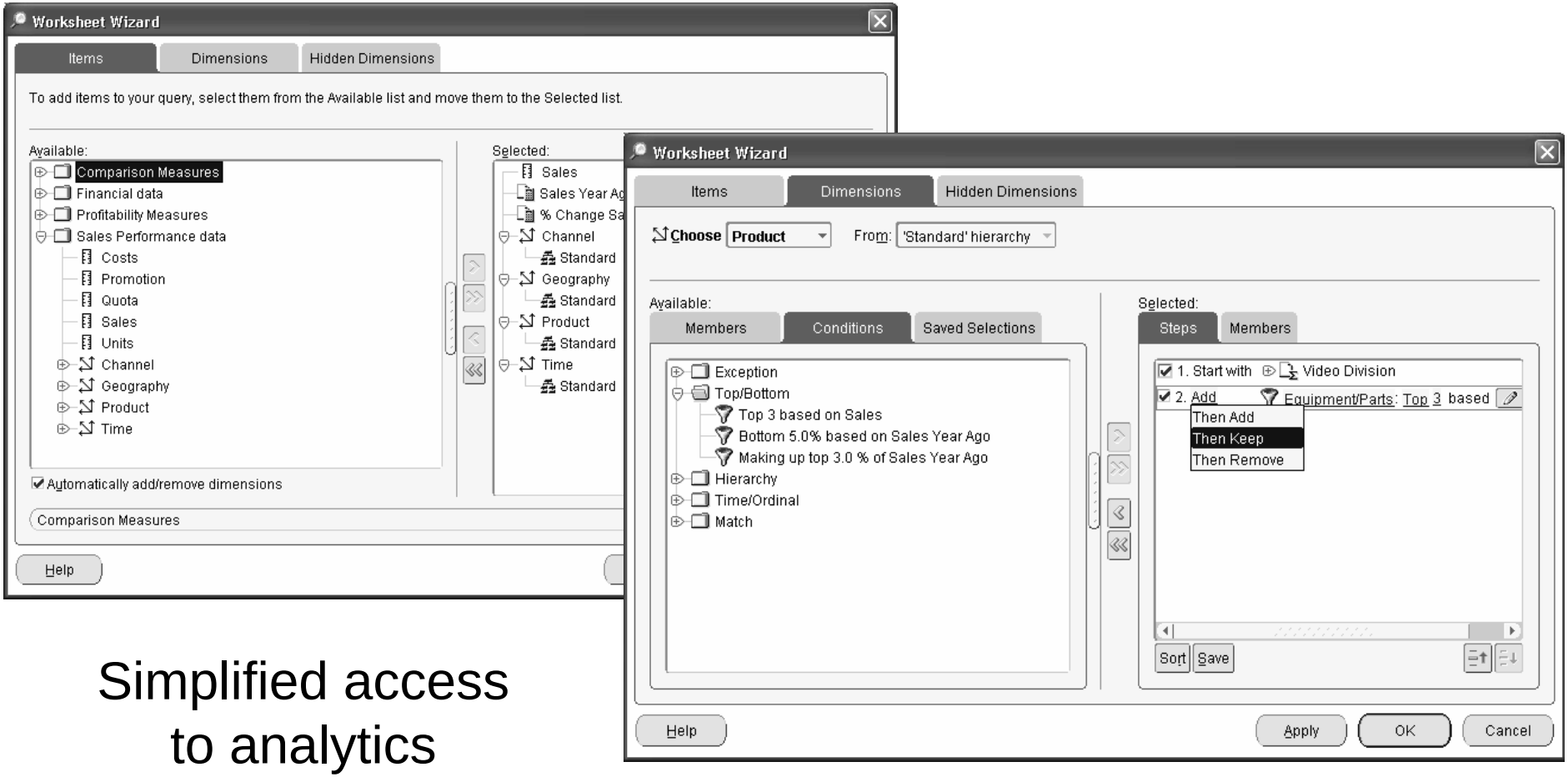


Casual user tool
Existing workbooks
Part of Portal
Launches Viewer
Zero footprint

Discoverer Development Themes

- Single tool for both relational and multidimensional analysis
- Easy access to powerful analytics of the database
- Highly customizable display
- Support collaboration

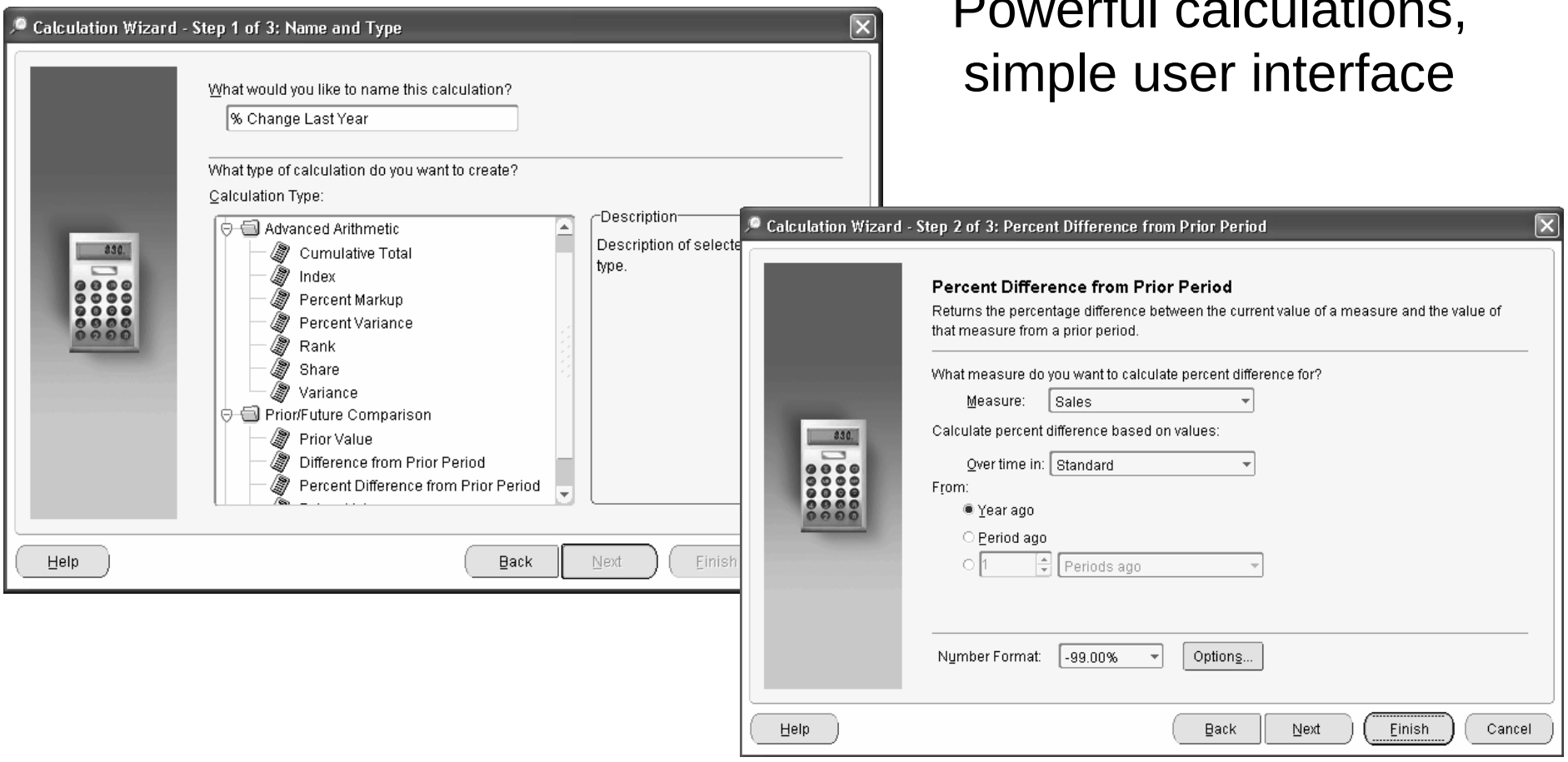
Query Building



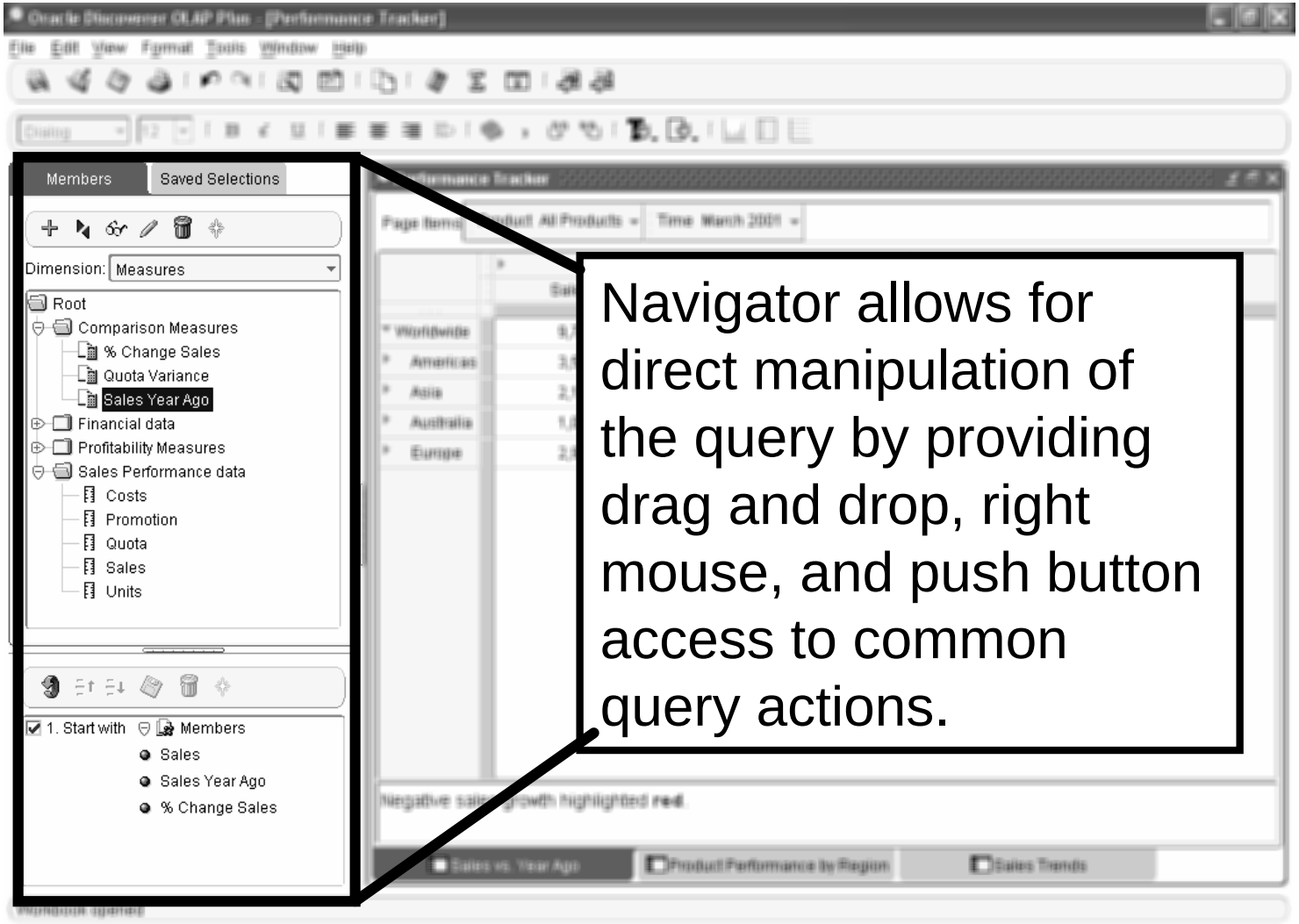
Simplified access to analytics

Custom Calculations

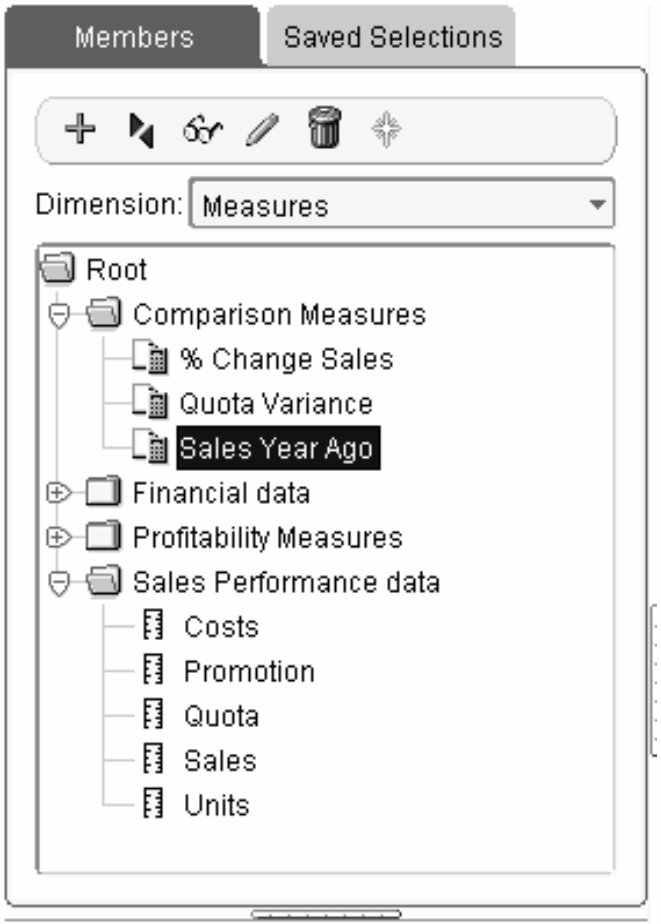
Powerful calculations, simple user interface



Direct Manipulation

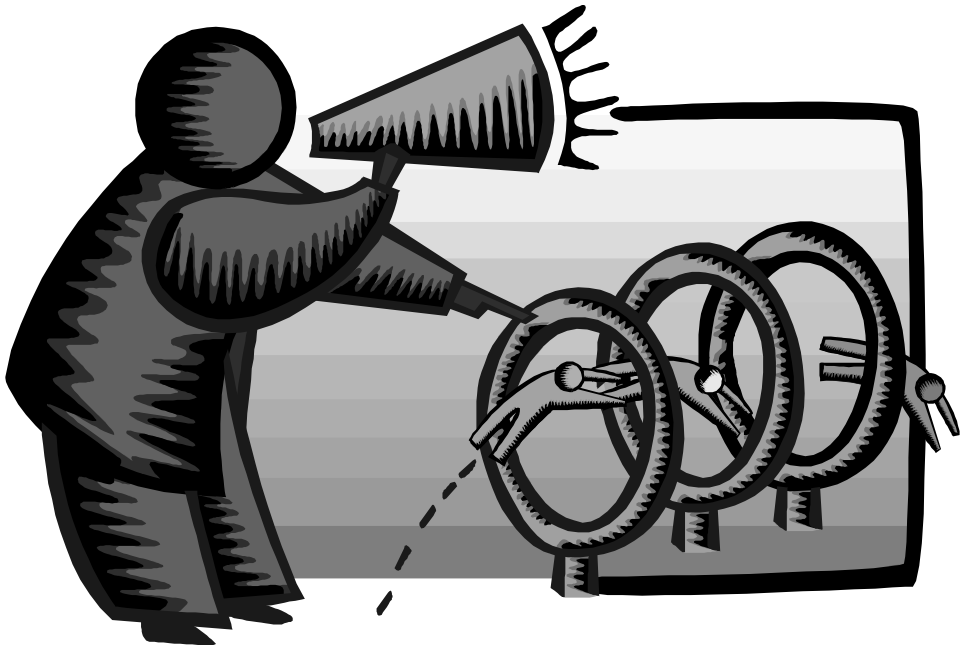


Navigator – Member Selection



- **Dimension members and measures can be selected and applied to the worksheet**

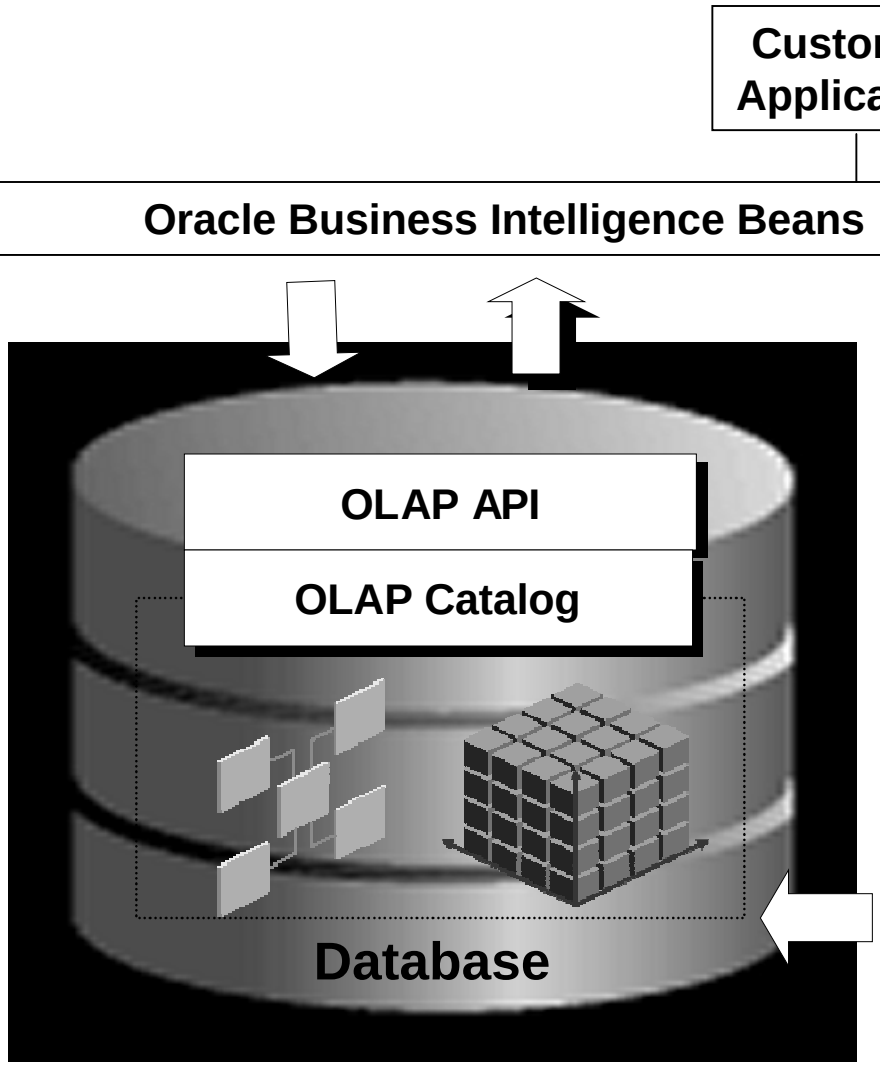
Demonstration of Discoverer OLAP



Discoverer Plus Features Over Vanilla BI Beans Application

- Multiple deployments
  - Thick applet
  - Thin viewer
  - Portlet
- Worksheet metaphor
- Export to PDF
- Undo
- Drag and Drop selection changes
- Totals at bottom or right
- Other features as well

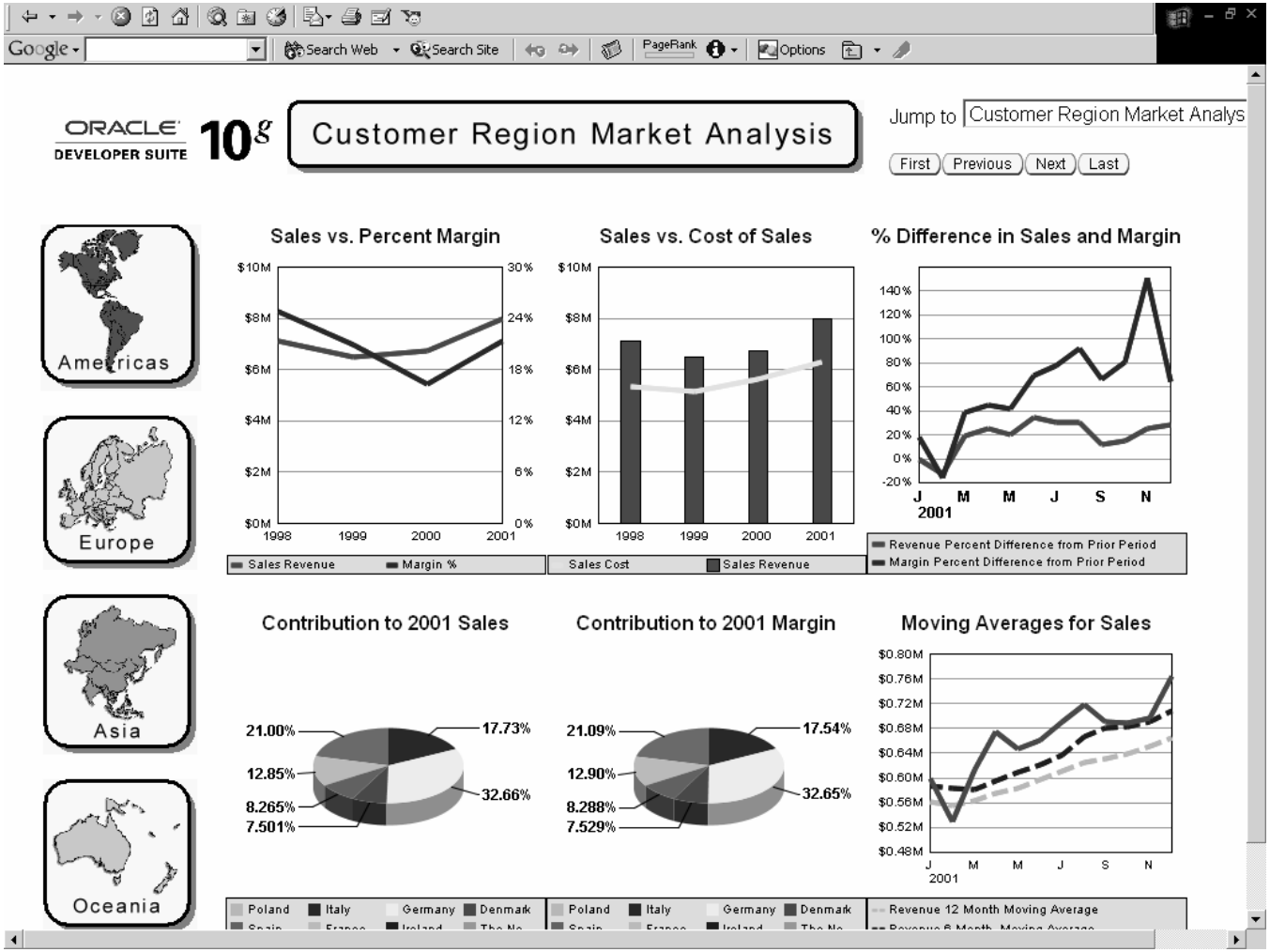
Custom Development via BI Beans



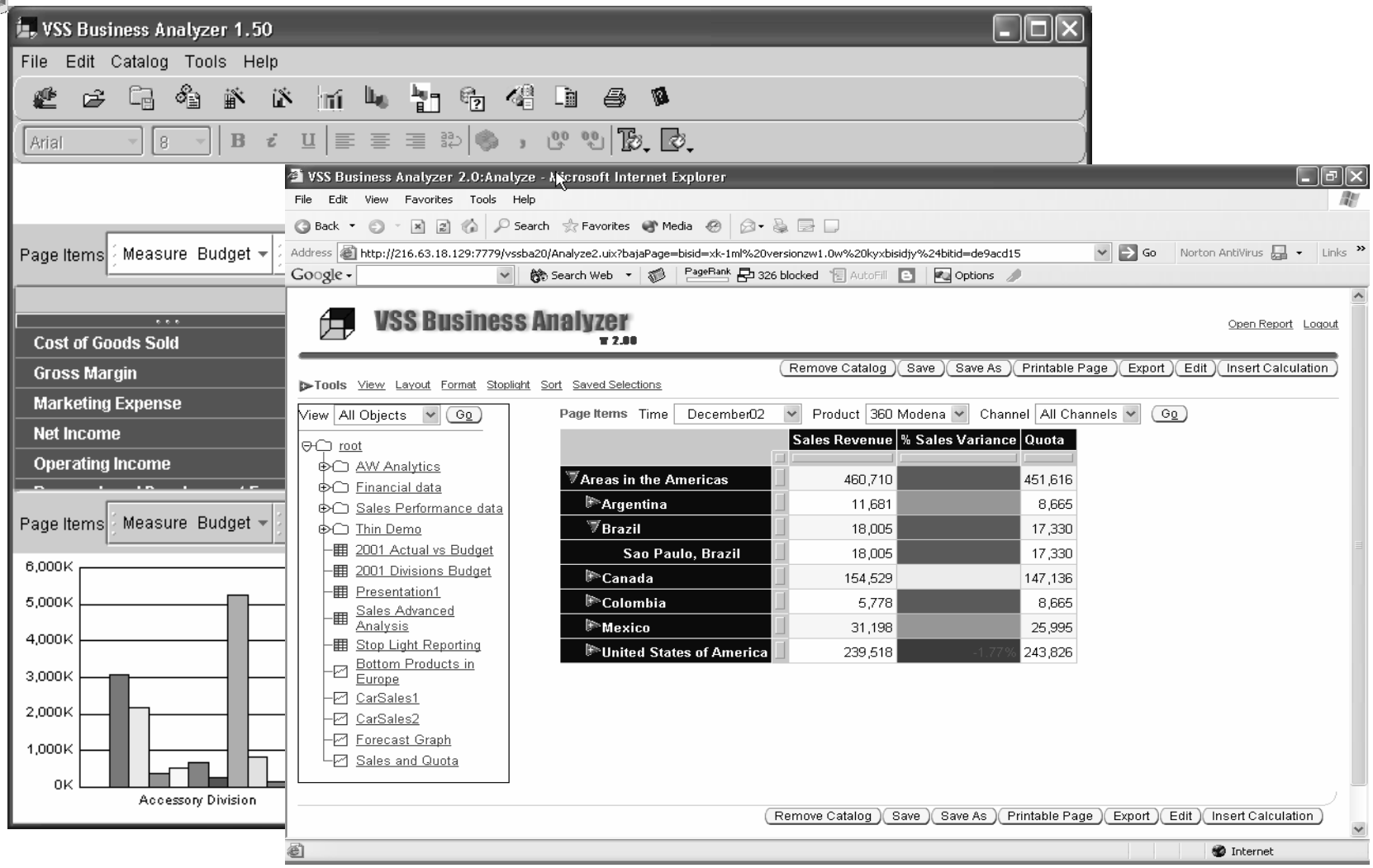
Custom BI Applications

- **BI Beans integrated with JDeveloper provides a powerful environment for rapidly developing powerful business intelligence applications**
- **Targeted applications enable companies to deliver valuable insights to a wide range of end users: executives, analysts, information consumers**

Custom BI Application



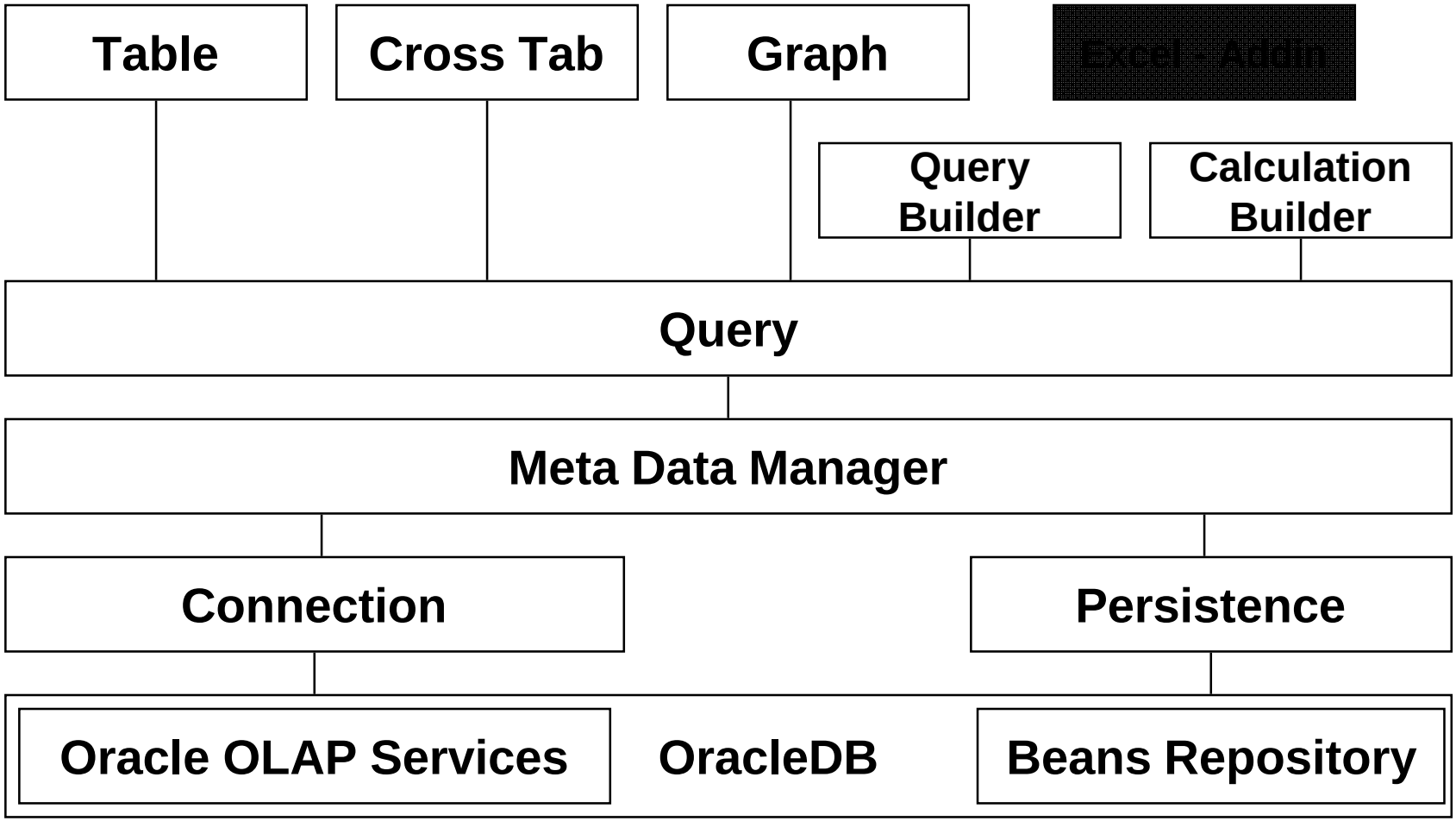
BI Beans Applications



Thick Client

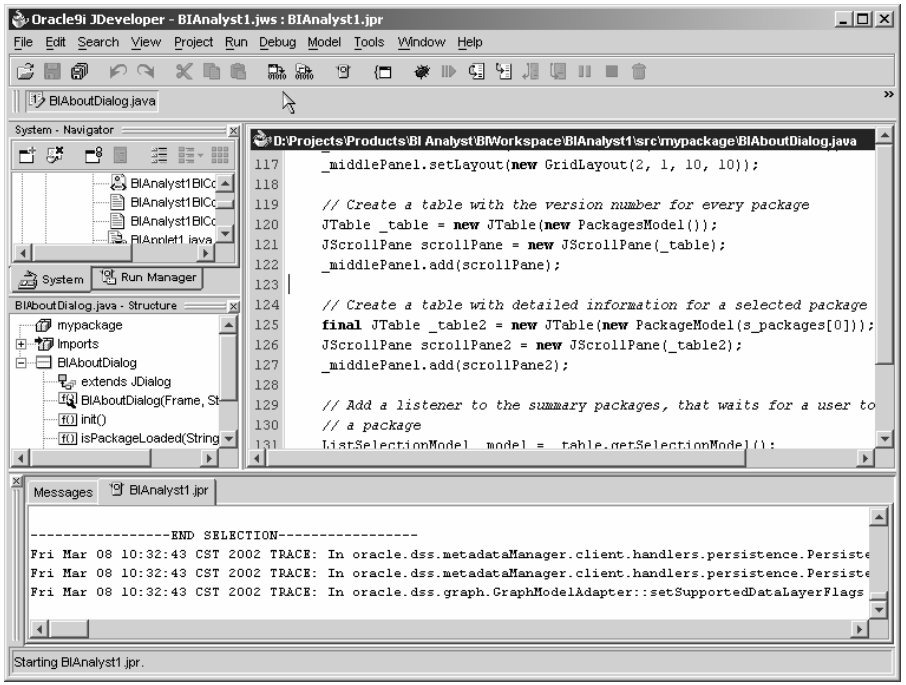
Thin Client

Business Intelligence Beans

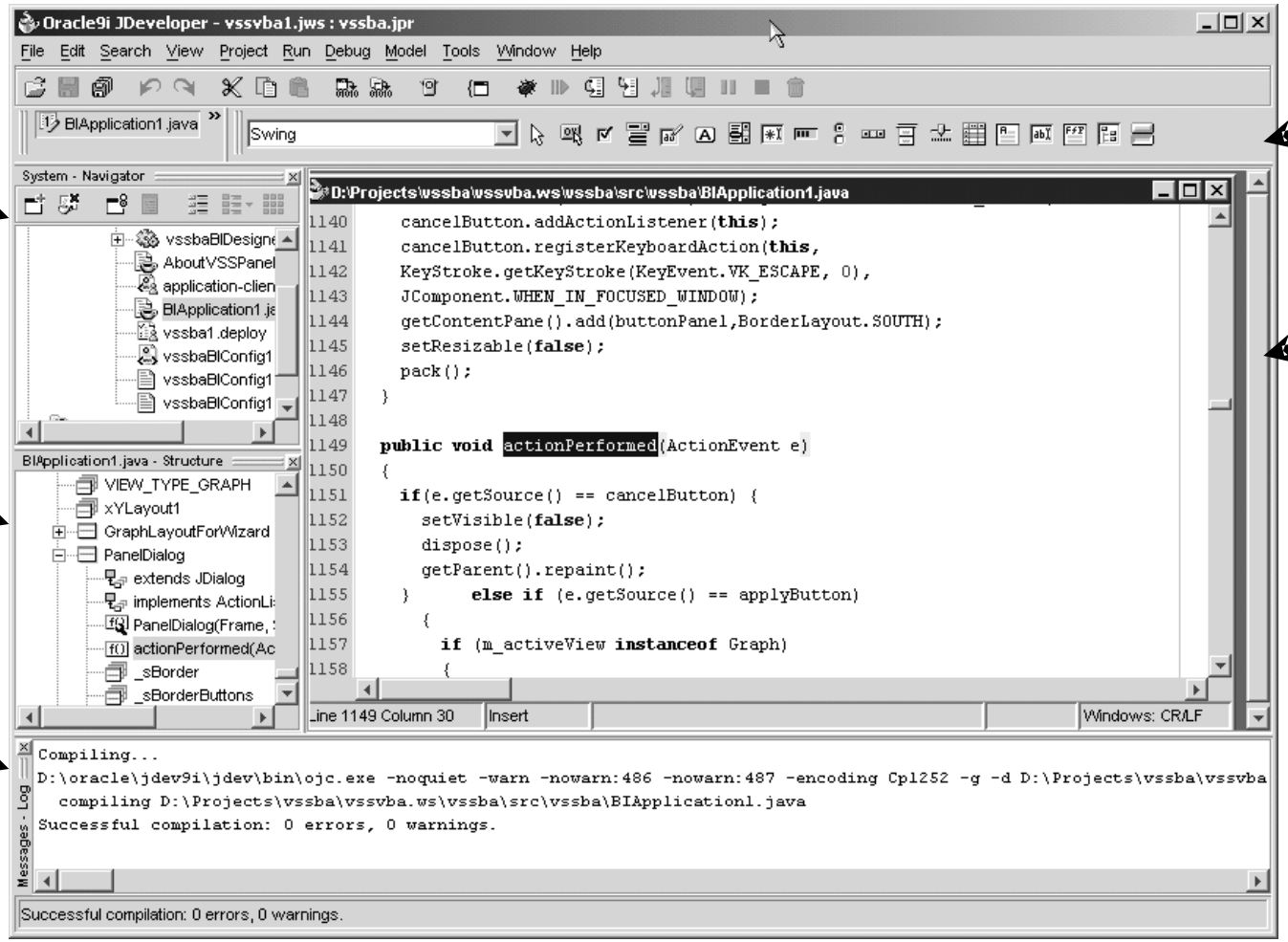


JDeveloper Integration

- **Single Development tool for Relational and OLAP dev**
- **Design-time integration objectives**
  - **Use JDeveloper concepts; extend when necessary**
  - **Live data access**
  - **Run application objects**
  - **Extensive use of Wizards to support rapid development**
  - **Use BI Beans runtime repository to enable multiple deployment options**



JDeveloper Environment



System Navigator

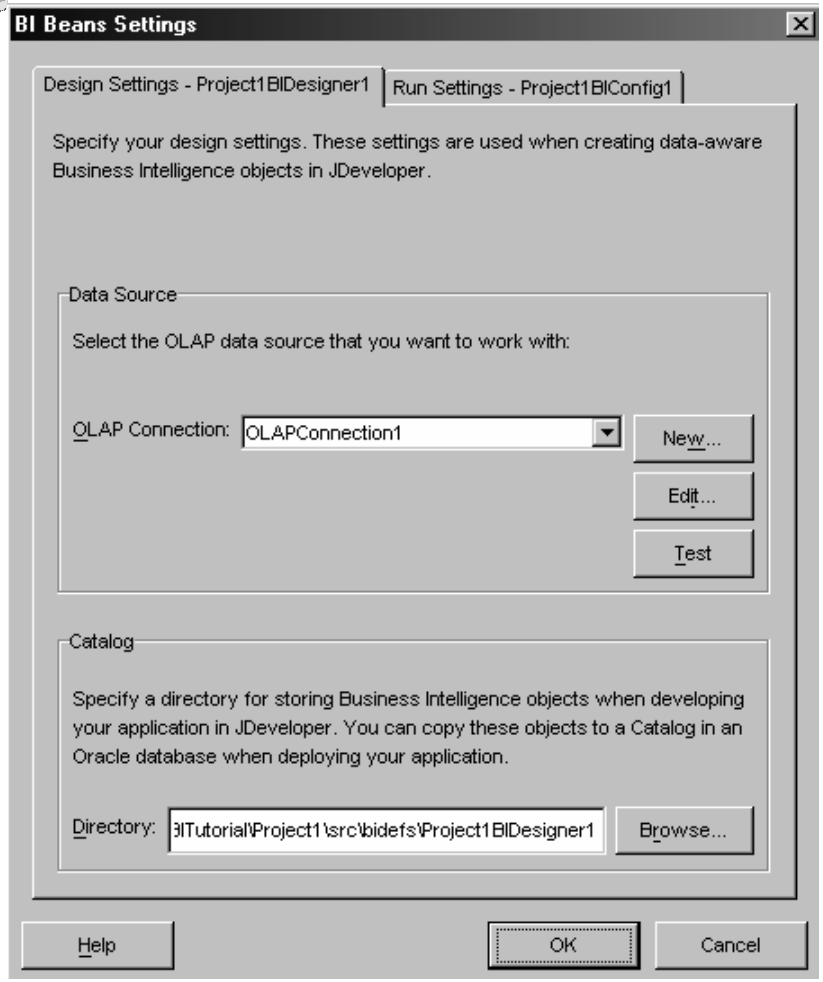
Structure Window

Log Window

Component Toolbar

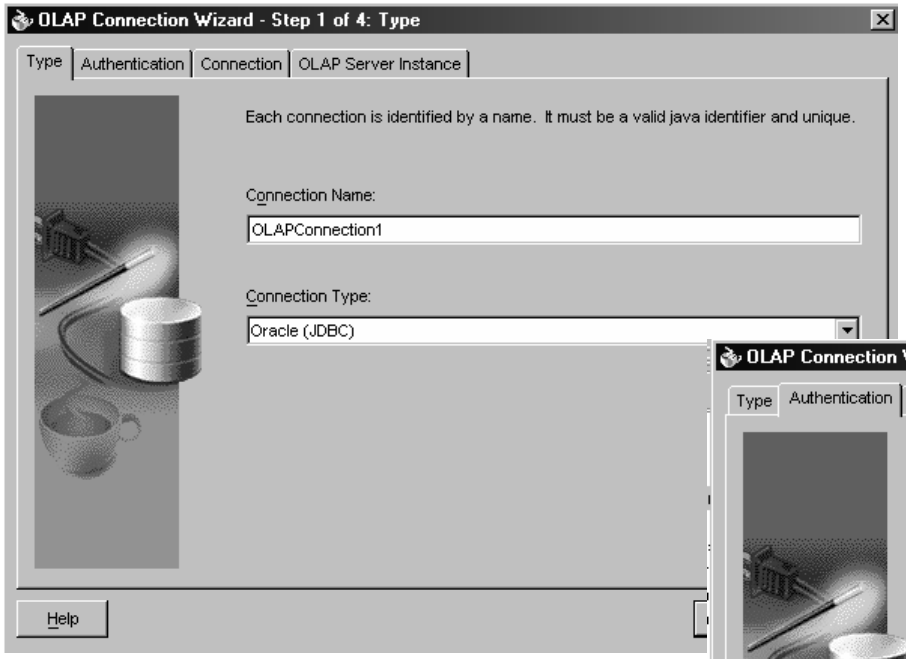
Code Window

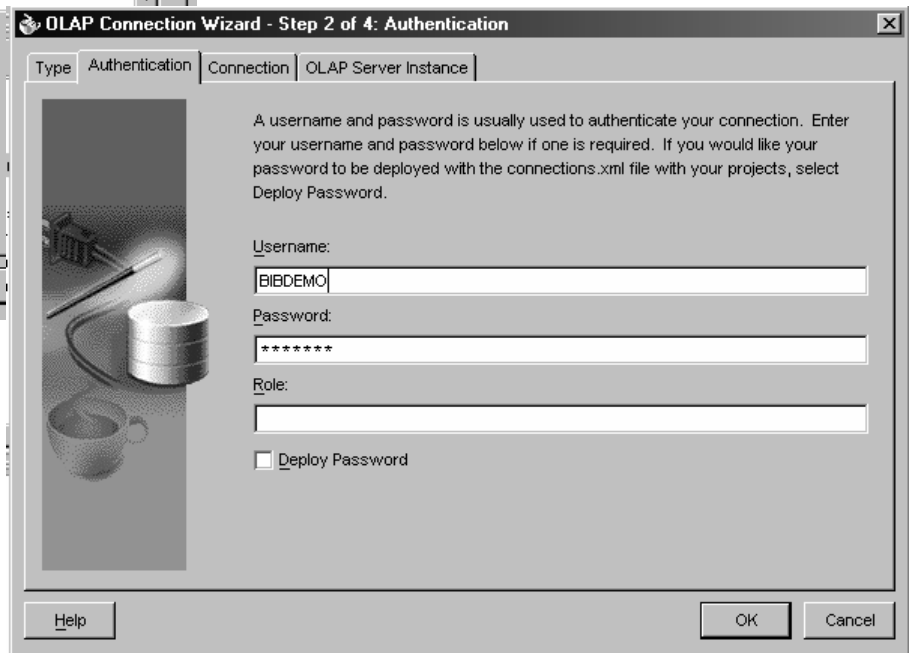
BI Beans Designer Settings



- **Container for Business Intelligence Objects**
- **References information needed to connect:**
  - ❑ **to Oracle OLAP**
  - ❑ **and the BI Beans Catalog.**
- **<u>Design Settings</u> - Lets you view and edit settings in your BI Designer object**
- **<u>Run Settings</u> - Lets you view and edit settings in your BI Configuration file**

Connection Wizard

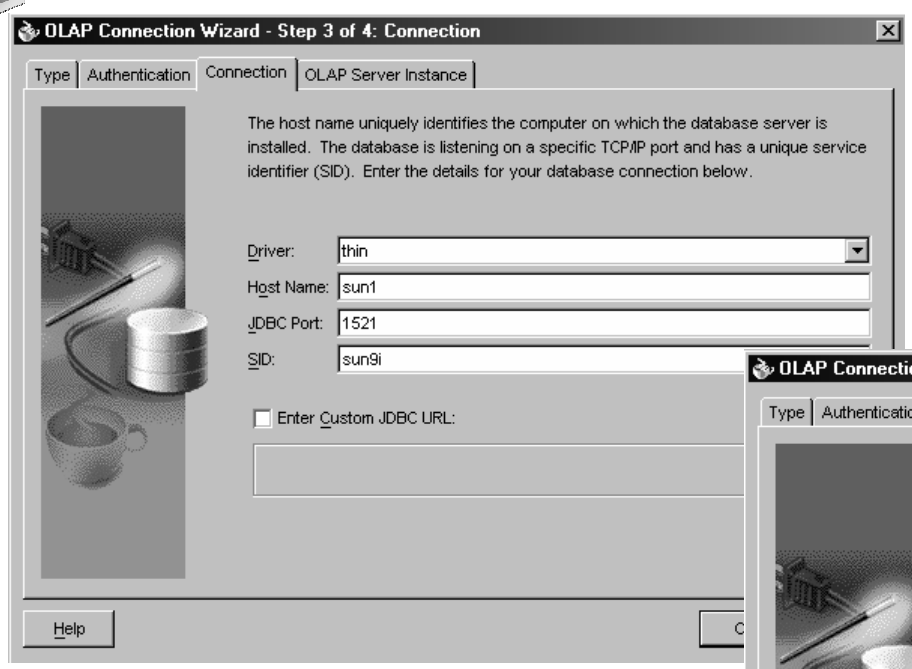




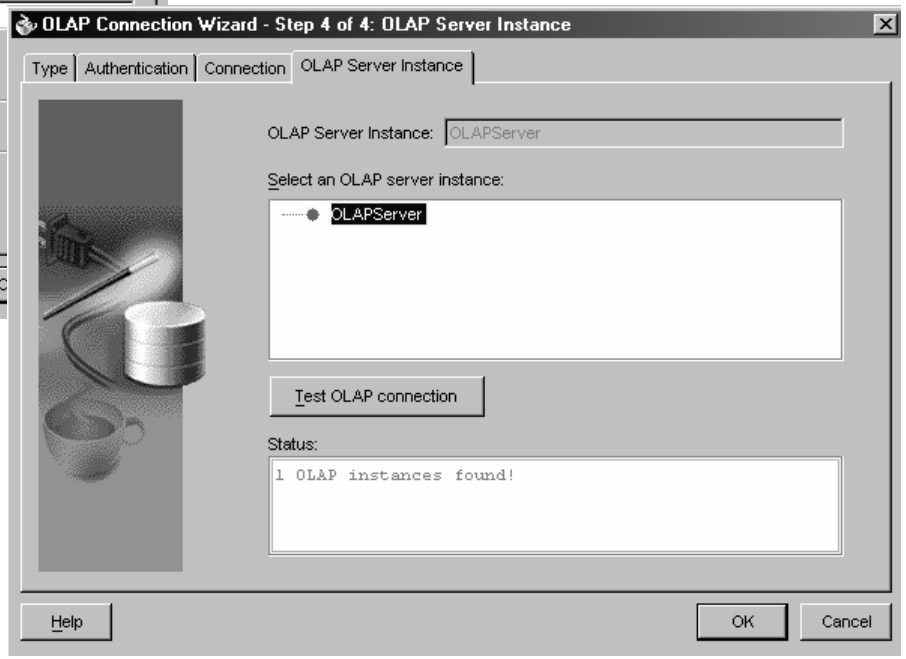
Walks you through creating an Catalog Connection

- **Define Connection Name and Type**
- **Login and Password**

Connection Wizard



- **Specify data source.**



- **Select and Test OLAP Connection**

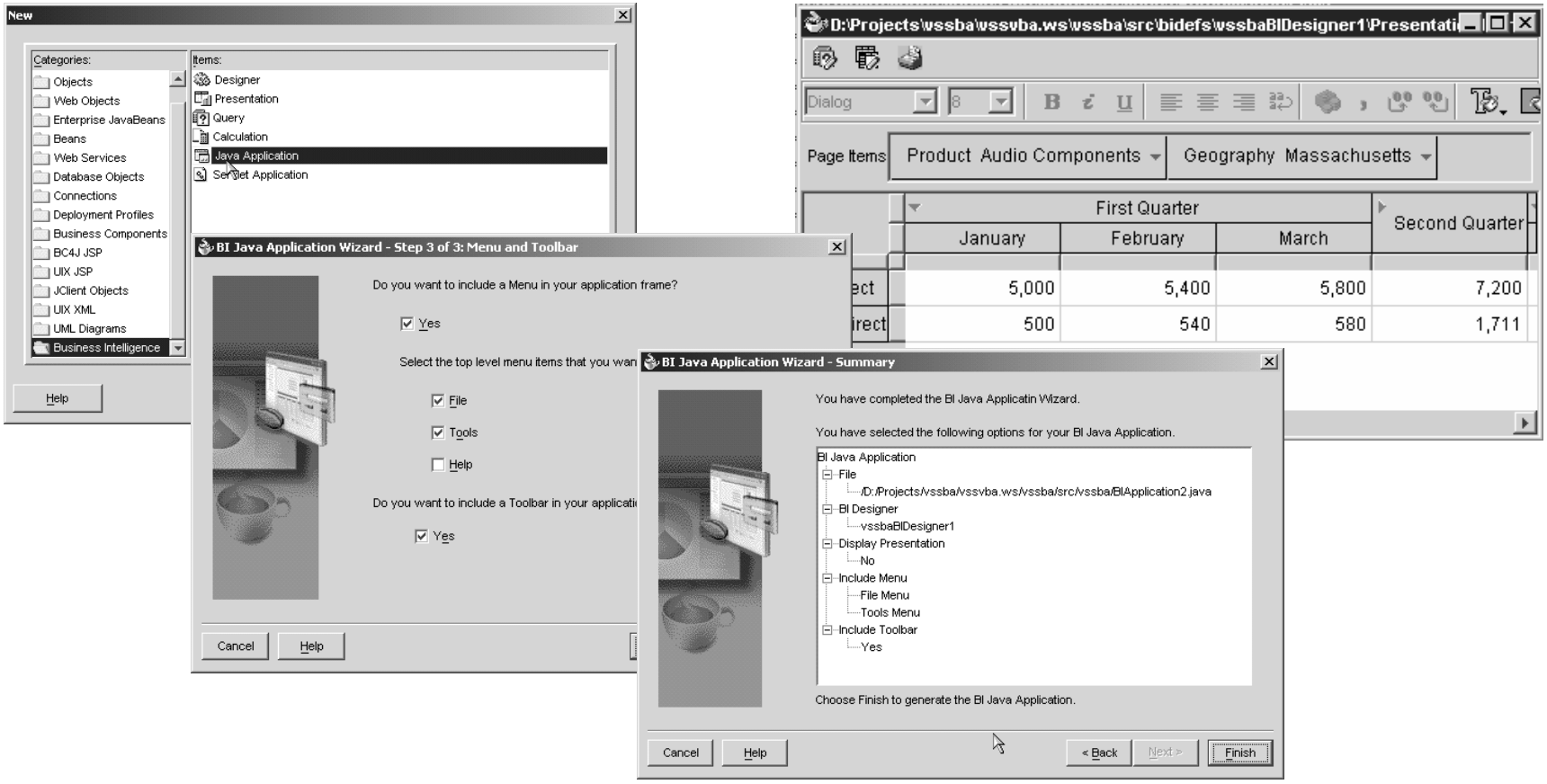
Presentation Beans

- Provides common user interface across Oracle BI products
- Translate UI gestures into OLAP events
- Graph
  - Over 50 graph types
  - Can modify appearance
- Crosstab/Table
  - Cell level formatting
- View toolbar enables simple access to formatting capabilities
- Customers: Discoverer, Reports, Portal, CRM, Enterprise Planning and Budgeting, Balanced Scorecard ...

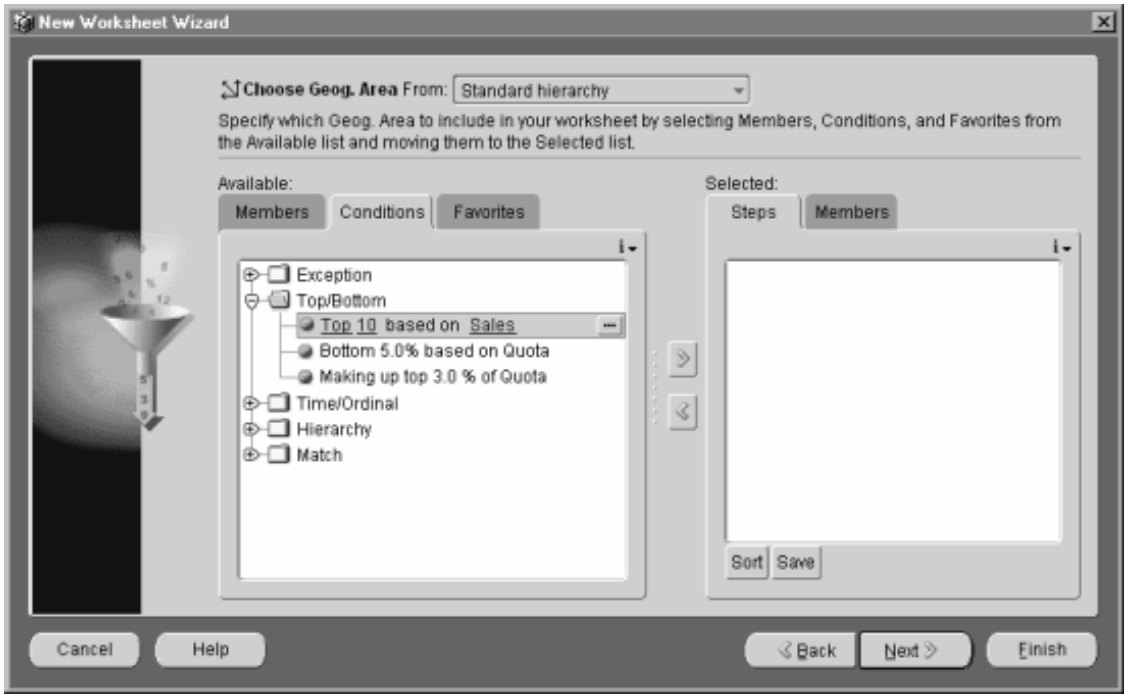
Business Intelligence Wizards

- **Specialized Wizards Built into JDeveloper**
  - **Connection Wizard**
  - **Calculation Wizard**
  - **Query Wizard**
  - **Presentation Wizard**
  - **Java Client Application Wizard**
  - **Servlet (JSP) Application Wizard**

JDeveloper BI Wizards

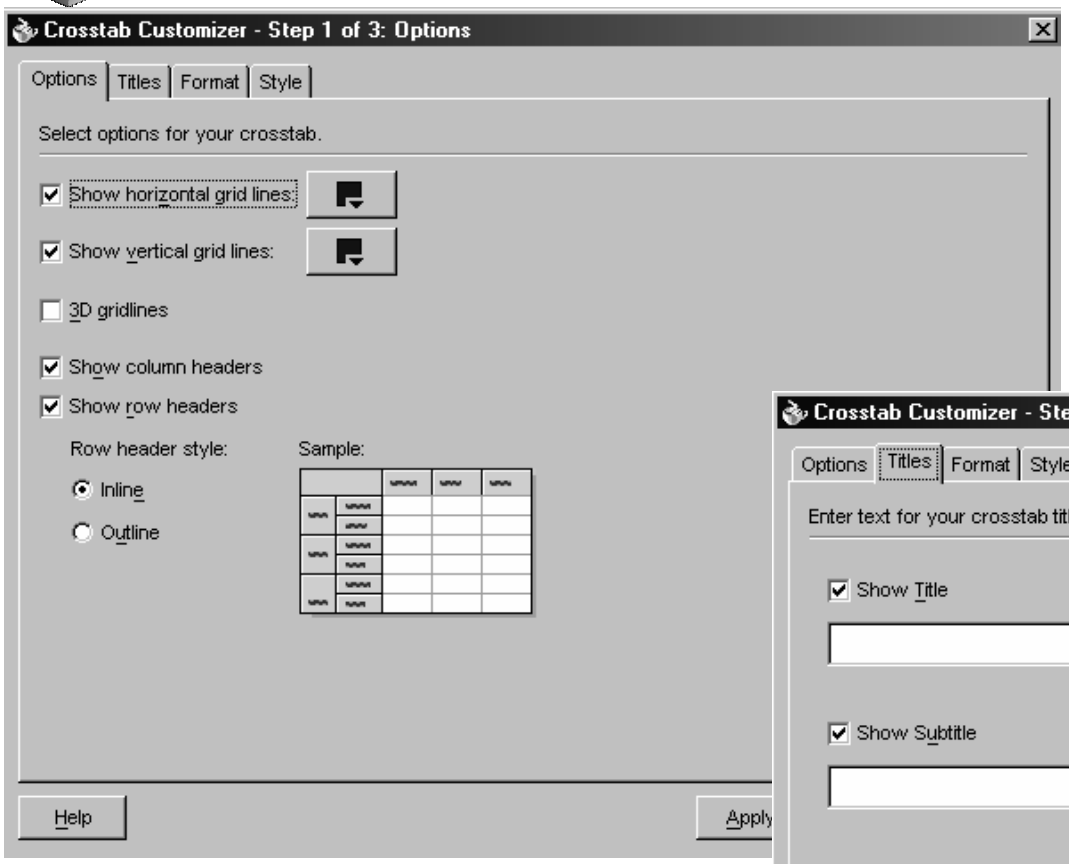


Query Builder



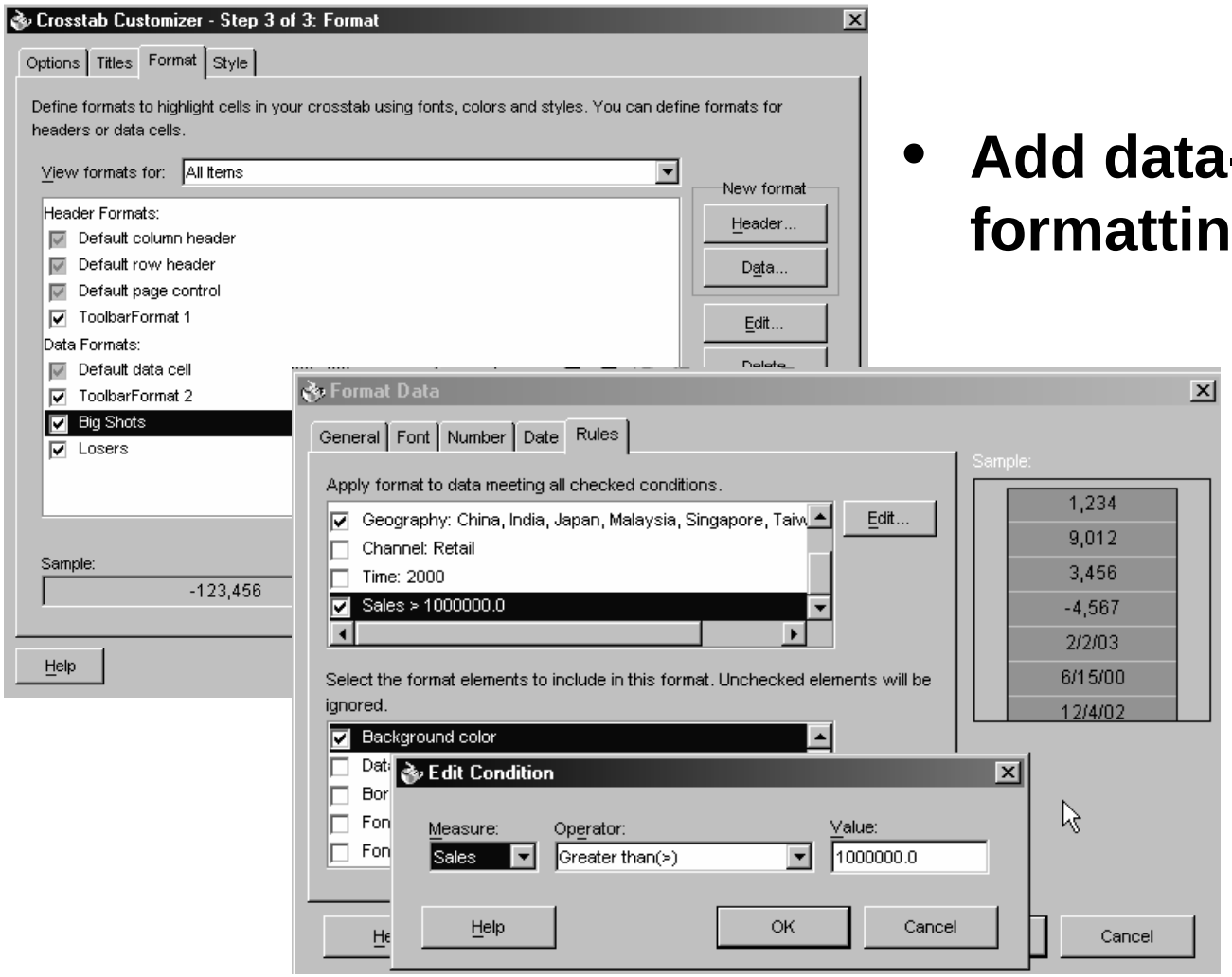
- **"Brains" behind the presentation beans**
  - ❑ **Data provider**
  - ❑ **Data navigation**
  - ❑ **Data selection**
- **QueryBuilder customizer**
  - ❑ **Enables end user to specify advanced queries using business terms - not SQL**
  - ❑ **Save favorite selections**

Customizer



- **Alter the look of your presentation.**
- **Add titles and footnotes.**

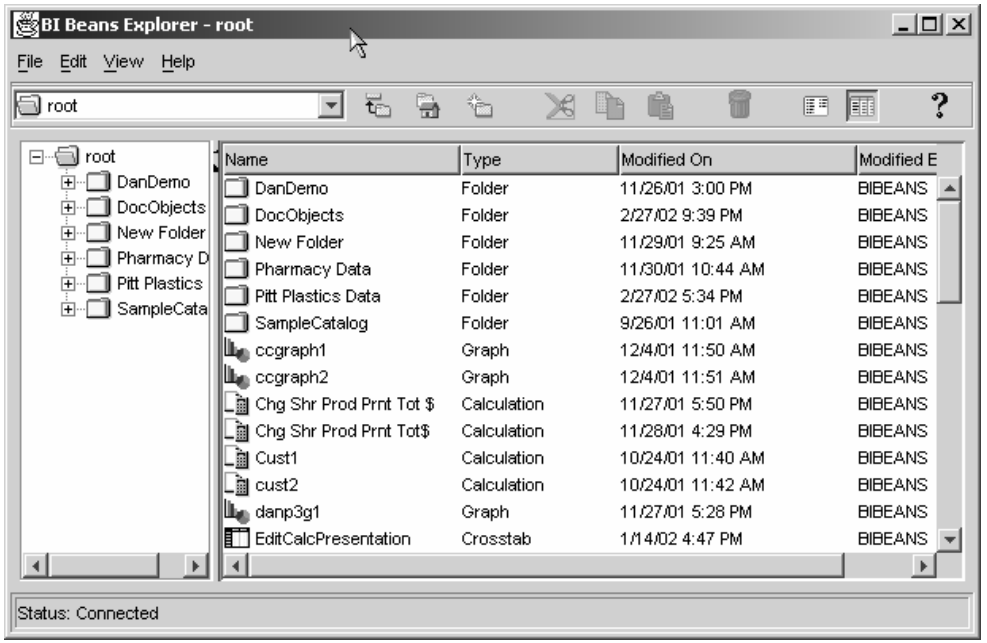
Customizer



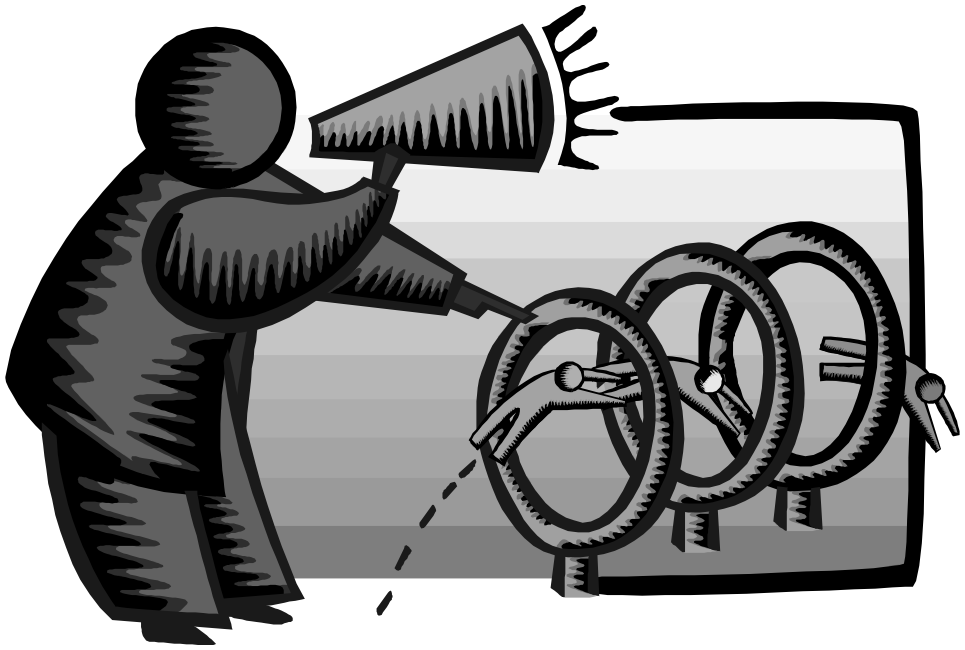
- **Add data-driven formatting.**

Persistence Services – BI Catalog

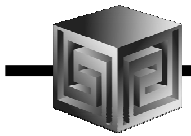
- Enables end users to save personal analyses or share analyses with other users.
- Organizes information in folders
- Persisted objects include:
  - Crosstab, table and graph formatting
  - Entire queries or individual selections
  - Calculations
- Objects persisted in XML format
- Searchable

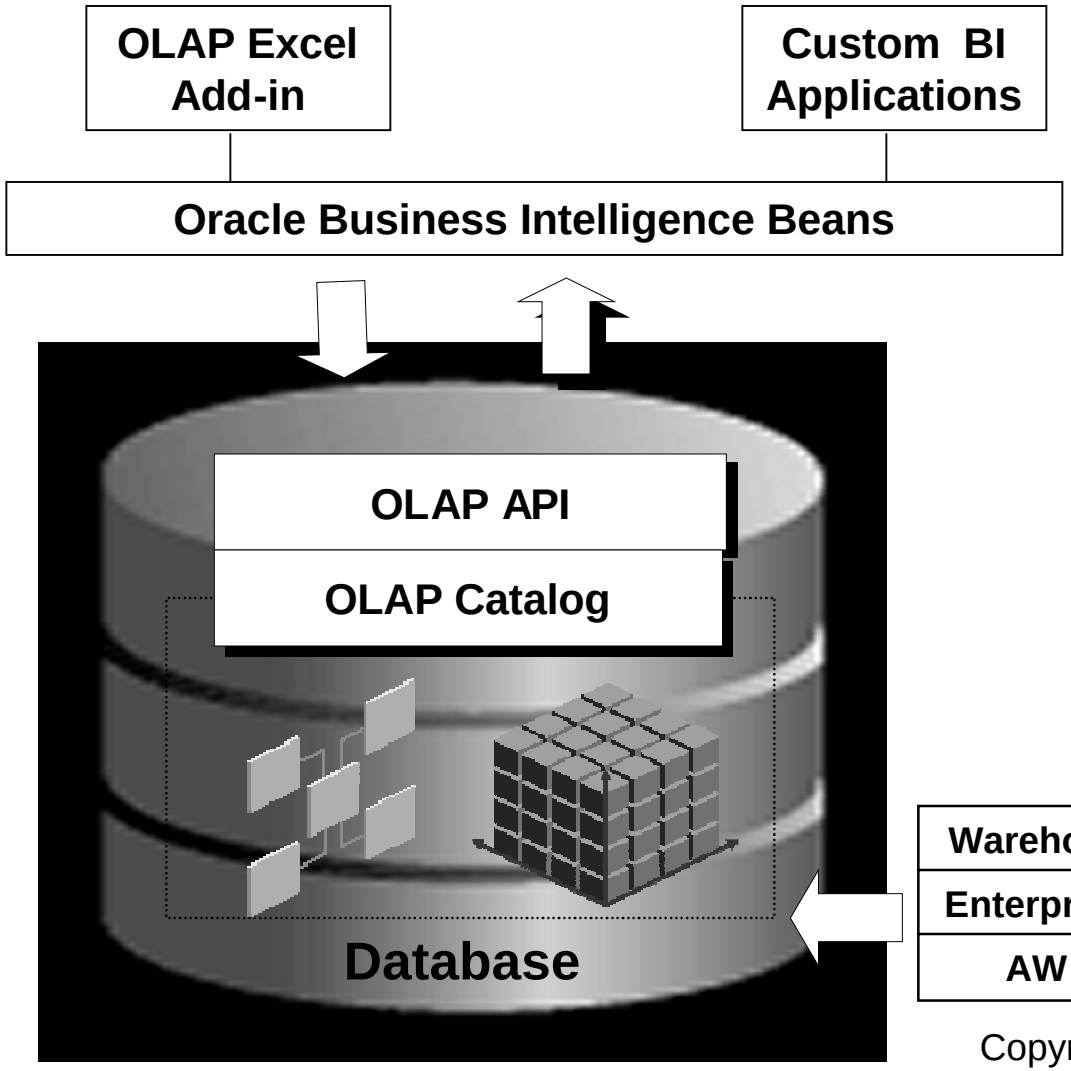


Demonstration of BI Beans Application



Access to All OLAP Data from Excel

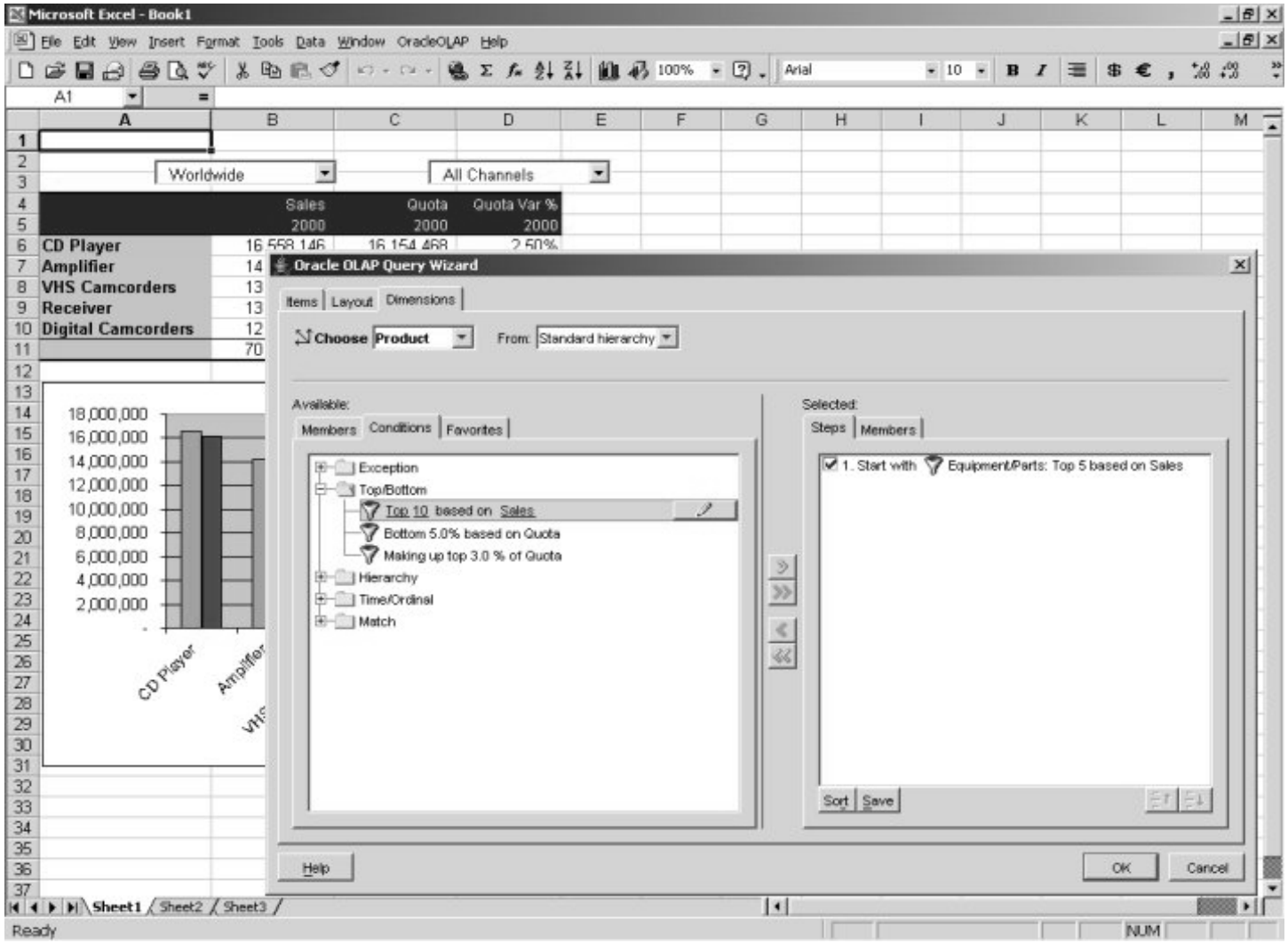




OLAP Excel Add-in

- Query Oracle OLAP directly from Excel
- Leverages BI Beans Query Builder and Calc Builder

Spreadsheet Add-In



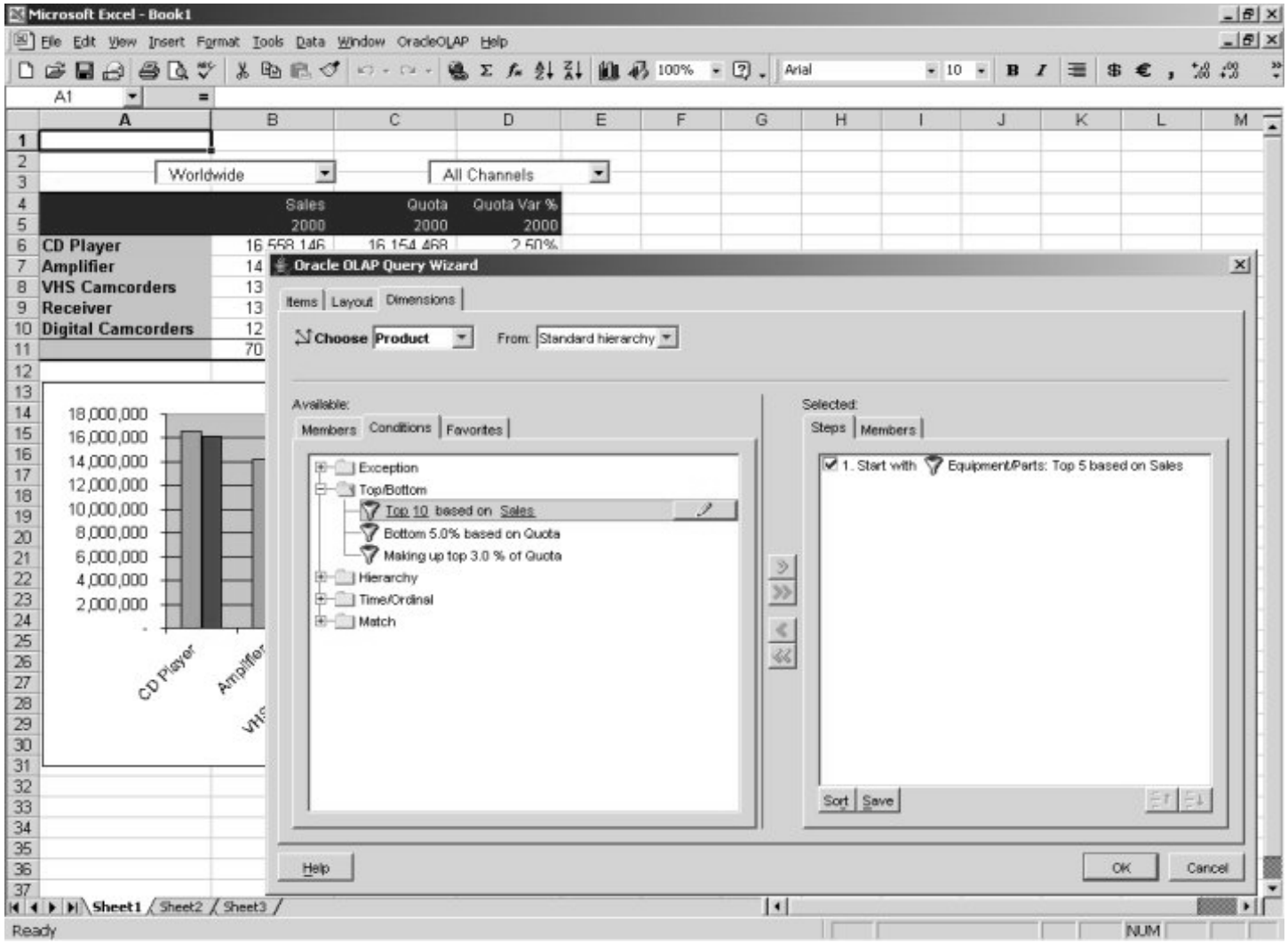
Spreadsheet Add-in Specifics

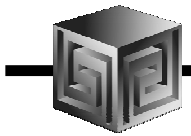
- Use instead of Discoverer as ETL OLAP Tool
- Allows access directly from Excel to entire OLAP cube
- Allows access to Query Editor
- Allows access to Calc Builder
- Presents data in familiar Excel interface
- Breaks down perception OLAP data "closed"
- Users love access from Excel!

What Does Spreadsheet Add-in Do?

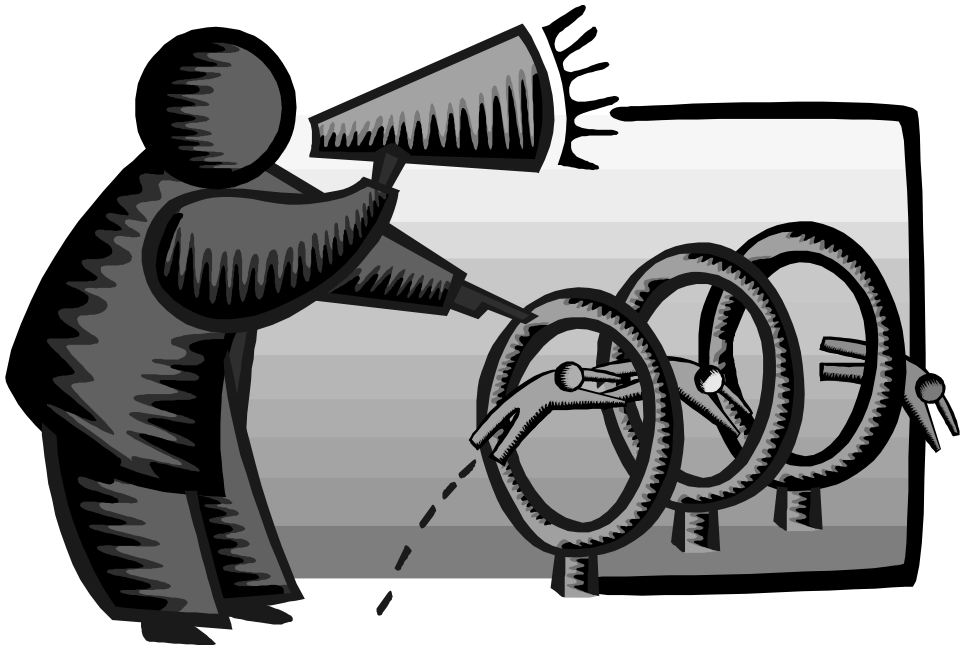
- Adds OracleOLAP menu to Excel menu
- New Query gets data into Excel
- Edit Query changes selection in Excel
- Add New Calculation calls Calculation Wizard
- Allows for drilling and paging on OLAP data
- Saves queries between sessions
- Refresh Query refreshes queries from server
- Several options to modify behavior

Spreadsheet Add-In





Demonstration of Spreadsheet Add-in



Which Is Right For You?

BI Beans

- Need customizations
- Integrate with other non-Oracle Applications
- Need to extend in future
- Have Java programmers
- No problem with:
  - Documentation
  - Installation
  - Support
  - Training

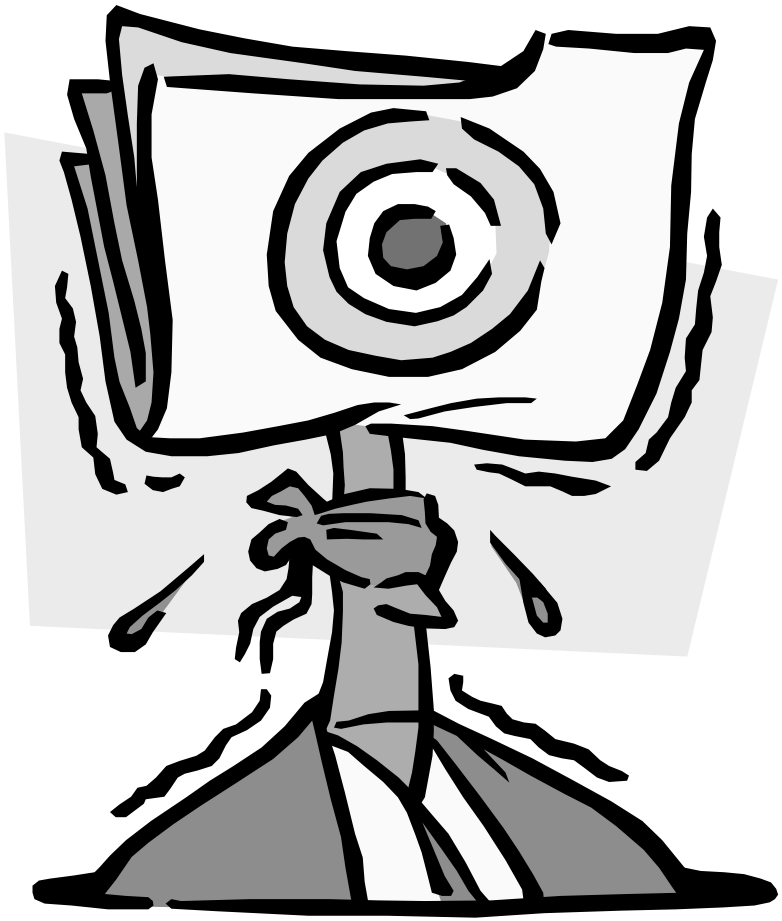
Discoverer

- Want out-of-the-box setup
- Already have Discoverer
- Want Portal integration
- Like Discoverer functionality

Excel Add-in

- Want to drive from Excel
- Free (with Oracle OLAP)
- Users OK with creating own

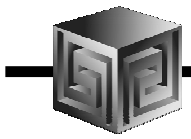
QUESTIONS?



Oracle OLAP Case 1

- Manufacturing company needs to reduce inventory levels
- Uses OLAP DML Forecast command based on orders
- Users can override forecasts and add their own promotional campaigns
- Computes more accurate forecasts of production needs, reducing inventory levels
- Can compare accuracy of monthly forecasts by comparing various “scenarios” each month with actual shipments
- Application presented as JSP for business forecasters / managers

Oracle OLAP Case 2



- Service organization with call center wants to minimize hold time but not increase headcount
- Solution is to analyze hold time and customer resolution time for each support analyst
- Can rank support engineers / departments by customer satisfaction / resolution / callback rates
- Can pay bonus based on quantifiable results

Oracle OLAP Case 3

- Oil company has complex GL and existing Express-based “business rules engine” for allocating costs and income
- Uses Oracle OLAP engine to develop models to allocate data based on rules analysts develop
- Users can develop their own way of analyzing the data rather than relying on IT
- IT sets up infrastructure, users develop actual analyses

Oracle OLAP Case 3 (continued)

- Company has existing Express application that meets user needs, but wants to modernize U/I and run with web interface
- Export/import existing Express databases to Oracle OLAP AWs
- Back-end code works as-is
- Front-end code rewritten in Oracle OLAP Web Agent (OLAP DML)
- "Application Generator" allows business users to create entirely new applications with their own multi-dimensional objects

Oracle OLAP Case 4

- Manufacturer wants an ad-hoc analysis and reporting against sales data warehouse
- Users need easy-to-use interface and limited custom analysis capabilities
- Front-end is BI Beans custom JSP with cross-tabs customized for user needs
- "Custom selector" allows users to select data
- Highlights importance of "returns"
- Daily data allows managers to impact EOM numbers
- Company changing business practices now

Oracle OLAP Case 5

- CPG company has existing Oracle Sales Analyzer implementation
- Company wants to explore using OracleBI to update technology
- Created Proof-of-concept dimensional model in less than 40 hours
- Demonstrated two techniques:
  - Export out data and import into Oracle OLAP
  - Use AWM to map to star schema data warehouse
- Company evaluating Discoverer OLAP

Oracle OLAP Case 6

- Shipping company wants to flexibly report data with many custom calculations
- Company used to multidimensional tools, but wants solution integrated with Oracle
- Many users accustomed to Excel
- Company wants training, but ends up needing consulting to get going
- Company now creating cubes on their own, using Excel add-in as their front-end of choice

Oracle OLAP Case 7

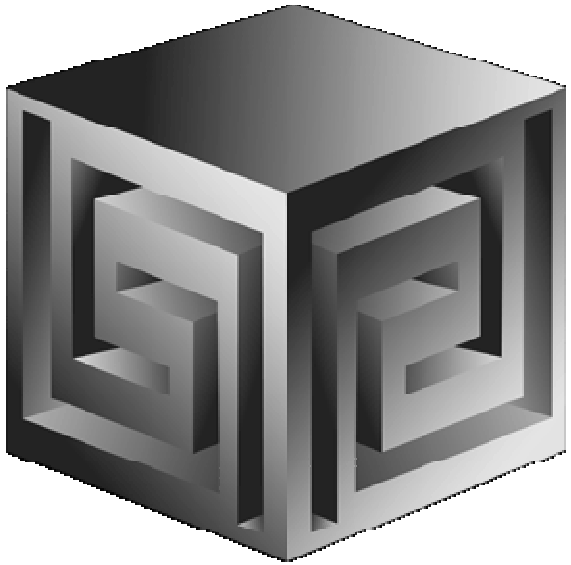
- Financial analysis company wants to analyze stocks against benchmarks using proprietary models
- Presentation of data is by various attributes of Equities such as Market Capitalization, Industry, etc.
- Users want to drill from groups of stocks to individual equities, changing dimensionality
- Custom OLAP DML code transforms data with models when copying from one cube to another

Oracle OLAP Case 8

- ASP Company using Oracle OLAP to deliver analysis of web traffic to clients
- Building separate AW for each client
- Uses templates to share common "dimensions" across multiple implementations
- Each client gets separate AW so each can customize dimensional model to their needs
- Building ASP offering around Oracle BI/OLAP

Oracle BI and Oracle OLAP—What's All This About?

October 2005



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