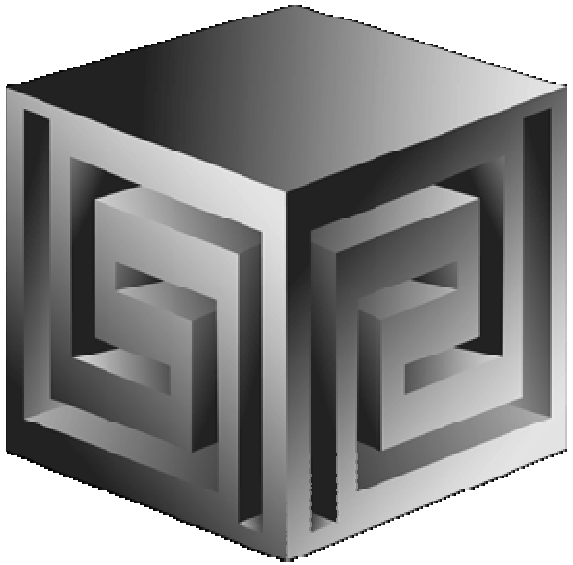
Faster and Smarter Data Warehouses with Oracle 11g

Oracle OpenWorld 2008



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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
  - Multi-dimensional applications
- Delivers
  - Design and integrate BI and DW solutions
  - Training and mentoring
- Expert presenter at major Oracle conferences

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Vlamis OpenWorld Presentations

Presenter	Time	Title
Dan Vlamis	Sun 8:30-10:00	Building Cubes and Analyzing Data using Oracle OLAP 11g
Mark Thompson	Sun 2:30-4:00	Integration of OBIEE and Essbase
Dan Vlamis	Sun 4:00-5:30	BIWA Panel: Why Do BI Projects Fail?
Dan Vlamis	Mon 1:00-2:00	Faster and Smarter Data Warehouses with Oracle Database 11g

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Dan Vlamis, President, Vlamis Software Solutions

- Developer for IRI (former owners of Oracle OLAP)
- Founded Vlamis Software in 1992
- Wrote portions of Oracle Sales Analyzer
- Beta tester and early adopter of Oracle OLAP
- Expert speaker and author
- Recognized expert in Express and OLAP industry
- Bringing multi-dim experience to Essbase

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Thomas H. Davenport
Harvard Business Review
Competing on Analytics
January 2006

"Virtually all organizations we identified as **aggressive analytics competitors are clear leaders** in their fields, and they attribute their success to the masterful exploitation of data."

Are you an analytics competitor?

Can you answer yes to these questions:

- ❑ **Compare performance across time periods?**
- ❑ **Access key performance indicators in near real time**
- ❑ **Identify top/bottom products, customers, employees, costs, channels?**
- ❑ **Understand share of category, product mixes, % sales contribution, % profit contribution?**
- ❑ **Can you benchmark your vendors, sales reps, customers?**
- ❑ **Do you move seamlessly between strategic analysis to tactical analysis?**
- ❑ **Does ad-hoc mean mouse-clicks? or phone calls to IT?**

What's stopping you from competing with Analytics?

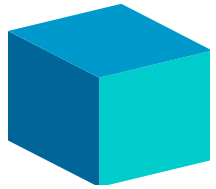
- **Is the business:**
  - **Lacking visibility into business performance?**
  - **Showing little confidence in the accuracy of reports?**
  - **Given point in time metrics, but asking for forward looking analysis?**
  - **Missing opportunities because of lack of ad-hoc reporting?**
  - **Operating in a constantly changing environment?**
  - **Using Excel and Access as their "reporting repository"?**

- **Is the IT organization and infrastructure:**
  - **Challenged with conflicting priorities?**
  - **Spending significant resources developing new reports?**
  - **Struggling to provide timely and accurate information?**
  - **Producing ad-hoc reports or extracts to business users?**
  - **Managing to service level agreements?**

Oracle OLAP 11g – Relational and OLAP!

- **An integrated component of Oracle Database 11g that enables companies to easily gain insights into business performance. It offers:**
  - ❑ **Exceptional query, calculation and data preparation performance**
  - ❑ **Rich analytic capabilities**
  - ❑ **Simple user model that reflects business usage**

OLAP



- **Oracle OLAP is the only OLAP engine on the market**
  - ✓ **This is fully embedded within a database**
  - ✓ **That is fully accessible via SQL**

Therefore it can provide advanced calculation capabilities to <u>any</u> business application

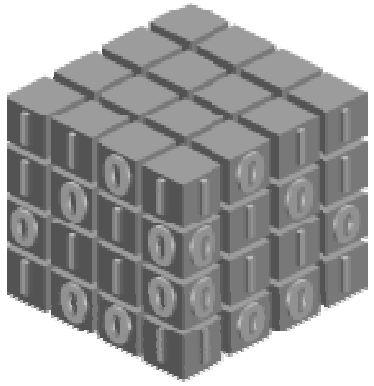
Business Advantages of Oracle 11g OLAP Option

- Enhanced business analysis
  - Complex calculations
    - Compare things e.g. last year to now
    - More sophisticated analytical calculations
  - More interactive analysis of data
    - Advanced data selections using many combined criteria
    - Intuitive, hierarchical navigation
- More timely data
  - It's easier and faster to aggregate dimensional data
- Query performance is both faster and more consistent

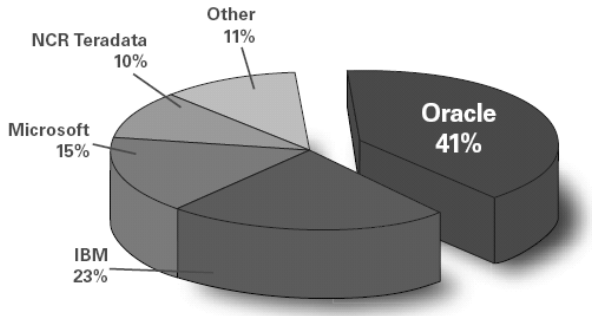
Business Advantages of Oracle 11g OLAP
Enhanced business analysis

- **Example - Multidimensional Calculations & Complex Embedded Queries**
  - **Uni-dimensional**
    - **“What are my top ten products?”**
  - **Multidimensional**
    - **‘What was the percent change in market share for a grouping of my top 20% of products for the current three month period versus same period year ago for accounts which grew by more than 20 percent in revenue?”**

Oracle OLAP Features and Benefits



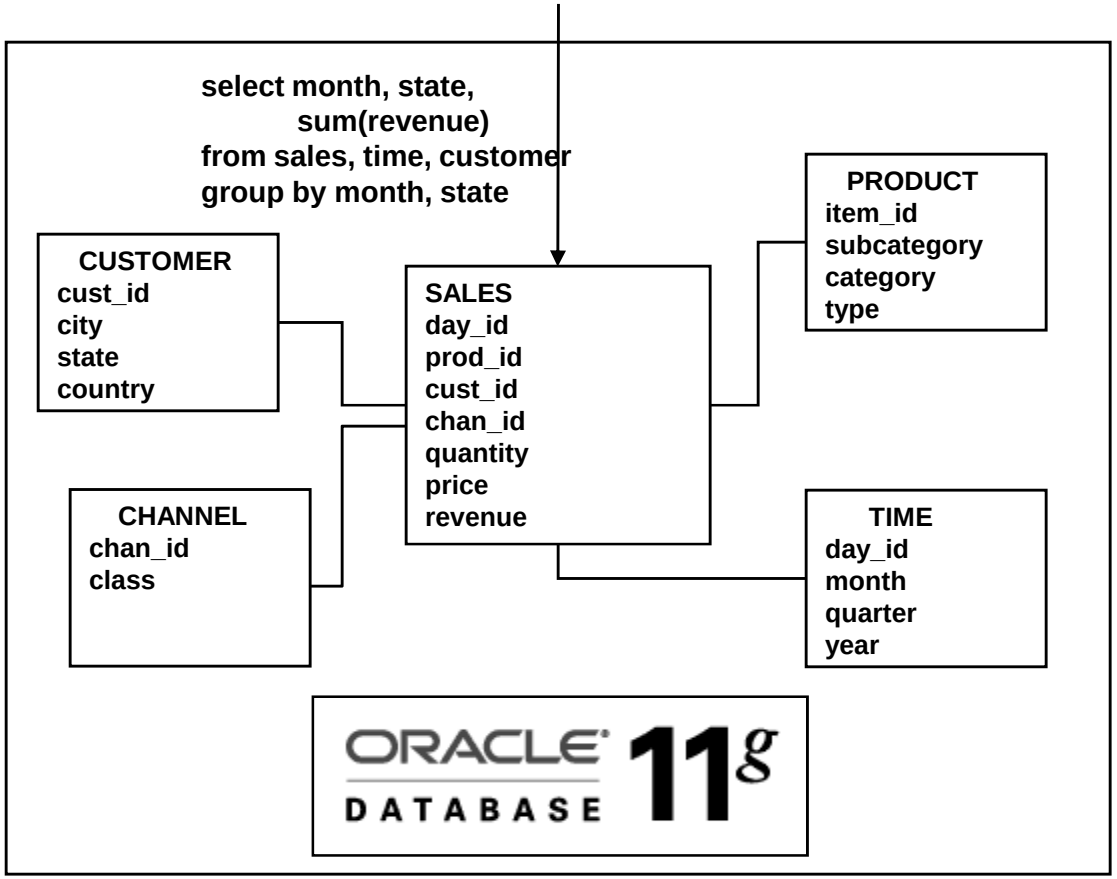
- Core component of Market leading Oracle DB
- Highly scalable OLAP server
- Centralized Business Model view
- Sophisticated Calculation Engine with hundreds of pre-built functions
- Financial Intelligence, Time Series Intelligence, Business metrics
- Consistent, “Speed of Thought” response
- Real time loading capabilities
- Open SQL access or API
- High Concurrency, Partitioning, Clustering, Failover
- Mission Critical Performance and Scalability
- Unmatched data security



Worldwide Data Warehouse Management Market Share, 2006

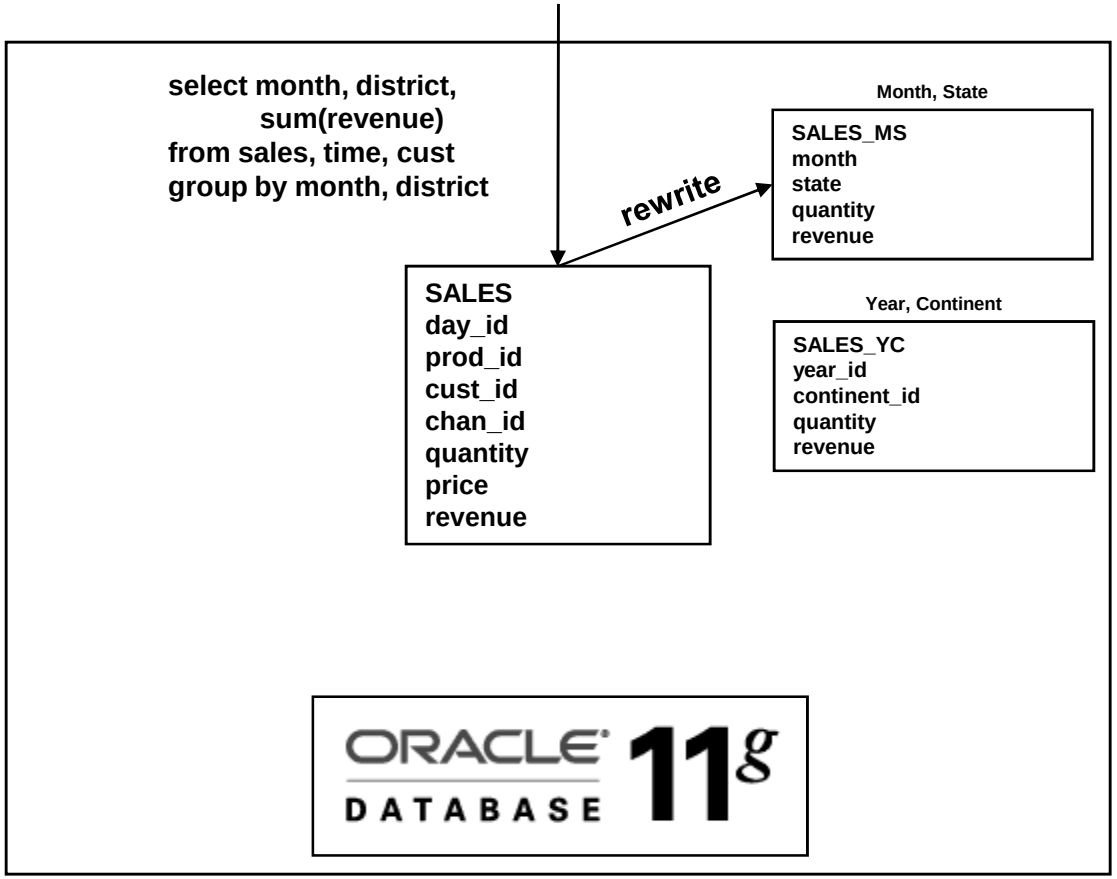
Source: IDC, 2007 – Data Warehouse Platform Tools 2006 Vendor Shares

Materialized Views
Typical MV Architecture Today



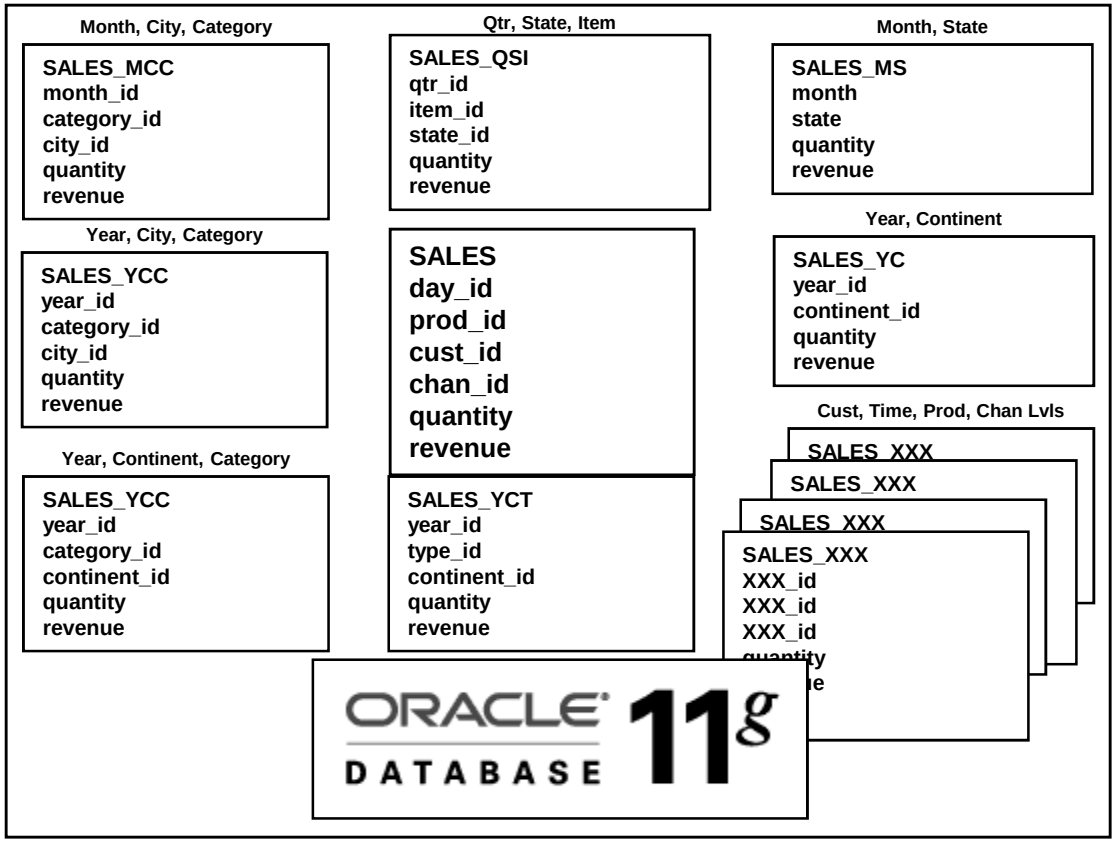
- Query tools access star schema stored in Oracle data warehouse
- Most queries at a summary level
- Summary queries against star schemas can be expensive to process

Materialized Views
Automatic Query Rewrite



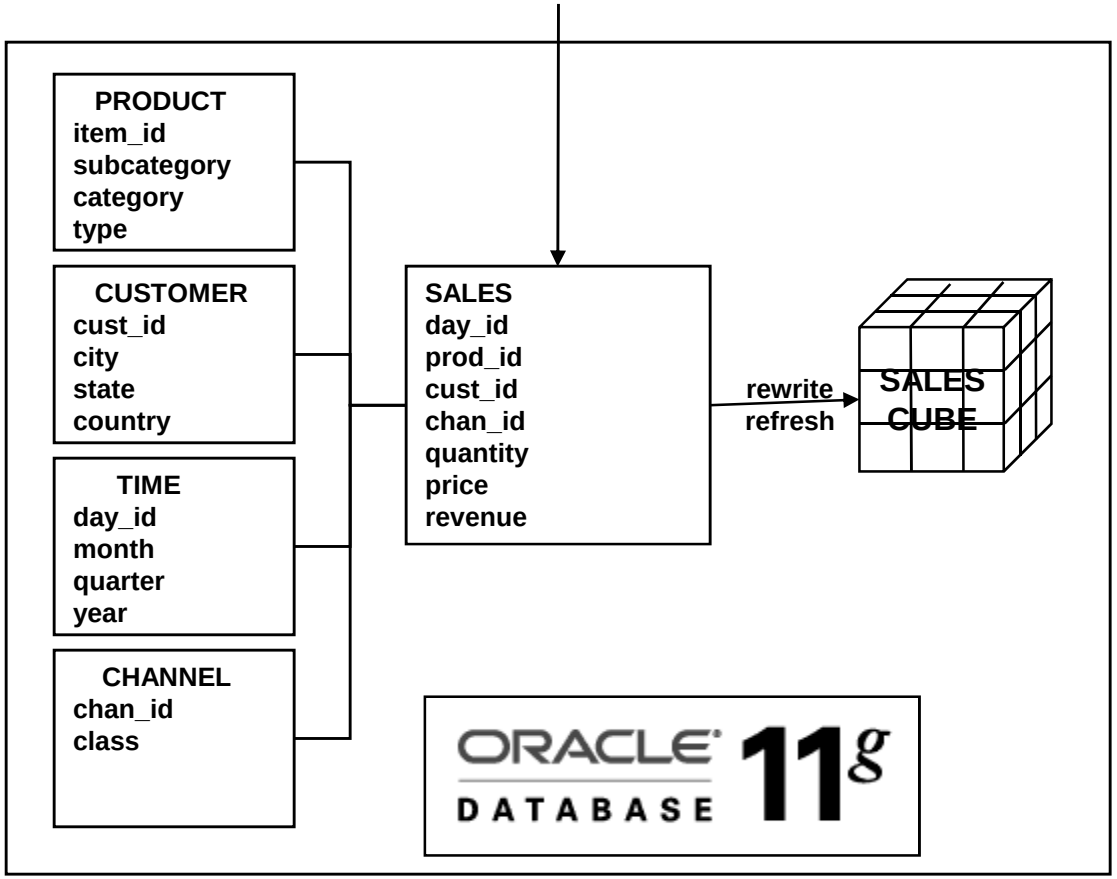
- Most DW/BI customers use Materialized Views (MV) today to improve summary query performance
- Define appropriate summaries based on query patterns
- Each summary is typically defined at a particular grain
  - Month, State
  - Qtr, State, Item
  - Month, Continent, Class
  - etc.
- The SQL Optimizer automatically rewrites queries to access MV's whenever possible

Materialized Views
Challenges in Ad Hoc Query Environments



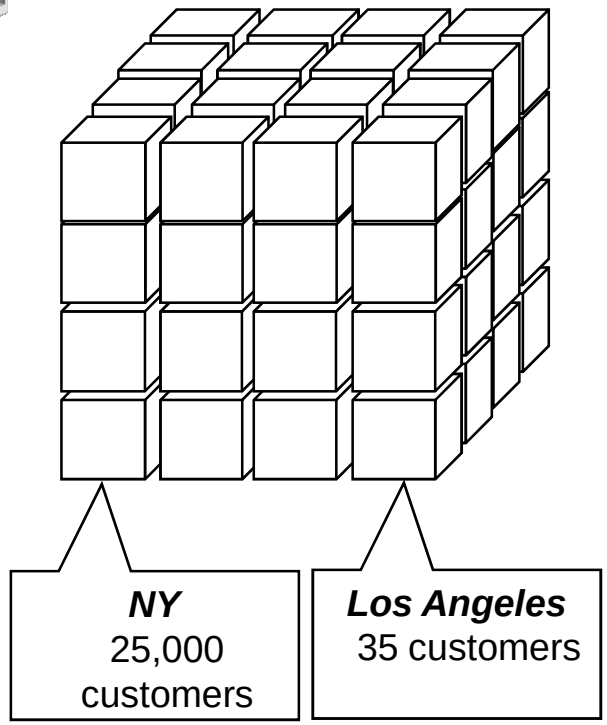
- Creating MVs to support ad hoc query patterns is challenging
- Users expect excellent query response time across any summary
- Potentially many MVs to manage
- Practical limitations on size and manageability constrain the number of materialized views

Cube-based Materialized Views
Breakthrough Manageability & Performance



- A single cube provides the equivalent ***of thousands of summary combinations***
- The 11g SQL Query Optimizer treats OLAP cubes as MV's and rewrites queries to access cubes ***transparently***
- Cube refreshed using standard MV procedures

Cost Based Aggregation
Pinpoint Summary Management



Precomputed

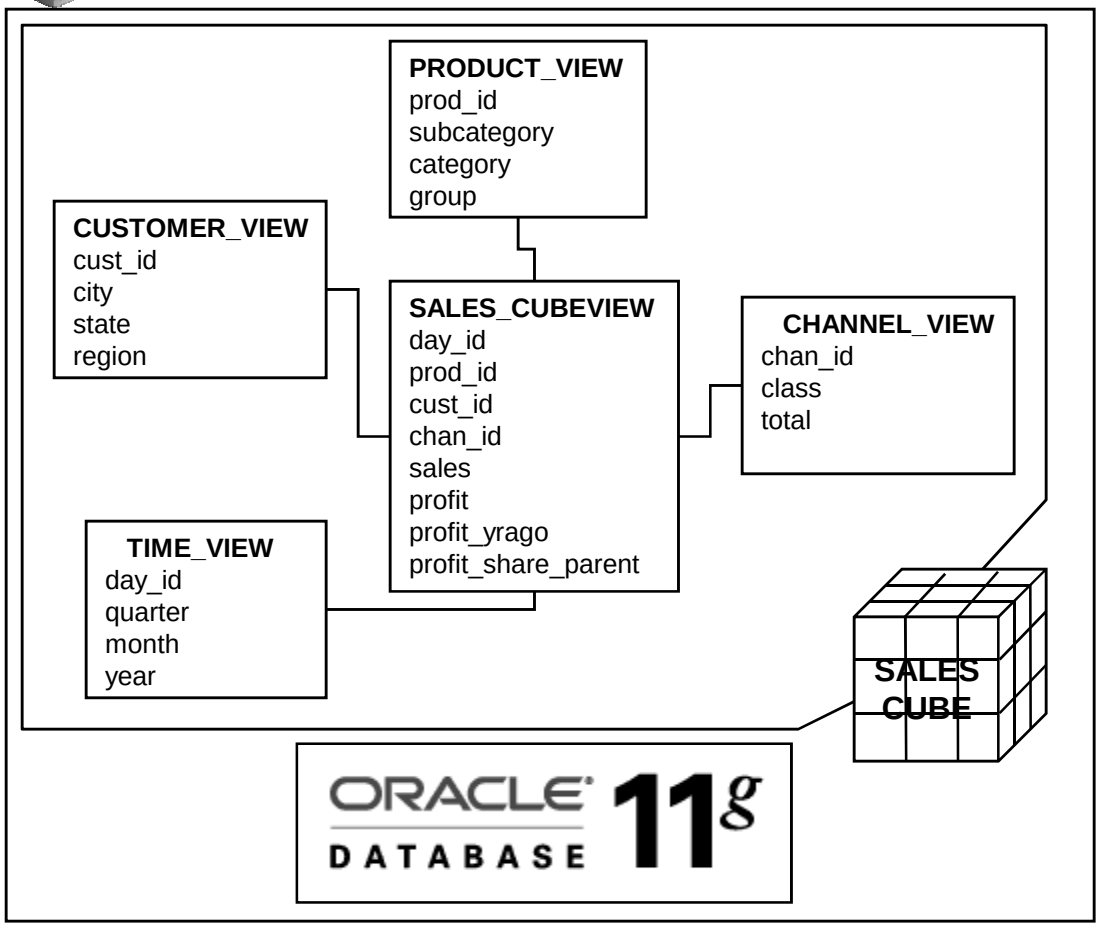
Computed when queried

- **Improves aggregation speed and storage consumption by pre-computing *cells* that are most expensive to calculate**
- **Easy to administer**
- **Simplifies SQL queries by presenting data as fully calculated**

One Cube Accessed Many Ways...

- **One cube can be used as**
  - **A summary management solution to SQL-based business intelligence applications as cube-organized materialized views**
  - **A analytically rich data source to SQL-based business intelligence applications as SQL cube-views**
  - **A full-featured multidimensional cube, servicing dimensionally oriented business intelligence applications**

Cube Represented as Star Model
Simplifies Access to Analytic Calculations

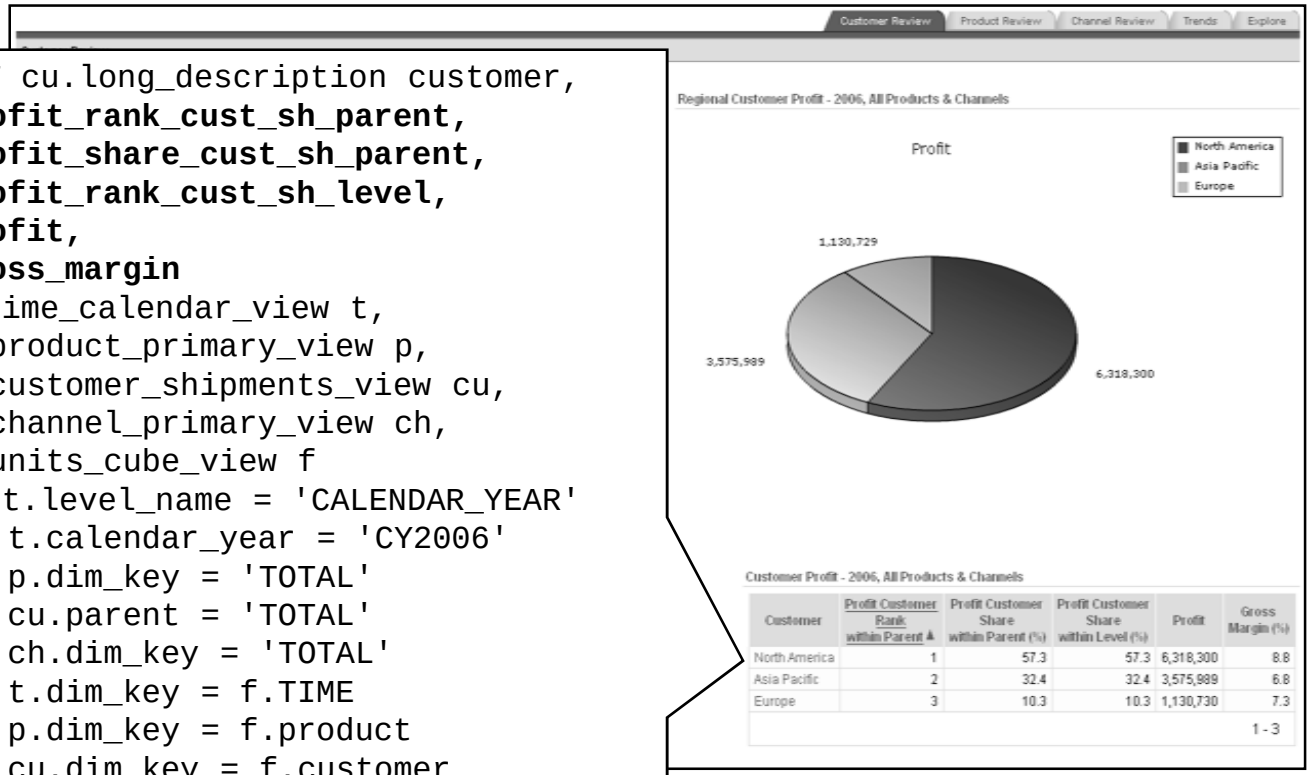


- Cube represented as a star schema
- Single cube view presents data as completely calculated
  - Analytic calculations presented as columns
  - Includes all summaries
- Automatically managed by OLAP

Empowering Any SQL-Based Tool
Leveraging the OLAP Calculation Engine

Application Express on Oracle OLAP

```
SELECT cu.long_description customer,
  f.profit_rank_cust_sh_parent,
  f.profit_share_cust_sh_parent,
  f.profit_rank_cust_sh_level,
  f.profit,
  f.gross_margin
FROM time_calendar_view t,
     product_primary_view p,
     customer_shipments_view cu,
     channel_primary_view ch,
     units_cube_view f
WHERE t.level_name = 'CALENDAR_YEAR'
   AND t.calendar_year = 'CY2006'
   AND p.dim_key = 'TOTAL'
   AND cu.parent = 'TOTAL'
   AND ch.dim_key = 'TOTAL'
   AND t.dim_key = f.TIME
   AND p.dim_key = f.product
   AND cu.dim_key = f.customer
   AND ch.dim_key = f.channel;
```



Faster and Smarter

- Faster to aggregate – agg just what's needed
- Faster to maintain – incr. refresh, skip-level
- Faster to retrieve data – cube structure
- Simpler to manage – 1 materialized view
- Smarter in calcs – interrow calculations
- Smarter agg rules – centrally managed
- Smarter maintenance – in central repository
- Smarter forecasting – built into database

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Changes in OLAP 11g

- **Oracle OLAP has many NEW things**
  - **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!)**

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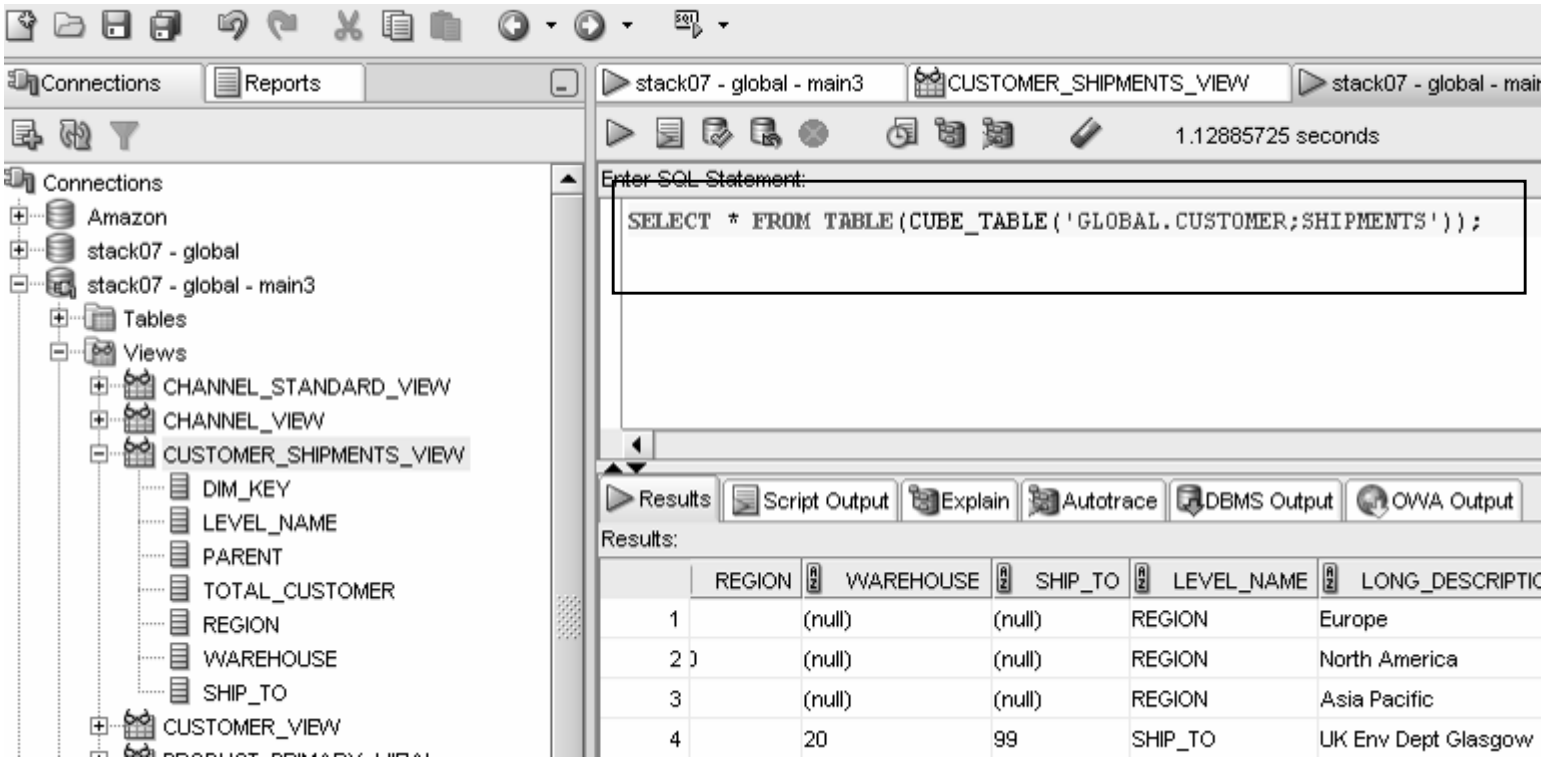
OLAP 11g Changes

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



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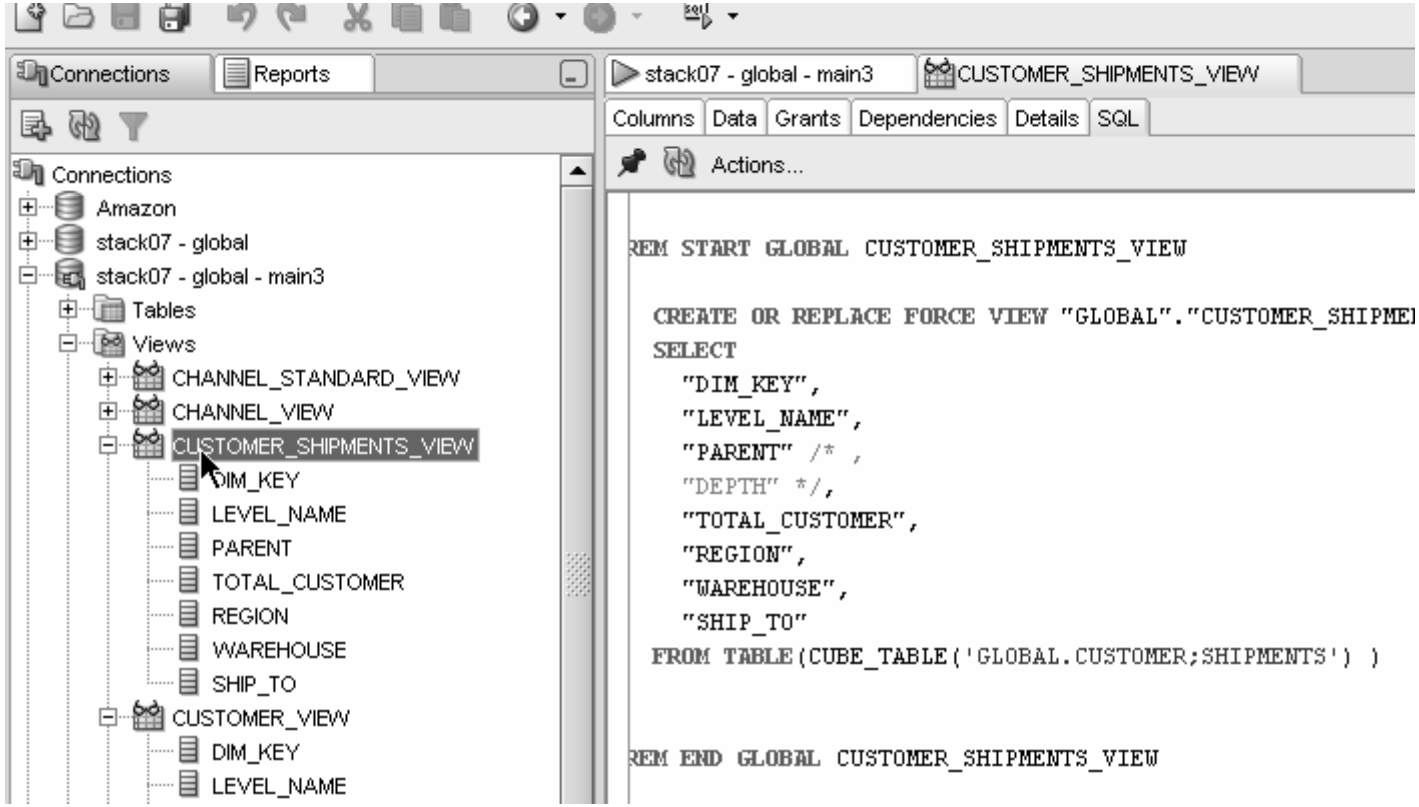
OLAP 11g Changes

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



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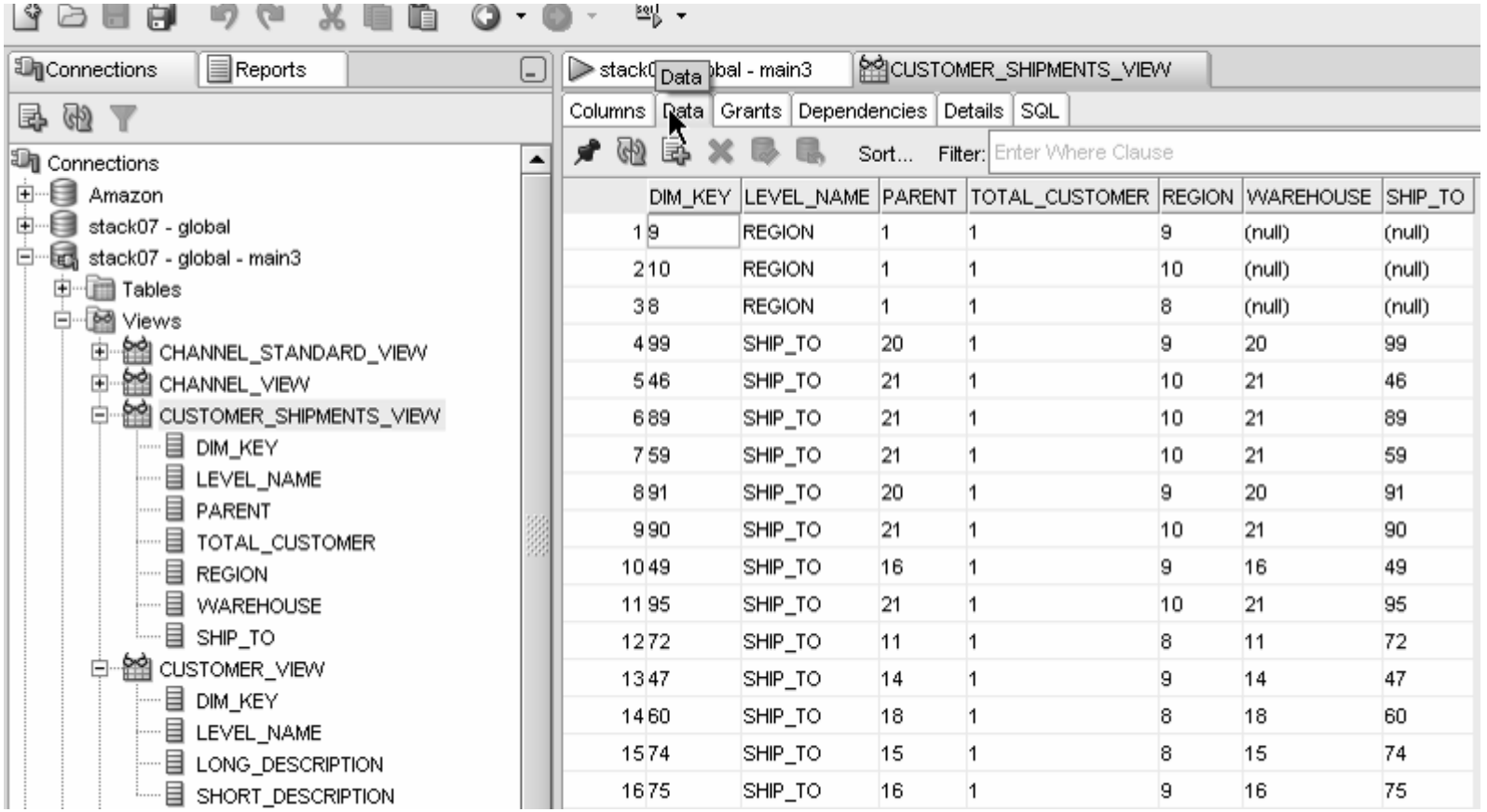
OLAP 11g Changes

- **Views easily accessed from SQL Developer**



	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

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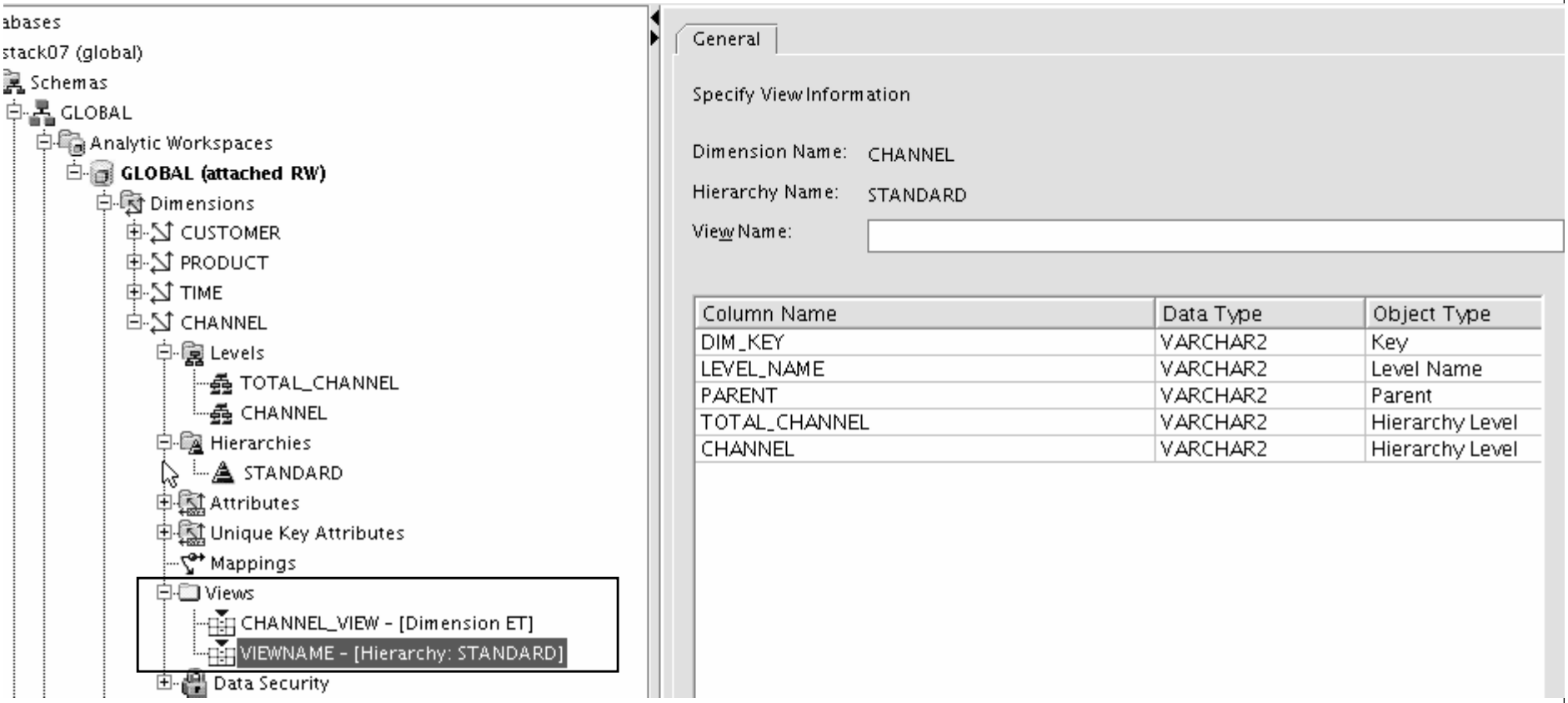
OLAP 11g Changes

- **Automatic views accessible from AWM**



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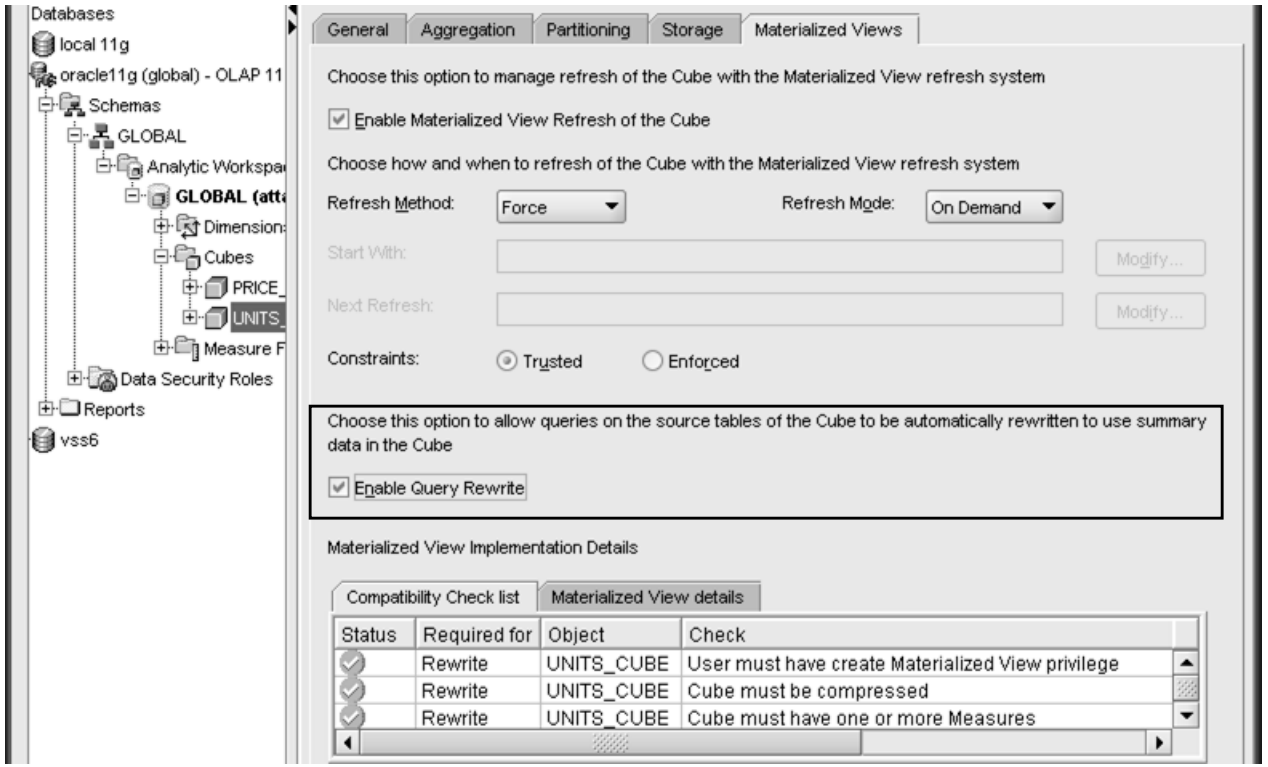
OLAP 11g Changes

- **Query Rewrite knows about AWs now**



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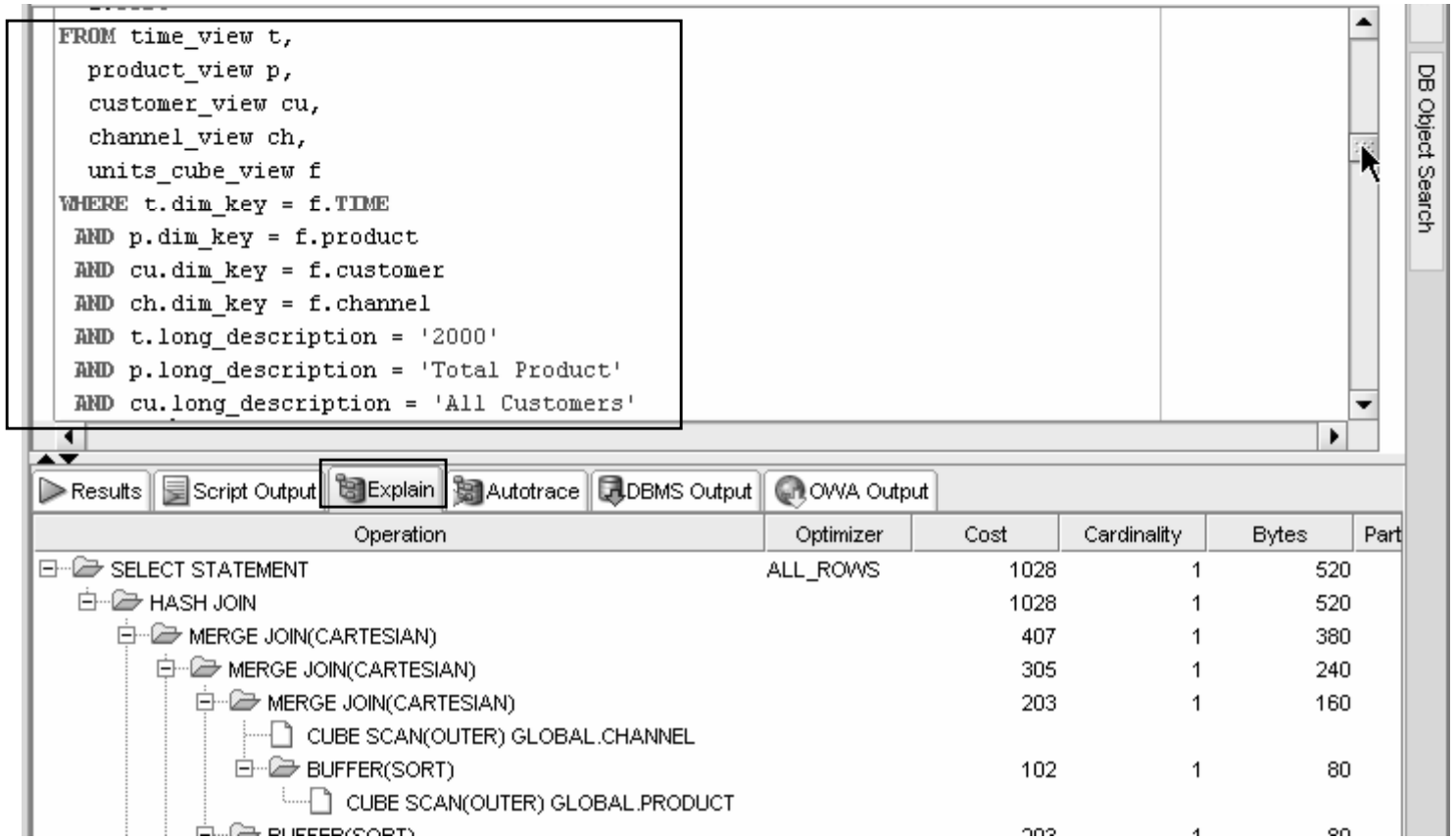
OLAP 11g Changes

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



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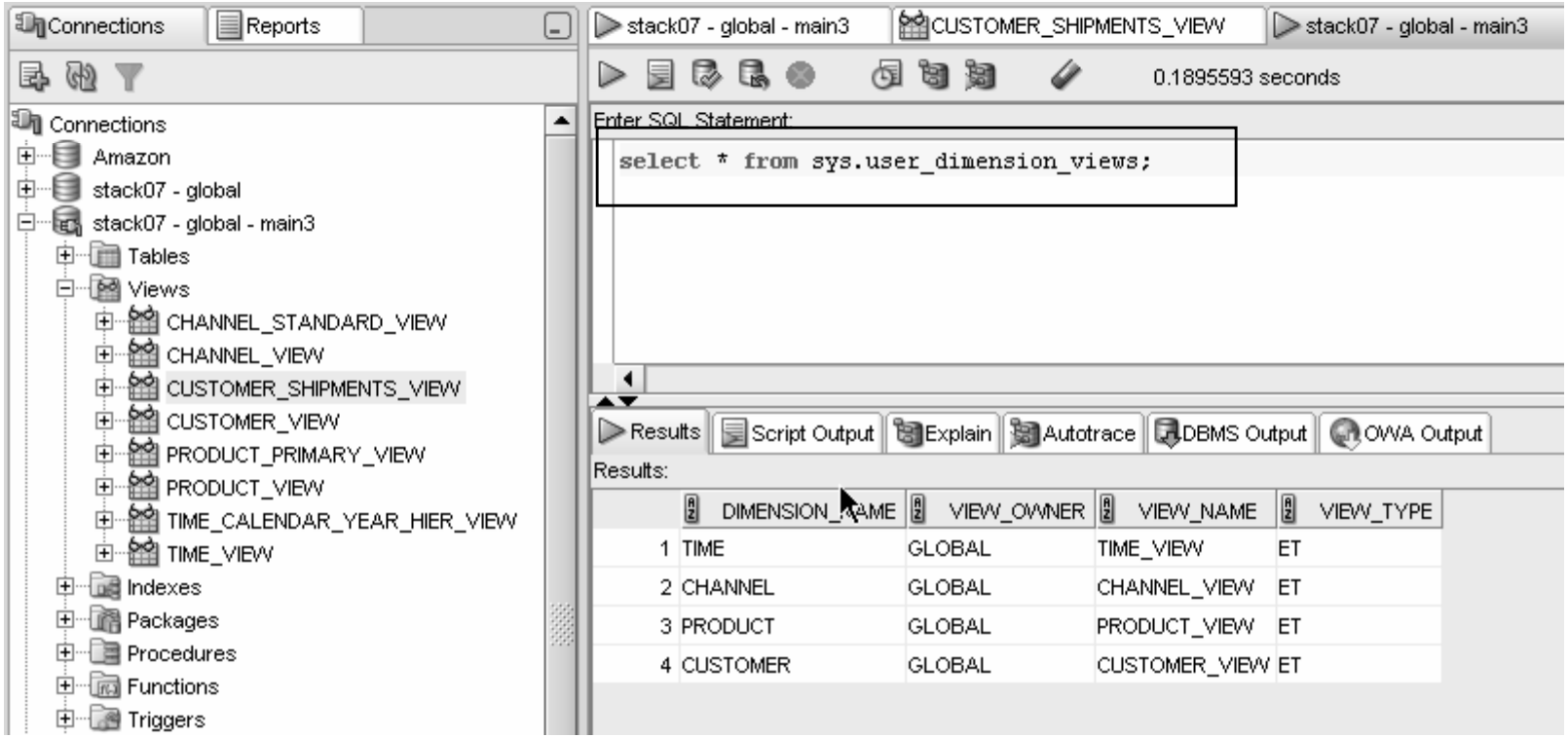
OLAP 11g Changes

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



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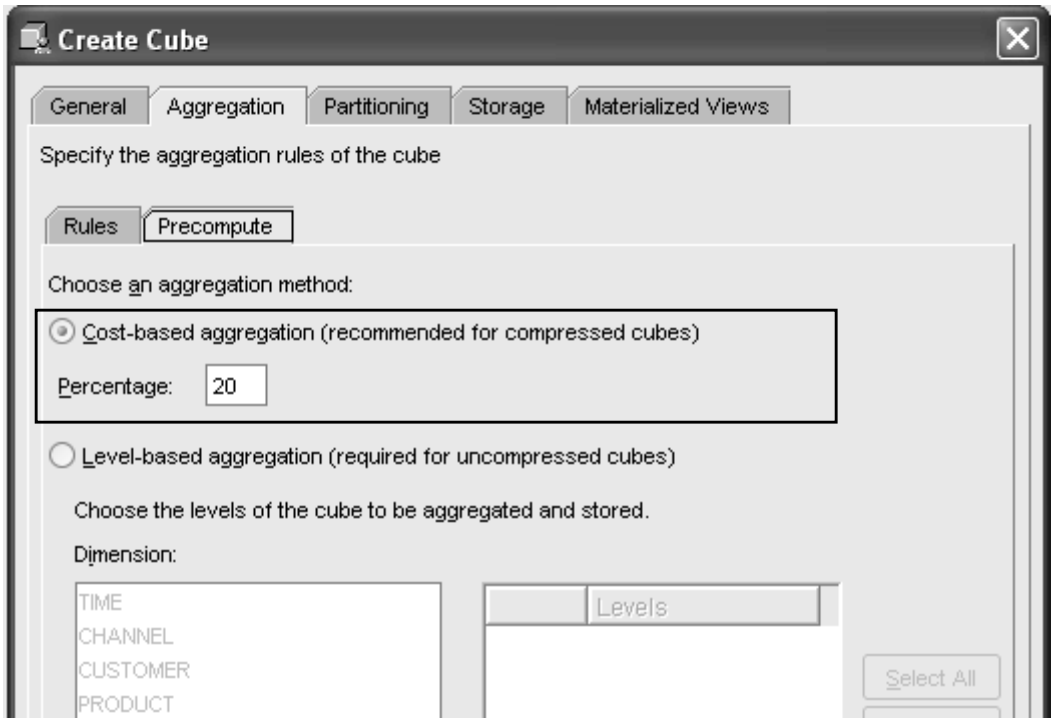
OLAP 11g Changes

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



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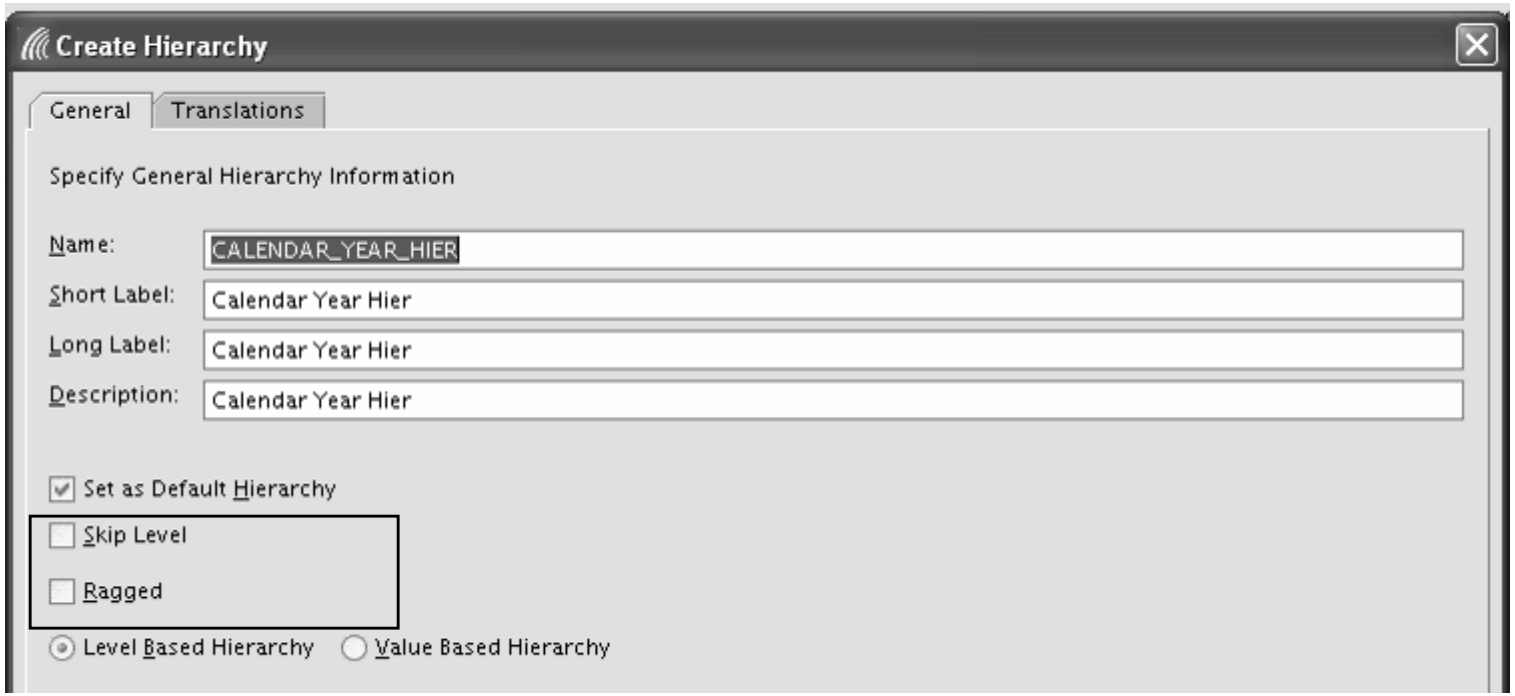
OLAP 11g Changes

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



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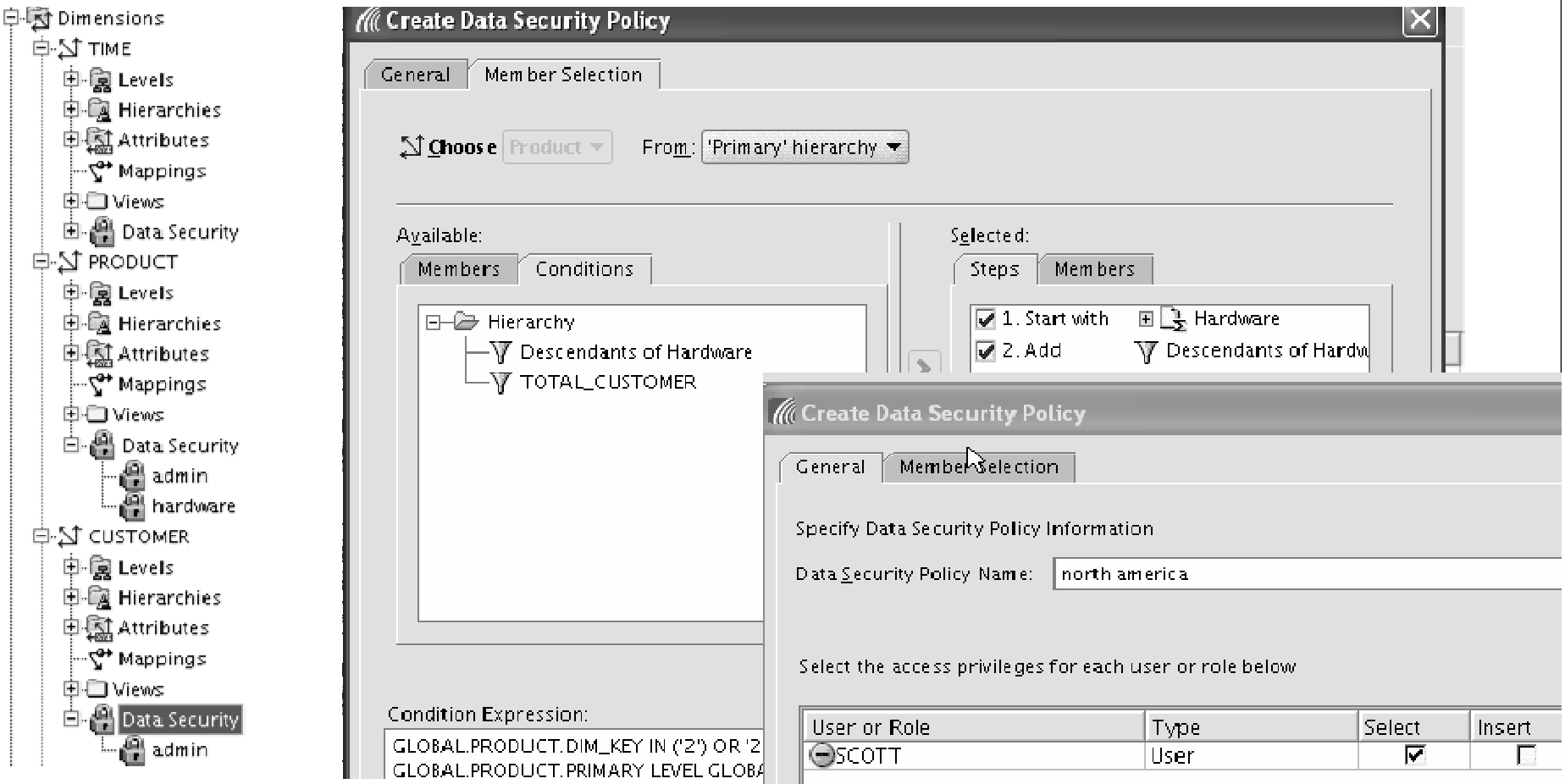
OLAP 11g Changes

- **Create security policies based on hierarchies**



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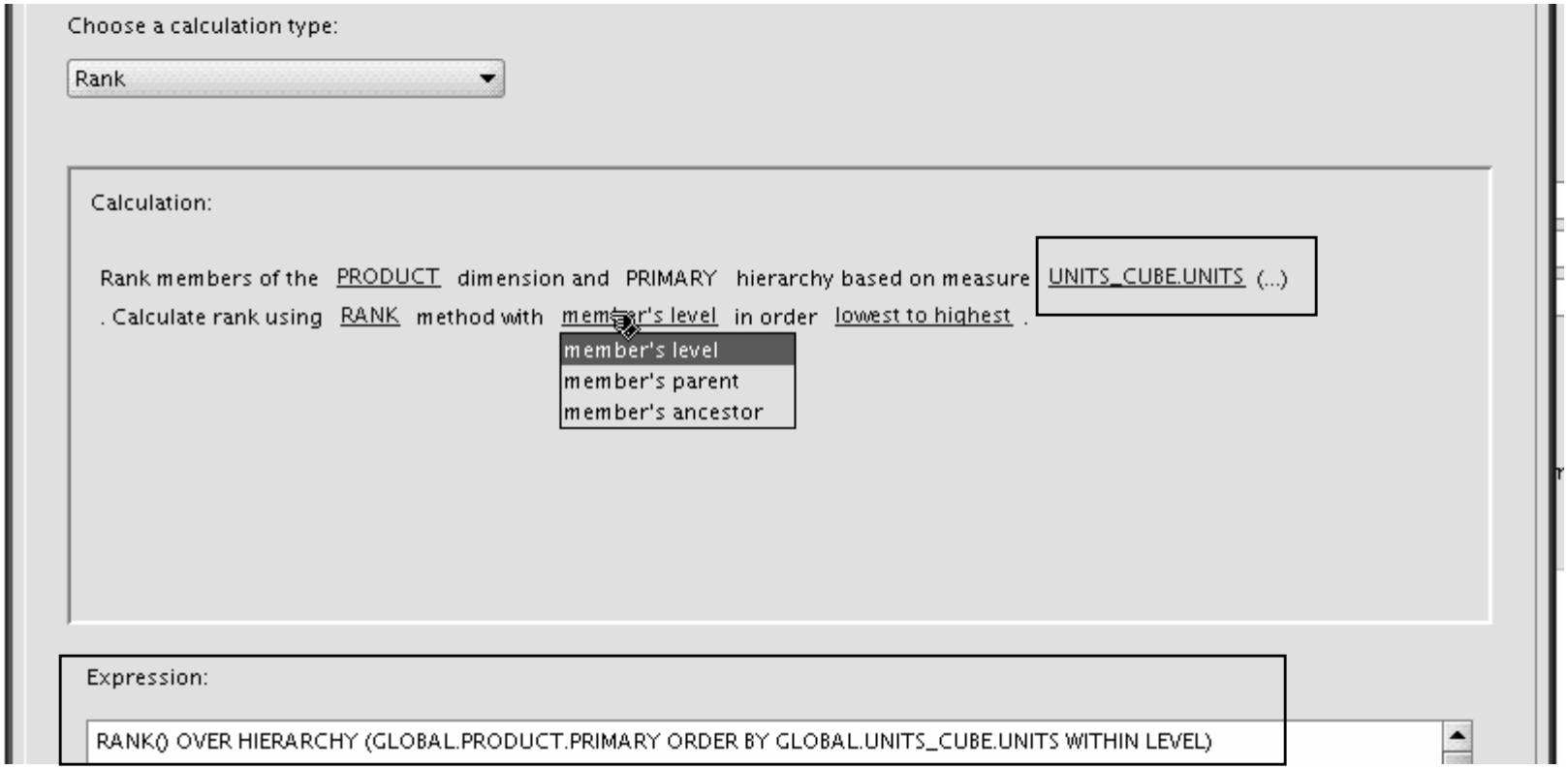
OLAP 11g Changes

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



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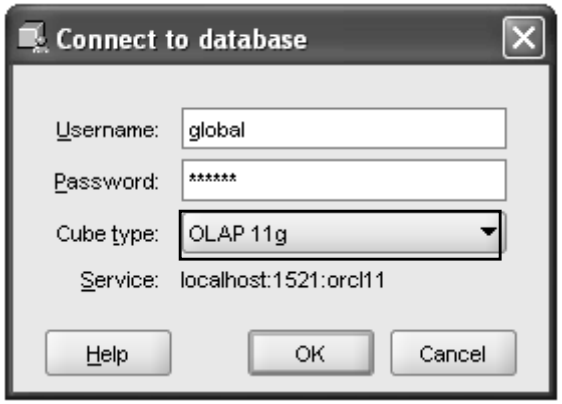
OLAP 11g Changes

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



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Further Information

- Oracle BI Sales
  - http://www.oracle.com/bi
- Oracle BI Technical
  - http://www.oracle.com/technology/tech/bi/index.html
- Oracle BI EE on top of Oracle OLAP
  - Collaborate 208: Using Oracle BI EE with Oracle OLAP Cubes on www.vlamis.com/presentations
- VMWare image with Demo environment
  - Send dvlamis@vlamis.com an email
- Oracle OLAP and AWM Sales
  - http://www.oracle.com/solutions/business_intelligence/olap.html
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- Four keynotes, 50+ sessions, vendor displays
- Hands-on labs
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- Detail are at:

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- Email:

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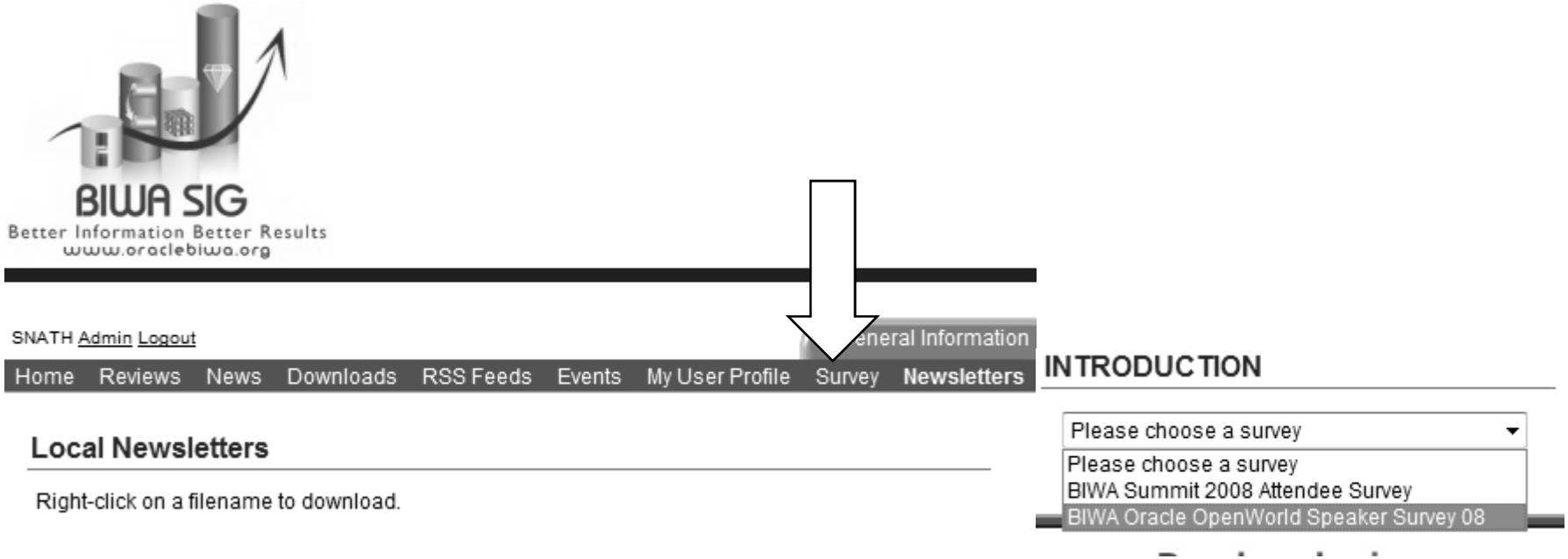
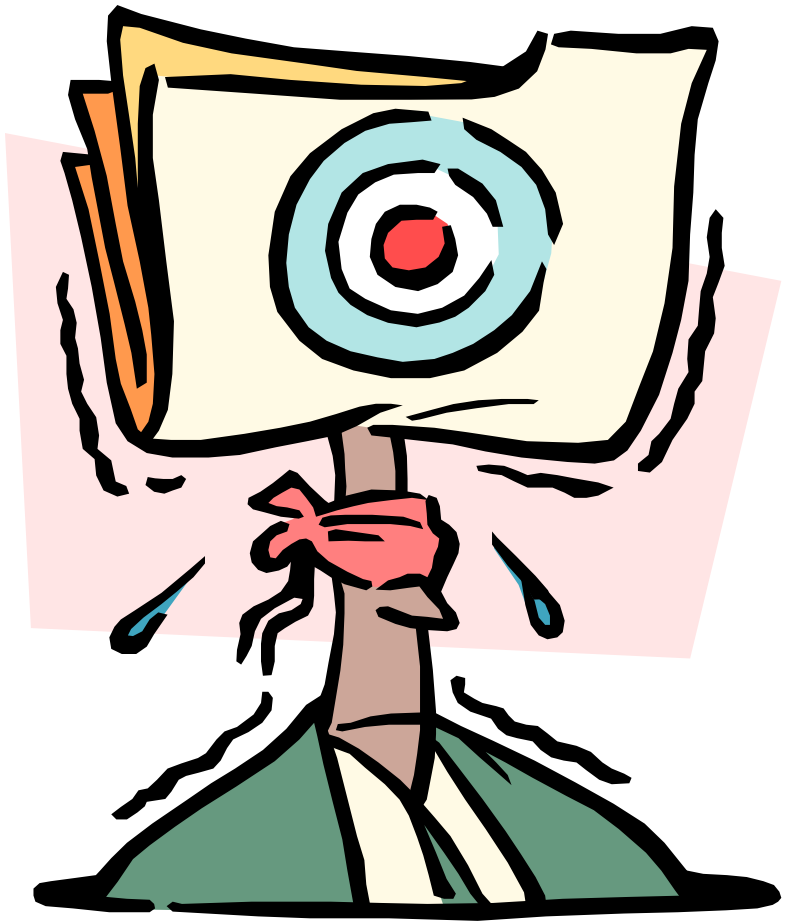


QUESTIONS?



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