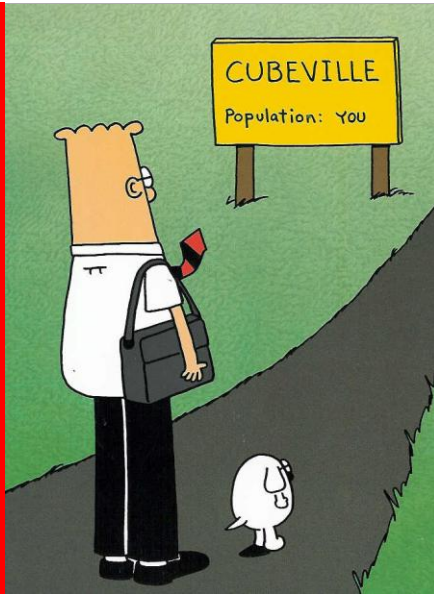




Partner Presentation

**Faster and Smarter Data Warehouses with
Oracle OLAP 11g**

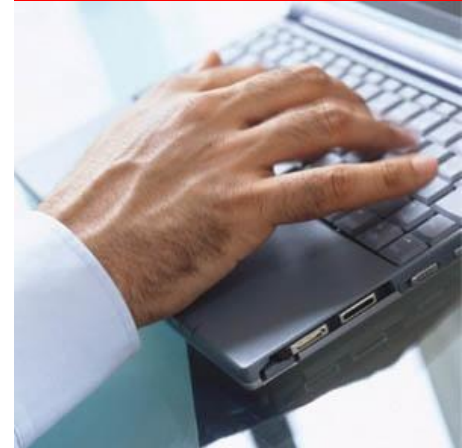


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Oracle Database 11g – OLAP Option

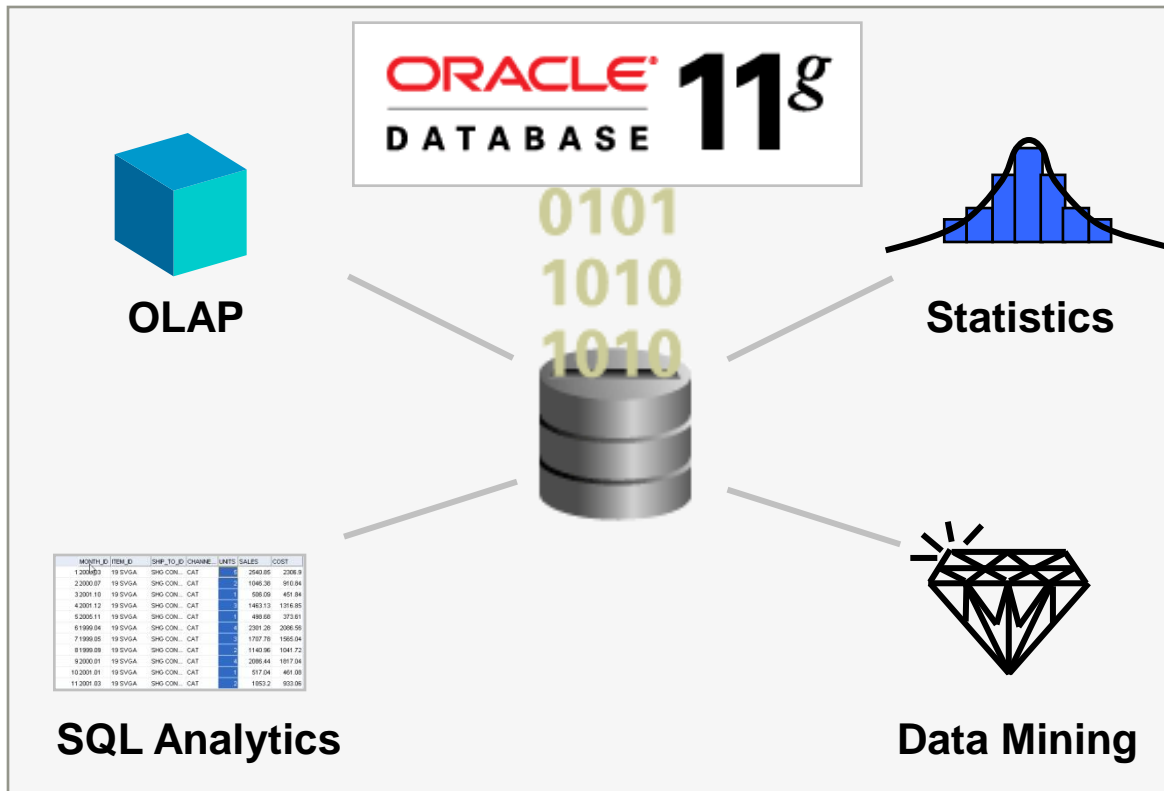
Presentation **Agenda**

- Oracle OLAP Overview
- Enhancing BI Solutions Transparently
- Delivering Rich Analytics Easily



Oracle Database Strategy for DW

Embedded Analytics



- Bring the analytics to the data
- Leverage core database infrastructure

Oracle Optimized Warehouse Initiative

Reference Configurations

- Documented best-practice configurations for data warehousing
- Available Today
 - Dell / EMC, HP, IBM, Sun



The image shows three overlapping screenshots of Oracle Reference Configuration tables for Data Warehouse. The tables are color-coded: orange, blue, and yellow. They contain detailed specifications for various hardware configurations, including processor, memory, and storage details.

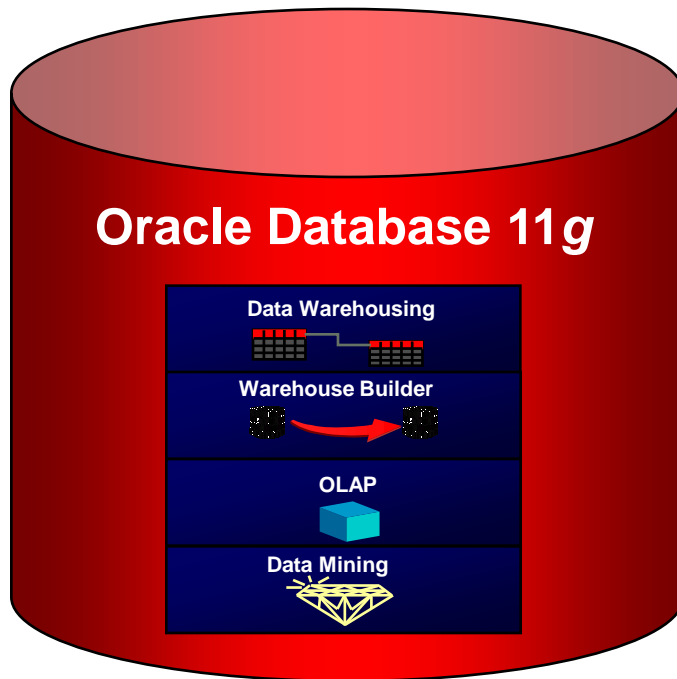
Optimized Warehouse

- Scalable systems pre-installed and pre-configured: ready to run out-of-the-box
 - Dell / EMC (1 TB blocks up to 4 TB)
 - IBM (5 TB blocks up to 20 TB)
 - Sun (10 TB block)



Oracle OLAP

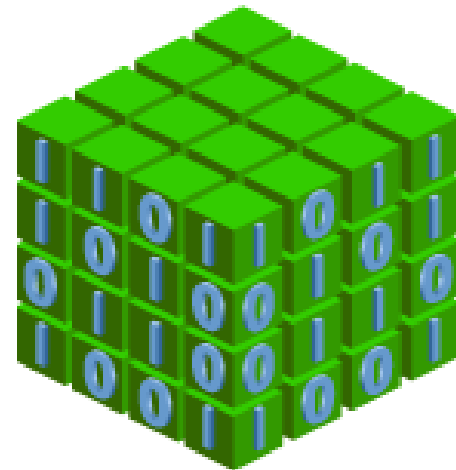
Leveraging Core Database Infrastructure



- Single RDBMS-MDBMS process
- Single data storage
- Single security model
- Single administration facility
- Grid-enabled
- Accessible by any SQL-based tool
- Embedded BI metadata
- Connects to all related Oracle data

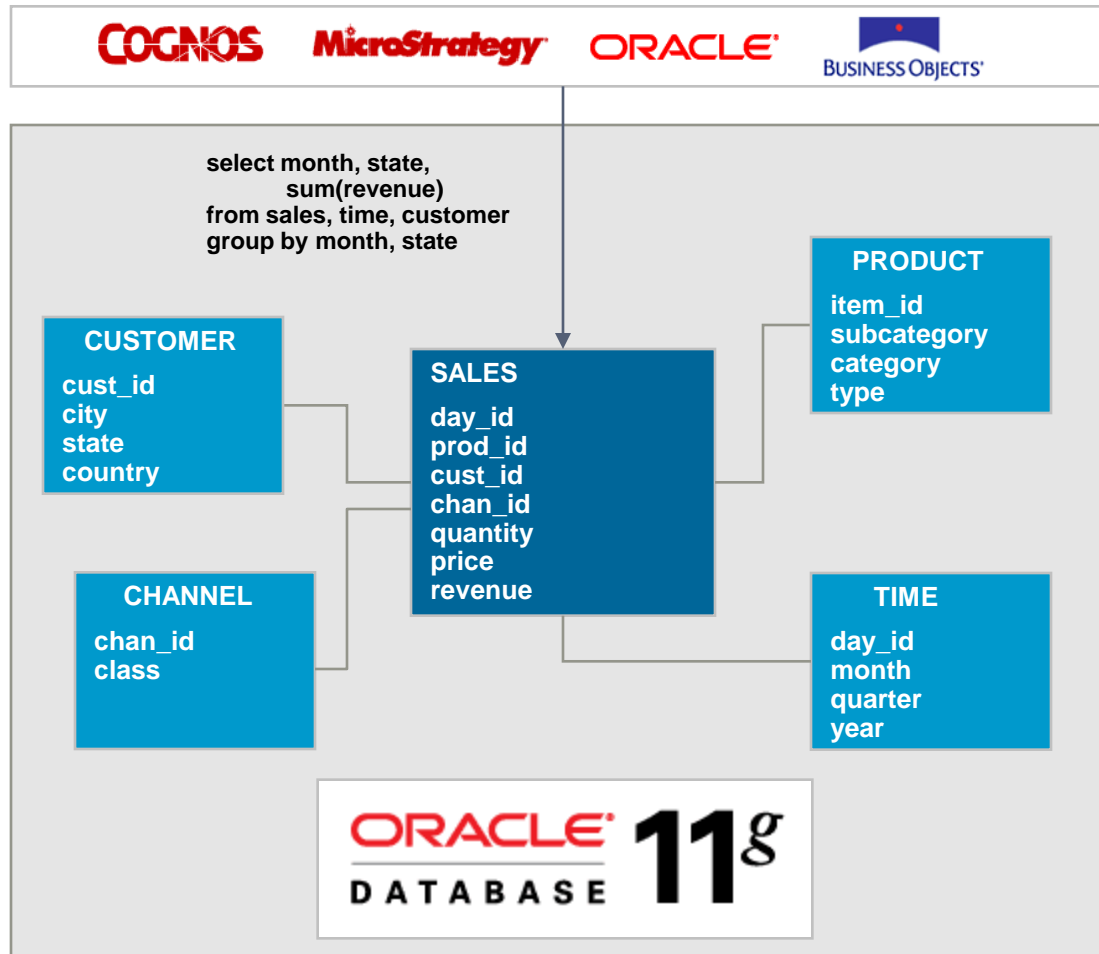
OLAP Option

- A **summary management solution** for SQL based business intelligence applications
 - An alternative to table-based materialized views, offering improved query performance and fast, incremental update
- A **full featured** multidimensional OLAP server
 - Excellent query performance for ad-hoc / unpredictable query
 - Enhances the analytic content of Business intelligence application
 - Fast, incremental updates of data sets



Materialized Views

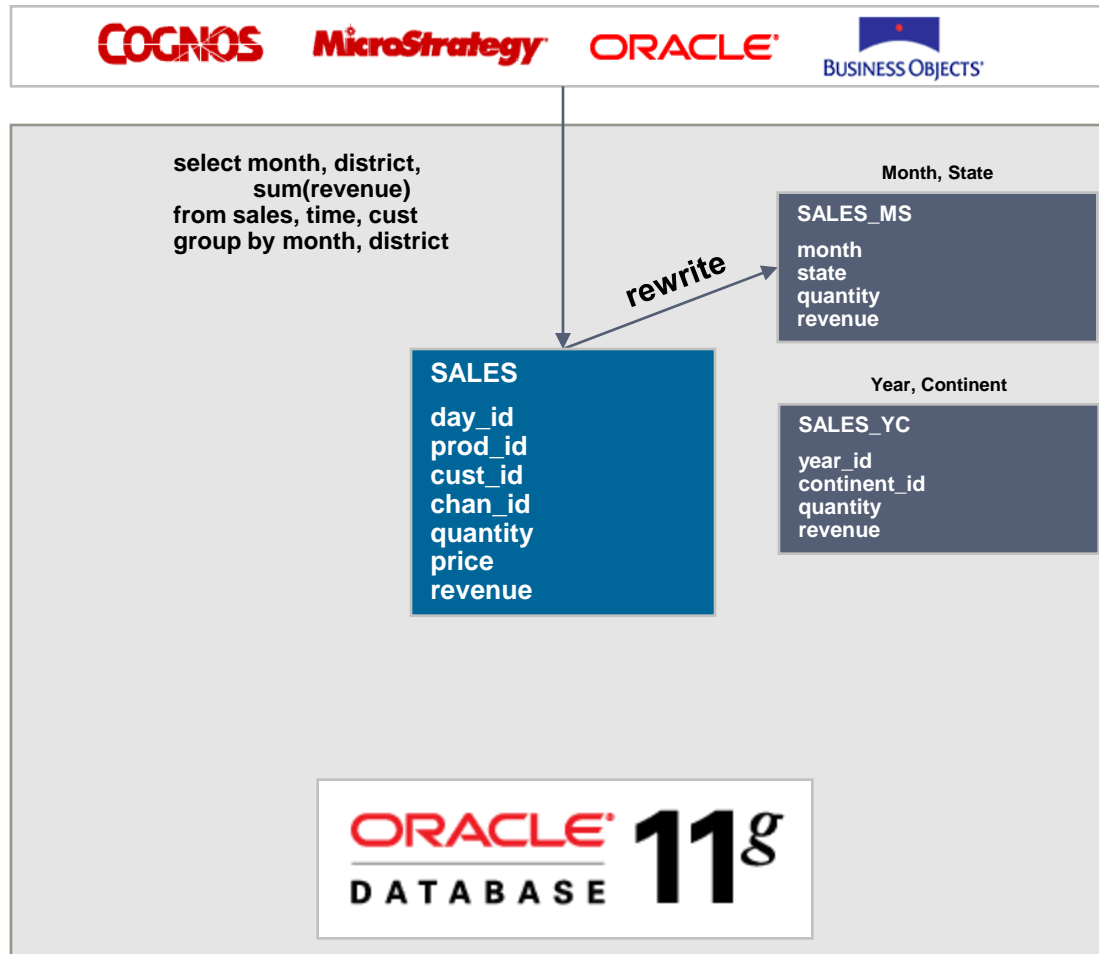
Typical MV Architecture Today



- 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

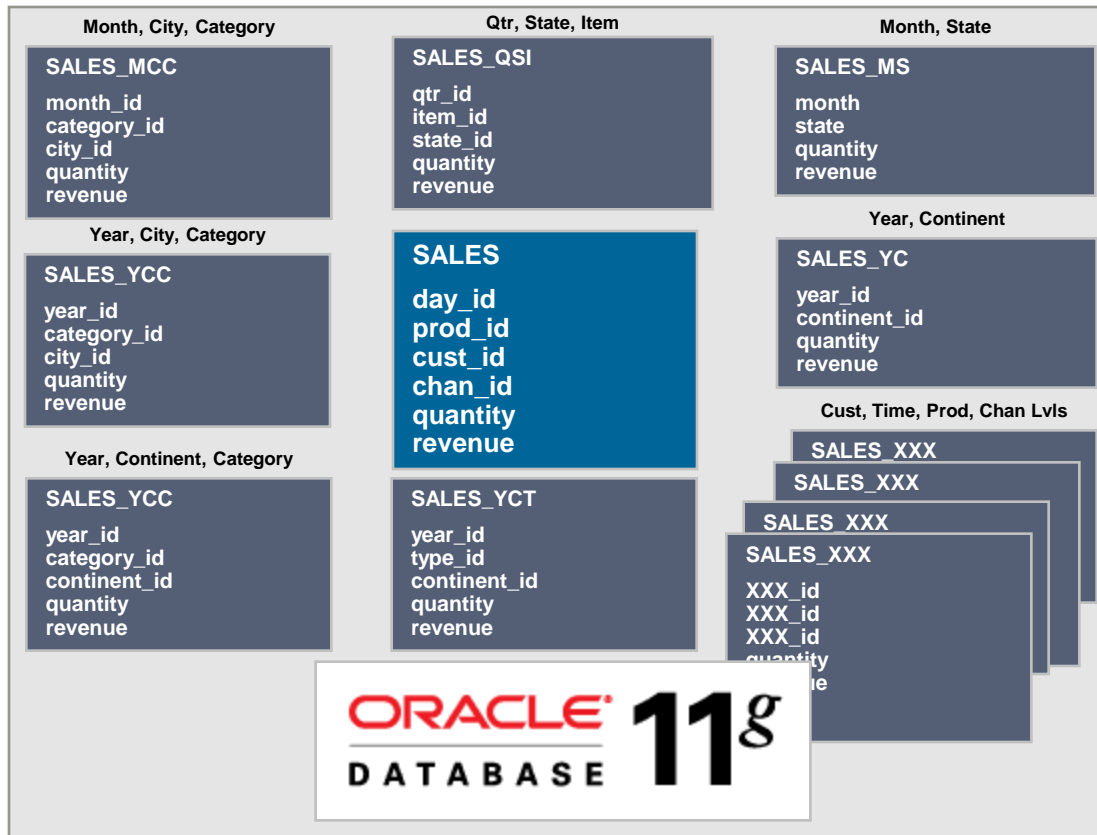


- Most DW/BI customers use Materialized Views (MV) today to improve summary query performance
- Define appropriate summaries based on query patterns
- Each summary is typically defined at a particular grain
 - Month, State
 - Qtr, State, Item
 - Month, Continent, Class
 - etc.
- The SQL Optimizer automatically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

Challenges in Ad Hoc Query Environments

COGNOS

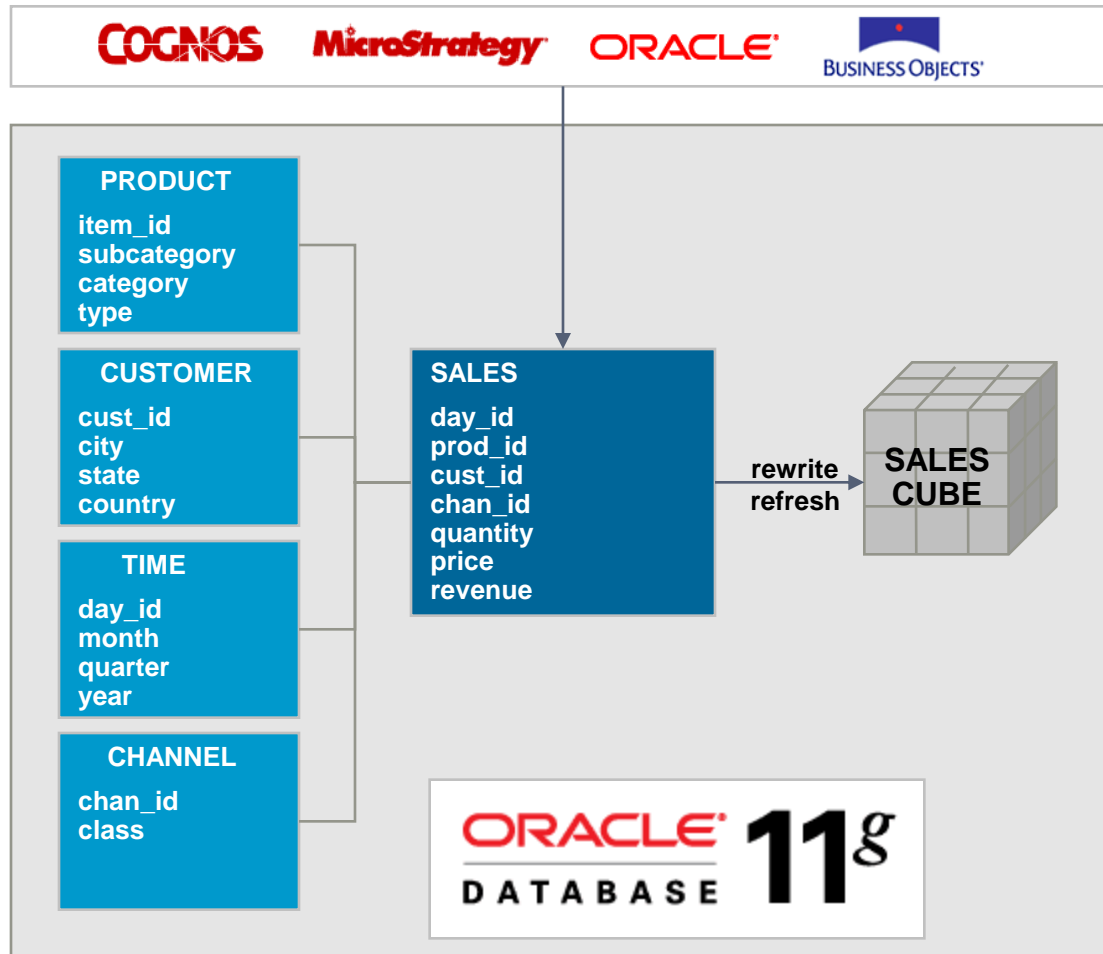
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- Creating MVs to support ad hoc query patterns is challenging
- Users expect excellent query response time across any summary
- Potentially many MVs to manage
- Practical limitations on size and manageability constrain the number of materialized views

Cube-based Materialized Views

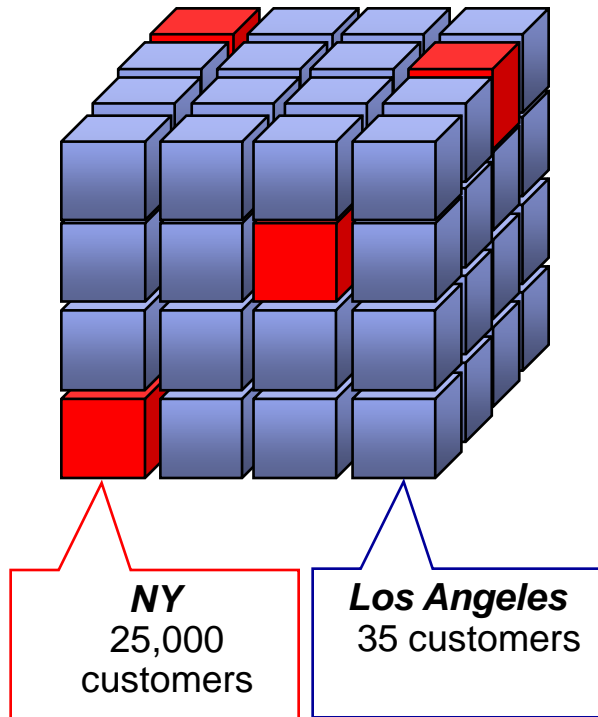
Breakthrough Manageability & Performance



- 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



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**Demonstration
Transparently Improving Performance of BI Solutions**

Easy Analytics

Fast Access to Information Rich Results

- Time-series calculations
- Calculated Members
- Financial Models
- Forecasting
 - Basic
 - Expert system
- Allocations
- Regressions
- Custom functions
- ...and many more

Snapshot of some functions

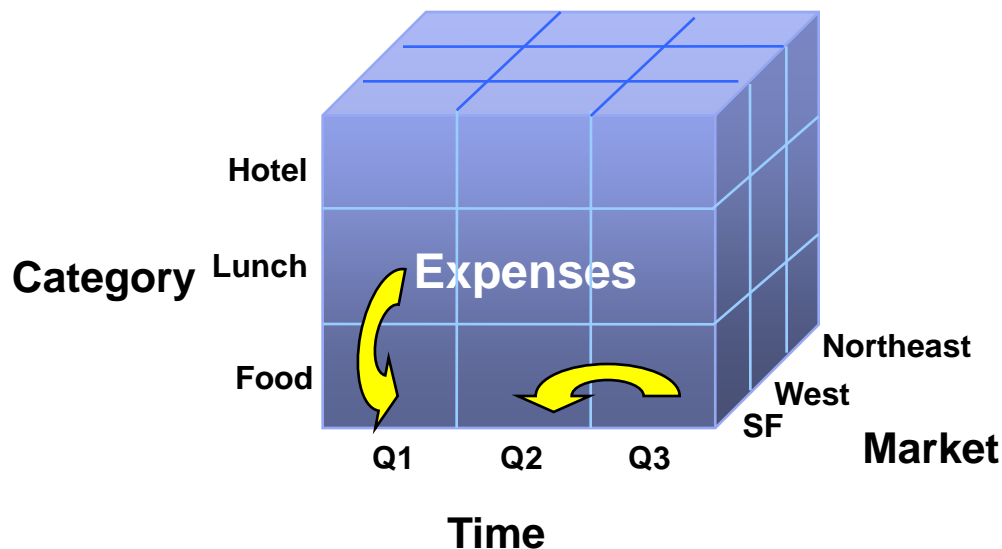
deprdecl	aggregate	abs	rank	chgdims
deprdeclsw	allocate	antilog	rem	instat
deprsl	categorize	antilog10	remainder	limit function
deprsoyd	correlation	arccos	round	statall
fintsched	fcopen	arcsin	sign	statdepth
fpmtsched	fcquery	arctan	sin	statequal
growrate	info	arctan2	sinh	statfirst
irr	normal	bin_to_num	smooth	statlast
npv	random	bitand	sort	statlen
vintsched	stddev	ceil	sqrt	statlist
vpmtsched	any	cos	tan	statmax
cumsum	average	cosh	tanh	statmin
lag	count	decode	truncate	statrank
lagabspt	every	exp	width_bucket	statval
lagdif	largest	floor	begindate	coalesce
lagpct	median	greatest	dayof	na2
lead	mode	intpart	ddof	nafill
movingaverage	none	least	enddate	naflag
movingmax	percentage	log function	endof	nullif
movingmin	smallest	log10	isdate	nvl
movingtotal	forecast	max	makedate	nvl2
total	modulo	min	mmof	ascii

Easy Analytics

Optimized Data Access Method

How do Expenses compare this Quarter versus Last Quarter

What is an Item's Expense contribution to its Category?



- Data stored in dense arrays
- Offset addressing – no joins
- More powerful analysis
- Better performance

Advanced Time-Series Analyses in Real-Time

- Large European financial institution
- Used by traders to help decrease susceptibility to market volatility
- Replacing FAME Time Series Database
 - **F**orecasting, **A**nalysis and **M**odeling **E**nvironment
- Three billion stored facts on RAC
- Data updated every 2 seconds – processing approximately 1m records daily
- SQL-based custom application used by 1500 concurrent users

Parkinson

$$P_N = \frac{1}{N\sqrt{4\ln 2}} \sum_N (\ln(High / Low))^2$$

Garman-Klass

$$G_N = \frac{1}{N} \sum_N \left[\left(\ln \left(\frac{High}{Low} \right) \right)^2 - (2\ln 2 - 1) \left(\ln \left(\frac{Close}{Open} \right) \right)^2 \right]$$

Rogers

$$R_N = \frac{1}{N} \sum_N \left[\left(\ln \left(\frac{High}{Low} \right) \right)^2 + \left(\ln \left(\frac{Close}{Open} \right) \right)^2 \right]$$

BLUE

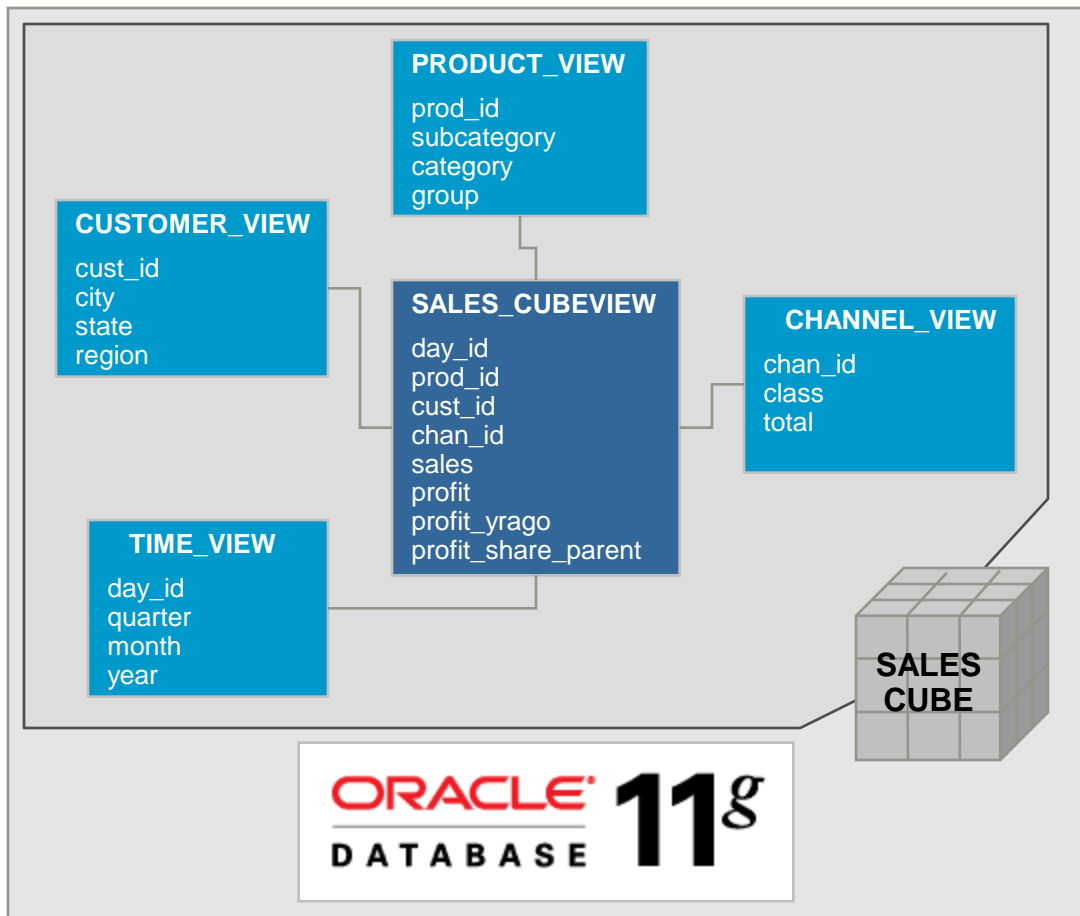
$$B_N = \frac{1}{7N} \sum_N \left[\left(\ln \left(\frac{Close}{Open} \right) \right)^2 + 6 \left(\ln \left(\frac{Low}{Close} \right) \right)^2 \right]$$

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

The Gallup Organization

Healthcare Group



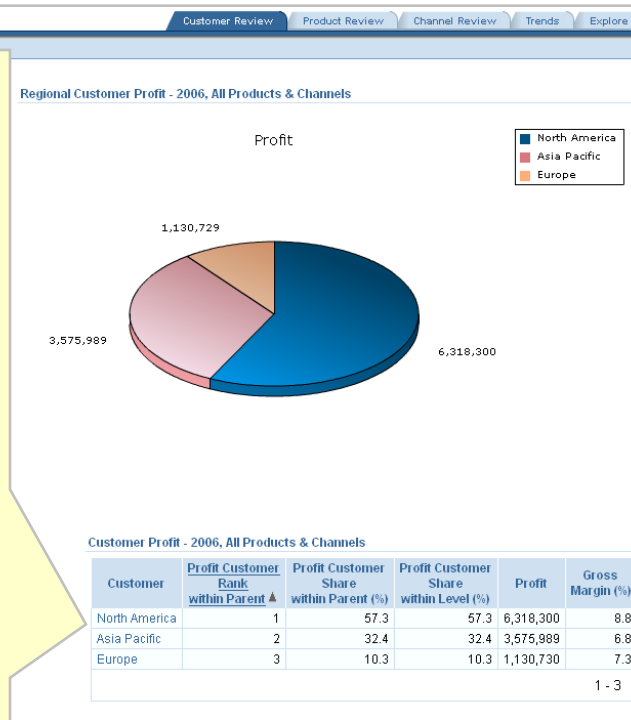
- Gallup asks over 1 billion questions annually
- Gallup Healthcare Group
 - Conduct surveys measuring quality of care and patient loyalty
 - Originally developed a reporting infrastructure that delivered static reports to hospitals across the US
- Enhanced the interactivity and analytic content of solution
 - Support over 1000 concurrent users
 - Response time less than 2 seconds per query
- Reduced cost and complexity
 - Leveraged Oracle Database investment
 - Integrated OLAP into existing infrastructure (security, navigation, XML/XSL application underpinnings)
 - Lowered application development costs
 - Reduced complexity for users

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;
```



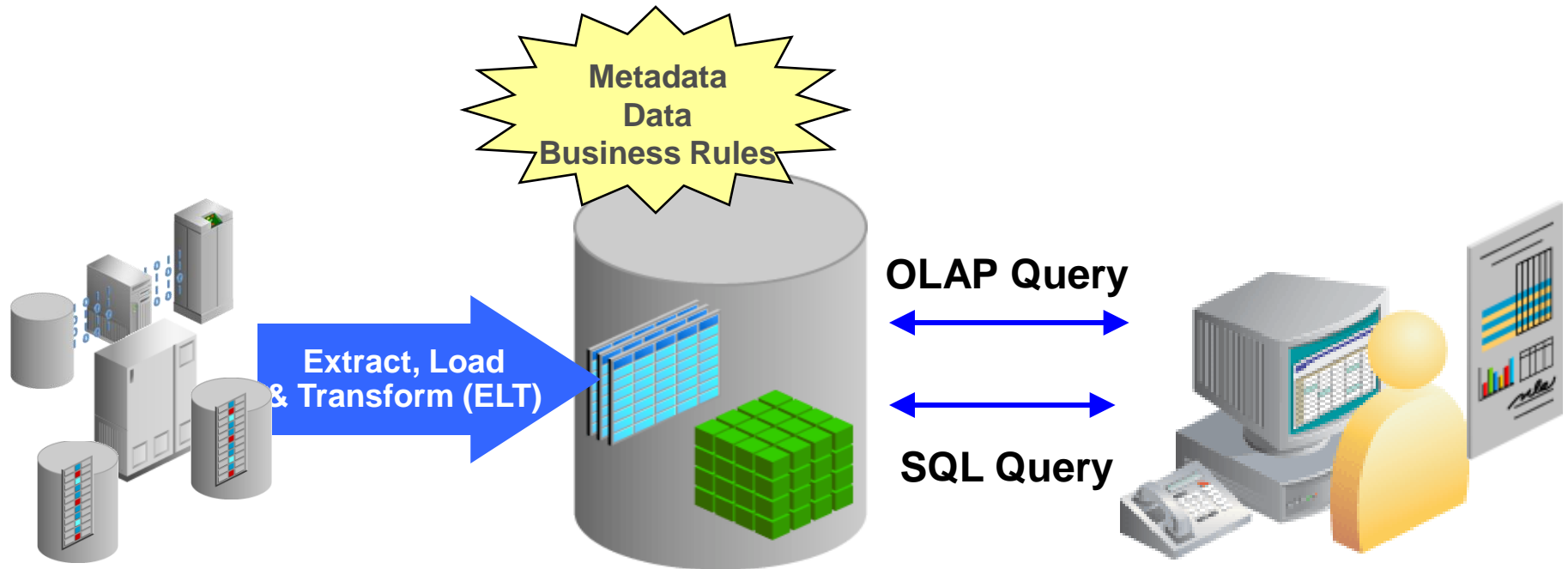


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Demonstration
SQL Access to Any Level of Data with Calculations

One Cube, Dimensional or SQL Tools

Single version of the truth



Centrally managed data, meta data and business rules

Top OLAP 11g New OLAP Features

- SQL Query
 - SQL cube scan
 - SQL cube join
 - CUBE_TABLE
 - Optimized looping
 - System maintained dimension and fact views
- SQL-like calculation expressions
- Cost-based aggregation
- Security
 - SQL Grant / Revoke
 - Permit with Extensible Data Security and AWM

Top 11g New OLAP Features

- Cube and maintenance scripts
 - Declarative calculation rules
 - Based on logical model
- All meta data in the Oracle Data Dictionary
 - Dimensional Model
 - Calculation definitions
 - Security policies
 - Data source mappings
 - SQL representation of model

Oracle OLAP 11g Summary

- Improve the delivery of information rich queries by SQL-based business intelligence tools and applications
 - Fast query performance
 - Simplified access to analytic calculations
 - Fast incremental update
 - Centrally managed by the Oracle Database