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Oracle OLAP

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Business Analytics, **OLAP**

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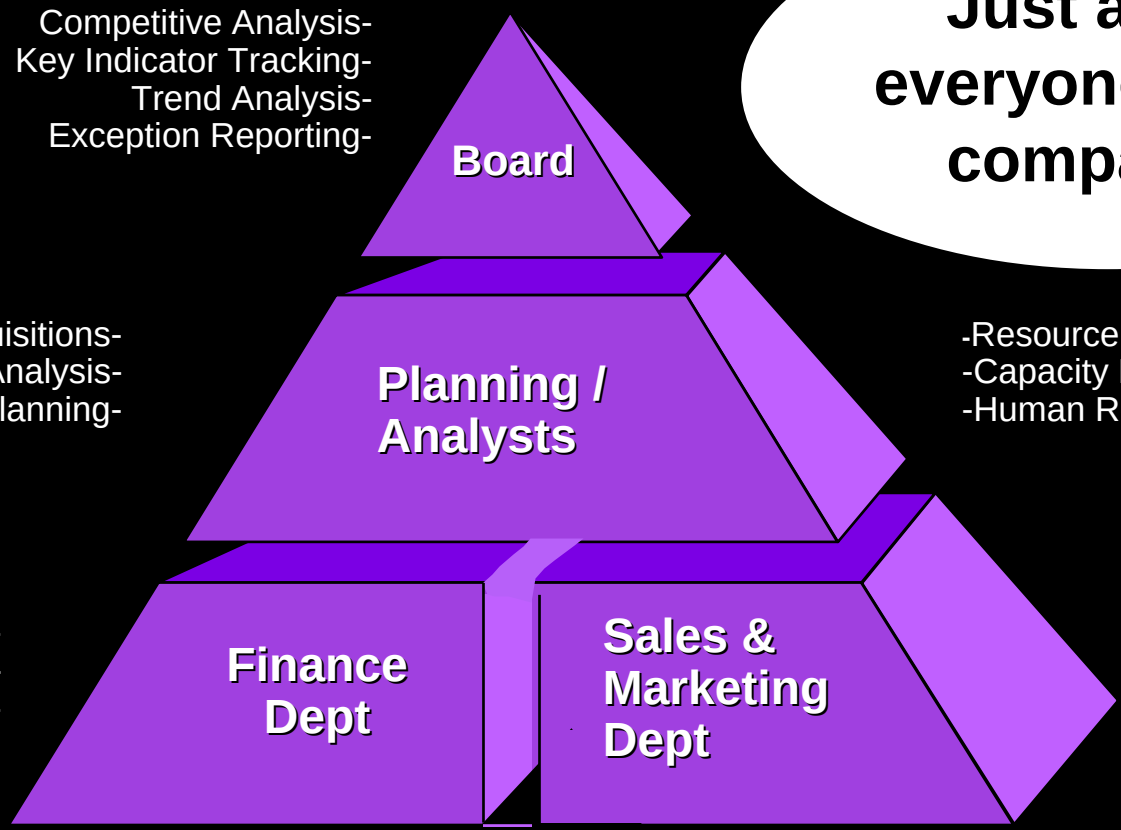
The Business Requirements
Who generates them?



Competitive Analysis-
Key Indicator Tracking-
Trend Analysis-
Exception Reporting-

Just about everyone in the company!!

Investment/Acquisitions-
Reorganization Analysis-
Long Range Planning-

-Resource Allocation
-Capacity Planning
-Human Resource Planning

Budgeting-
Consolidation-
Variance Analysis-

-Sales Tracking
-Promotion Analysis
-Sales Forecasting

Financial Modelling-
Foreign Exchange/Cash Management-
Asset Liability Modelling-
Activity Based Management-

-Product Profitability
-Customer Profiling
-Distribution Analysis
-Sales Performance/Effectiveness

OLTP vs. OLAP

Transactional	Analytical
Who?	Why?
What?	How?
Where?	What if ?
Report data	Analyze & use data

Pedigree (short) …

OLAP is alive and well at Oracle

- Over thirty years of innovation yields a complete and compelling OLAP platform
  - Express, the first multidimensional database
  - Oracle 9iR2, the first (and only) relational-multidimensional database
  - Oracle 10g
    - The first (and only) Grid capable OLAP platform
    - All new administration
    - All new data access tools
    - All new applications

Purely Relational, ROLAP, or MOLAP?
A typical MOLAP implementation

What if …

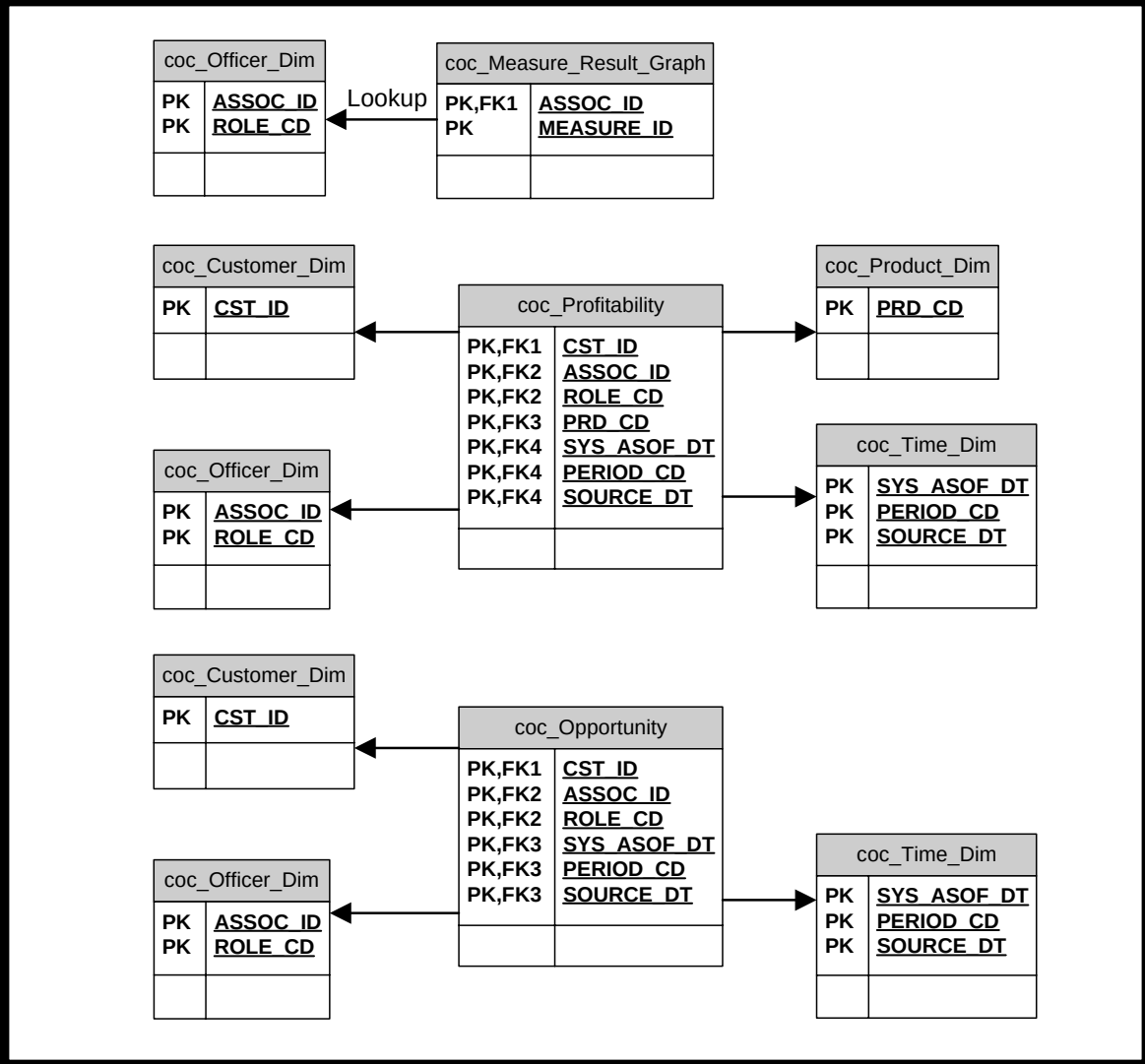
- A single database offered the openness of a relational solution?
- … and provided the calculation power of a multidimensional engine ?
- The calculations could be defined as easily as spreadsheet formulas?
- The system was efficient to build and maintain ?
- Users experienced excellent query performance ?

The Business Requirements
Why do they need OLAP?

Businesses need OLAP because:

- Multidimensional model: They want to inspect their data in a multidimensional format that includes dimensions, levels, hierarchies and attributes.
- Calculations: They want to define calculations that adhere to the proprietary rules that govern their particular multidimensional view of the data. For example, as in aggregation.
- Processing efficiency: Since analysis is an intensively re-iterative process, the query response time must be sub-second. OLAP engines are better designed to meet this requirement.
- Transaction model: A read-repeatable transaction model that supports what-if analysis.

Design – Logical models



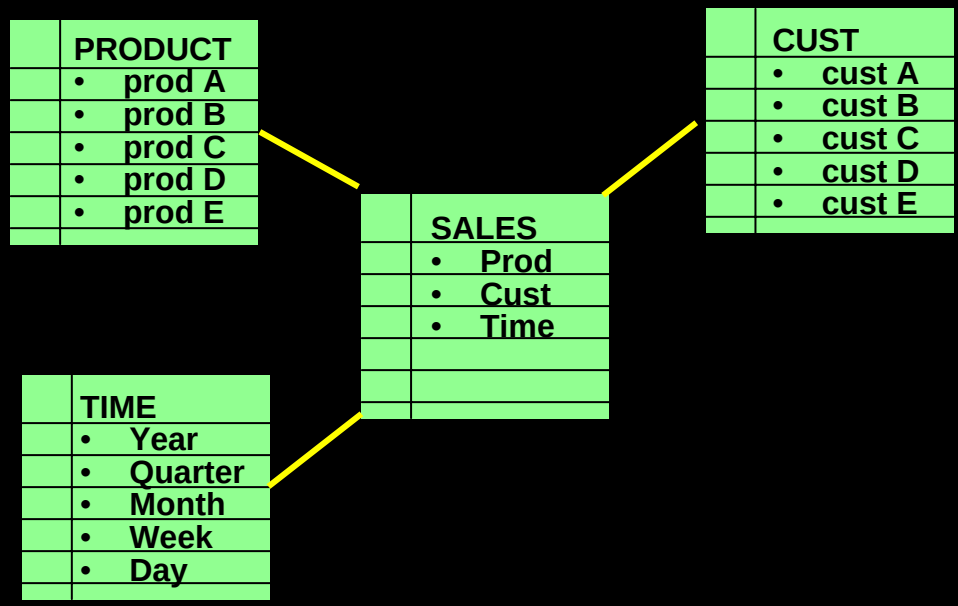
Purely Relational, ROLAP, or MOLAP?

Select a purely relational implementation when …

- **The analytic requirements of the business are met by the capabilities of SQL.**
- **There are appropriate in-house SQL skills.**
- **The relational engine provides satisfactory query performance.**

Purely Relational, ROLAP, or MOLAP?

Relational Technology



A purely relational implementation is designed and optimized to support the efficient movement and calculation of large volumes of data.

Purely Relational, ROLAP, or MOLAP?

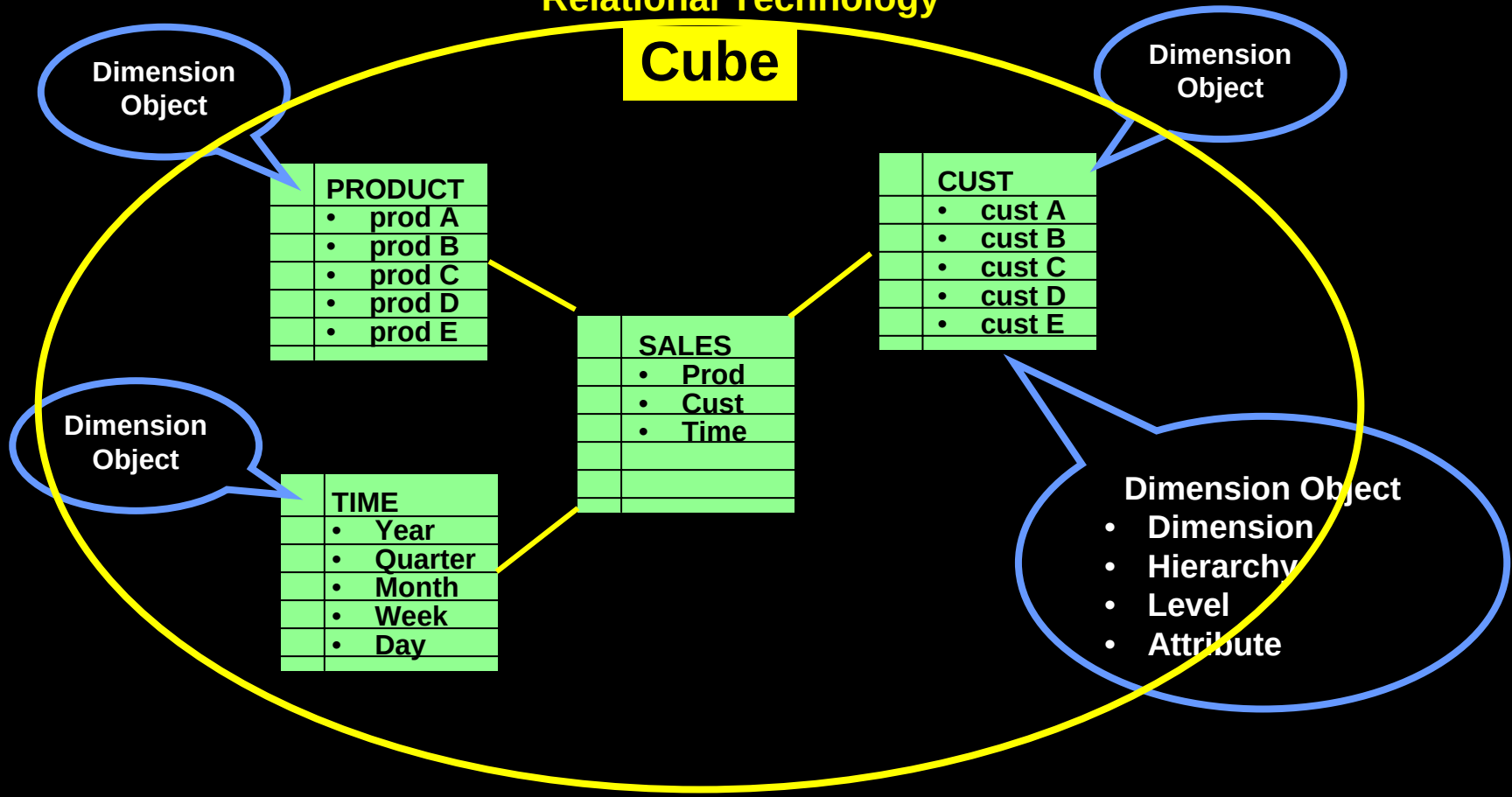
Select a ROLAP implementation when …

- **The analytic requirements of the business are met by the capabilities of SQL.**
- **User is looking for an easier way to formulate complex queries.**
- **The detail data is very sparse.**

✶ Use Materialized Views to optimize performance.

Purely Relational, ROLAP, or MOLAP?

Relational Technology



This is a ROLAP IMPLEMENTATION.

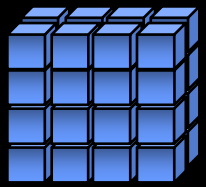
Purely Relational, ROLAP, or MOLAP?

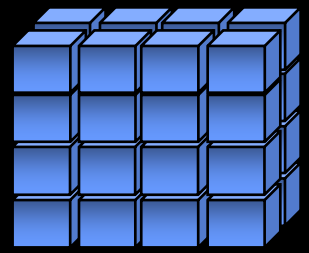
Select a MOLAP implementation …

- When the analytic requirements of the business need the extended analytic, forecasting and planning functionality of Multidimensional Database Technology.
- When the analysis includes lots of calculated and aggregated Key Performance Indicators
- Need an easier way to define complex or proprietary calculations.
- Need a transaction model that supports what-if analysis.

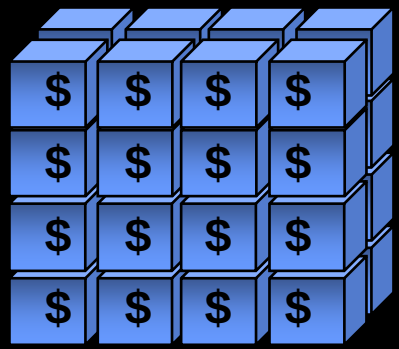
Purely Relational, ROLAP, or MOLAP?

Multidimensional Technology





Cube



SALES dimensioned by
- **PRODUCT,**
- **CUSTOMER,**
- **TIME**

This is a MOLAP implementation

Purely Relational, ROLAP, or MOLAP?
Multidimensional Technology

Some benefits of the multidimensional processing model . . .

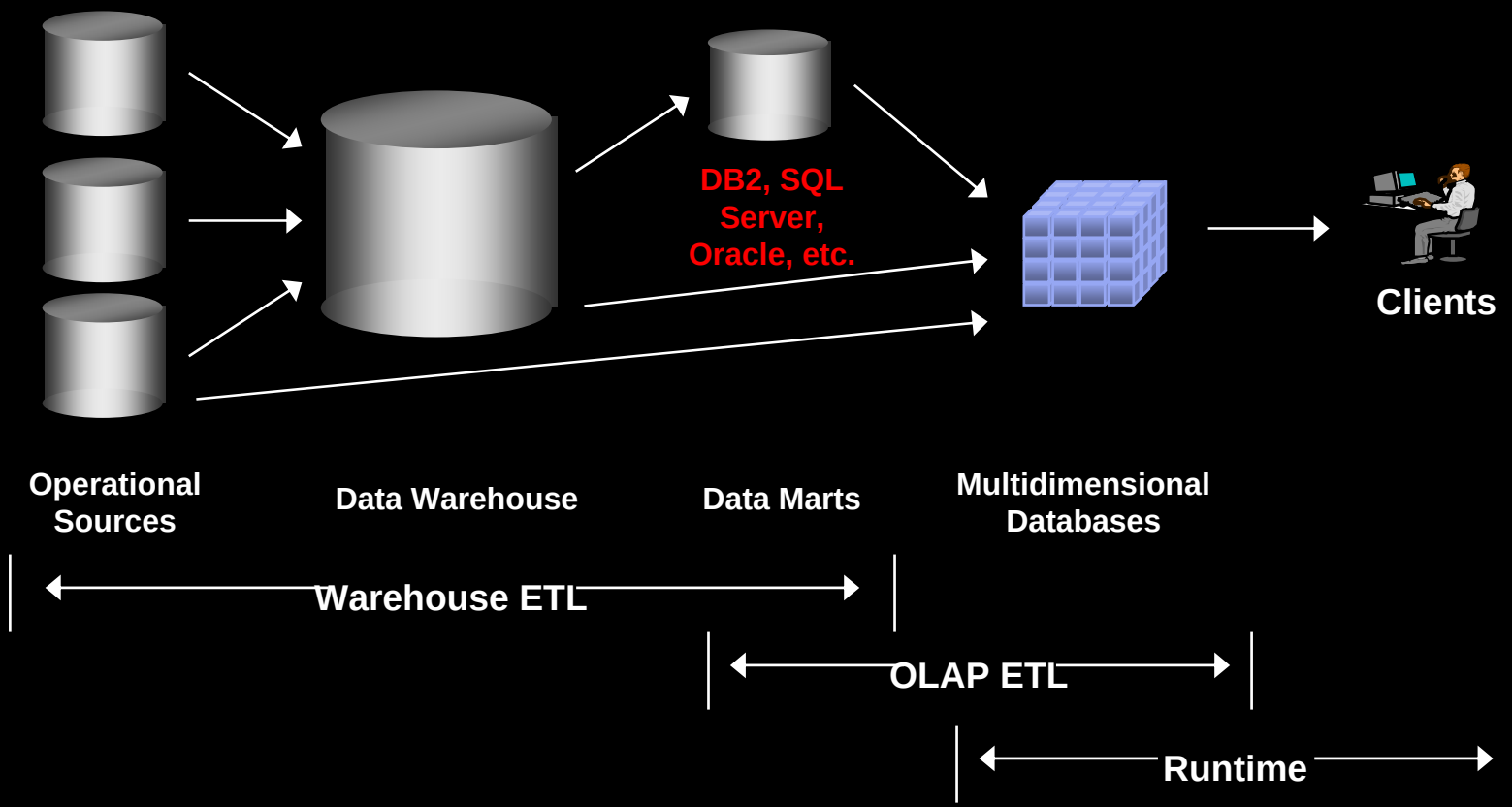
- **A separate query is formulated and executed for each dimensional component of the query.**
  - ✶***Ease of use feature!***
- **No JOIN is required when using the multidimensional technology.**
  - ✶***Improved performance!***
- **"Aggregate then filter" methodology is used.**
  - ✶***Consistent, correct results.***
  - ✶***Intelligent drill!***

Architecture
The OLAP Option in the Oracle Database

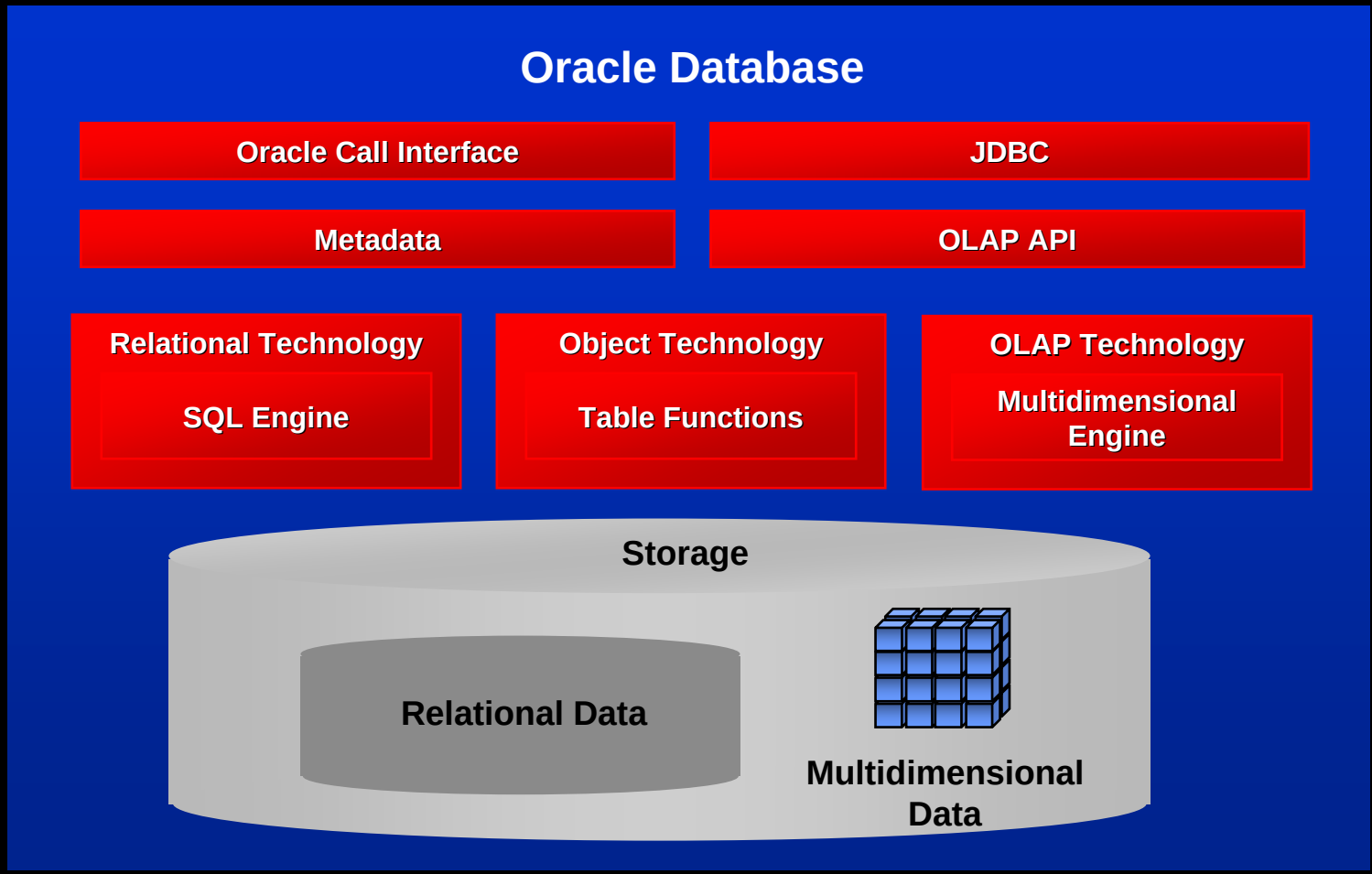
Components include:

- A powerful SQL calculation engine
- A powerful multidimensional calculation engine
- Multidimensional data storage and retrieval
- Programming APIs for SQL, PL/SQL, and Java
- Dimensionally aware data manipulation language (OLAP DML)
- SQL access to multidimensional data

Prior Architecture



Current Architecture
The OLAP Option in the Oracle Database



Architecture – Open access

Because no single tool will satisfy all of the users in an organization …

… Oracle has products that represent every class of reporting tool.

Architecture – Open access

Any SQL Query Tool

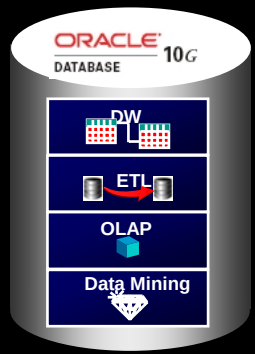
8. Any SQL interface or query tool
SQL, PL/SQL

HTML DB

7. Custom built applications
OLAP Java API

Oracle Forms

1. Simple reporting tools that execute pre-defined SQL statements, and has no knowledge of OLAP
HTML DB



6. Spreadsheet tools
Oracle Excel Add-in

OLAP Excel Add-in

2. OLAP-aware tools that generate SQL
Discoverer Plus

Discoverer Plus

5. OLAP-aware application building tools
BI Beans

BI Beans

Oracle Reports (OLTP)

4. Tools that provide the ability to define highly formatted reports in multiple formats
Reports

3. Multidimensional object-aware OLAP-aware tools that generate SQL
Discoverer Plus OLAP

Discoverer Plus OLAP

Architecture – Open access

Every Oracle tool can access the power of the Analytic Workspace.

1. Simple reporting tools that execute pre-defined SQL statements, and has no knowledge of OLAP
HTML DB


HTML DB

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Discoverer Plus

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SQL, PL/SQL


Any SQL Query Tool

Architecture – Open access

In fact, the power of the Analytic Workspace can be accessed by any third-party tool that emits SQL!

1. Simple reporting tools that execute pre-defined SQL statements, and has no knowledge of OLAP
HTML DB


HTML DB

2. OLAP-aware tools that generate SQL
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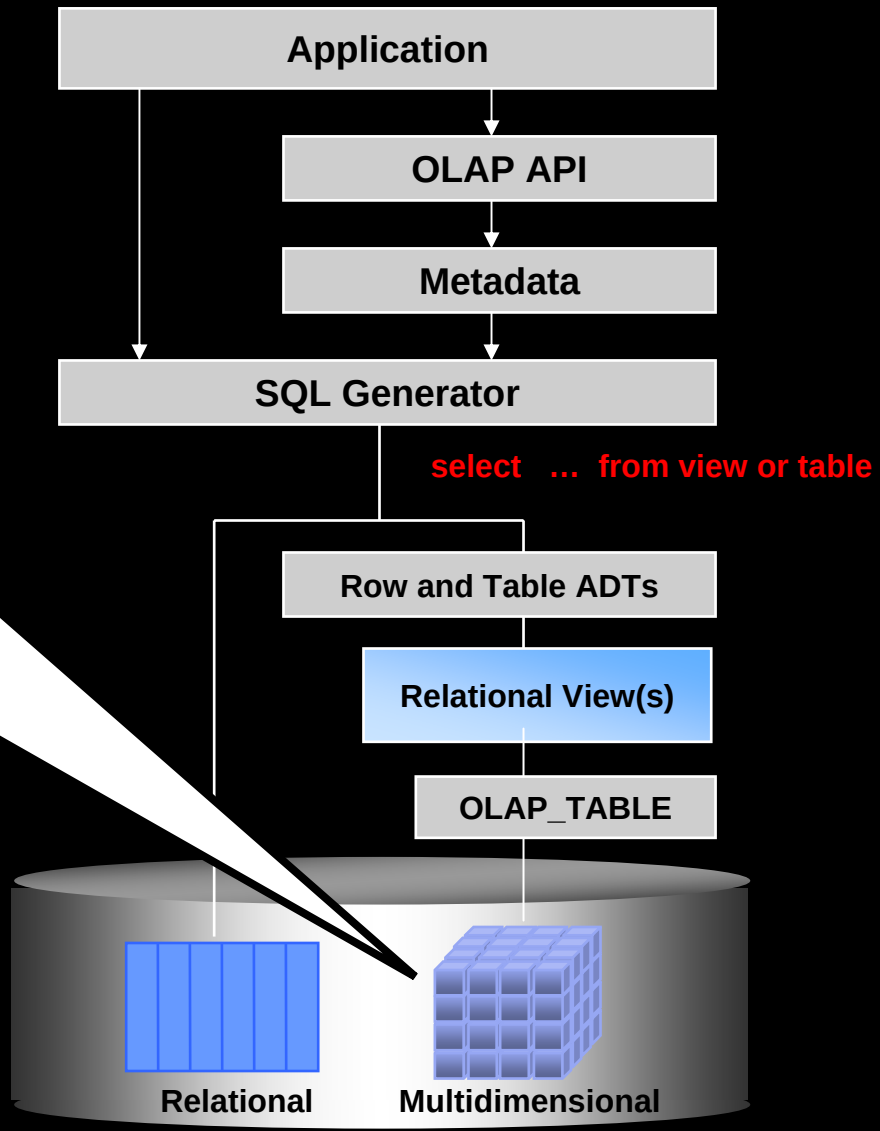
SQL, PL/SQL


Any SQL Query Tool

A Closer Look

This object represents the **Analytic Workspace**

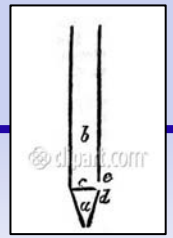
Let's take a closer look at the AW.



A Closer Look
Analytic Workspace

- **An Analytic Workspace is a container that holds multidimensional data and objects.**
- **The data in the AW is manipulated by the multidimensional calculation engine that is imbedded in the RDBMS.**
- **AWs and the multidimensional engine were designed for *efficient processing of multidimensional calculations*.**

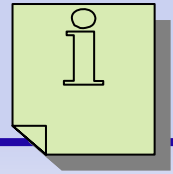
A Closer Look
Analytic Workspace



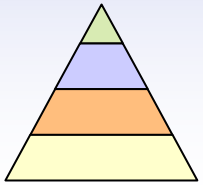
OLAP
DML

```
While A
  Do B
End
```

Program
source code

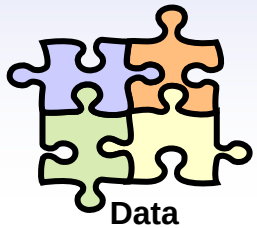


Dimension definitions
Measure definitions

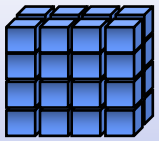


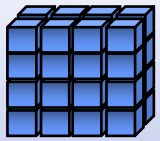
Hierarchy
definitions

Formulas and
equations

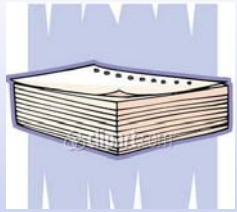


Data
relationships

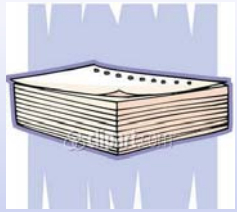




Definitions for logical
groupings of data
- CUBES -



Dimension
data

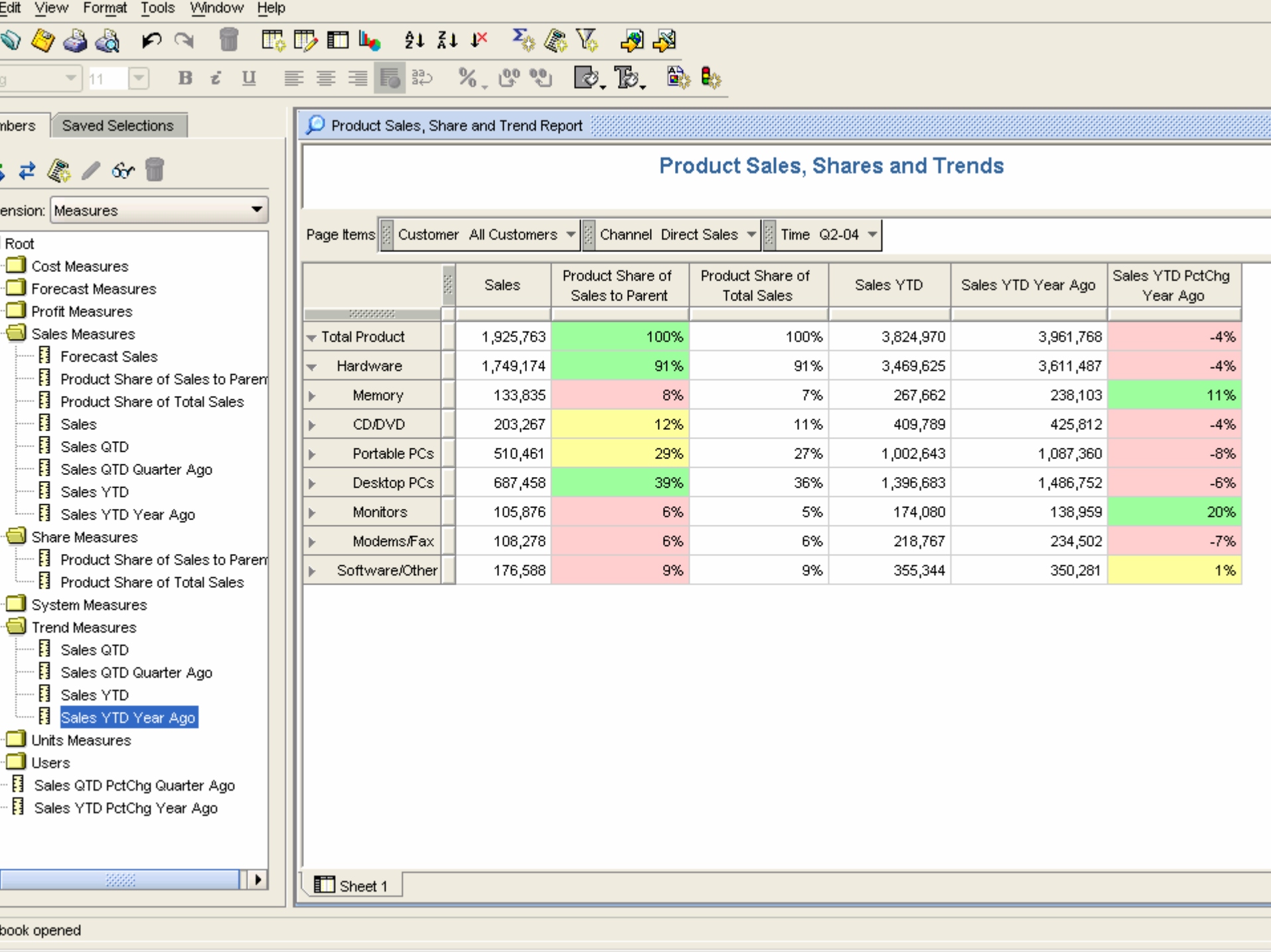


Measure
data

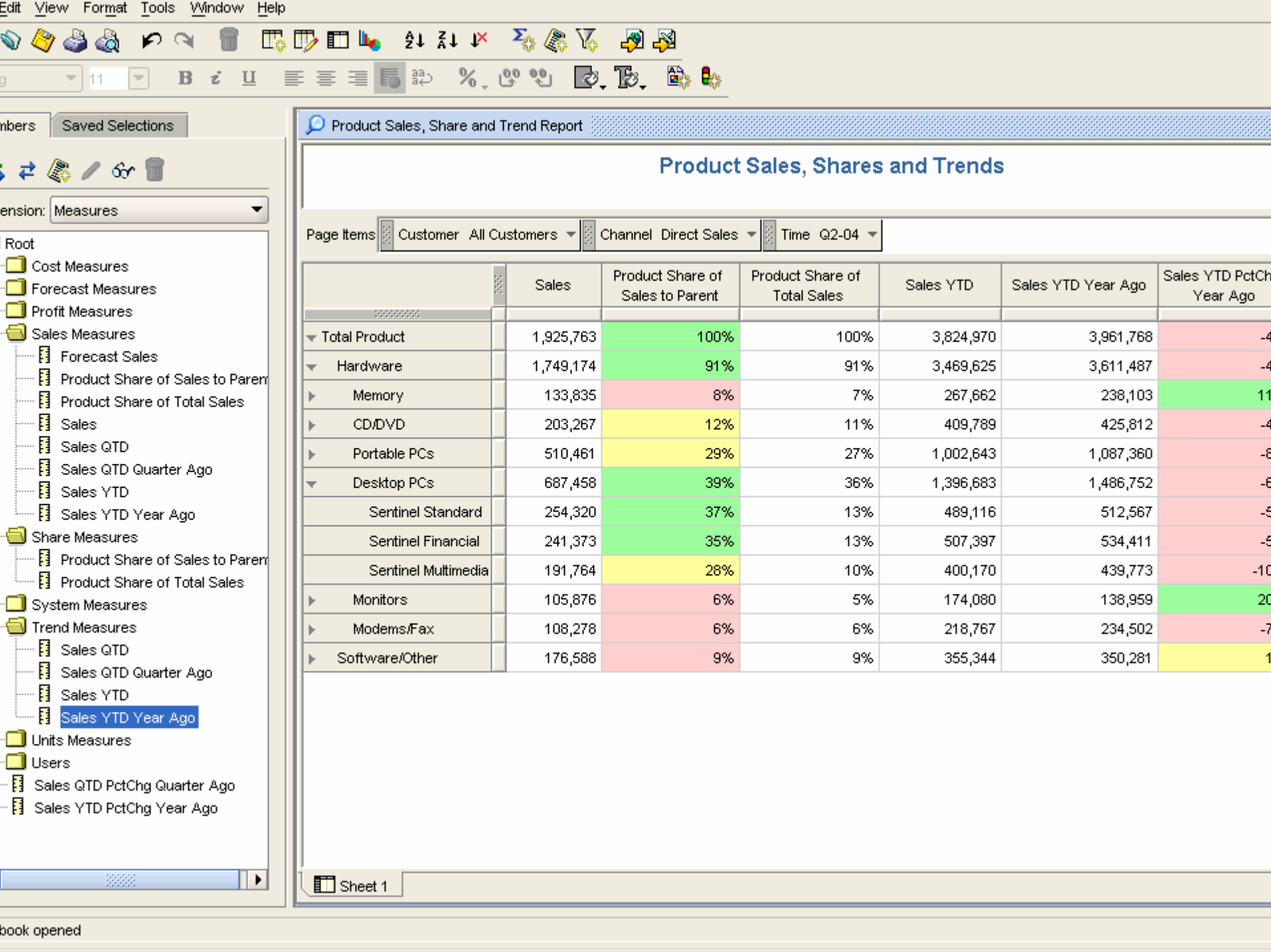
Prepare the OLAP Data Warehouse
The tools

Use these tools to design and build your OLAP data warehouse:

- **Oracle Warehouse Builder** – *End-to-end ETL tool*
- **Enterprise Manager** – *Describe the star or snowflake logical data model*
- **Analytic Workspace Manager** – *Build AW from star schema*
- **DBMS_AWM APIs** – *Build AW from star schema*
- **OLAP DML** – *Programmatically build the AW and all of its objects*



	Sales	Product Share of Sales to Parent	Product Share of Total Sales	Sales YTD	Sales YTD Year Ago	Sales YTD PctChg Year Ago
Total Product	1,925,763	100%	100%	3,824,970	3,961,768	-4%
Hardware	1,749,174	91%	91%	3,469,625	3,611,487	-4%
Memory	133,835	8%	7%	267,662	238,103	11%
CD/DVD	203,267	12%	11%	409,789	425,812	-4%
Portable PCs	510,461	29%	27%	1,002,643	1,087,360	-8%
Desktop PCs	687,458	39%	36%	1,396,683	1,486,752	-6%
Monitors	105,876	6%	5%	174,080	138,959	20%
Modems/Fax	108,278	6%	6%	218,767	234,502	-7%
Software/Other	176,588	9%	9%	355,344	350,281	1%



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Sentinel Standard	254,320	37%	13%	489,116	512,567	-5
Sentinel Financial	241,373	35%	13%	507,397	534,411	-5
Sentinel Multimedia	191,764	28%	10%	400,170	439,773	-10
Monitors	105,876	6%	5%	174,080	138,959	20
Modems/Fax	108,278	6%	6%	218,767	234,502	-7
Software/Other	176,588	9%	9%	355,344	350,281	1


QUESTIONS
&
ANSWERS


ORACLE®