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Analytic Views Simplify Complex Business Intelligence Queries

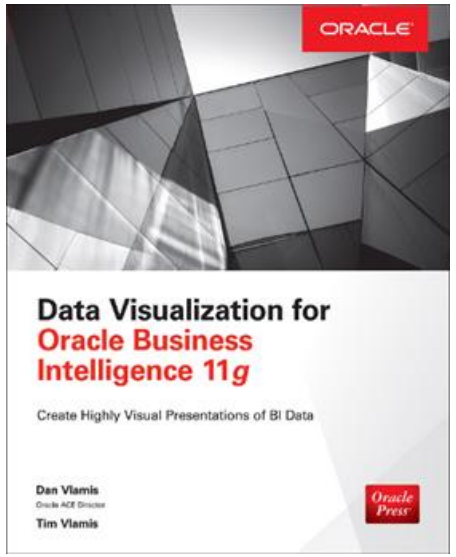
Event: Oracle OpenWorld 2016

Presenter: Dan Vlamis and Tim Vlamis

Date: September 18, 2016

Vlamis Software Solutions

- Vlamis Software founded in 1992 in Kansas City, Missouri
- Developed 200+ Oracle BI and analytics systems
- Specializes in Oracle-based:
  - Enterprise Business Intelligence
  - Data Warehousing
  - Data Mining and Predictive Analytics
  - Data Visualization
- Multiple Oracle ACEs, consultants average 15+ years
- www.vlamis.com (blog, papers, newsletters, services)
- Co-authors of book “Data Visualization for OBI 11g”
- Co-author of book “Oracle Essbase & Oracle OLAP”
- Oracle University Partner
- Oracle Gold Partner



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Vlamis at Oracle OpenWorld

Presenter	Time	Location	Title
Tim Vlamis & Dan Vlamis	Sun 10:30 AM	Moscone West 3020	Oracle Big Data Science
Dan Vlamis & Tim Vlamis	Sun 1:00 PM	Moscone West 3018	Analytic Views Simplify Complex Business Intelligence Queries
Dan Vlamis & Tim Vlamis, Doug Schieder	Tues 5:00 PM	Oola	Vlamis Reception

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Please Join Us

Vlamis OOW 2016 Reception

Location: Oola Restaurant and Bar
860 Folsom Street
Two blocks from Moscone!

Time: Tuesday, September 20, 2016
5:00-7:30 pm

By Invitation Only
Space is limited.

RSVP: Scan here to register

Or RSVP to Carolyn at
cgillespie@vlamis.com

Cocktails and
hors d'oeuvres
will be served.

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Dan and Tim Vlamis

Dan Vlamis – President

- Founded Vlamis Software Solutions in 1993
- 30+ years in business intelligence, dimensional modeling
- Oracle ACE Director
- Developer for IRI (expert in Oracle OLAP and related)
- BIWA Board Member since 2008
- BA Computer Science Brown University

Tim Vlamis – Vice President & Analytics Strategist

- 30+ years in business modeling and valuation, forecasting, and scenario analyses
- Oracle ACE
- Instructor for Oracle University's Data Mining Techniques and Oracle R Enterprise Essentials Courses
- Professional Certified Marketer (PCM) from AMA
- MBA Kellogg School of Management (Northwestern University)
- BA Economics Yale University

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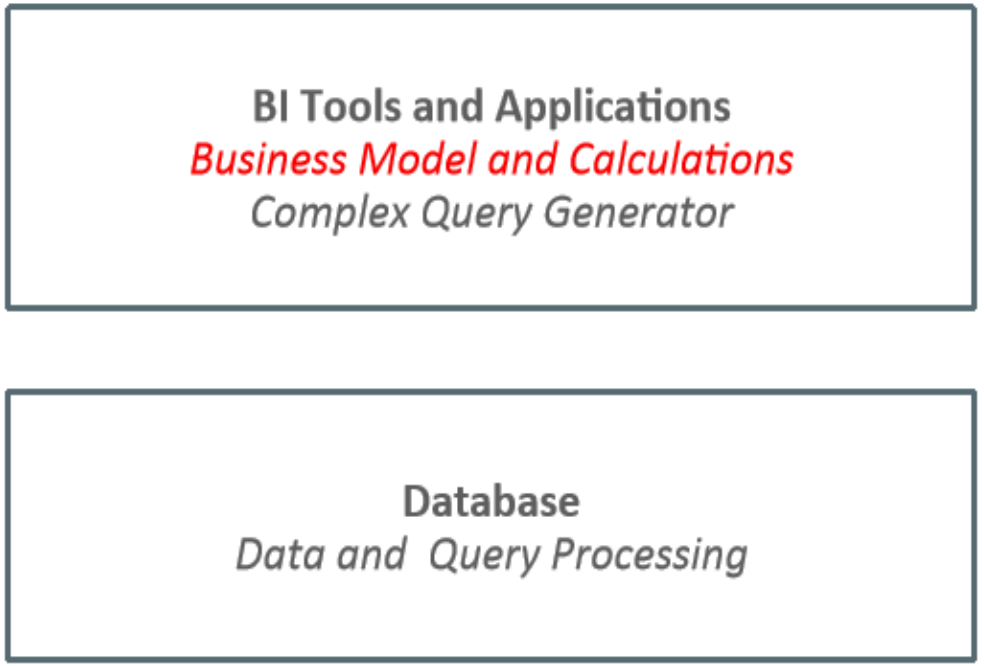
Agenda

- Current approach to BI
- Analytic Views Simple Select
- Analytic Views Modeling
- Database USER tables

Today's Approach to BI

Simple Tables and Complex Queries



- Metadata and calculations are defined in the application layer
  - Lack of re-use / repetitive work
  - Potential for inconsistent results
- Requires complex query generators
  - Makes custom application development very difficult

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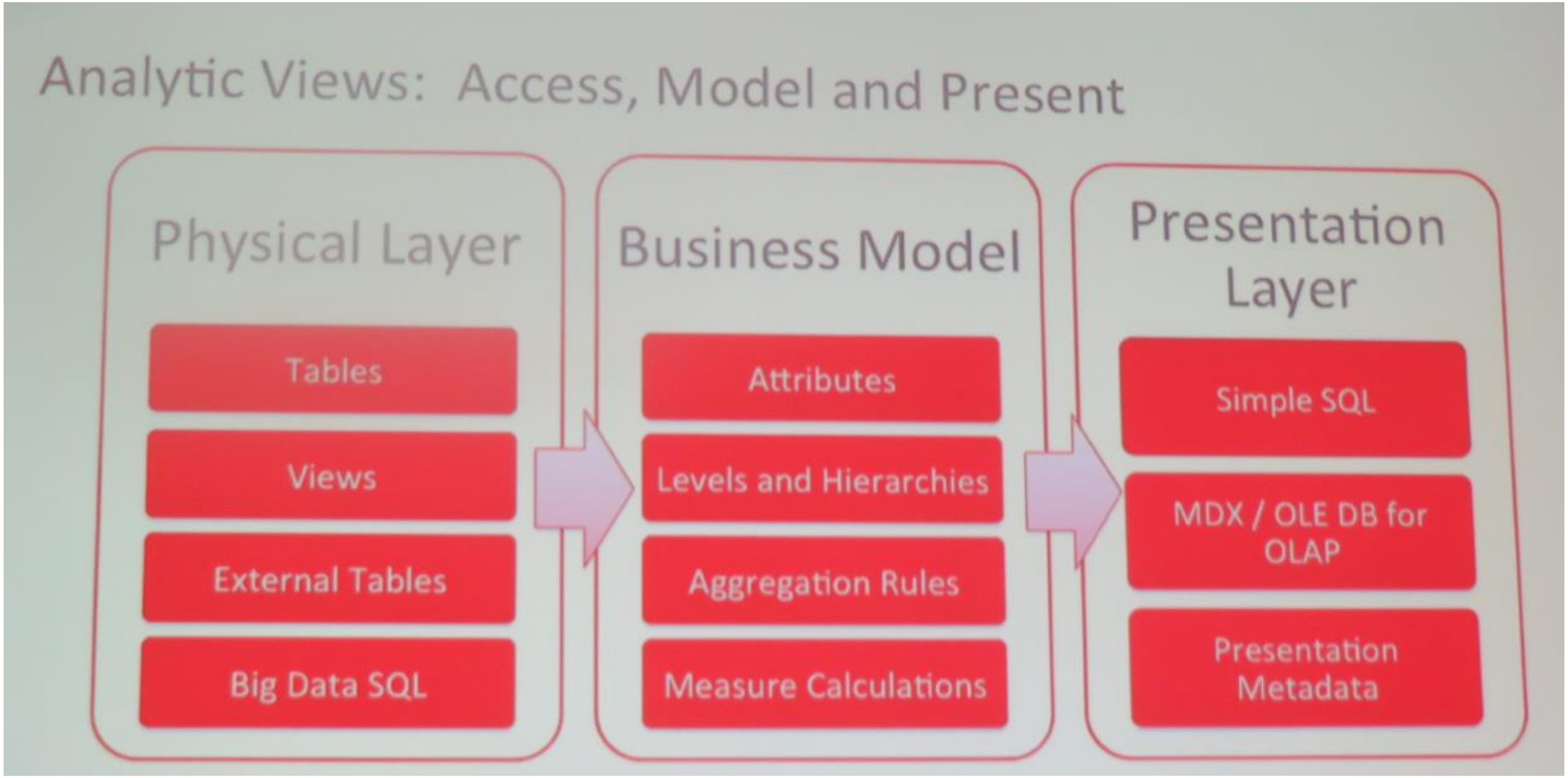
Access, Model and Present



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Analytic Views

- New type of view in the Oracle Database
  - Business model and calculation rules are embedded within the Analytic View
  - Purely relational concept – no instantiation of the data
- Analytic Views as easily queried with simple SQL or MDX
  - With a smart Analytic view, SQL generation is easy
  - MDX provider (OLE for OLAP), supports Excel PivotTable connections
- Access data from tables, views, external tables and Big Data SQL
  - Use Analytic Views to organize and present a wide variety of data

Advantages

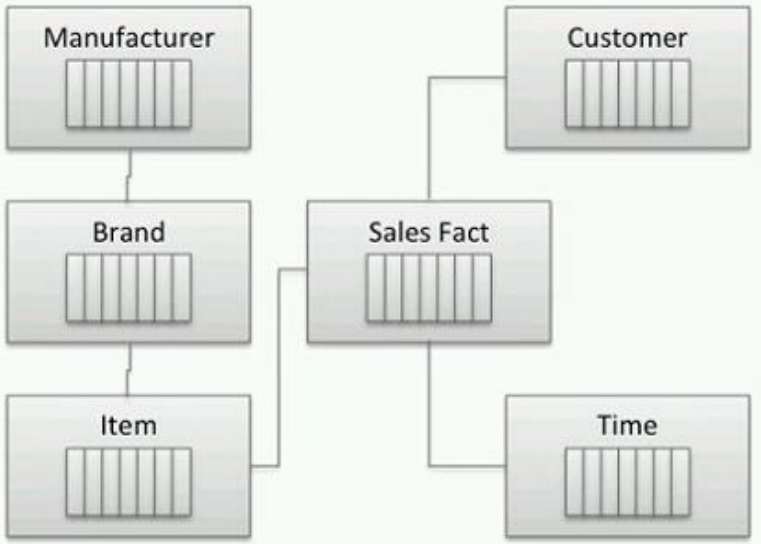
Joined, Aggregated and Calculated

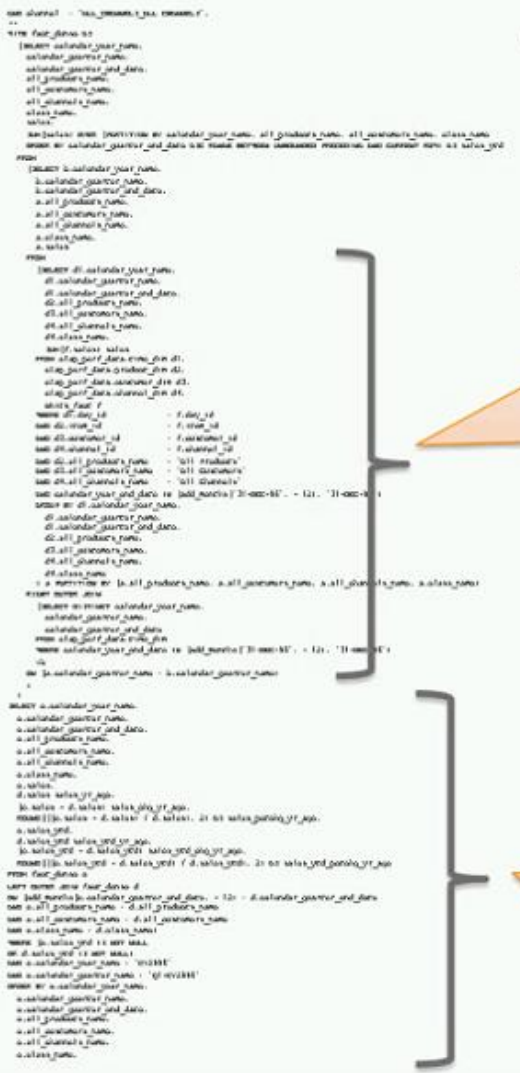
- Joins all hierarchies and fact data into a single view (de-normalized)
  - No Joins required in query
- Returns rows for all aggregate data
  - GROUP BY not required in query
- Presents calculated measures as a single Column
  - Just select the column name
- Query transformation engine accesses and calculates data
  - No pre-calculation is required

Typical Query

Typical Query

Simple Tables and Complex Queries





4. Sales YTD

1. Expand time filter (include prior year)
2. Join dimension tables to fact table (partitioned outer on time)
3. Aggregate (SUM … GROUP BY)

5. Sales YTD Change Year Ago
6. Sales YTD % Change Year Ago
7. Filter to 2015

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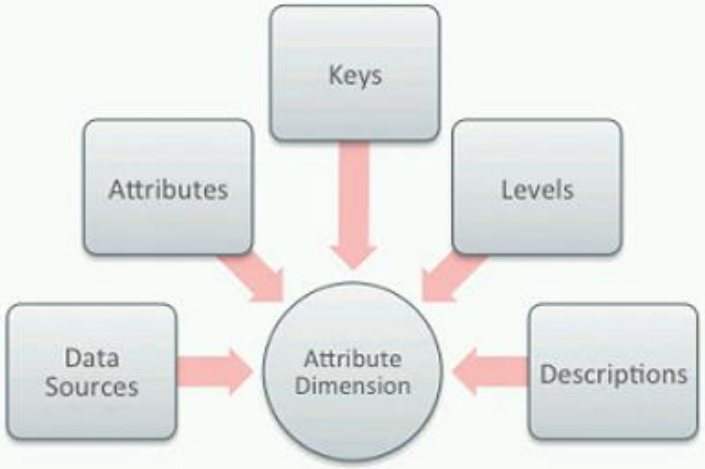
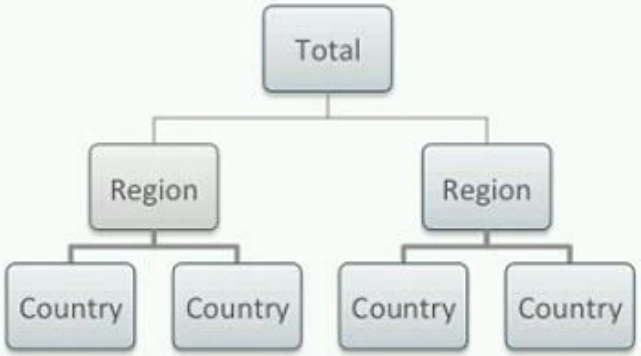
Three New Database Objects

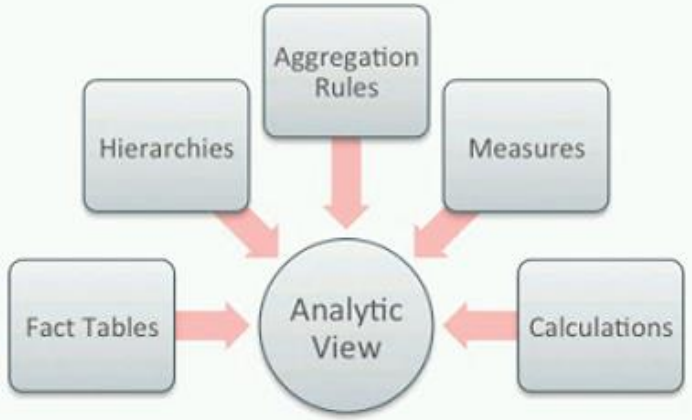
- Attribute Dimensions
  - Map to data objects with dimension / attribute data
  - Identify the roles of columns



- Hierarchies
  - Organizes levels into aggregation and drill paths
  - A new type of view that can be queried with SQL



- Analytic Views
  - Maps to data objects with fact / measure data
  - A new type of view that an can be queries with SQL and MDX



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Hierarchy Queries

Smart Views and Simple Queries

```
SELECT
  time_hierarchy.member_name       AS TIME,
  product_hierarchy.member_name    AS product,
  geography_hierarchy.member_name AS geography,
  sales,
  sales_year_ago,
  sales_chg_year_ago,
  sales_pctchg_year_ago
FROM
  sales_av hierarchies (time_hierarchy, product_hierarchy, geography_hierarchy)
WHERE
  time_hierarchy.level_name        = 'YEAR'
AND product_hierarchy.level_name   = 'DEPARTMENT'
AND geography_hierarchy.level_name = 'REGION';
```

- Descriptive values are selected from standard columns
- Fact Data selected from view
- Calculations are simply selected as column
- Hierarchies option replaces JOIN and GROUP BY
- Hierarchy filters indicate aggregation level

- Update filter; everything else stays the same

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Hierarchy Queries

Example of Member Name and Level Name

```
SELECT member_name,
  level_name
FROM time_hierarchy
ORDER BY hier_order;
```

MEMBER_NAME	LEVEL_NAME
ALL YEARS	ALL
CY2011	YEAR
Q1CY2011	QUARTER
Jan-11	MONTH
Feb-11	MONTH
Mar-11	MONTH
Q2CY2011	QUARTER
Apr-11	MONTH
May-11	MONTH
Jun-11	MONTH
Q3CY2011	QUARTER
Jul-11	MONTH

Analytic View Model

- Script to build SALES_AV_3
- Note the USING and DIMENSION BY statements.
- CLASSFICATIONS add metadata that can be used by applications to enhance the display of data.

```
CREATE OR REPLACE HIERARCHY CUBE sales_av_3
 CLASSIFICATION caption VALUE 'Sales View'
 CLASSIFICATION description VALUE 'Sales View'
USING sales_fact
DIMENSION BY
 (geography_attr_dim KEY state_province_id REFERENCES state_province_id HIERARCHIES (geography_hierarchy DEFAULT)
  product_attr_dim KEY category_id REFERENCES category_id HIERARCHIES (product_hierarchy DEFAULT ),
  time_attr_dim KEY month_id REFERENCES month_id HIERARCHIES (time_hierarchy DEFAULT))
MEASURES (
sales FACT sales
   CLASSIFICATION caption VALUE 'Sales'
   CLASSIFICATION description VALUE 'Sales'
   CLASSIFICATION format_string VALUE '$9,999.99',
 units FACT units
   CLASSIFICATION caption VALUE 'Units'
   CLASSIFICATION description VALUE 'Units'
   CLASSIFICATION format_string VALUE '$9,999.99',
sales_year_ago as (LAG(sales) OVER (HIERARCHY time_hierarchy OFFSET 1 ACROSS ANCESTOR AT LEVEL YEAR))
   CLASSIFICATION caption VALUE 'Sales Year Ago'
   CLASSIFICATION description VALUE 'Sales Year Ago'
   CLASSIFICATION format_string VALUE '$9,999.99'
  )
DEFAULT MEASURE SALES;
```


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Hierarchy Queries

- Simply select returning Sales and Sales Year Ago by Year and Product Category

```
SELECT time_hierarchy.member_name    AS "Time",
       product_hierarchy.member_name AS "Product",
       product_hierarchy.level_name  AS "Product Level",
       sales                         AS "Sales",
       sale_year_ago                 AS "Sales Year Ago"
 FROM sales_av_3 hierarchies (time_hierarchy, product_hierarchy)
WHERE time_hierarchy.level_name    = 'YEAR'
  AND time_hierarchy.year_id       = 'CY2015'
  AND product_hierarchy.level_name = 'CATEGORY'
ORDER BY time_hierarchy.hier_order
```

Time	Product	Product Level	Sales	Sales Year Ago
CY2015	All Computer Furniture	CATEGORY	109,192,254.85	108,894,204.49
CY2015	Camcorders and Accessories	CATEGORY	730,206,403.17	734,811,991.58
CY2015	Cameras and Accessories	CATEGORY	1,634,097,291.16	1,631,246,488.55
CY2015	Computer Printers and Supplies	CATEGORY	7,899,717,959.62	7,870,968,266.83
CY2015	PDAs	CATEGORY	36,399,047.63	36,175,401.33
CY2015	Total Personal Computers	CATEGORY	24,130,108,671.73	24,082,400,466.60
CY2015	Total Server Computers	CATEGORY	522,470,142.97	520,577,110.46
CY2015	Total iPlayer Family	CATEGORY	603,031,301.95	601,835,395.06

Analytic Views Summary

- Analytic Views new in Oracle DB 12.2
- Go to Larry's keynote for news on 12.2 availability
- APEX application coming that exposes AVs
- BI applications can use simple SQL to get data from Oracle DB
- AVs = simple SQL. DB In Memory = fast access.
- AVs run against any row source, not just tables (e.g. big data)
- Creating AVs is simple. Will have GUI in SQLDeveloper 4.2
- "Analytic Views: A New Type of Database View for Simple, Powerful Analytics [CON6502]" by Bud Endress Wed 12:15pm Moscone South 102

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TECHNOLOGY AND APPLICATIONS FORUM FOR THE ORACLE COMMUNITY

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April 2-6 2017
Las Vegas, NV

Mandalay Bay
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Save the Date

COLLABORATE 17 registration will open on Thursday, October 27.

Call for Speakers

Submit your session! The Call for Speakers is open until Friday, October 7.

collaborate.ioug.org

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Thank You!

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