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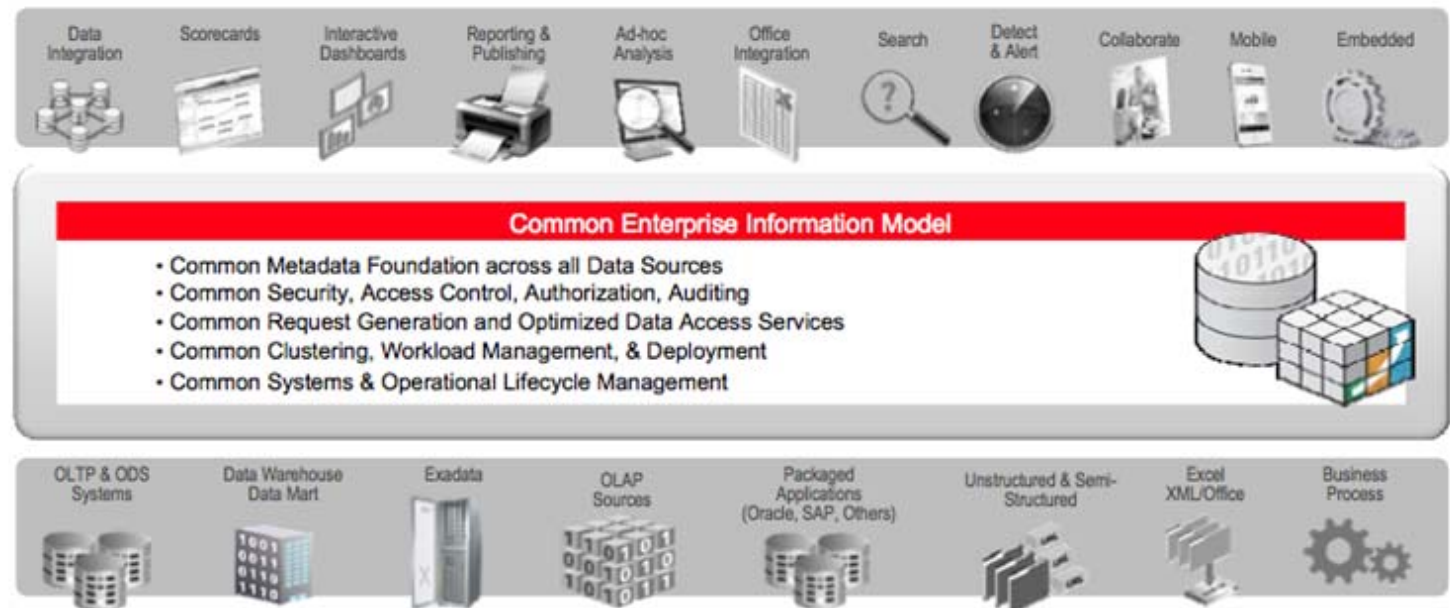
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## OBIEE11g RPD Modeling New Features

Mark Rittman, Technical Director, Rittman Mead  
ODTUG BI/EPM Seriously Practical Conference, Sydney 2011

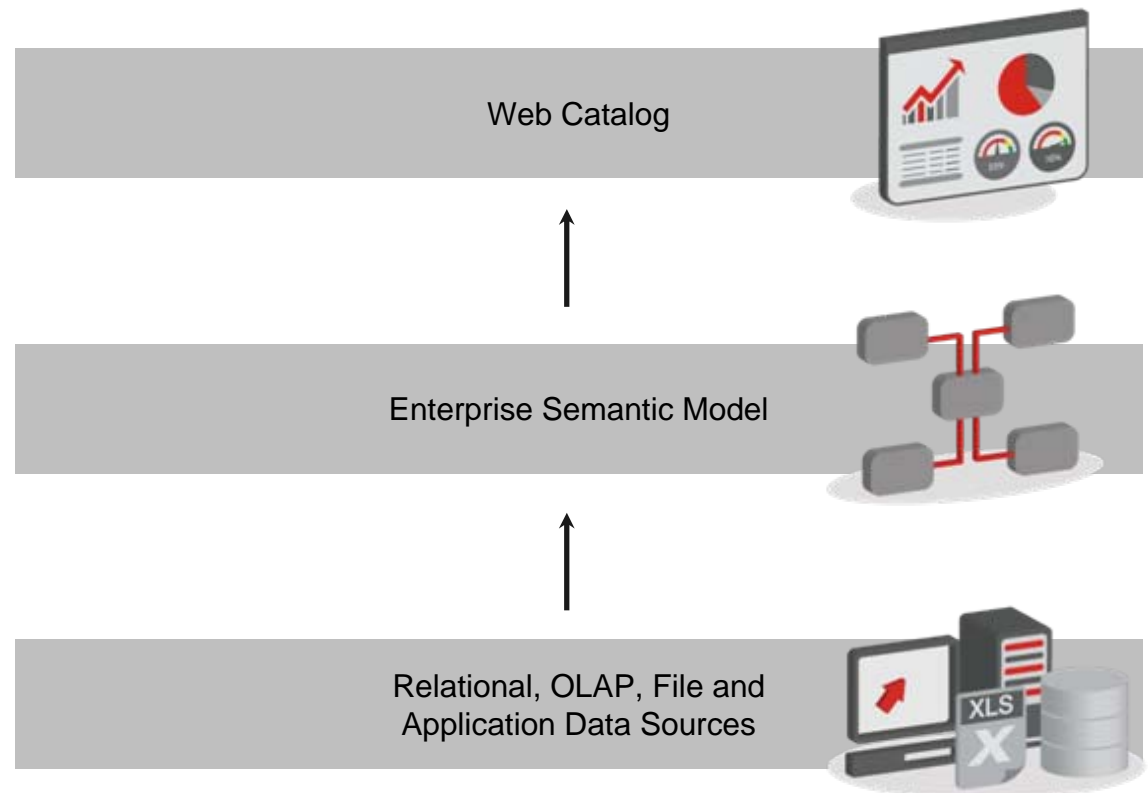
# Oracle Business Intelligence 11g

- The latest release of OBIEE (Oracle BI Enterprise Edition)
- Major changes to front-end, integration, architecture
- Objective is to make it more “enterprise-ready”
- Closely integrated with Oracle Fusion Middleware 11g

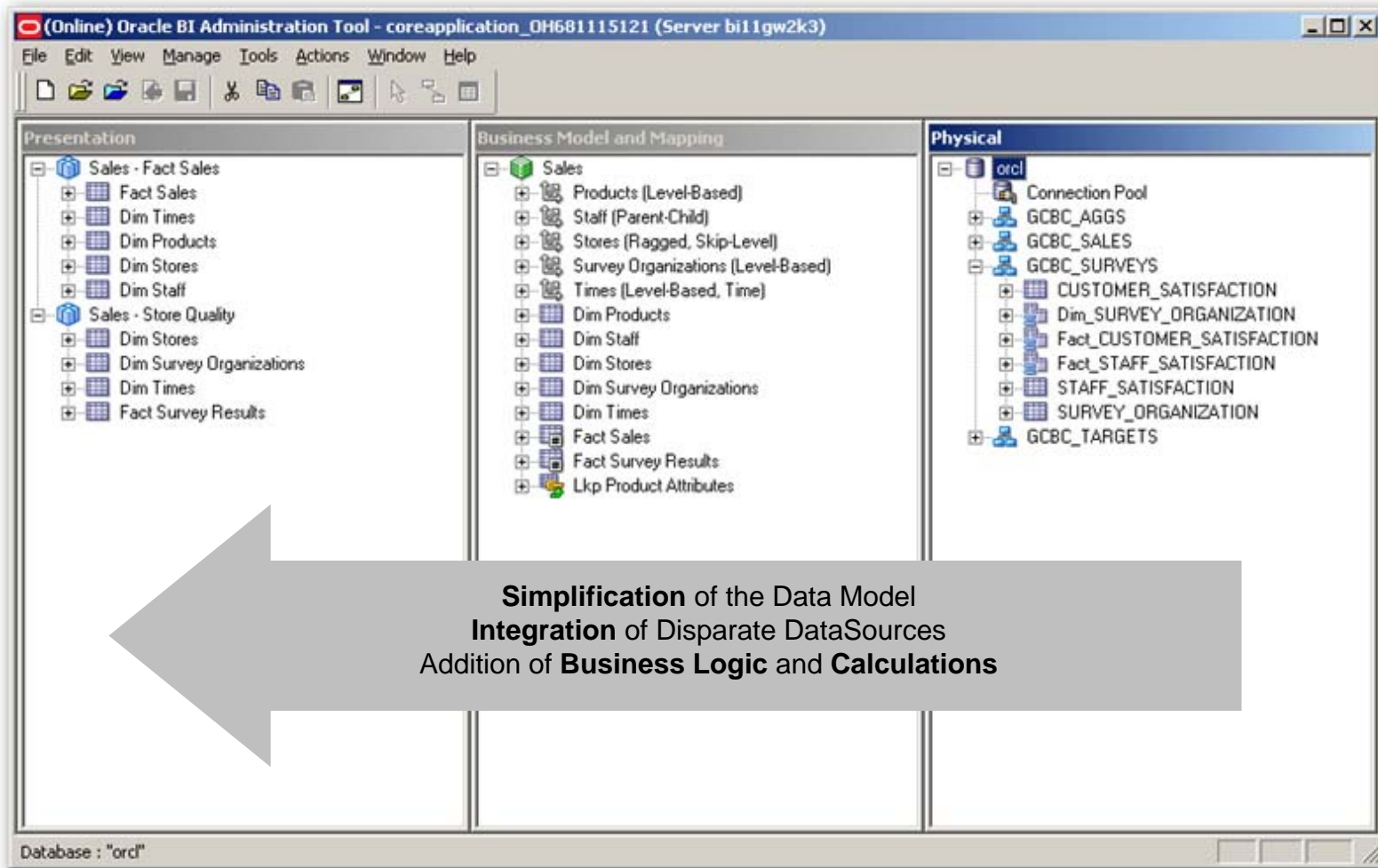


## OBIEE Metadata and Data Layers

- The **Web Catalog** contains definitions of reports, alerts dashboards, KPIs, based on...
- A **Semantic Model** made up of Metrics, dimensions, hierarchies and calculations, derived from...
- **Physical Data Sources**, such as relational databases, OLAP Cubes and application source adapters



## Flow of Data Through the Three-Layer Semantic Model



## Semantic Model Design Objectives

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- Create a simple, logical, dimensional model for users to query
- Integrate where possible disparate data sources using conformed dimensions
- Add dimensions and hierarchies to facilitate drilling to detail
- Add common calculations and aggregations
- Present data to users through subject areas (a.k.a. data marts)
- Add role-based data and subject-area security

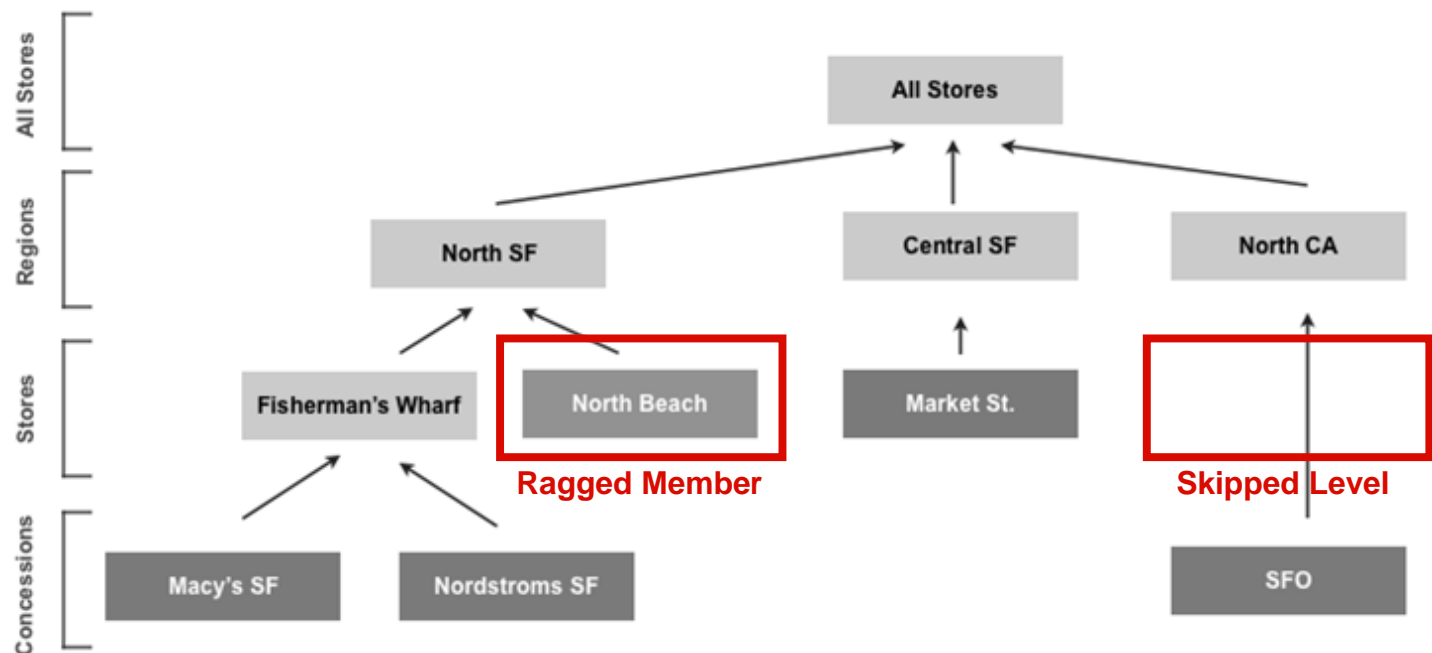
## New Features in OBIEE 11gR1 For Data Modeling

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- Support for Ragged, Skip-Level and Parent-Child Hierarchies
- Hierarchical Subject Area Columns
- Lookup Logical Tables
- ID Columns for Descriptive Columns
- LTS Priority Ordering
- Repository Passwords
- Deployment of Repository Files using Fusion Middleware Control

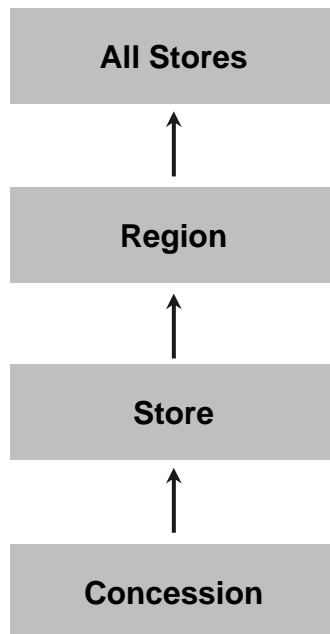
## Ragged and Skip-Level Logical Dimensions

- Level-based hierarchies may have skip-levels, or ragged hierarchies
- Skip-levels are when members may not have an immediate parent
- Ragged hierarchies are when leaf members are not all at the same level



## Ragged and Skip-Level Logical Dimensions in the Dataset

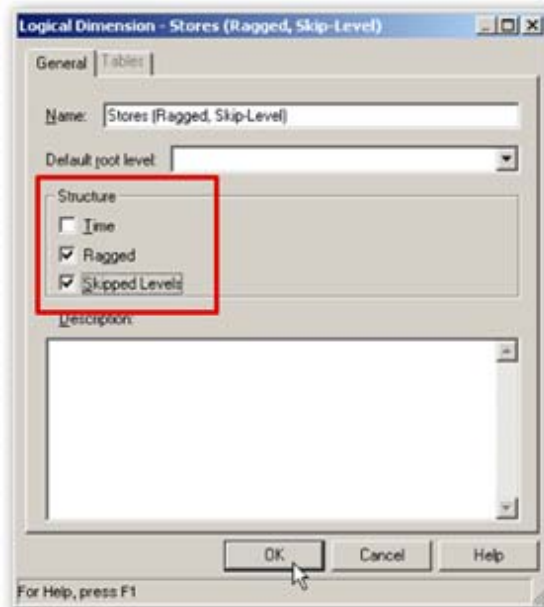
- Skip-levels and Ragged hierarchies are represented in the underlying table through NULLs



	CONCESSION_ID	CONCESSION_NAME	STORE_ID	STORE_NAME	REGION_ID	REGION_NAME
1	(null)	(null)		3 Geary Street	1	Central SF
2	(null)	(null)		1 Market Street	1	Central SF
3	(null)	(null)		4 North Beach	2	North SF
4	(null)	(null)		5 Taylor Street	2	North SF
5	(null)	(null)		2 Fishermans Wharf	3	North SF
6	102 SFO		(null)	(null)	3	North CA
7	(null)	(null)		6 Walnut Creek	3	North CA
8	(null)	(null)		11 San Diego	4	South CA
9	(null)	(null)		9 Santa Clara	4	South CA
10	(null)	(null)		7 Anaheim	4	South CA
11	(null)	(null)		8 Los Angeles	4	South CA
12	(null)	(null)		14 Embarcadero	5	East SF
13	(null)	(null)		15 10th Avenue	6	West SF
14	(null)	(null)		16 Haight Street	6	West SF
15	(null)	(null)		12 Chicago	7	Other USA
16	(null)	(null)		13 New York	7	Other USA
17	100 Nordstroms, SF			2 Fishermans Wharf	2	North SF
18	101 Macys, SF			2 Fishermans Wharf	2	North SF

## Creating Ragged and Skip-Level Logical Dimensions

- Select Ragged and/or Skip-Level in the logical dimension properties
  - Do not select for non-ragged, non-skip, as detecting NULLs adds overhead
- For ragged hierarchies, add surrogate key to ensure consistent logical PK
  - Delete this additional level when you create the presentation hierarchy



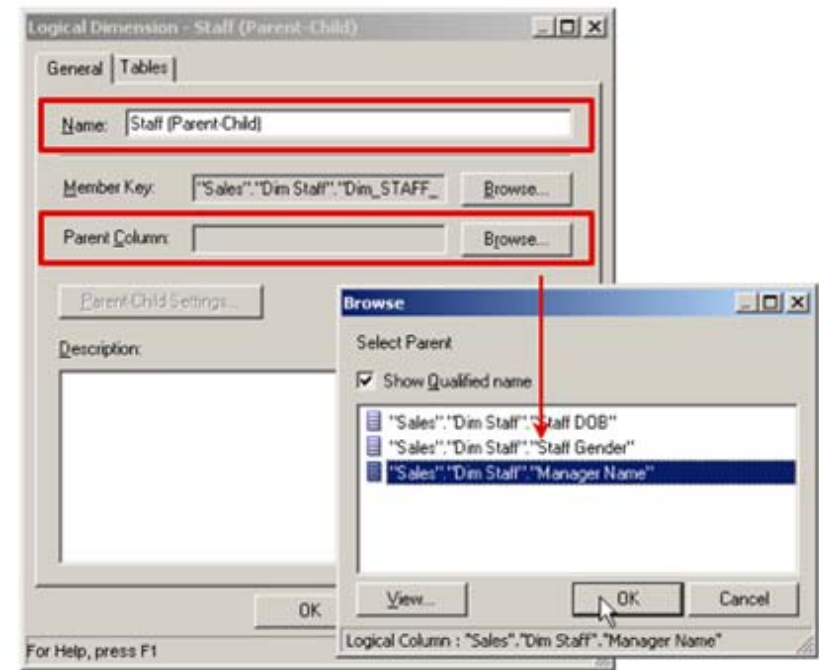
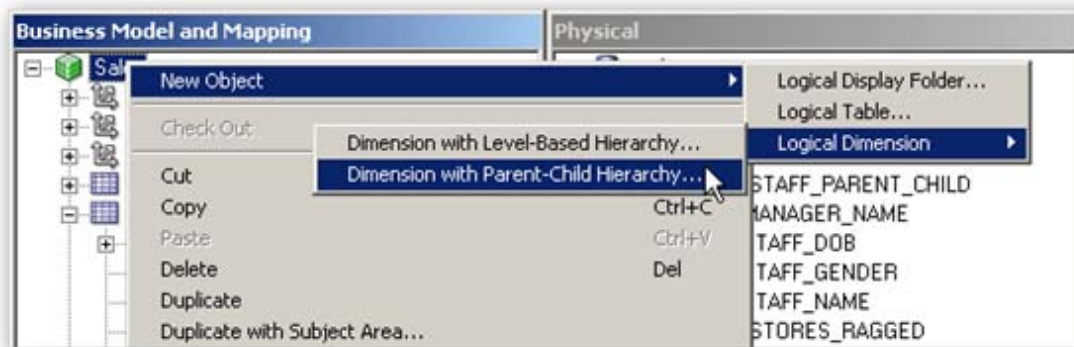
## Parent-Child (Value-Based) Dimensions

- Some data sets contain recursive, parent-child (value-based) hierarchies
  - Hierarchy is defined in the data, rather than the column relationships
- Typically used for organizations and other implicitly ragged hierarchies
- Difficult to model relationally as recursive SQL queries would be required to traverse

STAFF_DOB	STAFF_GENDER	STAFF_NAME	MANAGER_NAME
1 01-DEC-40	M	Pierre Houdan	(null)
2 10-JAN-72	F	Diana Daves	Lacey Laxson
3 12-OCT-80	M	Jose Nigro	Pedro Balfaur
4 28-MAY-81	F	Doris Lines	Lacey Laxson
5 14-SEP-87	M	Antony Bogart	Pedro Balfaur
6 19-JUL-87	M	Earl Hodson	Pedro Balfaur
7 16-DEC-78	M	Walker Bridgeman	Adrian Boles
8 14-AUG-71	F	Kara Grossman	Jon James
9 15-APR-87	M	Hasty Gonzales	Jon James
10 11-SEP-88	M	Adam Rumph	Jon James
11 04-NOV-55	F	Edith Lofton	Adrian Boles
12 29-JUL-84	M	Larry Nolen	Jon James
13 16-DEC-78	F	Cassandra Barry	Alison Chisel
14 22-DEC-76	M	Russell Durkee	Alison Chisel
15 18-FEB-80	M	Douglas Bader	Ronald Koeman
16 01-DEC-82	F	Mildred Butters	Hector Nunez
17 03-JAN-90	M	Geoff Blowe	Diana Daves
18 03-OCT-89	M	Archie Krigbaum	Jose Nigro

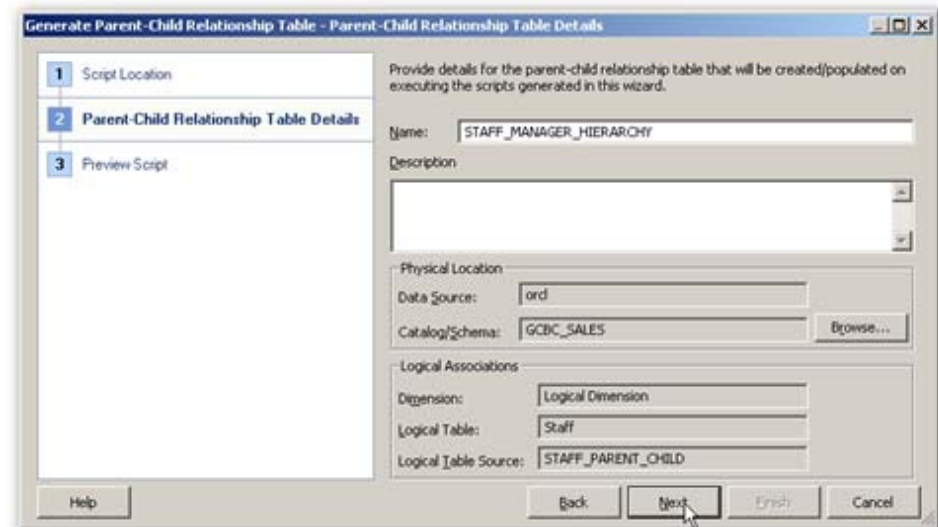
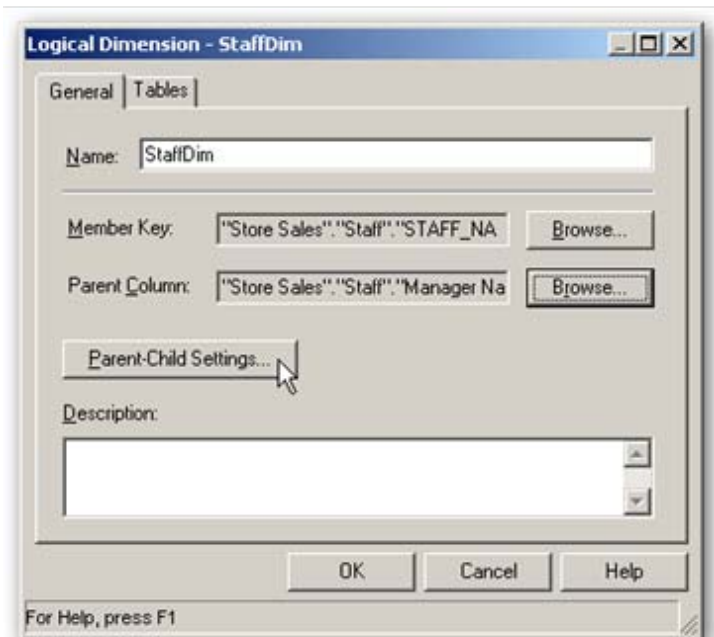
## Creating Parent-Child Hierarchies

- Command to create logical dimensions now includes Parent-Child option
- Initial logical dimension dialog then prompts you to select **Parent Column**
- Once selected, you then need to define the **closure table** to resolve recursion



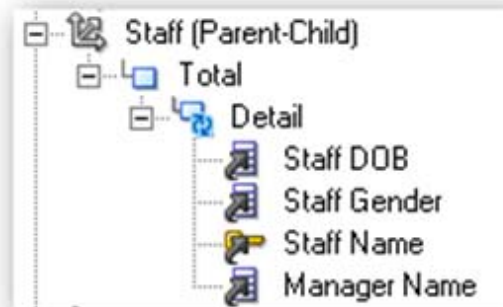
## Parent-Child Hierarchy Closure Tables

- To avoid the need for recursive SQL, a closure table is defined for the hierarchy
- Iterates through the hierarchy once, speeds up all subsequently queries
- Creates two scripts; one to create closure table, one to populate it
- Population script will need to be re-run each time underlying data changes



## Parent-Child vs. Ragged Hierarchies : Which to Use?

- Parent-child hierarchies are naturally ragged, so which should you choose?
- Depends on the data structures you are reporting on
  - If each hierarchy level is distinct and named, go for level-based with ragged hierarchy option
  - If hierarchy levels are not named, or data is stored in RDBMS recursively, go for parent-child hierarchy
- Parent-child takes more maintenance, so only use if necessary

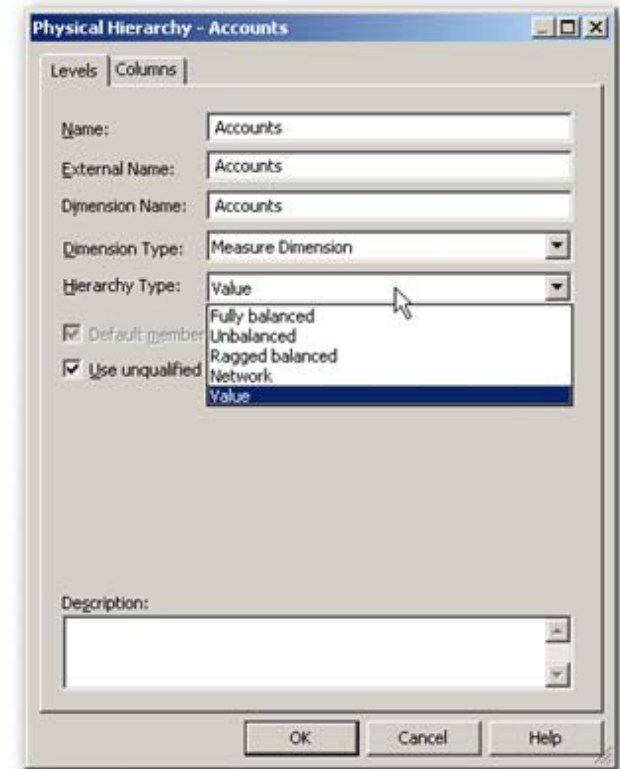
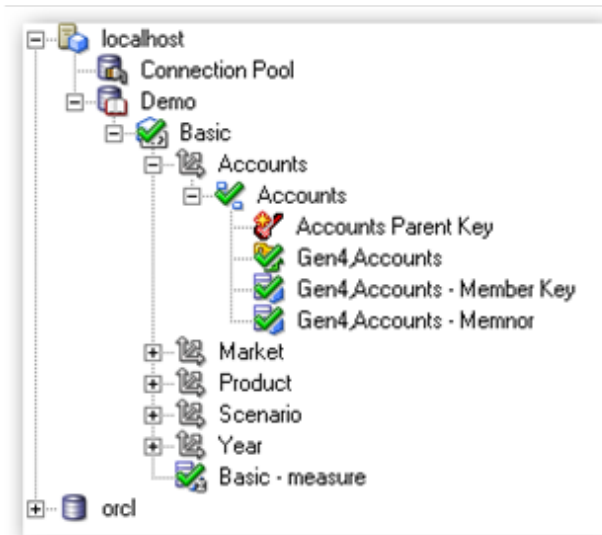


VS.



## Hierarchical Columns and Essbase Sources

- Essbase data sources can be amended to use parent-child (“value”) hierarchies
- Avoids issue where changing outlines requires re-import
- Business Model columns no longer based on outline generations
- New generations can be added dynamically as Essbase outline evolves



## Hierarchical Columns

- Logical dimensions in the business model can now be dragged across to create Hierarchical Columns in subject areas
- One hierarchical column per logical dimension hierarchy
- Allows in-column drilling in analyses

Staff (Parent Child)	Amount
[-] Pierre Houdan	53
[+] Adrian Boles	8
[-] Alison Chisel	37
[+] Cassandra Barry	11
[+] Russell Durkee	5
[+] Jon James	20
[-] Lacey Laxson	11
[-] Doris Lines	10
Malcom Doig	40
Vernice Kennebeck	19
Pete Sims	26
[+] Ronald Koeman	15



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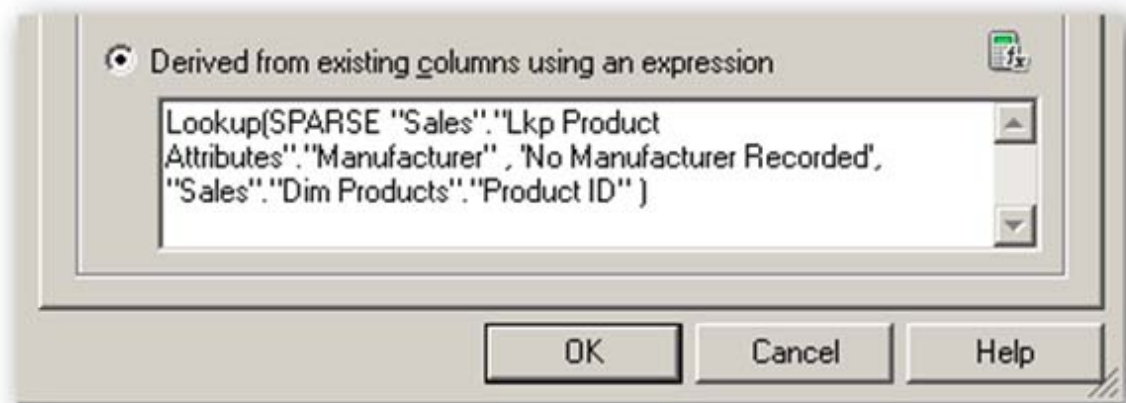
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## Demonstration

OBIEE 11g Skip-Level, Ragged and Parent-Child Hierarchies

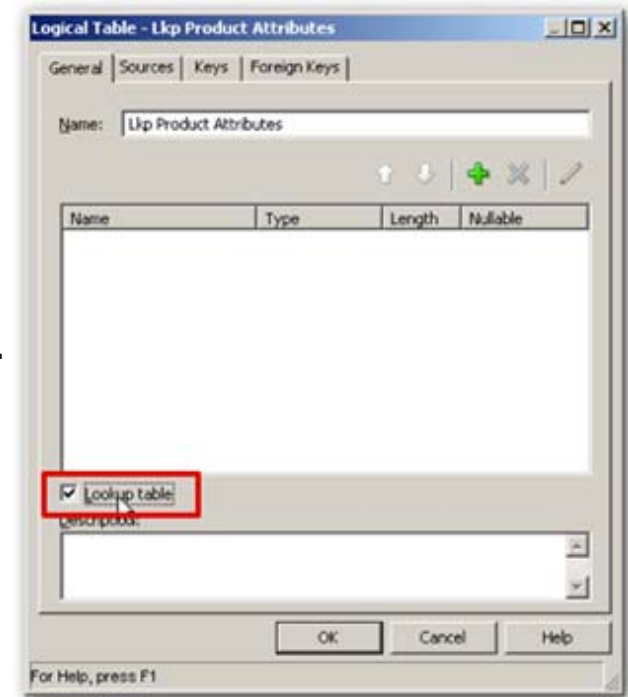
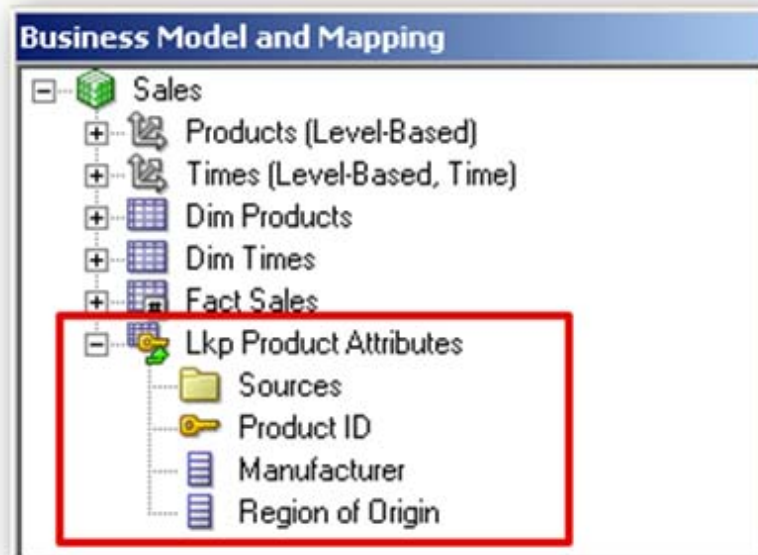
## Lookup Tables and Function

- LOOKUP function introduced with OBIEE 11g allows lookups on logical and physical tables
- Useful for several scenarios
  - ▶ Pushing currency conversions to separate calculations
  - ▶ Accessing columns that cannot use GROUP BY (e.g. CLOB)
  - ▶ Avoiding unnecessary outer joins in LTS



## Lookup Logical Tables

- Allows you to define a logical table as being a lookup table
  - Removes check as to whether it is a fact, or joined to a fact table
- Can be accessed via a logical calculation using SPARSE or DENSE lookup
- BI Server generates separate lookup SQL query, joined to main dataset by BI Server in-memory



## Accessing Lookup Tables

- Lookup tables are accessed using the new LOOKUP function
- Can be SPARSE (outer join) or DENSE (inner join)
- Physical table lookups push join to SQL query; logical creates two SQL queries

Lookup(DENSE <<lookupColumn>>, <<sourceKeyorExpression>>) Lookup(SPARSE <<lookupColumn>>

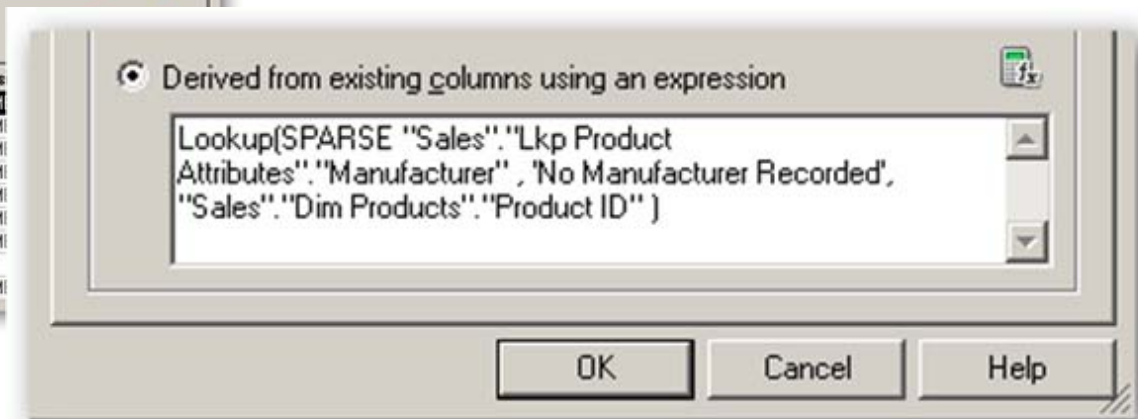
Logical Table Source - Dim\_TIMES

General Column Mapping Content Parent-Child Settings

Show mapped columns  Show unmapped columns

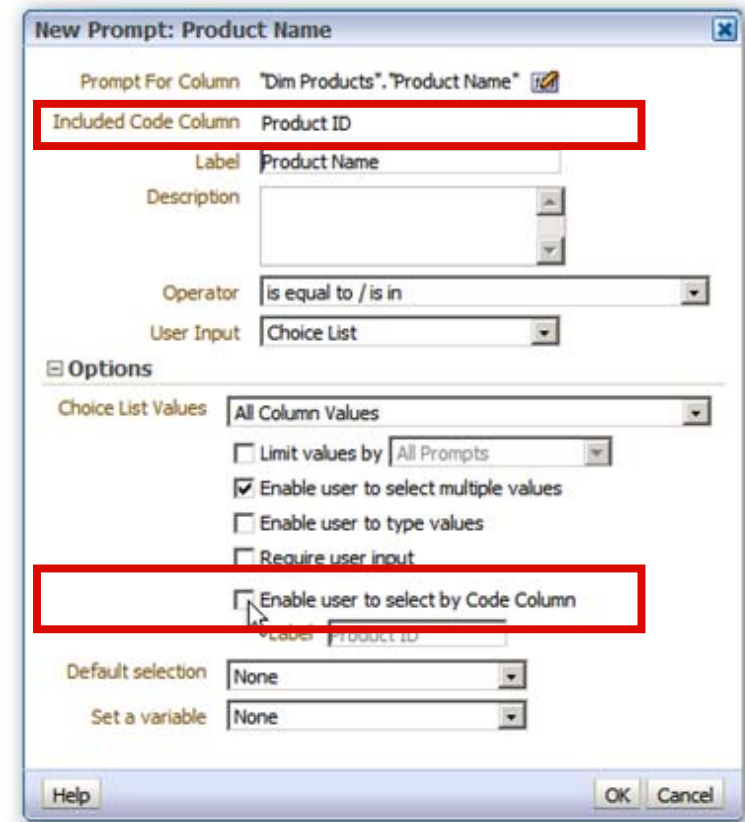
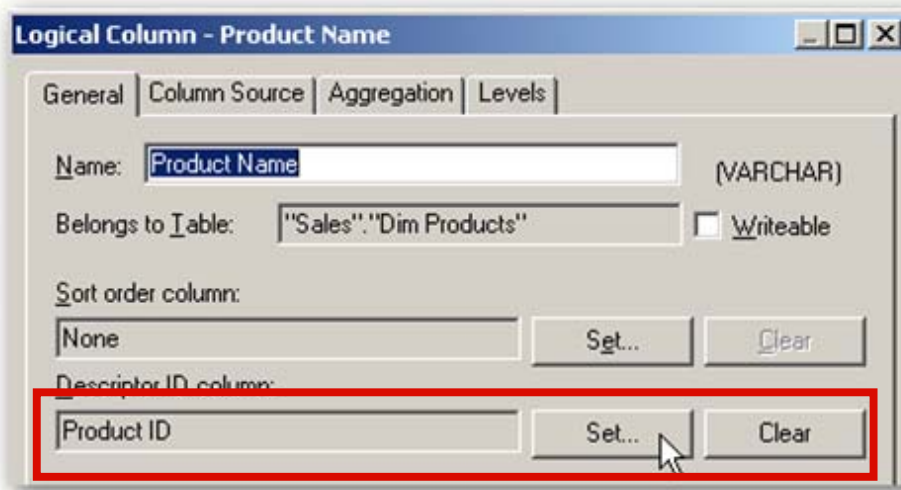
Logical column to physical column mapping:

Logical Column	Expression		Phys
Fiscal Quarter	FSCL_QUARTER_DESC		Dim_TIM
Fiscal Quarter YYYYQ	FSCL_QUARTER_YYYYQ		Dim_TIM
Fiscal Year YYYY	FISCAL_YEAR_YYYY		Dim_TIM
Month	MONTH_DESC		Dim_TIM
Month YYYYMM	MONTH_YYYYMM		Dim_TIM
Quarter	QUARTER_DESC		Dim_TIM
Quarter YYYYQ	QUARTER_YYYYQ		Dim_TIM
Season	Lookup(DENSE "ord"."GCBC_SALES"."Lkp_SEASON		Dim_TIM
Year YYYY	YEAR_YYYY		Dim_TIM



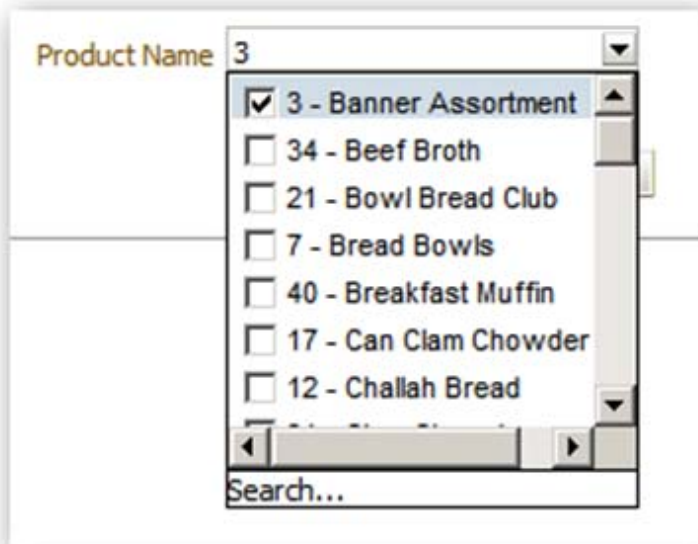
## ID Columns for Descriptive Columns (Double-Columns)

- In OBIEE 10g, it was difficult to define dashboard prompts that display descriptions, but pass back IDs
- OBIEE 11gR1 allows you to define an ID column for descriptive column(s)
  - Multiple columns can reference same ID
- Dashboard prompts are aware of IDs



## Double-Columns in Use

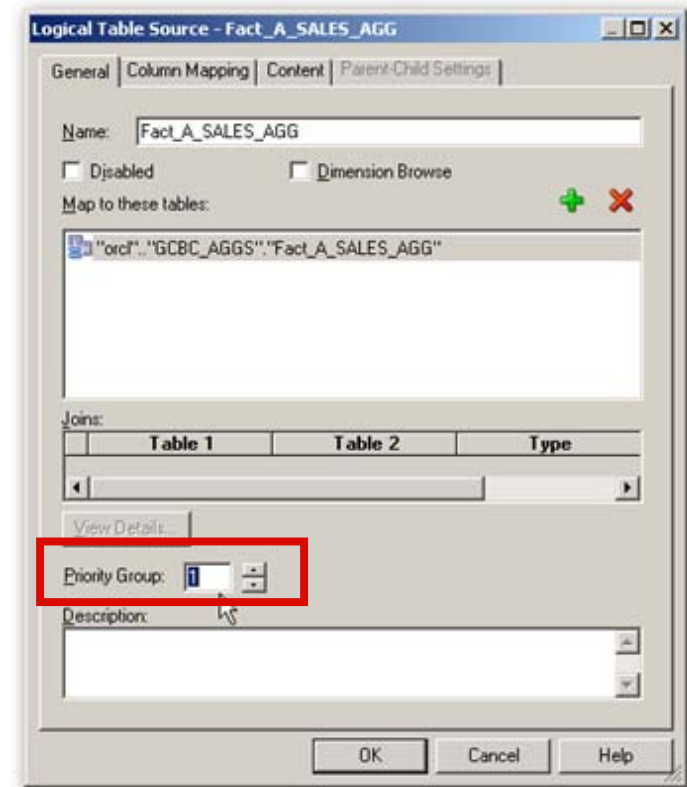
- User can select using just descriptions, or can elect to show IDs as well
- Set analyses prompt to “Is Prompted”
- SQL will automatically filter on IDs, rather than descriptions



```
WITH SAWITH0 AS (select sum(T117.REV_AMT) as
c1,      T107.PROD_CAT_DESC as c2,
T107.PROD_ID as c3from
GCBC_SALES.PRODUCTS T107,
GCBC_SALES.SALES T117  where ( T107.PROD_ID
= T117.PROD_ID
and (T107.PROD_ID in (12, 17, 31)) ) group
by T107.PROD_CAT_DESC, T107.PROD_ID),SAWITH1
AS (select 0 as c1,      D1.c2 as c2,
D1.c3 as c3,      D1.c1 as c4,      sum(D1.c1)
as c5from      SAWITH0 D1group by D1.c1,
D1.c2, D1.c3)select D1.c1 as c1,      D1.c2
as c2,      D1.c3 as c3,      D1.c4 as c4,
sum(D1.c5) over (partition by D1.c2)
as c5from      SAWITH1 D1
```

## LTS Priority Group Order

- A single logical table can have multiple logical table sources defined
- Usually, the selection of LTS by the BI Server is straightforward and defined by the context of the query
- When multiple aggregate LTS are defined, however, which one is chosen can be difficult to determine (based on **Number of Members At This Level**)
- OBIEE 11gR1 LTS Priority Group Order makes this more explicit
  - ▶ Lower value = higher priority
  - ▶ LTS Priority Group becomes main decider in which LTS to use



## LTS Priority Group Example

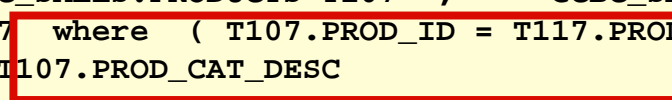
- A logical fact table has two LTS mapped; one detail-level and one aggregate
- By default, the aggregate source is used for aggregated queries (due to dimension logical level mapping)
- This behaviour will be over-ridden though when LTS Priority Group is amended
  - Setting it to 1 makes it lower priority than the detail-level LTS



```
select sum(T879.FCAST_SAL_AMT) as c1,      T873.PROD_CAT_DESC as c2
by T873.PROD_CAT_DESC
```

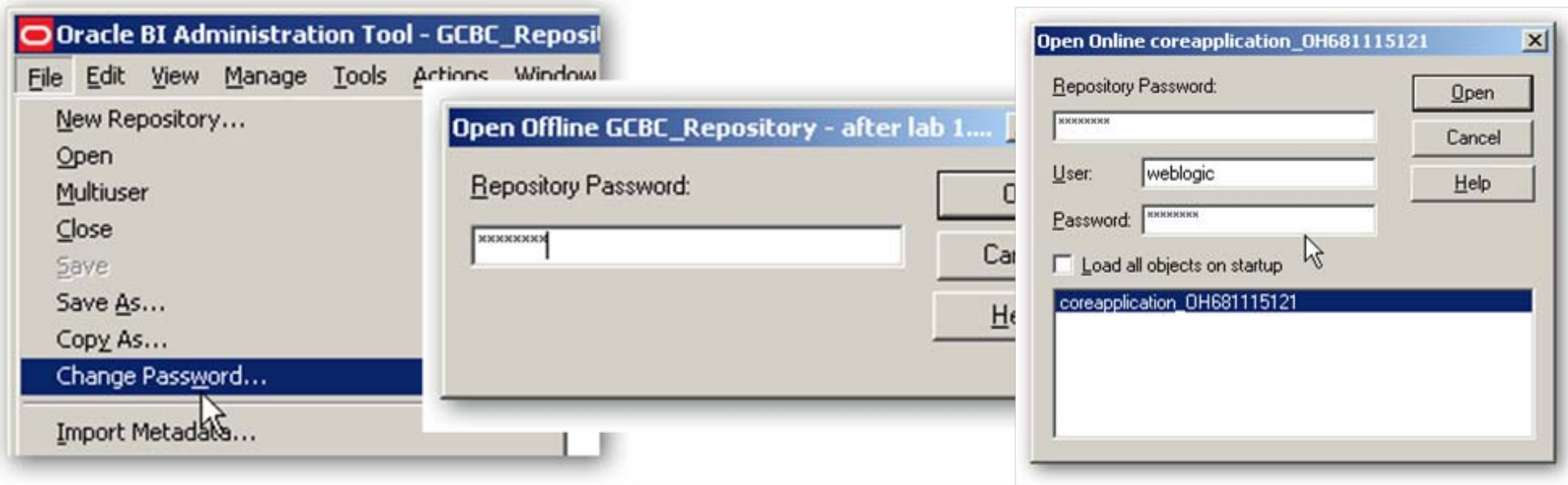


```
select sum(T117.FCAST_SAL_AMT) as c1,
T107.PROD_CAT_DESC as c2
from GCBC_SALES.PRODUCTS T107 , GCBC_SALES.SALES
T117 where ( T107.PROD_ID = T117.PROD_ID ) group
by T107.PROD_CAT_DESC
```



## Repository Passwords, and Repository Identity Management

- Repository files now have a password
  - Secures RPD file when there is no access to WebLogic Server
- RPD files are now encrypted, and compressed
- RPD Password is all that is required to edit RPD offline;  
**BIAdministrator** application role required in addition to edit online



## Deployment of RPD Files Through Enterprise Manager

- Repository files are now deployed using Fusion Middleware Control
- Select **Deployment > Repository > Lock and Edit Configuration**
- Select RPD file and enter repository password
- Press **Apply > Activate Changes > Restart to Apply Changes**

The screenshot shows the Fusion Middleware Control interface for a Business Intelligence Instance. The page is titled "coreapplication" and shows the user is logged in as "weblogic". The page was refreshed on Aug 16, 2010 at 10:44:23 PM BST. The "Change Center" is visible, with "Activate Changes" and "Restart to apply recent changes" highlighted. The "Deployment" tab is selected, and the "Repository" sub-tab is active. The "Upload BI Server Repository" section is shown, with the following fields:

Repository File	GCBC_Repository - after lab 3.rpd	Update...
Repository Password	.....	
Confirm Password	.....	

## Summary

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- The goal of the semantic model is to simplify reporting data using a conformed logical dimensional model
- Think in terms of dimensional modeling, particularly for the business model
- New features in OBIEE 11gR1 allow us to extend our modeling capability
- More complex hierarchies can be defined
- Lookup tables, and ID/Descriptive double columns can be defined
- Logical Table Source ordering is now more explicit
- RPD management is now handled through Fusion Middleware Control
- RPD administration security is externalized, and RPDs are now encrypted and secured



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