


How-to Tips for Integrating Essbase in OBIEE

Presented By

Analytic Vision

June 24, 2011

Analytic Vision Introduction

- ❖ Analytic Vision is a Data Warehousing, Business Intelligence, Performance Management consulting firm
 - ❖ Data Warehouse design and development
 - ❖ Oracle Business Intelligence Enterprise Edition (OBIEE)
 - ❖ OBIEE pre-built applications over Oracle EBS, PeopleSoft, JD Edwards
 - ❖ Hyperion Essbase and related build and reporting products
 - ❖ Hyperion Planning and Financial Management (HFM)
- ❖ Founded in 2001, currently a team of 50 consultants
- ❖ Headquartered in Charlotte, NC; Serving Eastern United States
- ❖ Extensive business experience across many verticals:
 - ❖ Retail, Financial Services, Manufacturing, Distribution, Health Sciences, Communications, and Healthcare
- ❖ Oracle Platinum Partner 

Today's Agenda

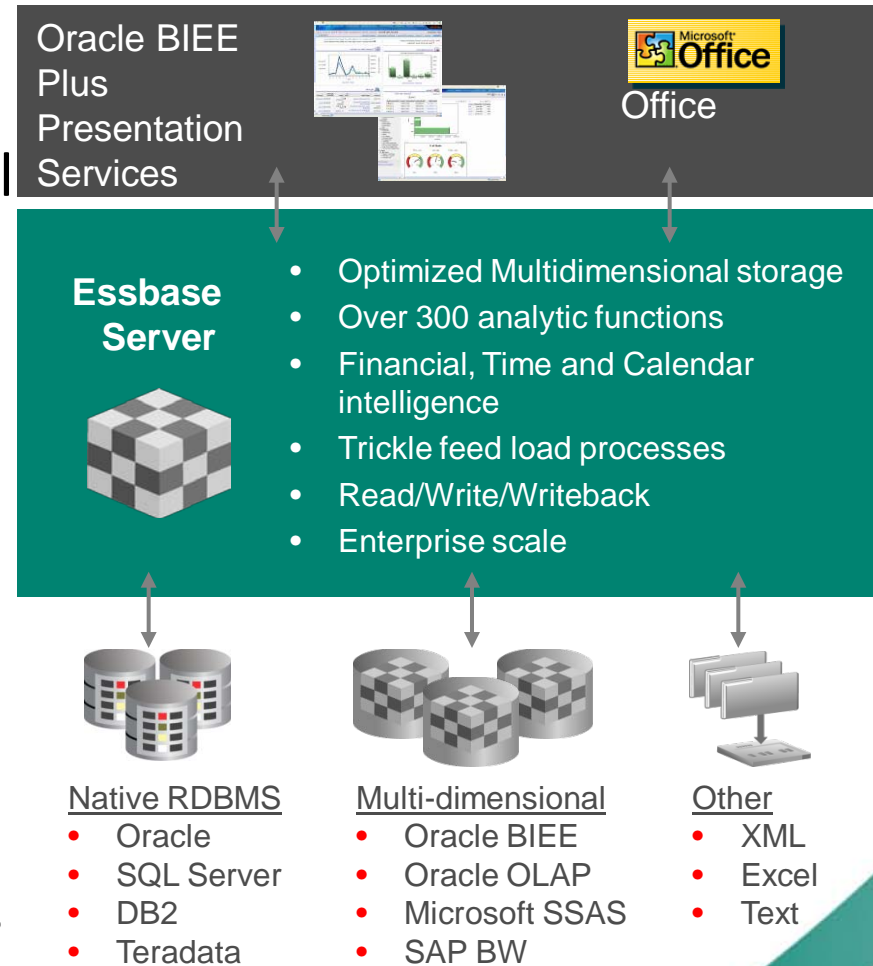
- ❖ Introduction to Essbase Functionality
 - ❖ Understand existing Essbase ad hoc reporting capabilities
 - ❖ Learn the importance and impact of Essbase dimension capabilities
- ❖ Discuss Considerations for Modeling Essbase in the RPD
- ❖ Discuss Essbase Reporting Issues in OBIEE and Resolutions
- ❖ Compare creating a P&L report with drilldown in OBIEE vs Essbase
- ❖ Steps to Integrate Essbase with Relational transaction data

**Demonstrations will be performed
throughout the presentation**

Introduction to Essbase Functionality

Essbase OLAP Server Highlights

- ❖ Flexible business model definition (not tables and SQL)
- ❖ Optimized for fast data retrieval across all levels of aggregation
- ❖ Advanced calculation and writeback support
 - ❖ Over 300 functions
 - ❖ Handles forecast allocations
- ❖ Leading Excel user interface
- ❖ For BI Developers, it's an aggregate fact table on steroids



Essbase Data Modeling and Access are Very Flexible

	May			YTD_May		
	Net Sales			Profit %		
	CY Actuals	LY Actuals	Var LY %	CY Actuals	LY Actuals	Var LY %
Accessories	\$494,684	\$417,251	18.6%	11.5%	12.1%	-5.3%
Bed Coverings	\$2,094,078	\$1,709,338	22.5%	26.1%	26.3%	-0.7%
Window Treatments	\$1,418,230	\$1,176,367	20.6%	19.7%	20.2%	-2.5%
Type Rollup	\$4,006,992	\$3,302,956	21.3%	20.8%	21.2%	-1.9%

- ❖ Formulas shown here in 3 dimensions (Time, Measures, Scenario)
- ❖ Note how one formula “Var LY%” works for every measure
- ❖ Excel add-in allows formatting based upon multiple dimensions
- ❖ User has flexibility to manually key in Member names and refresh report (e.g. Change “May” to “Jun” and retrieve data)

A Dimension is Limited to One Area of a Report

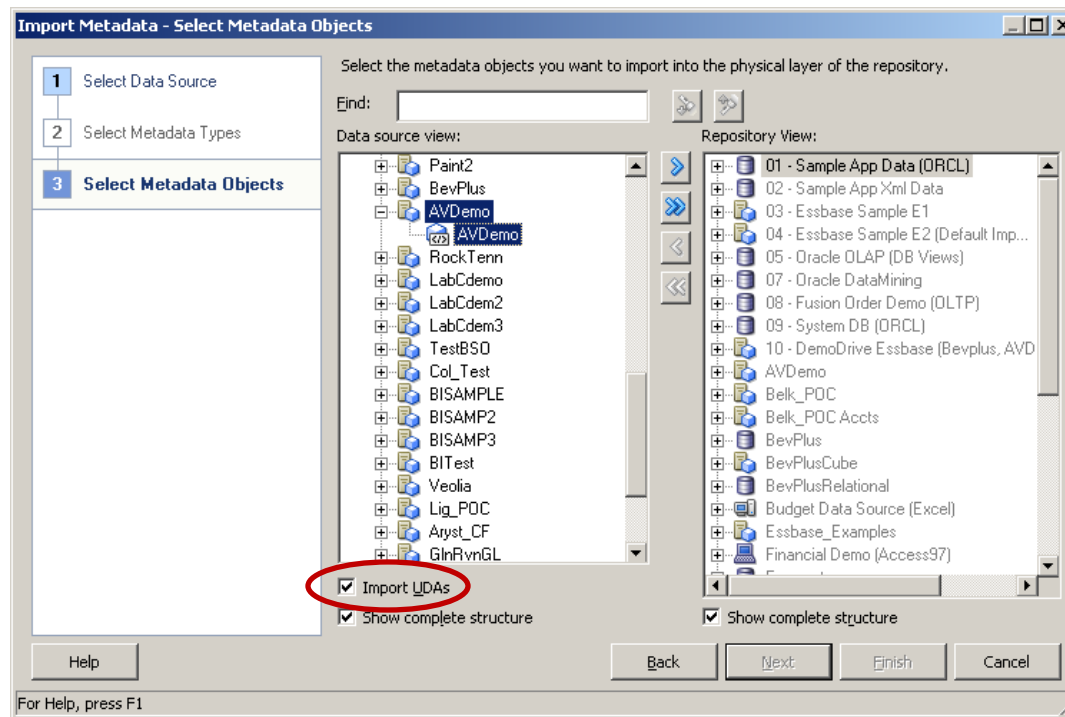
	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	CY Actuals	\$2,095,546	\$2,954,482	\$3,237,769	\$3,605,990	\$4,006,992	\$2,175,526	\$3,333,677	-	-	-	-	-
3	CY Plan	\$2,384,952	\$3,808,674	\$3,260,478	\$2,925,230	\$3,285,901	\$2,507,943	\$2,643,973	\$3,745,075	\$5,065,540	\$4,199,005	\$2,771,947	\$2,920,871
4	LY Actuals	\$2,454,108	\$3,800,674	\$3,252,580	\$2,970,014	\$3,302,956	\$2,585,340	\$2,747,577	\$3,854,531	\$5,095,500	\$4,205,808	\$2,747,221	\$2,928,546

- ❖ This is a limitation of Essbase reporting
- ❖ Many Essbase databases break Year out from Time in order to provide easy trend reporting for end users
- ❖ Hyperion Planning actual requires the following four dimensions: Year, Periods, Scenario, Version
- ❖ Understanding this is important when integrating relational data
- ❖ OBIEE reporting is more flexible on this point

Modeling Essbase in the RPD

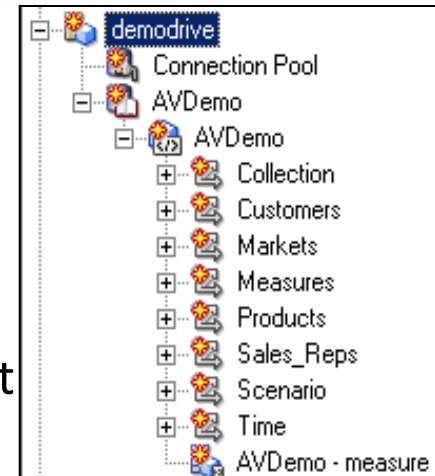
Import Essbase into OBIEE

- ❖ Under File, Import metadata; select Essbase as your source
- ❖ Select the desired Essbase Application and Database and click the arrow to move it into the Repository View
- ❖ Click the “Import UDAs” check box to include user defined attributes



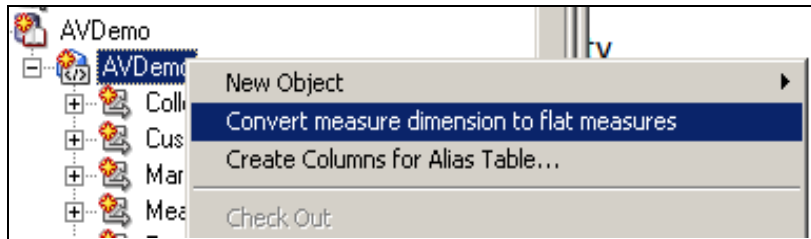
RPD Design: Choosing the Measures

- ❖ Rename the Essbase Server to match Application
- ❖ Note that by default all Essbase dimensions come in as dimensions and there is one “fact” measure
 - ❖ The Pro for this is all Essbase hierarchies are available
 - ❖ The Con is that all report columns have the same format
- ❖ This creates a design quandary for some Essbase databases, particularly financial databases like Hyperion Planning
 - ❖ Users need the ability to drilldown the GL Account hierarchy
 - ❖ But GL dimension often includes statistic metrics like Profit % that need different formatting than the financial accounts
- ❖ The solution can be multiple versions in OBIEE
 - ❖ One version may have Scenario as the “Measures”, which often has Var%
 - ❖ The other version makes Accounts measures, but limits the facts



RPD Design: Convert Measures and Alias

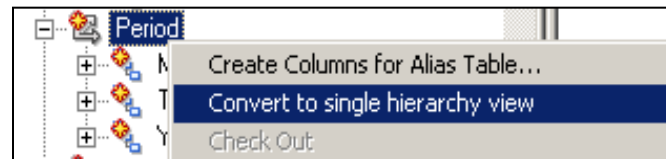
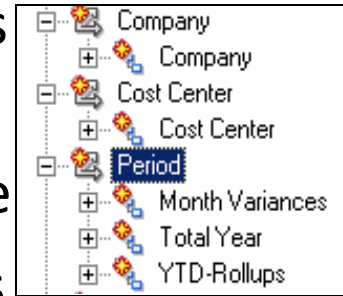
- ❖ Change the desired dimension type to “Measures” in Properties
- ❖ Right click on the Database name
 - ❖ Select “Convert measure dimension to flat list” to convert every member value of the dimension tagged as “Measures” into a flat list of your “facts”



- ❖ Select “Create Columns for Alias Table...” to create dimension columns for dimension member descriptions
 - This is highly recommended
 - An alias in Essbase holds the description, and the member name is the code
 - There can be multiple alias tables as well (e.g. one per language)
 - “Default” is the alias table that most Essbase solutions use

RPD Design: Alternate Hierarchies

- ❖ Some Essbase dimensions hold Alternate Hierarchies
- ❖ This Period dimension has the standard Year, Qtr, Month hierarchy, as well as YTD and Month Variance
- ❖ The developer must decide whether to model this as three separate OBIEE dimensions, or convert them back to one



- ❖ Points of consideration:
 - ✧ Keeping them separate organizes the metadata much better for users
 - ✧ The con for having them separate is that only one of them can be used in a given report
 - In this example, the user could not include both the current month and current YTD in the same report

RPD Design: Handling Sort Order

- ❖ By default, Essbase column sort orders are alphabetical
- ❖ In 10g we used the Evaluate function to run an Essbase MDX Rank function to create a logical column to use for sort
 - ❖ Evaluate(Rank(%1.dimension.currentmember,%2.members), Basic.Months, Basic.Months)
- ❖ 11g now automatically creates “Member Number Ranking” (Memnor) column for every Generation in each dimension
- ❖ This column can now be used to match the sort order displayed in Essbase, and should be the new sort default on import

Gen4,Time Periods	Gen4,Time Periods - Memnor
Jan	1
Feb	2
Mar	3
Apr	5
May	6
Jun	7
Jul	9
Aug	10
Sep	11
Oct	13
Nov	14
Dec	15

RPD Design: Hierarchy Columns Over Alias

- ❖ Many Essbase databases use the “code” as the Member name and the “description” in the Alias
- ❖ This makes it tough navigating hierarchy selections →
- ❖ Recommend creating Hierarchy Columns for Aliases
- ❖ Essbase users can swap these, so we provide choice

```

    Accounts.Accounts
    └─ Accounts
       └─ BalanceSheet
          └─ Statistics
             └─ ASP
                └─ Ratios
                   └─ ExchangeRates
                      └─ IncomeStatement
                         └─ 300000
                            └─ 310000
                               └─ 311000
                                  └─ 400000
                                     └─ 500000
                                        └─ 312000
                                           └─ 320000
                                              └─ 330000
                                                 └─ 340000
                                                    └─ 350000
    
```

Title: Eden GL Income Statement

Pivot Table: Years - Default | Current Year | Gen3, Time Periods | Q1

		GL - measure		
		Actual	Plan	Variance
Accounts	Accounts - Default			
410000	Net Revenue	22,884,270,753	24,240,640,983	(1,356,370,231)
450000	Cost of Sales	29,008,233,686	31,633,441,625	2,625,207,939
400000	Gross Profit	(6,123,962,934)	(7,392,800,642)	1,268,837,708
500000	Operating Expenses	3,497,890,943	3,465,531,670	(32,359,272)
311000	Pretax Income From Operations	(9,621,853,876)	(10,858,332,312)	1,236,478,436
312000	Other Exp (Inc)	(8,631,189)	(8,424,729)	206,461
310000	Total Pretax Income	(9,630,485,066)	(10,866,757,041)	1,236,271,975
320000	Provision for Income Tax	12,362,526	12,017,316	(345,210)
340000	Earnings from Investments in Subs	645,280	633,822	11,459
300000	Net Income	(9,642,202,311)	(10,878,140,535)	1,235,938,224

Title: Eden GL Income Statement

Pivot Table: Year | Current Year | Quarter | Q1

		GL - measure		
		Actual	Plan	Variance
Accounts Desc				
Net Revenue		22,884,270,753	24,240,640,983	(1,356,370,231)
Cost of Sales		29,008,233,686	31,633,441,625	2,625,207,939
Gross Profit		(6,123,962,934)	(7,392,800,642)	1,268,837,708
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Typical Essbase OBIEE Issues and Resolution

Drilldown Fails on a Deep Hierarchy

- ❖ **ISSUE:** When drilling down a deep hierarchy column in Answers, instead of the next level showing up, the value you drilled down on disappears (e.g. issue may show up around Gen8)
- ❖ **SOLUTION:**
 - ❖ OBIEE is losing track of the full hierarchy ancestor drill path
 - ❖ We need to increase the length of the Ancestor Reference column in the physical cube dimension from 128 to 2048
 - ❖ Save changes and this mystery error is now corrected

Physical Cube Column - Gen3,Account - Ancestor Ref

Name: Gen3,Account - Ancestor Ref

Type: VARCHAR Length: 2048 Nullable

External Name: Ancestor_Names

Aggregation rule: None

Essbase Settings

Column Type: Ancestor Reference

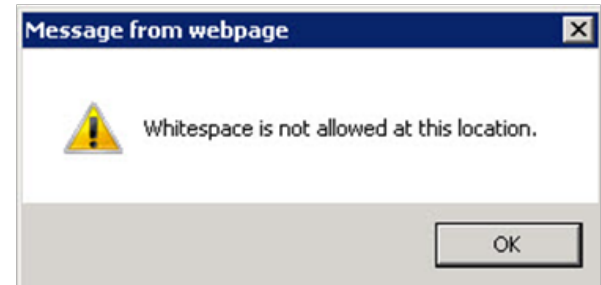
Attribute Hierarchy: Browse...

Description:

OK Cancel Help

Whitespace Error in Answer Reports

❖ **ISSUE:** When working with Essbase data in Answers, the following “Whitespace” error may appear



❖ **SOLUTION:**

- ❖ Essbase offers a lot of flexibility in naming members; however, the XML interface can get confused with the use of some special characters
- ❖ The best solution is to replace these characters in Essbase
- ❖ An RPD option is to replace these members with a case statement
 - CASE when "demodrive"."GL_Main".""."GL_Main"."Account - Default" = 'SG&A' THEN 'SG+A' else "demodrive"."GL_Main".""."GL_Main"."Account - Default" END

Name	Character	Unicode code point (decimal)	Standard	Description
quot	"	U+0022 (34)	XML 1.0	(double) quotation mark
amp	&	U+0026 (38)	XML 1.0	ampersand
apos	'	U+0027 (39)	XML 1.0	apostrophe (= apostrophe-quote)
lt	<	U+003C (60)	XML 1.0	less-than sign
gt	>	U+003E (62)	XML 1.0	greater-than sign

Ad Hoc Hierarchy Column Returns No Results

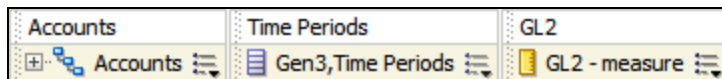
❖ ISSUE: Some companies set Essbase to not summarize top level

- ❖ Excel Essbase reporting allows user to drill with no data

	A	B
1		Time Periods
2	Accounts	#Missing
3		

	A	B
1		Time Periods
2	IncomeStatement	-111,299,762,338.18
3	BalanceSheet	0.00
4	Accounts	#Missing

- ❖ OBI Answers may make user think no data is loaded or an error occurred



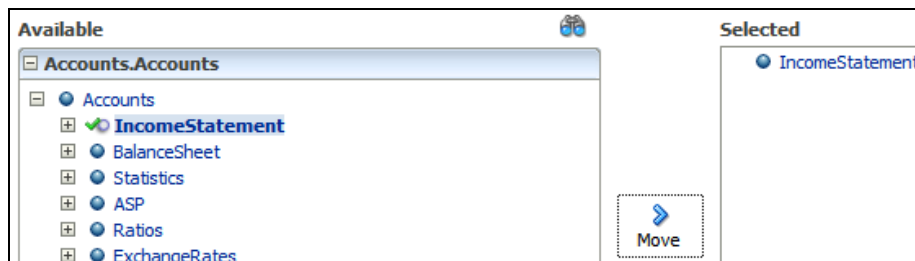
Accounts	Time Periods	GL2
Accounts	Gen3, Time Periods	GL2 - measure

Compound Layout

No Results
The specified criteria didn't result in any data.

❖ SOLUTION:

- ❖ You can change the Essbase database to summarize to the top
- ❖ Or train user to use Selection Steps and Filters to scope Essbase data to return values



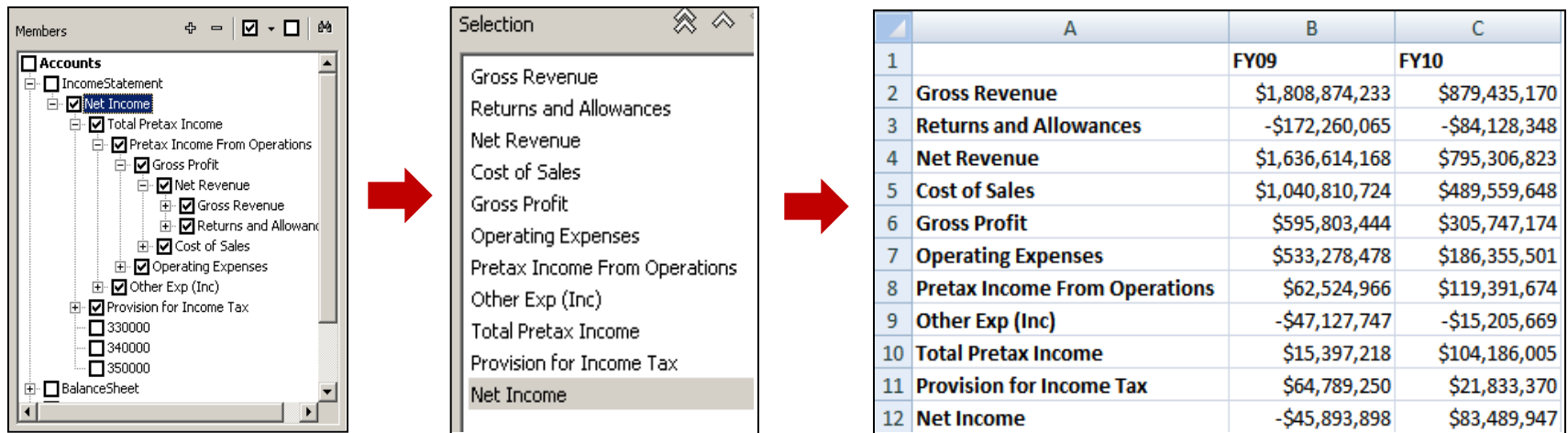
Available	Selected
<ul style="list-style-type: none">Accounts.AccountsAccountsIncomeStatementBalanceSheetStatisticsASPRatiosExchangeRates	<ul style="list-style-type: none">IncomeStatement

Move

Creating an Essbase P&L Statement Comparison

P&L Reporting Using Essbase Smart View

- ❖ Essbase users are used to simple hierarchy account selection
 - ❖ Users can click the accounts in desired sequence across the hierarchy
 - ❖ Allowing them to select all accounts at one time



- ❖ Performance is fast, as only one MDX retrieve is processed

P&L Reporting Using OBIEE

- ❖ The good news is that OBIEE can now create hierarchy reports
- ❖ But it takes a number of steps to create

- ❖ Edit Analysis Properties for member placement

Placement of added members Within the hierarchy (
 Outside the hierarchy

- ❖ Add Account Selection Steps for each hierarchy “level” in the desired report order
- ❖ This generates the P&L report with account drill down

Accounts - Accounts Desc

1. Start with 'Net Revenue', 'Cost of Sales'
2. Then, Add 'Gross Profit', 'Operating Expenses'
3. Then, Add 'Pretax Income From Operations', 'Other Exp (Inc)'
4. Then, Add 'Total Pretax Income', 'Provision for Income Tax', 'Earnings from Investments in Subs'
5. Then, Add 'Net Income'

	GL - measure		
	Actual	Plan	Variance
Accounts Desc			
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⊕ Net Income	(9,642,202,311)	(10,878,140,535)	1,235,938,224

- ❖ Performs a separate MDX retrieval for each selection step

Integrate Relational Data with Essbase for Seamless Drill Through

Seamlessly Combine Relational and Essbase Data

❖ Federated model combines sources “horizontally”

Products Hierarchy	1- Revenue	2- Billed Qty (Rel Only)	17 - Net Costs (Essb Only)
[-] Total Products	16,500,000	1,773,791	11,452,449
[-] BizTech	6,990,741	756,318	4,818,368
[-] FunPod	5,723,187	629,373	3,993,554
[-] HomeView	3,786,072	388,100	2,640,527
Grand Total	16,500,000	1,773,791	11,452,449

- ❖ Billed Qty comes from relational data
- ❖ Net Costs comes from Essbase
- ❖ Revenue could come from either depending on the context of the query

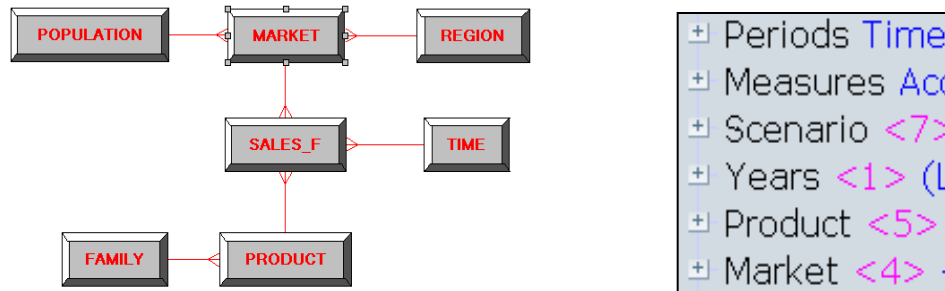
❖ Drill through model combines “vertically”

- ❖ Year, Quarter, and Month come from Essbase
- ❖ Week and Day drill down into relational data

	1- Revenue			1- Revenue
	BizTech	FunPod	HomeView	
[-] Total Time	20,835,919	17,380,727	11,398,292	49,614,938
[-] 2008	6,921,745	5,670,348	3,749,227	16,341,320
[-] 2009	6,269,954	5,135,153	3,518,394	14,923,501
[-] 2009 Q1	1,086,525	868,031	567,128	2,521,684
[-] 2009 Q2	3,235,567	2,613,163	1,758,816	7,607,546
[-] 2009 Q3	1,501,258	1,194,129	877,818	3,573,205
[-] 2009 Q4	446,604	459,830	314,632	1,221,066
[-] 2009 / 10	136,535	176,239	125,858	438,632
[-] 2009 / 11	185,769	156,897	112,585	455,251
[-] 2009 Week 45	10,578	4,527	12,554	27,660
[-] 2009 Week 46	40,399	20,653	14,858	75,910
[-] 2009 Week 47	70,618	48,149	31,721	150,487
11/15/2009		12,352		12,352
11/16/2009	19,139	7,464	10,250	36,853
11/17/2009	15,578	8,406	2,557	26,541

Process Starts with Dimensional Game Planning

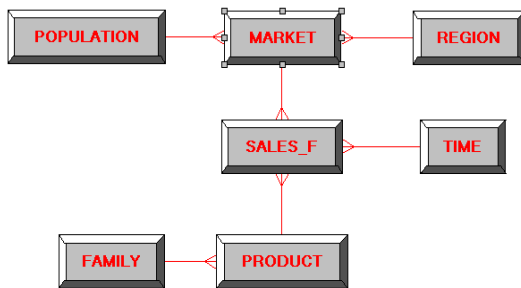
- ❖ Assess the Essbase dimensional organization and compare to the low level relational transaction data
 - ❖ To best match Essbase, you will need a star schema based design
 - ❖ Compare the levels of Essbase dimensions to columns in relational schema



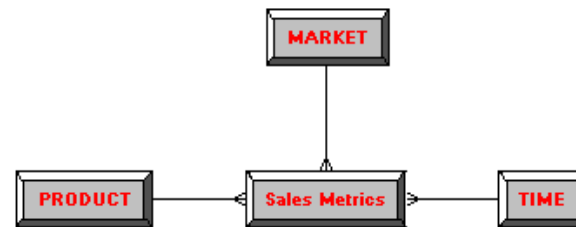
- ❖ Note how Essbase uses prefixes in member names like “Qtr 1”
 - ❖ Either add Essbase matching columns to the physical data model
 - ❖ Or create Business Model logical columns to match the format
- ❖ To enable drill to detail from any level, the relational dimensions need to match all hierarchy levels in Essbase

Create and Test the Relational Model First

- ❖ In this example we combined snow flaked dimensions in the Logical layer to better match the Essbase dimensionality



Physical Model



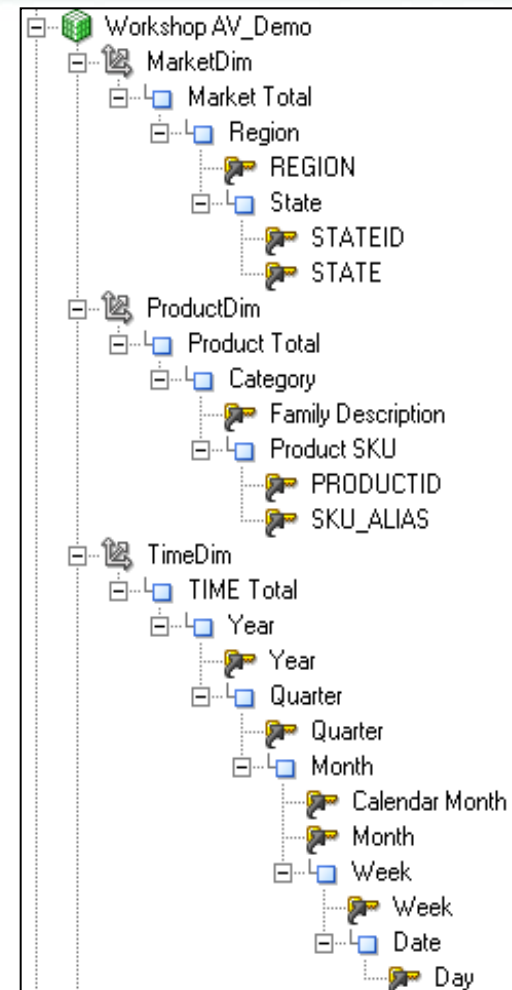
Logical Model

- ❖ Create logical columns to match Essbase formats
 - ❖ Essbase dimension values cannot be numeric, so convert year to text
`CAST ("BevPlus"."."."BEVPLUS"."TIME"."CALENDAR_YEAR" AS CHARACTER (4))`
 - ❖ Many members have prefixes for readability and uniqueness, convert Qtr
`'Qtr' || CAST ("BevPlus"."."."BEVPLUS"."TIME"."CALENDAR_QUARTER_NUMBER" AS CHARACTER (1))`

Create Dimension Hierarchies to Match Essbase

- ❖ These hierarchies leverage the columns that have been created to match Essbase formats
- ❖ Note that we leave Year in Time even though Essbase does not store it this way
 - ❖ There are pros and cons on combining time
 - ❖ Matching the Essbase model works best
- ❖ **DESIGN TIP:** Ragged hierarchies like an Account dimension need to be modeled top-down, bottom repeat to best match the corresponding Essbase hierarchy

Balance Sheet	Asset	Current Asset	Cash	Acct 12345	Acct 12345	Acct 12345
Balance Sheet	Asset	Current Asset	Cash	Acct 12365	Acct 12365	Acct 12365
Balance Sheet	Asset	Current Asset	Inventory	Raw Materials	Acct 12450	Acct 12450



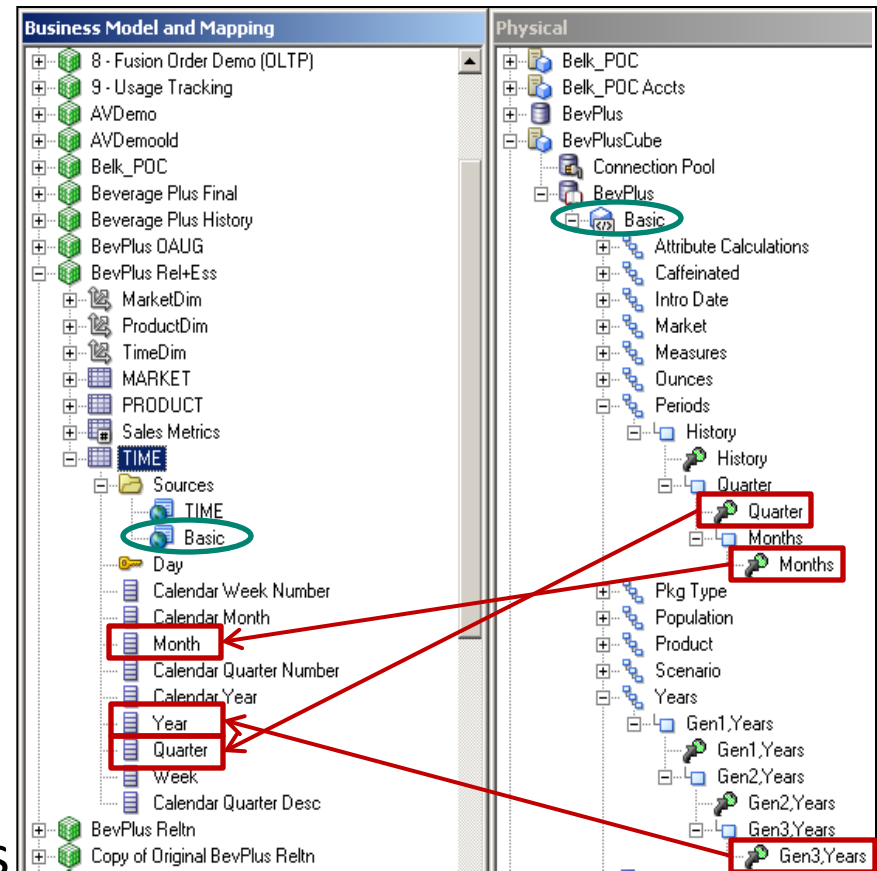
Create a Simple Report to Test the Relational Model

- ❖ This solution will eventually integrate Essbase from the month up with the goal of drilling into Week and Transaction Date
- ❖ We create a simple Year level report and test our drill down
- ❖ After the next step of integrating Essbase, we will run this same report and check the log to see where the data is being pulled from

Year	Quarter	Calendar Month Name	Calendar Week Number	Day	Sales	COGS	Margin
1999	Qtr3	July	Wk-29	7/19/1999 12:00:00 AM	\$6,301	\$1,931	\$4,370
				7/20/1999 12:00:00 AM	\$7,130	\$525	\$6,604
				7/21/1999 12:00:00 AM	\$4,585	\$1,248	\$3,337
				7/22/1999 12:00:00 AM	\$6,541	\$1,501	\$5,040
				7/23/1999 12:00:00 AM	\$9,147	\$444	\$8,702
				7/24/1999 12:00:00 AM	\$4,222	\$1,201	\$3,021
				7/25/1999 12:00:00 AM	\$3,021	\$757	\$2,264

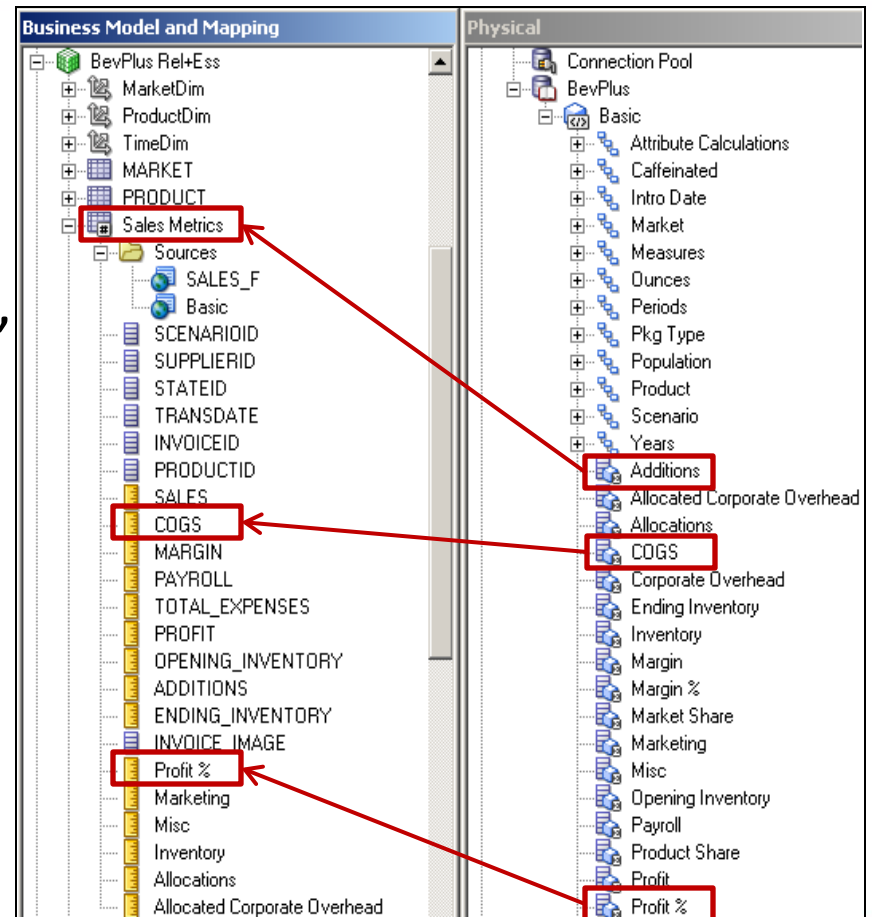
Integrate Essbase into the Relational Model

- ❖ Drag corresponding Essbase “Generations” on top of related relational columns
- ❖ The Essbase database (Basic) now shows up as a Source
- ❖ Essbase generation names can be changed in Essbase, as done here in Periods; but you’ll usually see default names
- ❖ Note that the Year value comes from a different dimension; this will impact report usage a bit; if a user selects Month, without filtering on a Year, they get all years of data for that month



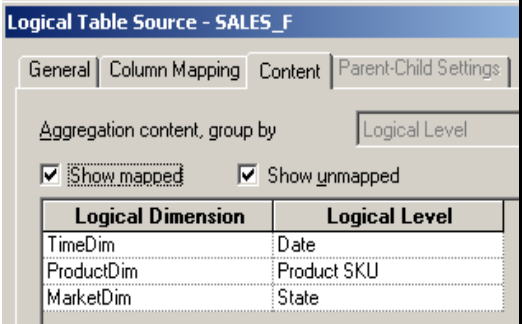
Integrate Essbase into the Relational Model

- ❖ Drag corresponding Essbase Measures on top of related relational Facts
- ❖ Essbase only calculated metrics, like “Allocations”; get dropped directly on “Sales Metrics”
 - ❖ These are not integrated
 - ❖ They will only work for Month up
- ❖ The use of relational only facts, like Invoice ID, will cause the BI Server to pull results from the relational data source



Map the Data Source Content Level

- ❖ After all Essbase dimensions have been mapped, we need to map the Content level
 - ❖ **DESIGN TIP:** Check that you have mapped Essbase into relational columns used in the Logical dimension hierarchies
- ❖ The Relational Source (SALES_F) is mapped at the lowest level (Date, SKU, State)
- ❖ The Essbase Source (Basic) matches the lowest level for SKU and State, but only maps to Month in the Time dimension



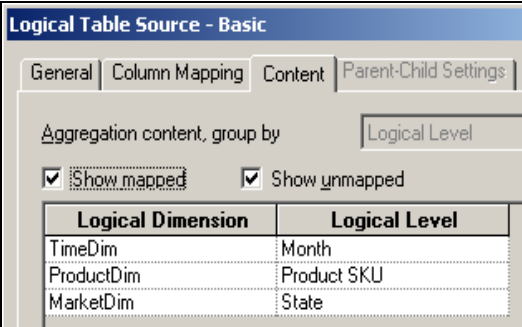
Logical Table Source - SALES_F

General | Column Mapping | Content | Parent-Child Settings

Aggregation content, group by Logical Level

Show mapped Show unmapped

Logical Dimension	Logical Level
TimeDim	Date
ProductDim	Product SKU
MarketDim	State



Logical Table Source - Basic

General | Column Mapping | Content | Parent-Child Settings

Aggregation content, group by Logical Level

Show mapped Show unmapped

Logical Dimension	Logical Level
TimeDim	Month
ProductDim	Product SKU
MarketDim	State

Test the Essbase Integration



- ❖ Run our simple test report and drill down and check the logs

Year	Quarter	Calendar Month Name	Calendar Week Number	Day	Sales	COGS	Margin
1999	Qtr3	July	Wk-29	7/19/1999 12:00:00 AM	\$6,301	\$1,931	\$4,370
				7/20/1999 12:00:00 AM	\$7,130	\$525	\$6,604
				7/21/1999 12:00:00 AM	\$4,585	\$1,248	\$3,337
				7/22/1999 12:00:00 AM	\$6,541	\$1,501	\$5,040
				7/23/1999 12:00:00 AM	\$9,147	\$444	\$8,702
				7/24/1999 12:00:00 AM	\$4,222	\$1,201	\$3,021
				7/25/1999 12:00:00 AM	\$3,021	\$757	\$2,264

- ❖ The log for the drill on Qtr 3 clearly shows an MDX statement




```
select
{ [Measures].[Payroll],
  [Measures].[Marketing],
  [Measures].[Sales],
  [Measures].[COGS]
} on columns,
NON EMPTY {crossjoin({[_Periods3]},{[_Years3]})} properties ANCESTOR_NAMES, GEN_NUMBER on rows from [BevPlus.Basic]
```

- ❖ While the log for the drill on Weeks shows a SQL Statement

```
select distinct 0 as c1,
  D1.c5 as c2,
  D1.c6 as c3,
  .....
from
(select sum(case when T113101.MEASURESID = 7.0 then T113101.AMOUNT end ) as c1,
  .....
```

Steps to Link a Document Image

- ❖ Drilling down into the image is the ultimate bottom “level”
 - ❖ Set up a Virtual Directory to store your images
 - ❖ Use a naming standard that leverages key information like invoice number
 - ❖ In the ETL process, create a column that holds the URL link that associates the image to the given transaction detail fact
 - ❖ In Answers, change the data format to treat the URL column as HTML

Invoice Detail									
State	Day	SKU Description	Invoice Number	Sales	COGS	Margin	Profit	Profit %	Invoice Image
Colorado	1/1/1998 12:00:00 AM	Dark Cream	9803260	\$40	\$0	\$40	\$40	\$100	
	1/2/1998 12:00:00 AM	Dark Cream	9803264	\$0	\$0	\$0	\$0	\$100	
		Vanilla Cream	9803264	\$90	\$0	\$90	\$90	\$100	

- ❖ User clicks on image cell to display



Invoice																																																														
Sam's Electrical																																																														
Company ID 81 111 222 333 Tax ID 11 222 333 444 Contact Name Sam Smith Telephone (555) 222-4444 Business Fax (555) 222-4445 sam@samselectrical.com 15 Bountiful Street, Plentysville																																																														
						One																																																								
Invoice Number		INS07-36																																																												
Reference		PO#223																																																												
Date		10/21/07																																																												
Terms (days)		45																																																												
Due Date		12/05/07																																																												
Description		Install new external power point at back door.																																																												
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Questions?

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