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Public

Understanding the basics of Essbase data & Cube Operations that affect it

Key Concepts for Basic Understanding ...
... in a 30-minute presentation!

Jane Story

July, 2023

Agenda – Understanding Essbase Data

1. The Magic of Essbase, ASO and BSO? *Quick Review.*
2. Data in and out of Essbase …? *One rule*
3. Reporting data out of Essbase …? *Basics of a report/form/retrieve*
4. What is a Restructure? *Basics of Implicit and Explicit Restructures*
5. Operational Guidelines - data? *Member properties, dense dynamic XREF, etc.*
6. Where can I find information about my data? *Activity Reports, etc.*

1. The Magic of Essbase?

BSO/ASO, Dimensions/Members - Quick Review

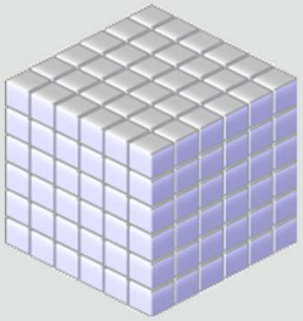
3

BSO or ASO Review

Extended Spread Sheet Database

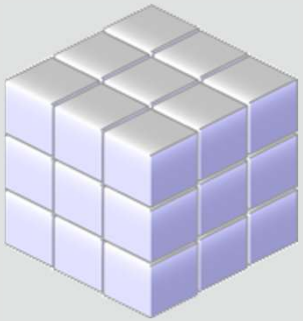
Aggregate **S**torage **O**ption : Primarily aggregation
Block **S**torage **O**ption: Primarily complex analysis/calculation

	Jan	Feb
Lightbolt	166	182
Thunderball	131	149



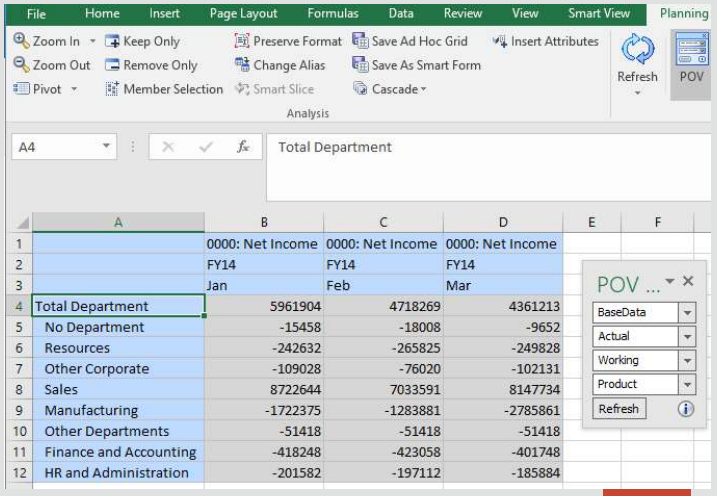
Aggregate storage

REPORTING



Block storage

ANALYSIS / CALCULATION

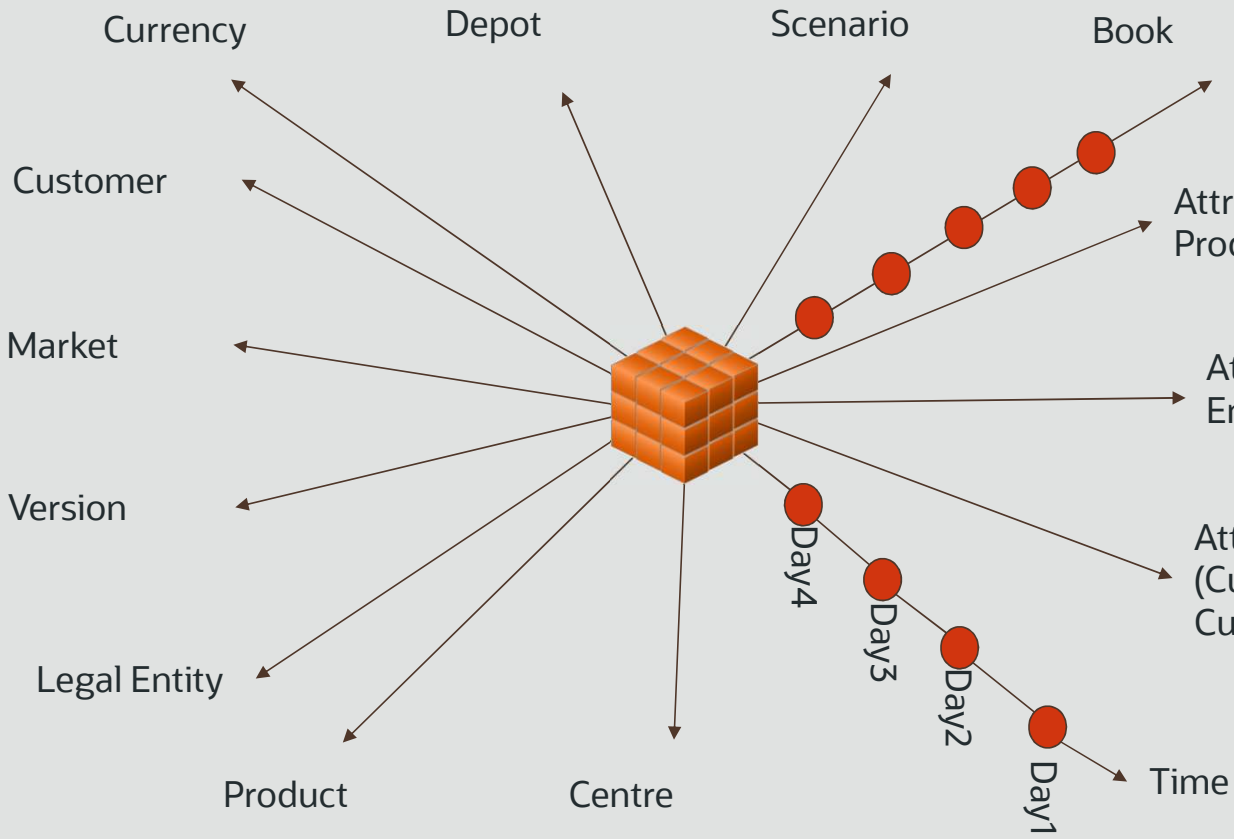


	A	B	C	D
1		0000: Net Income	0000: Net Income	0000: Net Income
2		FY14	FY14	FY14
3		Jan	Feb	Mar
4	Total Department	5961904	4718269	4361213
5	No Department	-15458	-18008	-9652
6	Resources	-242632	-265825	-249828
7	Other Corporate	-109028	-76020	-102131
8	Sales	8722644	7033591	8147734
9	Manufacturing	-1722375	-1283881	-2785861
10	Other Departments	-51418	-51418	-51418
11	Finance and Accounting	-418248	-423058	-401748
12	HR and Administration	-201582	-197112	-185884

4

Dimensions & Members Review

Hierarchies and structures

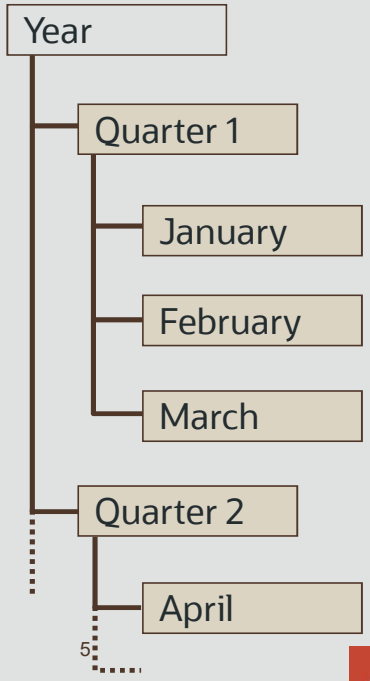


Dimensions for Plan1 (BSO)

Outline Order	Name	Type	Declared Members	Stored Members
1	Account	Dense	266	206
2	Period	Dense	25	15
3	HSP_View	Sparse	4	3
4	Year	Sparse	10	10
5	Scenario	Sparse	15	10
6	Version	Sparse	161	157
7	Entity	Sparse	126	64
8	Product	Sparse	26	21

Dimensions for Vis1ASO (ASO)

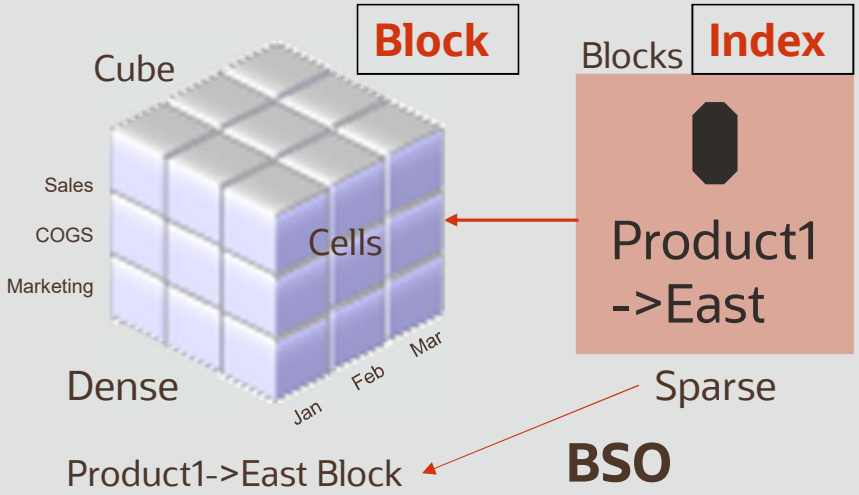
Name	Hierarchy Type	Declared Members	Stored Members	Levels
Account	Dynamic	23	22	8
Period	Multiple	23	22	4
Year	Stored	10	9	2
Scenario	Multiple	15	14	2
Version	Multiple	28	27	2
Entity	Multiple	124	72	5
Product	Multiple	26	25	4
Channel	Multiple	7	6	3

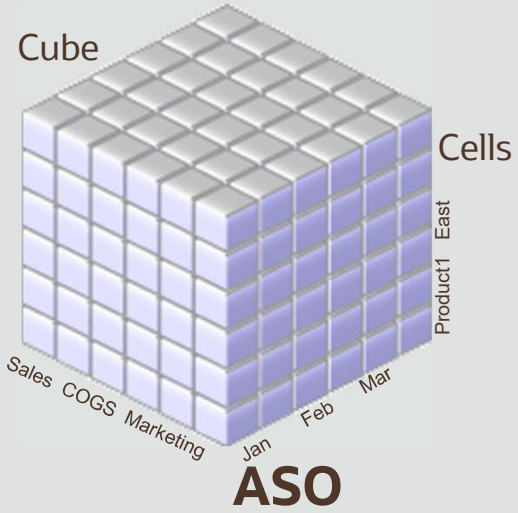


Essbase Data Storage Review - ASO and BSO

What are the storage differences?

Both have MEMBERS and DIMENSIONS





2. Data in and out of Essbase

One Rule

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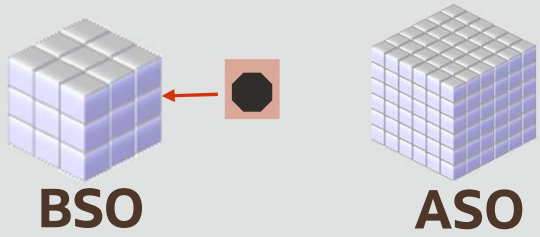
Data in and out of Essbase

Key Terminology and One Rule



Loading and retrieving data requires these items to load or retrieve data from a cell for both ASO and BSO:

1. **Members**:
   - *Members* exist in both ASO and BSO.
   - *Members* are grouped into *dimensions*.
   - Within dimensions, members are structured in *hierarchies*.
   - Level0 refers to the bottom of those hierarchies.
   - The member (or alias) name within Standard Dimensions (non-attribute) are used to load and retrieve data.
   - Note: It is possible to load data at lev0 only for ASO.

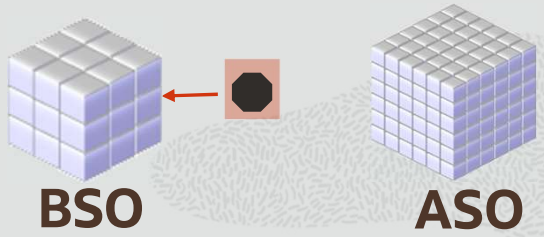
2. **Dimensions**:
   - Data is only stored against members in standard dimensions (non-attribute dimensions) in both BSO and ASO.
   - Attribute dimensions are not used to load data and are optional to retrieve data.

3. **To load and retrieve data in Essbase, there is ONE RULE:**

   - ***For every data item, one member from every standard dimension must be included in the load/retrieve.***

Data in and out of Essbase

One Rule



For this example, the BSO and ASO cube have the same dimensions:

1. Account
2. Period
3. Hsp_View/View
4. Year
5. Scenario
6. Version
7. Entity
8. Product

Dimensions for Plan1 (BSO)

Name	Type	Declared Members	Stored Members
Account	Dense	266	206
Period	Dense	25	15
HSP_View	Sparse	4	3
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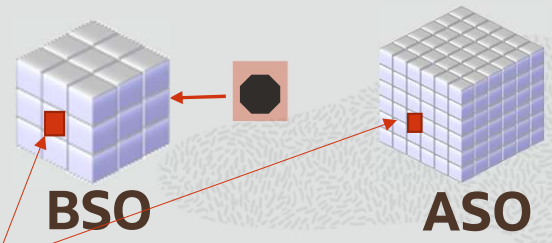
Version	Multiple	28	27	2
Entity	Multiple	124	72	5
Product	Multiple	26	25	4
View	Multiple	7	6	3

For the purpose of data load, attribute dimensions are ignored.

We want to load data here: Sales->Jan->Base->FY21->Forecast->Working->Entity1->Product1

Data in and out of Essbase

One Rule



For every data value to load, we must provide one member from every **standard** dimension:

1. Account
2. Period
3. Hsp_View/View
4. Year
5. Scenario
6. Version
7. Entity
8. Product

Dimensions for Plan1 (BSO)

Name	Type	Declared Members	Stored Members
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Vis1ASO (ASO)

ny	Declared Members	Stored Members	Levels
	23	22	8
	23	22	4
	10	9	2
	15	14	2
Version Multiple	28	27	2
Entity Multiple	124	72	5
Product Multiple	26	25	4
View Multiple	7	6	3

1. Sales
2. Jan
3. Base
4. FY22
5. Forecast
6. Working
7. Entity1
8. Product1

We want to load data here: Sales->Jan->Base->FY21->Forecast->Working->Entity1->Product1 = 100

3. Reporting Data out of Essbase

The Anatomy of a Retrieval - PAGE, POV, Columns, Rows

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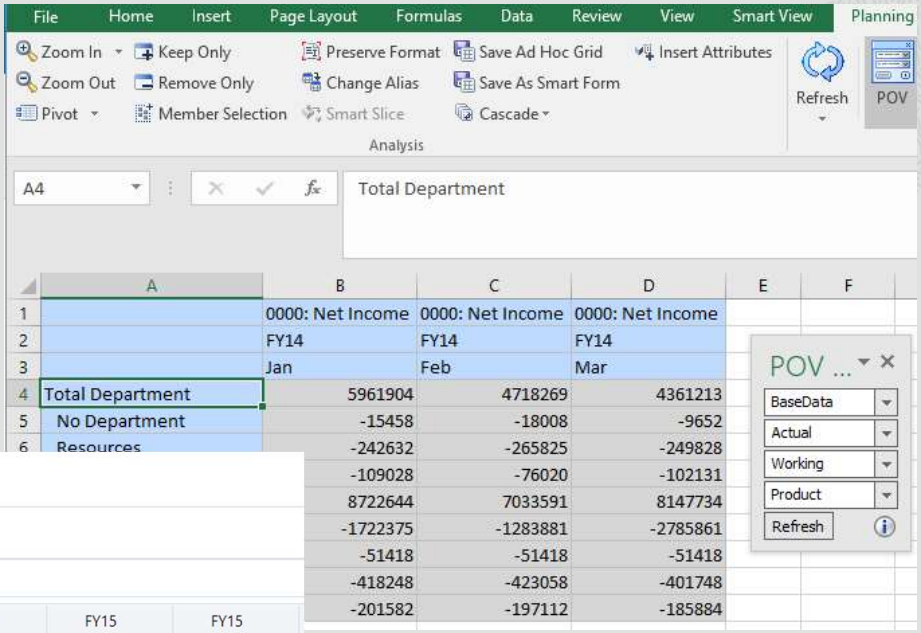
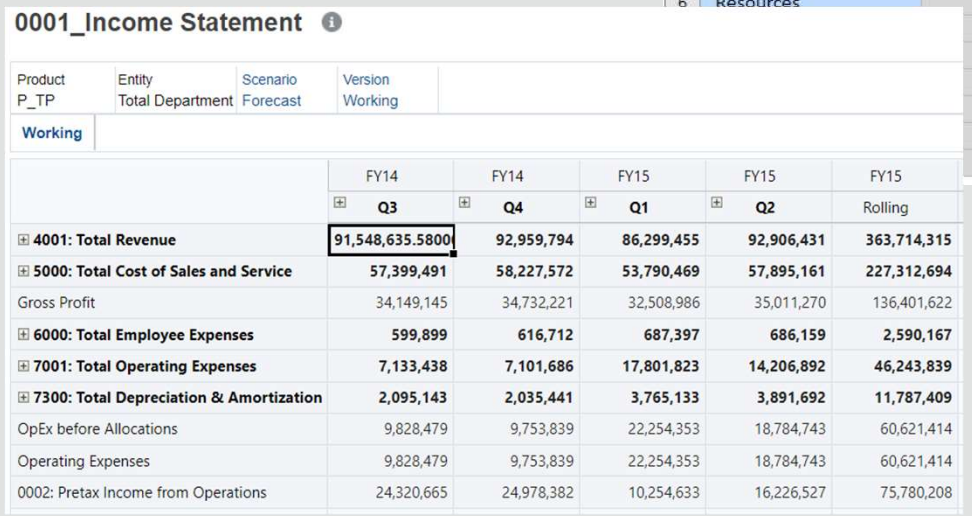
Anatomy of a Retrieval

Terminology – ROW, COLUMN, PAGE, POV

Every Smart View retrieve and Planning form has the following components:

1. **ROW**
2. **COLUMN**
3. **PAGE**
4. **POV**





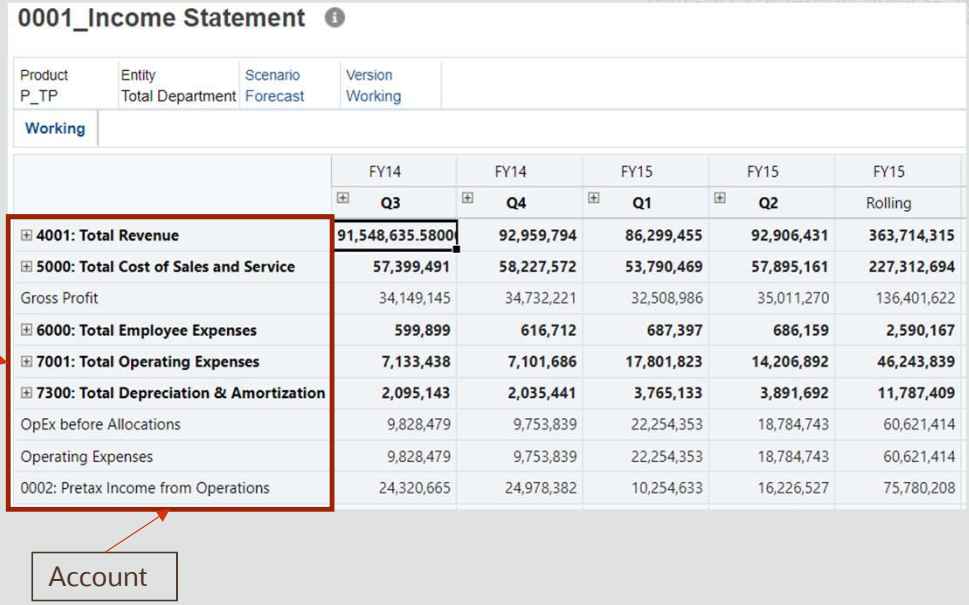
	FY14 Q3	FY14 Q4	FY15 Q1	FY15 Q2	FY15 Rolling
4001: Total Revenue	91,548,635.5800	92,959,794	86,299,455	92,906,431	363,714,315
5000: Total Cost of Sales and Service	57,399,491	58,227,572	53,790,469	57,895,161	227,312,694
Gross Profit	34,149,145	34,732,221	32,508,986	35,011,270	136,401,622
6000: Total Employee Expenses	599,899	616,712	687,397	686,159	2,590,167
7001: Total Operating Expenses	7,133,438	7,101,686	17,801,823	14,206,892	46,243,839
7300: Total Depreciation & Amortization	2,095,143	2,035,441	3,765,133	3,891,692	11,787,409
OpEx before Allocations	9,828,479	9,753,839	22,254,353	18,784,743	60,621,414
Operating Expenses	9,828,479	9,753,839	22,254,353	18,784,743	60,621,414
0002: Pretax Income from Operations	24,320,665	24,978,382	10,254,633	16,226,527	75,780,208

Anatomy of a Retrieval

Terminology – ROW dimensions

Every Smart View retrieve and Planning form has the following components:

1. **ROW →** *Multiple members* can be selected from ROW dimensions, to create new rows. There can be multiple ROW dimensions and a new report/XLS column will be created for each one.



0001_Income Statement

Product	Entity	Scenario	Version
P_TP	Total Department	Forecast	Working

Working

	FY14 Q3	FY14 Q4	FY15 Q1	FY15 Q2	FY15 Rolling
4001: Total Revenue	**91,548,635.5800**	**92,959,794**	**86,299,455**	**92,906,431**	**363,714,315**
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Account

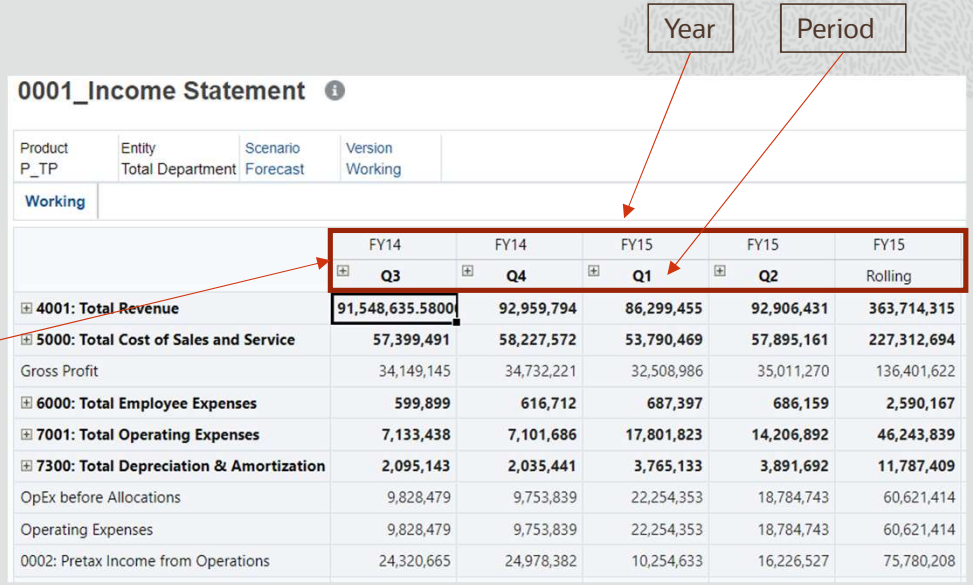
Anatomy of a Retrieval

Terminology – COLUMN dimensions

Every Smart View retrieve and Planning form has the following components:

1. **ROW**

2. **COLUMN →** *Multiple members* can be selected from COLUMN dimensions, As shown. As with ROWs, there can be multiple COLUMN dimensions



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4001: Total Revenue	**91,548,635.5800**	**92,959,794**	**86,299,455**	**92,906,431**	**363,714,315**
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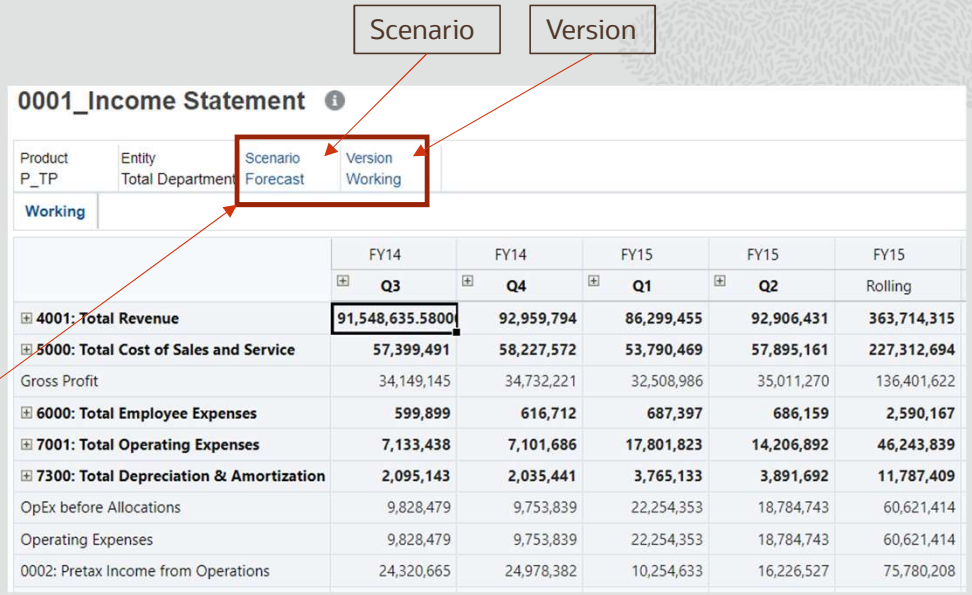
Anatomy of a Retrieval

Terminology – PAGE dimensions

Every Smart View retrieve and Planning form has the following components:

1. **ROW**
2. **COLUMN**
3. **PAGE** → *Multiple members* can be added to a PAGE selection. The user can select *one* member from this selection.



	FY14 Q3	FY14 Q4	FY15 Q1	FY15 Q2	FY15 Rolling
4001: Total Revenue	**91,548,635.5800**	**92,959,794**	**86,299,455**	**92,906,431**	**363,714,315**
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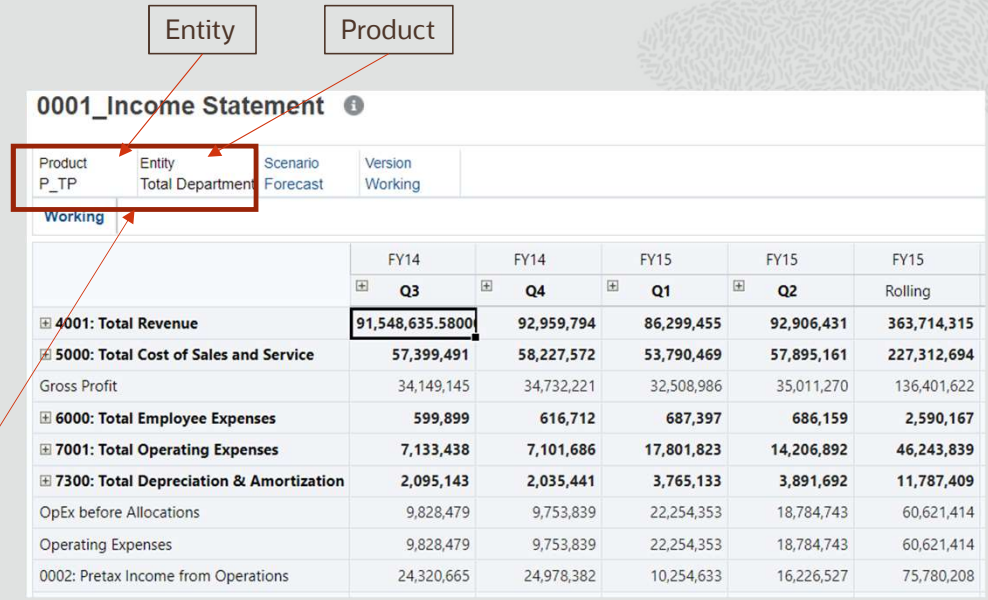
Anatomy of a Retrieval

Terminology – POV dimensions

Every Smart View retrieve and Planning form has the following components:

1. **ROW**
2. **COLUMN**
3. **PAGE**
4. **POV –** *One* member from the dimensions set as POV can be added to a form.



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4. What is a Restructure?

Outline & Data, Implicit vs explicit restructure

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What is a BSO cube Restructure?

What is a Restructure?

From an Essbase perspective, *each BSO Planning cube* has 2 main Essbase parts which may be altered by a refresh and/or restructure:

1. *Metadata*, such as dimensions, members, structures, hierarchies. These are stored in an Essbase outline (or OTL file)

2. *Data* is stored in two parts:
   - Blocks (consisting of a combination of DENSE members) (PAGE file)
   - Index to those blocks (a new block for every SPARSE combination) (IND file)

What is a BSO cube Restructure?

Db Refresh/**Im**plicit Restructure vs **Ex**plicit Restructure?

There are two types of Restructure, depending on the way they are requested/invoked.

1. *Implicit:* An implicit restructure occurs when dimension changes are pushed from Planning to Essbase via a cube refresh and those dimension changes require a restructure to be executed.

2. *Explicit:* An Explicit restructure occurs when a user specifically asks for the data within the cube to be restructured i.e. via Jobs, Calc Manager etc. An explicit restructure always fully rewrites Outline, IND and PAG.

What is a BSO Db Refresh?

Implicit Restructure

When changes are made in Planning to dimensions/members/member properties etc., these are "pushed" to Essbase in a DB refresh. In this case, the data restructure has been requested **Im**plicitly, i.e., dimension changes mean the restructure has to happen.

The Db Refresh implicitly triggers a restructure in Essbase to update the Essbase elements.

There are 3 levels of restructure:

1. Outline only - The outline will ALWAYS be restructured, every db refresh, even if no data.

A data restructure can be "index only" (low impact) or "index and block" (full/high impact) restructuring or not required.

2. Low impact, Index only – if the dimension changes only affect indexing, only the index file (IND) will be restructured. PAG/Data blocks will not be restructured.
3. High Impact - If the changes affect the data/blocks (e.g. moving a sparse member, adding/deleting a dense member) then a full data restructure (IND + PAG) will also implicitly triggered.

Please note:

- A low or high impact restructure can only occur if there is data in the cube.
- An *im*plicit restructure (i.e. via db refresh) will NOT remove #missing blocks.
- A db refresh is executed for all cubes in one operation.
- Time taken for restructure is seen to be relative to the size of the artifacts being restructured AND time since data had last full restructure (i.e. how much re-ordering has to occur in the data blocks).

What is an Explicit Restructure?

And how is it different to a Db Refresh?

A user can also *explicitly* trigger a Restructure for an individual cube via a Job or via Calc Manager, i.e., they explicitly request that the data blocks are re-written.

An explicit restructure will ***NOT*** push member changes from Planning to Essbase.

It will ALWAYS re-write the OTL, IND and PAG files.

An explicit restructure WILL remove #missing blocks.

An explicit restructure is executed on an individual cube.

What is a Restructure?

Summary

So,

A db Refresh is a push of changes from Planning to Essbase and will trigger an Implicit Restructure in Essbase

A user can execute an Explicit Restructure, independent of member/dimension changes and this will execute a full Essbase restructure.

Only an Explicit Restructure will remove #missing blocks (or blocks tagged for delete by a CLEARBLOCK calc).

What is a ASO Db Refresh?

Types of Changes

In ASO, there is no concept of blocks. However, some dimension changes will trigger re-indexing of the cells on disk and/or an outline re-write. When this happens, the ASO db refresh may take longer.

1. Compact Outline – this operation explicitly restructures the ASO outline.

2. Db refresh – Note: this can possibly be impacted by incremental slices and aggregate views if re-indexing is required. Merging incremental slices before a db refresh may help. Same with dropping aggregate views and re-creating after db refresh. Some changes may require the outline to be re-written and this can have a time impact if this occurs.

5. Operational Guidelines - Data

What can affect my data?

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Operational Guidelines – Avoiding Unnecessary Data - Summary

Operational Guidelines

Unnecessary data –

1. Only create Account members if they are used for your budget/forecast/plan.
2. Avoid storing or creating zeros unless specifically required.
3. Use @round if your business rules create values to a lot of decimal places that are not required (e.g., small value allocation loops).
4. Ensure unary operators are correct so that upper level blocks are not created if not necessary or required. Pay special attention to Smart Lists, Stored % and Text members.
5. Ensure Data Storage is set correctly – Dyn Calc, Store, Label Only, Never Share.

Operational Guidelines – Avoiding Unnecessary Data

Operational Guidelines

Do not create data you do not need:

1. Zeros – Zeros are data values, so if they are loaded to the cube, they will potentially aggregate and make the cube unnecessarily larger. Therefore, it is generally recommended to not load them or, if they exist, to remove them periodically using a business rule to change the zero to a #missing which can then be removed with an explicit restructure.
2. Unary Operators/Data Storage – Review member unary operators carefully to ensure that data that is not required at upper levels is not being created, e.g., do not always use addition, if all children are ignore/never, consider use of Data Storage of Label only.
3. Difference between IGNORE and NEVER
   - IGNORE will stop aggregation up the dimension the member is in but other dimensions will still aggregate a value.
   - NEVER will stop aggregation up all dimensions.

Operational guidelines:
https://docs.oracle.com/en/cloud/saas/enterprise-performance-management-common/tsepm/op_procs_bso_defrg_plan_type.html

Smart Lists, Stored %, Text Members. etc should be set to NEVER.

6. Where to find information about my Data?

Customer Activity Report – Where to look

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Where to find information?

Navigator->Overview->Activity Report (tab)-> View or Download

Activity reports are created daily during the maintenance window and provide a lot of information about the previous day's activities:

Essbase ASO Cube Statistics

	Vis1ASO	VisASO
Total Dimensions	16	15
Attribute	6	6
Max Key Length in Bits	60	60
Max Key Length in Bytes	8	8
Number of Input-level Cells	52	10,138
Number of Incremental Data Slices	5	0
Number of Incremental Input Cells	28	0
Number of Aggregate Views	0	0
Number of Aggregate Cells	0	0
Number of Incremental Aggregate Cells	0	0
Percentage Time of Querying Incremental Data Slices	0	0
Input-level Data Size in MB	0	0
Aggregate Data Size in MB	0	0
Total Size in MB	0	0
Pending Cache Size Limit in MB	32	32

Essbase BSO Cube Statistics

	Plan1	Plan2	Plan3
Total Dimensions	14	11	11
Standard Dimensions	8	7	7
Dense	2	2	2
Sparse	6	5	5
Attribute	6	4	4
Block Size in Cells	20,230	14,565	14,535
Block Size in KB	158	113	113
Level 0 Blocks	846,423	5,717	0
Upper Level Blocks	54,105	0	0
Total Blocks	900,528	5,717	0
Upper Level Blocks Percentage	6%	0%	0
Cells in Million	18,217	83	0
Block Density	0.72%	0.01%	0.00%
Average Clustering Ratio	44%	91%	100%
Page File Sizes in MB	548	0	0
Data Cache Setting in MB	500	500	500
Index File Size in MB	23	7	0
Index Cache Setting in MB	50	50	50
Hourglass/Modified Hourglass Deviations on Dense	0	0	0
Hourglass Deviations on Sparse	2	1	1
Modified Hourglass Deviations on Aggregating Sparse	8	5	5

Where to find information?

Navigator->Overview->Activity Report (tab)-> View or Download

Activity reports are created daily during the maintenance window and provide a lot of information about the previous day's activities:

Dimensions for Plan1 (BSO)

Outline Order	Name	Type	Declared Members	Stored Members	Levels	Formulas	Store	Never Share	Label Only	Shared Members	Dynamic Calc and Store	Dynamic Calc	Add Operator	Sub Operator	Multiply Operator	Divide Operator	Ignore Operator	Never Operator	Percent Operator
1	Account	Dense	1,258	1,190	10	35	163	1,027	13	14		41	1,158	6			42	52	
2	Period	Dense	39	17	4	6	13	4		9		11	29				8		
3	HSP_View	Sparse	2	2	2		1	1					1				1		
4	Year	Sparse	13	13	2		12	1					1				12		
5	Scenario	Sparse	18	13	2	5	7	6				5	6				12		
6	Version	Sparse	293	289	4	4	269	20				4	265				28		
7	Entity	Sparse	2,145	2,082	5		55	2,027		52		11	2,142				3		
8	Product	Sparse	38	34	4		29	5				4	38						
9	Size	Attribute	4	0	2							4	1				3		
10	probability	Attribute	3	0	2							3	1				2		
11	RevenueNumbers	Attribute	4	0	3							4	1				3		
12	LastDate	Attribute	2	0	2							2	1				1		
13	PROD_Colors	Attribute	4	0	2							4	1				3		
14	Date1	Attribute	2	0	2							2	1				1		

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