

What is Essbase ASO?

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

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Agenda - What is Essbase ASO?

- 1 What is the Magic of Essbase? *Quick Review.*
- 2 What is ASO? *The key features of ASO*
- 3 What are Dimensions, Members, and Hierarchies? *The Basics for understanding ASO.*
- 4 What is a Hierarchy Type? *Hierarchy Types: Stored, Dynamic, or Multiple*
- 5 How is Data Stored in ASO? *Buffers, Slices, and Views!*
- 6 Other ASO Maintenance? *Compact Outline.*
- 7 Where to find ASO Cube Statistics? *And how do they relate to what we know?*



1. What is the Magic of Essbase?

Quick Review



BSO or ASO?

Extended **S**pread **S**heet **D**atabase

Aggregate **S**torage **O**ption Large outlines, primarily aggregation

Block **S**torage **O**ption: Small outlines, complex analysis/calculation

	Jan	Feb
Lightbolt	166	182
Thunderball	131	149



Aggregate storage

REPORTING



Block storage

ANALYSIS / CALCULATION

	0000: Net Income	0000: Net Income	0000: Net Income
	FY14	FY14	FY14
	Jan	Feb	Mar
Total Department	5961904	4718269	4361213
No Department	-15458	-18008	-9652
Resources	-242632	-265625	-249828
Other Corporate	-109028	-76020	-102131
Sales	8722644	7033591	8147734
Manufacturing	-1722175	-1283681	-2785861
Other Departments	-51418	-51418	-51418
Finance and Accounting	-418248	-423058	-401748
HR and Administration	-201362	-197112	-185884

POV: BaseData, Actual, Working, Product, Refresh

Essbase Terminology

ASO Essbase **applications**:
one ASO **cube** to one ASO
Essbase application



ASO Cube

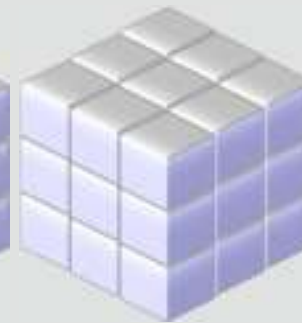


ASO Cube

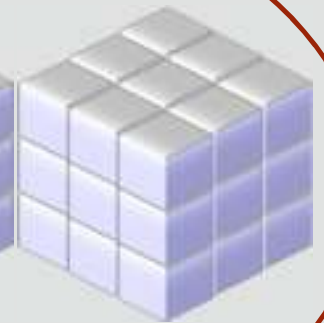
BSO Essbase **applications**:
One or more Essbase **cubes** to
one BSO Essbase application



BSO Cube



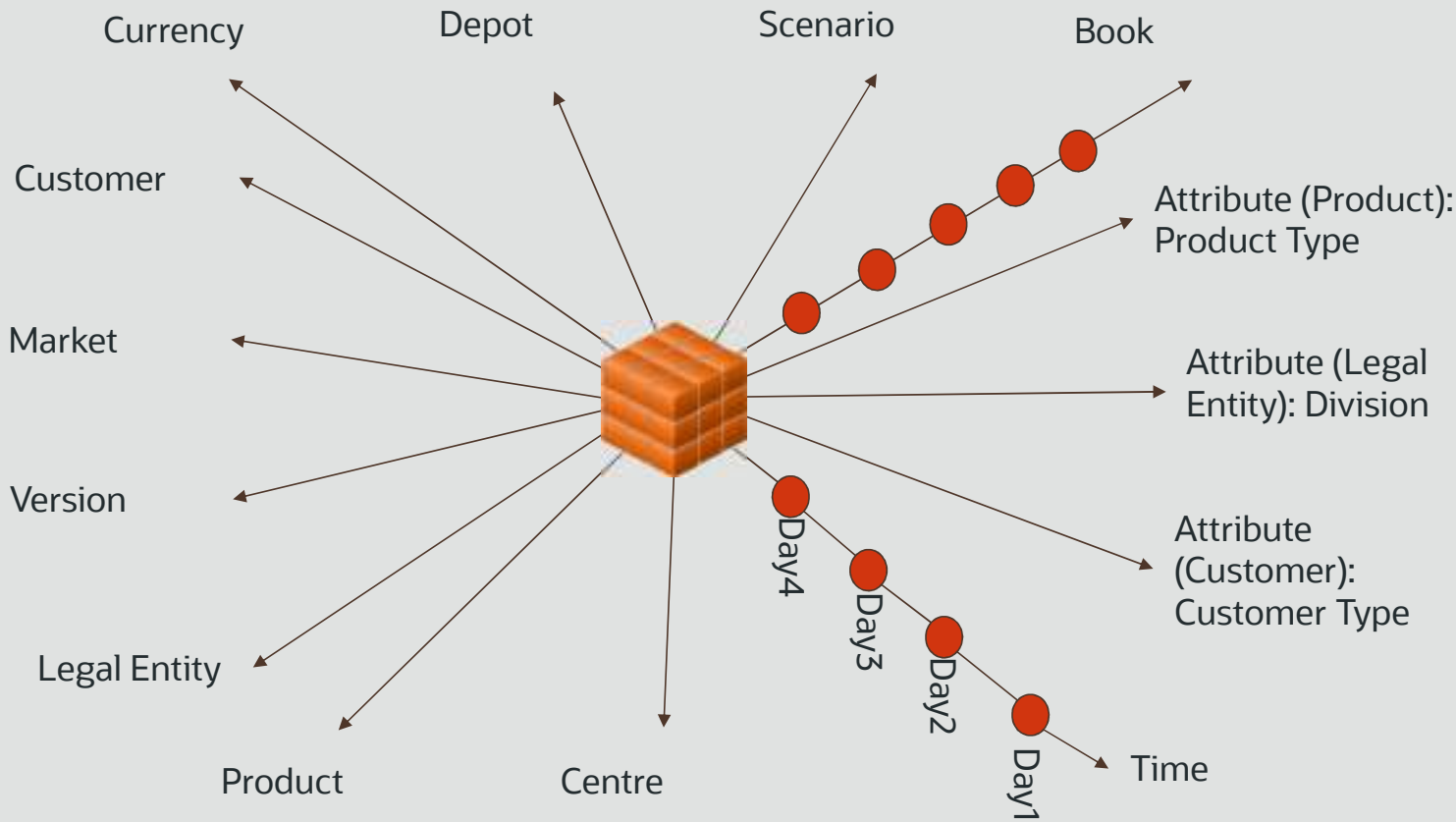
BSO Cube



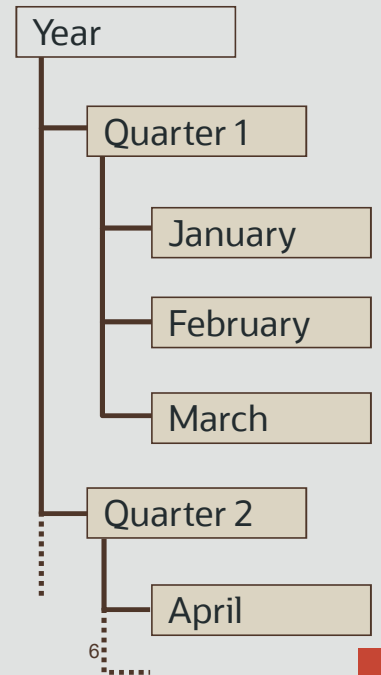
BSO Cube

Dimensions & Members

Hierarchies and structures



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





2. What is ASO?

The key features of ASO

How is ASO different than BSO?

Key features of ASO

1. Aggregate-intensive cubes.
2. Can handle larger numbers of dimensions and members.
3. Optimized for sparser data sets for operational analytics.
4. Use of ASO for aggregation can significantly reduce BSO size and calculation times.
5. Designed to work seamlessly with existing interfaces and user skills i.e., same requirements for data in, same requirements for data out.
6. Data can only be loaded at level0.
7. Data is aggregated “on the fly”.
8. Data “views” can be materialized, if required.



3. What are Dimensions, Members, and Hierarchies?

The Basics for understanding ASO



What are Dimensions?

The Basics for Understanding ASO

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

Dimensions for VisASO (ASO)				
Name	Hierarchy Type	Declared Members	Stored Members	Levels
Account	Dynamic	176	168	10
Period	Multiple	23	22	4
Year	Stored	10	9	2
Scenario	Multiple	15	14	2
Version	Multiple	28	27	2
Entity	Multiple	64	63	5
Product	Multiple	26	25	4
AltYear	Multiple	6	5	2

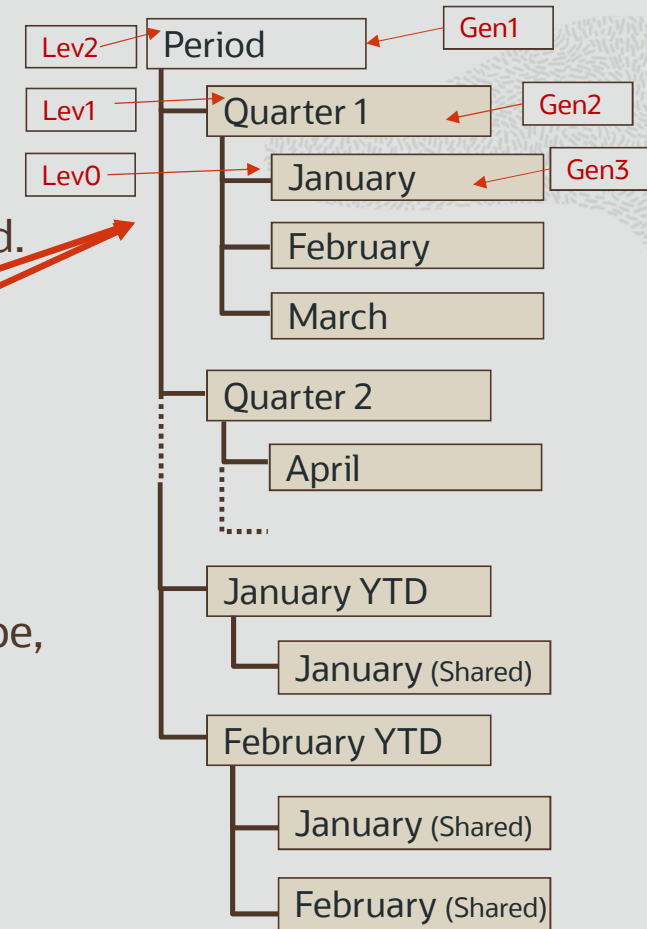
- A dimension is a view-point on the data.
- Members relating to that dimension/view-point are created within the dimension as a hierarchy.
- Declared members is the total of ALL members in the dimension.
- Stored members does not include label only or shared members.
- In ASO, the way the dimension behaves is determined by the *Hierarchy Type*
- To understand Hierarchy Types, you need to understand Hierarchies ...

What are Dimensions, Members, and Hierarchies?

Understanding Hierarchies, Generations, and Levels

1. Hierarchies show how the data within a dimension is structured.
2. Each layer of hierarchy is numbered:
 - **Generation** numbers start from the top
 - **Level** numbers start from the bottom
3. **Data** is held in ASO at **level0 only**.
4. **Hierarchy Type** decisions i.e. **Dynamic** or **Stored** Hierarchy type, is made at the top of the hierarchy/dimension i.e., **Gen1**.
5. Where a dimension requires both Stored and Dynamic, Generation1 is tagged as **Multiple** and the Stored/Dynamic Hierarchy Type is set against all **Gen2** members.

So, what is a Hierarchy Type? And what does it do? ...





4. What is a Hierarchy Type?

Hierarchy Types: Stored, Dynamic, or Multiple

ASO Hierarchy Types

Stored, Dynamic and Multiple

ASO has TWO main hierarchy types:

1. Store
2. Dynamic

Hierarchy type is inherited down from the point it is set.

There are, however, THREE settings at DIMENSION level (i.e. set against the Gen1 member):

1. **Store** – the entire dimension is stored.
2. **Dynamic** – the entire dimension is dynamic.
3. **Multiple** – i.e. both Hierarchy Types are required within this dimension. In these cases, Store and Dynamic is made at Generation2 of that dimension rather than Generation1 (i.e., the DIMENSION can contain MULTIPLE hierarchy types).

ASO Hierarchy Types

How to Choose?

- The *ideal* is to have as much stored as possible. i.e., the dimension should be Store if possible, and if not, preference is Multiple.
- If the dimension cannot be Store (e.g., it contains formula), make only the hierarchy that has the formula dynamic (at Gen2 in a Multiple dimension) and make the rest of the dimension Store (at gen2).
- There are some considerations to use of Multiple (when converting from a Dynamic dimension) etc. with regards to Shared members, formula and aggregation of a dimension.
- Let's look at a few more details and then some examples ...

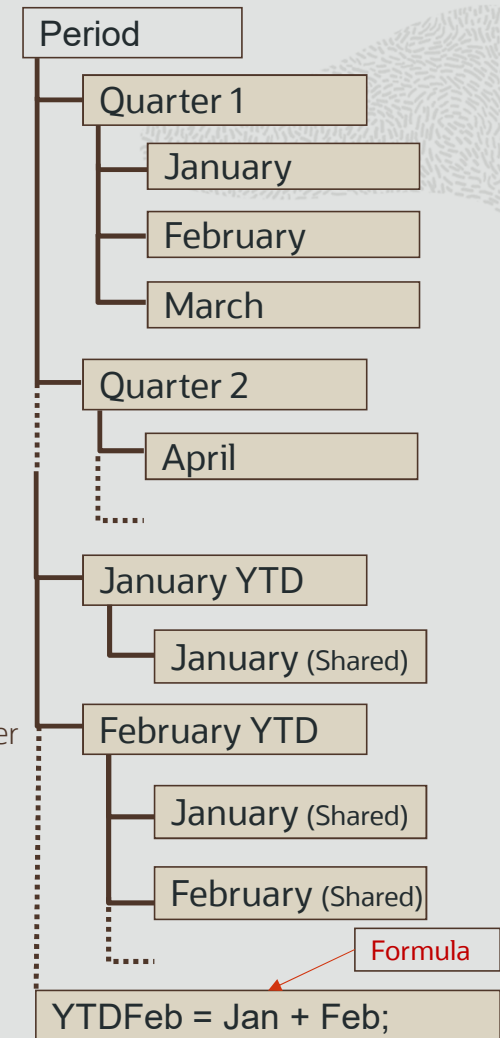
ASO Hierarchy Types

Understanding Hierarchies

Type
Dynamic
Dynamic
Multiple
Stored
Multiple
Multiple
Multiple
Multiple
Attribute

ASO dimensions can be either:

- Store
- Dynamic
- Multiple Hierarchy Enabled i.e. can have Stored AND Dynamic
- **Stored:**
 - All members must be + or ~
 - ~ can only be used if parent is Label Only
 - No shared members or formula.
- **Dynamic:**
 - Members can have any consolidation operator, including + and ~
 - Members can have formula
 - Allows multiple use of shared members within single hierarchy and non-lev0 base member for shared members
- **Multiple Hierarchy Enabled:**
 - Hierarchy type Store/Dynamic is selected at Gen2.
 - First Gen2 child should be Stored. 2nd and subsequent can be Store or Dynamic.
 - Allows shared members if used once and stored base member is lev0.



ASO Hierarchy Types – Example 1 - Stored

Where there are no formula and no shared members

Type
Dynamic
Dynamic
Multiple
Stored
Multiple
Multiple
Multiple
Multiple
Attribute

Example 1: Period dimension



This Period dimension only contains stored members.

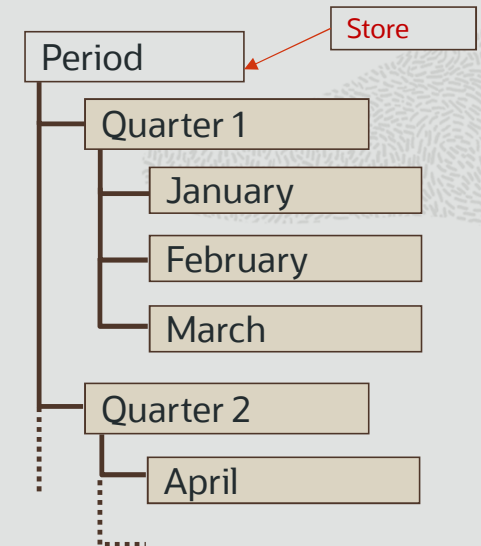
There is no formula.

There are no shared members.

The entire dimension can, therefore, be given a



Hierarchy Type of **STORE**



ASO Hierarchy Types – Example 2 - Multiple

Multiple allows use of Shared Members

Type
Dynamic
Dynamic
Multiple
Stored
Multiple
Multiple
Multiple
Multiple
Attribute

Example 2: Period dimension

This Period dimension contains stored members AND shared members.

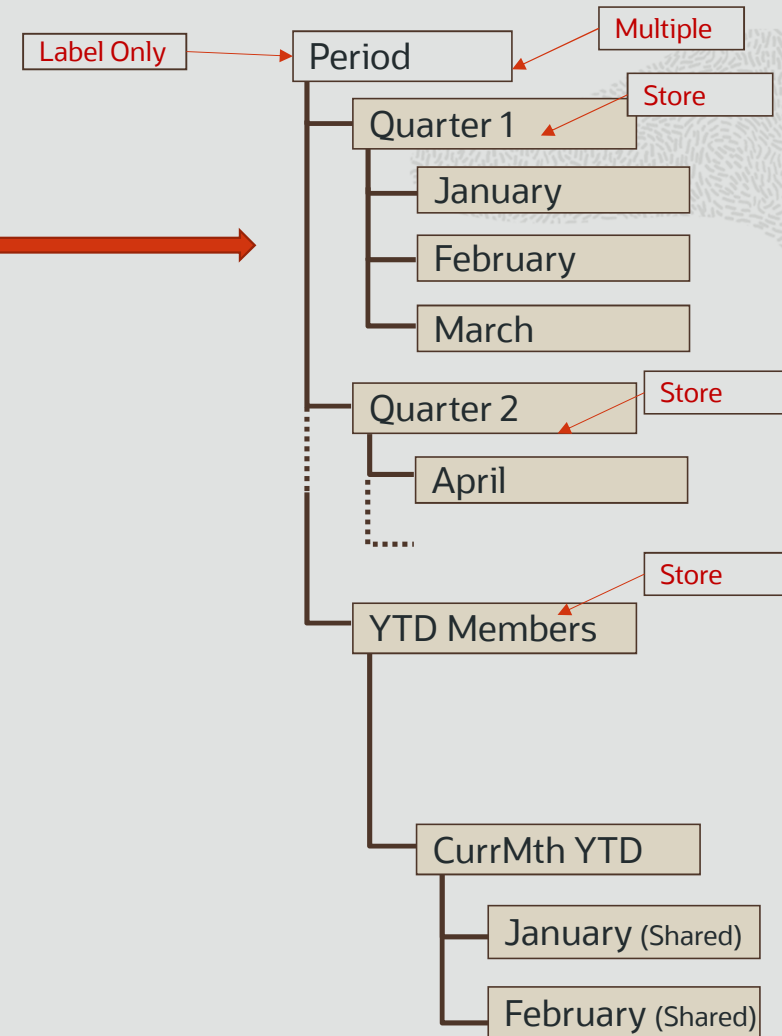
BUT the shared members are only used once.

There is no formula.

The *dimension*, therefore, can be given a

➡ Hierarchy Type of **MULTIPLE**

➡ And all the gen2 can be **STORE**



ASO Hierarchy Types – Example 3 - Multiple

Multiple = Stored + Dynamic

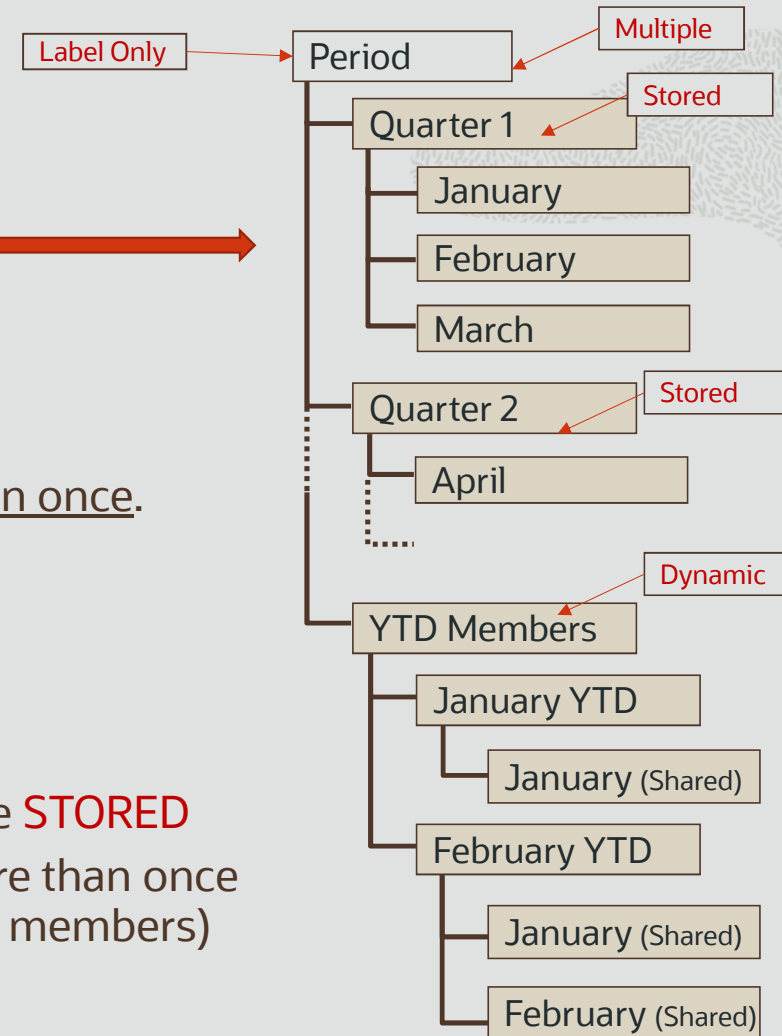
Type
Dynamic
Dynamic
Multiple
Stored
Multiple
Multiple
Multiple
Attribute

Example 3: Period dimension

This Period dimension contains stored members AND shared members.
BUT the shared members are only used more than once.
There is no formula.

The *dimension*, therefore, can be given a

- ➡ Hierarchy Type of **MULTIPLE**
- ➡ The gen2 with no shared members can be **STORED**
- ➡ The gen2 with shared members used more than once within the same hierarchy (i.e. under YTD members) must be **Dynamic**.



ASO Hierarchy Types – Example 4 - Dynamic

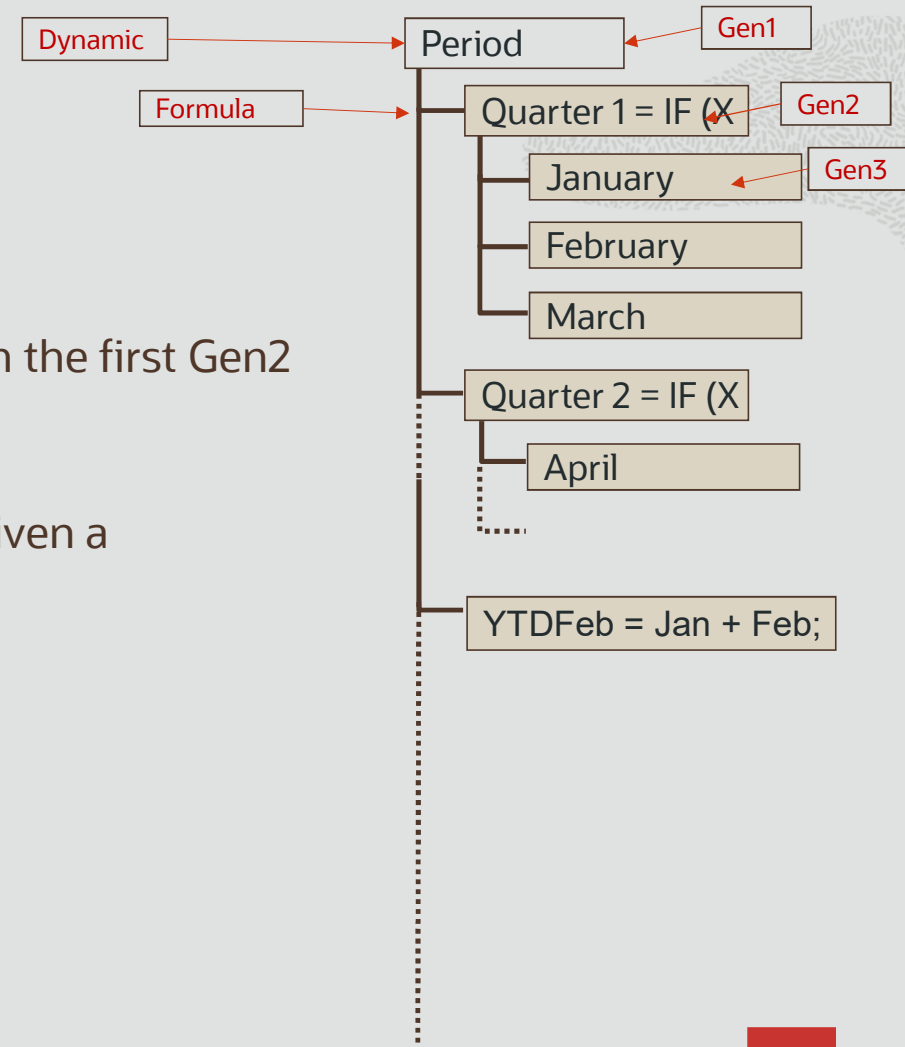
Understanding Hierarchies

Type
Dynamic
Dynamic
Multiple
Stored
Multiple
Multiple
Multiple
Multiple
Attribute

Example 4: Period dimension

This Period dimension contains a formula in the first Gen2 hierarchy.

The *dimension/Gen1*, therefore, has to be given a
➔ Hierarchy Type of **DYNAMIC**





5. How is Data Stored in ASO?

Buffers, Slices, and Views

How is Data Stored in ASO?

Load Buffers and Slices

Number of Incremental Data Slices	8
Number of Incremental Input Cells	273,500

- When data is loaded into ASO, data is loaded into a **buffer** and then a **slice** is created with the new data i.e. every data load, every Smart Push, every Data Push will create an additional slice.
- This means that the data can be held in more than one “slice”, known as **incremental slices**. These incremental slices can be seen in the Activity Report:

Number of Incremental Data Slices	4
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- Input Data** held in these Incremental Slices are known as **Incremental Input Cells**.
- Having multiple slices may increase retrieval times in some cases:

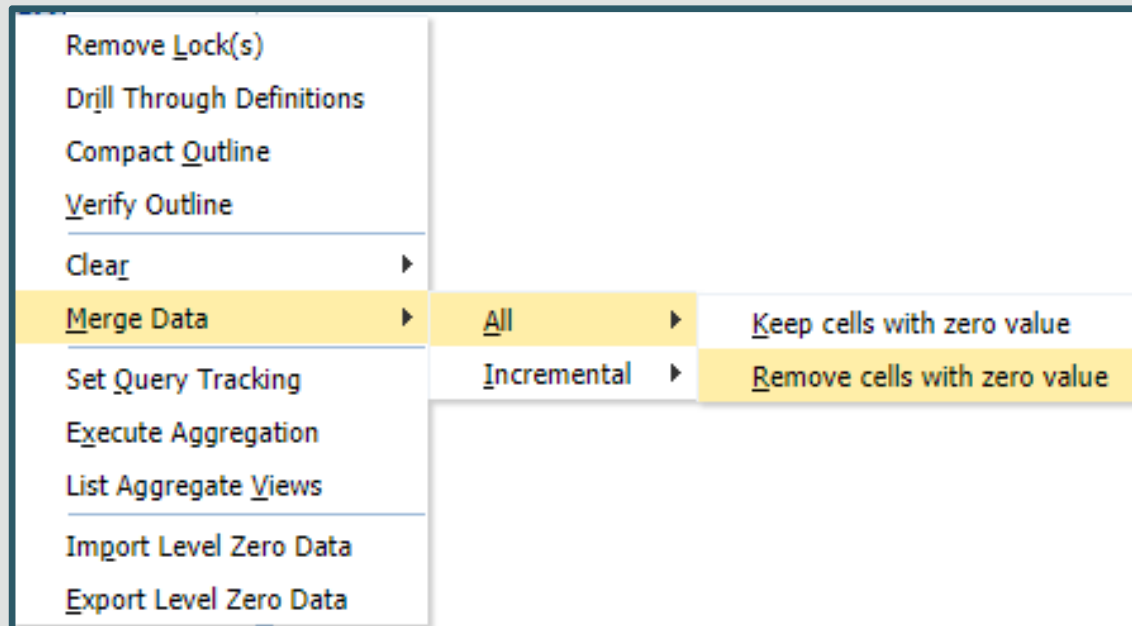
Percentage Time of Querying Incremental Data Slices	9%
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- For optimal performance, routinely merge all slices, removing zeros (where possible).
- Merging slices can be done manually in Calculation Manager or scheduled as a job.
- Merging slices can create a temporary lock on the db, so is best scheduled in off hours.

How is Data Stored in ASO?

Merging Incremental Slices

- Navigator->Rules->Actions->Database Properties->Select Cube->(Right Click) Merge Data-> All->Remove cells with zero values (if possible)



How is Data Stored in ASO?

Aggregate Views

Number of Aggregate Views	8
Number of Aggregate Cells	110,273,500

1. By default, data storage is determined by the Hierarchy Type choices, already discussed i.e., all upper levels etc. are not stored.
2. However, **Aggregate Views** or Materialize Views can calculate and store part of the data to disk, based on hierarchies (only Stored hierarchies can be materialized). Use of Aggregate Views has *potential* to improve retrieval times but should be tested with and without Views because often, if Hierarchy Type selections are optimal, views are not required.
3. Aggregate Views is a balance between the time it takes to create the Views and the time the Views save on retrievals/reports.
4. Aggregate Views should be removed and re-created when new data slices are created.
5. Aggregate Views can be created based on **Query Tracking** (i.e., based on a Query) or without (Default).
6. Aggregate Views can be created manually or run as a job.



6. Other ASO Maintenance?

Compact Outline

Other ASO Maintenance?

Compact Outline

1. When dimension changes are made to an ASO cube, these are stored in an OUTLINE.
2. It is recommended that the outline is regularly compacted (similar to a BSO outline restructure), especially after dimension changes.
3. Navigator->Rules->Actions->Database Properties->Select Cube->(Right Click) Compact Outline.
4. Always review the Details after the Compact Outline.



7. Where to find ASO information?

Activity Report



Activity Report

ASO cube statistics by cube

Essbase ASO Cube Statistics		
	Vis1ASO	VisASO
Total Dimensions	8	8
Attribute	0	0
Max Key Length in Bits	44	48
Max Key Length in Bytes	8	8
Number of Input-level Cells	0	300
Number of Incremental Data Slices	0	0
Number of Incremental Input Cells	0	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

Statistics show:

- Total Dimension Count
- # Cells
- # Incremental Data Slices
- # Cells in those slices
- # Aggregate Views
- # Cells in those Views
- Size of Aggregations
- Db total size

Activity Report

Dimensions by Cube

Dimensions for Vis1ASO (ASO)				
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Version	Multiple	28	27	2
Entity	Multiple	124	72	5
Product	Multiple	26	25	4
Channel	Multiple	7	6	3

Dimensions show:

- List of Dimensions
- # Attribute Dimensions (if applicable)
- Hierarchy Type for each dimension
- # Declared Members
- # Stored Members
- Levels in the dimension hierarchies.
- Other Member Property Statistics (not shown here)



ORACLE