Public

Hybrid BSO in Enterprise Planning – Best Practices, Tips, and Tricks

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ORACLE

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Program Agenda

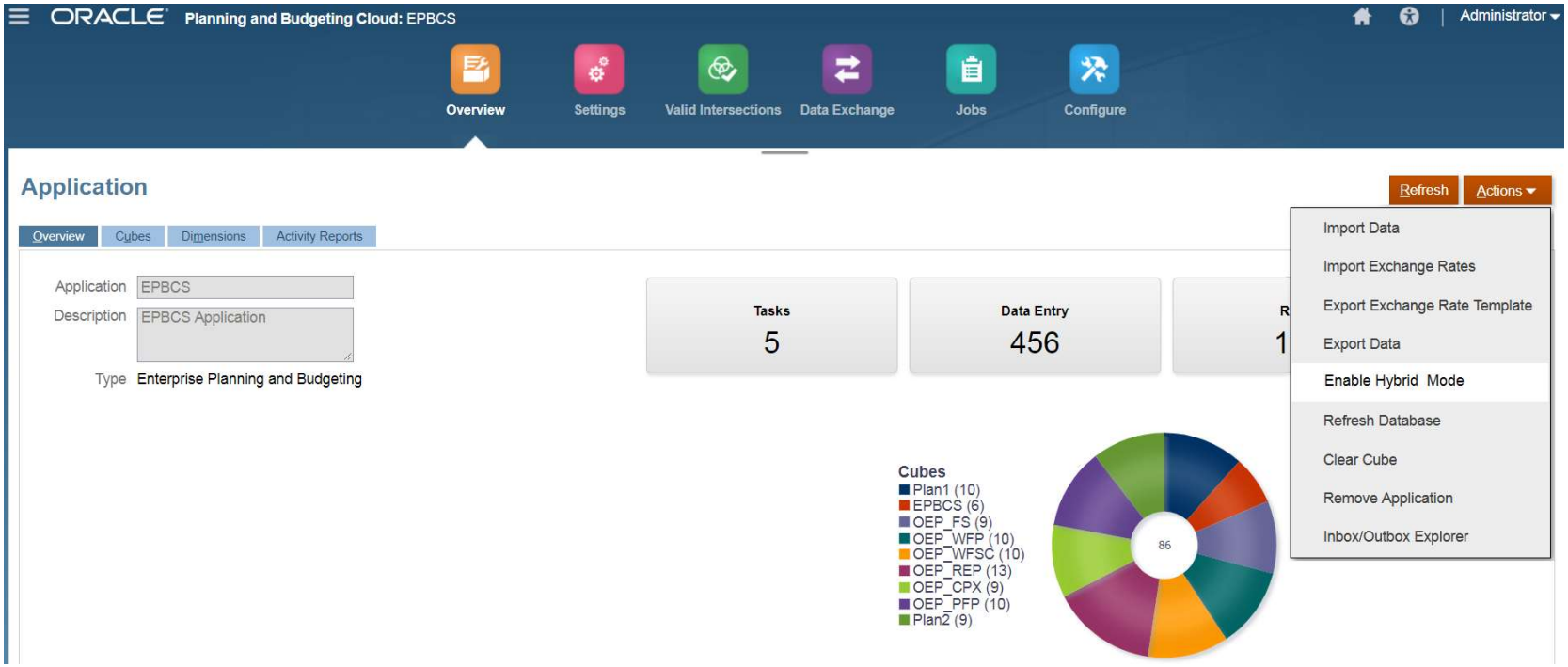
1. Why Hybrid BSO?
2. Enabling Hybrid BSO in EPBCS
3. Comparison between BSO & Hybrid BSO
4. Hybrid BSO Tuning Tips
5. Best Practices Monitoring/Enforcement
6. Q&A

Why Hybrid BSO?

- Hybrid BSO supports both BSO & ASO Capabilities
  (all BSO calcs with dynamic aggregations like ASO)
- Sparse and Dense Parent Members can be made dynamic
  - Reduces database and application size
  - Improves cube refresh performance
  - Reduces time for data export and import
  - Reduces AMW time
  - Improves performance of business rules
  - Improves usability

Enabling Hybrid BSO in EPBCS

An existing application can be converted to Hybrid by Enabling Hybrid Mode



Enabling Hybrid BSO in EPBCS

What happens when Hybrid BSO is enabled?

- Before enabling hybrid, best practice validations will be performed on the application. Any validation failure will need to be fixed before the app is converted to Hybrid
- On successful validation, all EPBCS BSO cubes (seeded and custom) are enabled for Hybrid and the modules will be reinitialized so hybrid specific changes will be brought in.

  -Certain sparse parent members are made dynamic in each of the out of box models/ dimensions

  -Appropriate member formula is seeded

  -Business rules are updated to remove rollup's for dimensions which are dynamic
- Customizations done before conversion will be retained. You can restore customized member formulas and rules to factory version in case of any calculation issues

Enabling Hybrid BSO in EPBCS

What else can you do?

- Make sparse parent members in other dimensions also dynamic (based on application size, planning and reporting requirements)
- The rollup and other rules in each of the models can be modified based on which sparse parent members have been made dynamic

Converting PBCS To Hybrid BSO in EPBCS

- Convert PBCS App to EPBCS
  - Select Application, then Overview, then Actions, then Convert to Enterprise
  - Must follow and honor all conversion steps and conversion Considerations as documented in the EPBCS Administrator's Guide
- Enable Hybrid BSO
  - Select Application, then Overview, then Actions, then Enable Hybrid Mode
  - Refer to earlier slides for enabling Hybrid BSO in an existing application
- Enabling Modules is Optional
  - Also works with Custom Cubes

Note: You cannot migrate a snapshot from Test with Hybrid enabled [Essbase .5xx] to Production if it has not yet been enabled for Hybrid [Essbase 11.1.2.4.xxx].

Comparison between BSO and Hybrid BSO

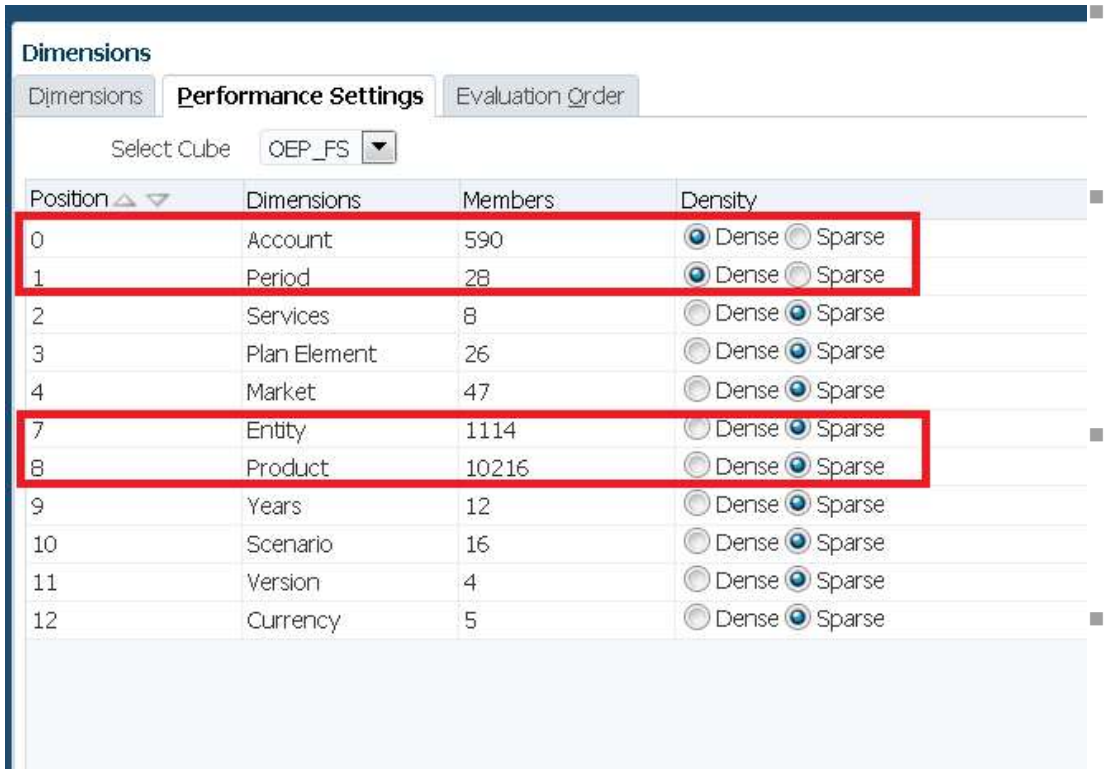
A Case Study

- **Goal** - Analyze and compare the performance of EPBCS Financials in both Hybrid and Non Hybrid mode, tune the application to get the best out of Hybrid BSO and document and share the tuning tips

- **Test environment & application size** – Use same hardware as what is available to customers with same Essbase configuration settings. Simulate customer scenario as closely as possible. Test both admin and end user flows

Comparison between BSO & Hybrid BSO

Test Application Details



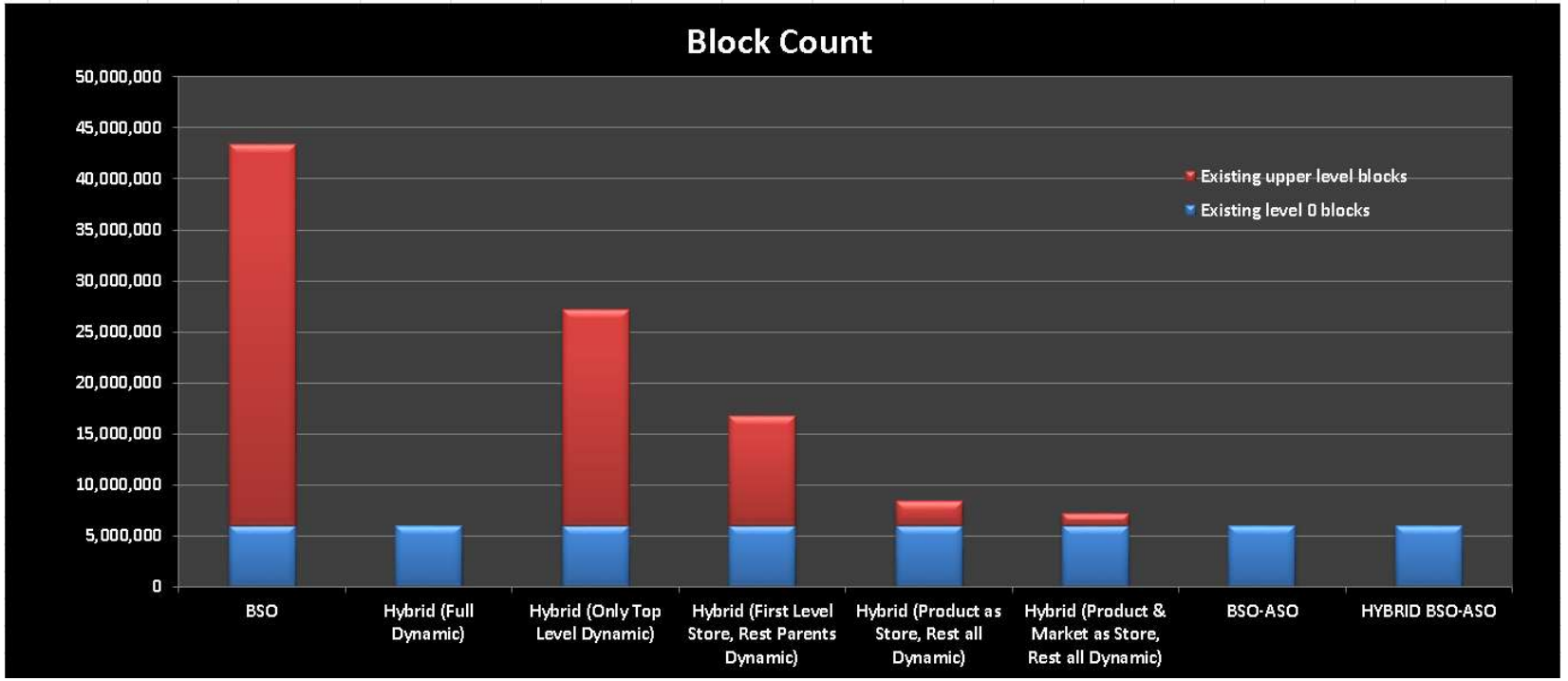
Position	Dimensions	Members	Density
0	Account	590	Dense Sparse
1	Period	28	Dense Sparse
2	Services	8	Dense Sparse
3	Plan Element	26	Dense Sparse
4	Market	47	Dense Sparse
7	Entity	1114	Dense Sparse
8	Product	10216	Dense Sparse
9	Years	12	Dense Sparse
10	Scenario	16	Dense Sparse
11	Version	4	Dense Sparse
12	Currency	5	Dense Sparse

- The application has data for 2 years/all periods in Actual, Plan & Forecast Scenario's for 30+ accounts
- The data is spread across entities and products. Each Entity has data for 10 products and each product has data for 40 market and 5 service members (fairly dense)
- Intermediate parents are added into Entity & Product dimensions with each parent member not having more than 50 child members
- The application size is around 11 GB (all leaf level data)

Comparison between BSO and Hybrid BSO

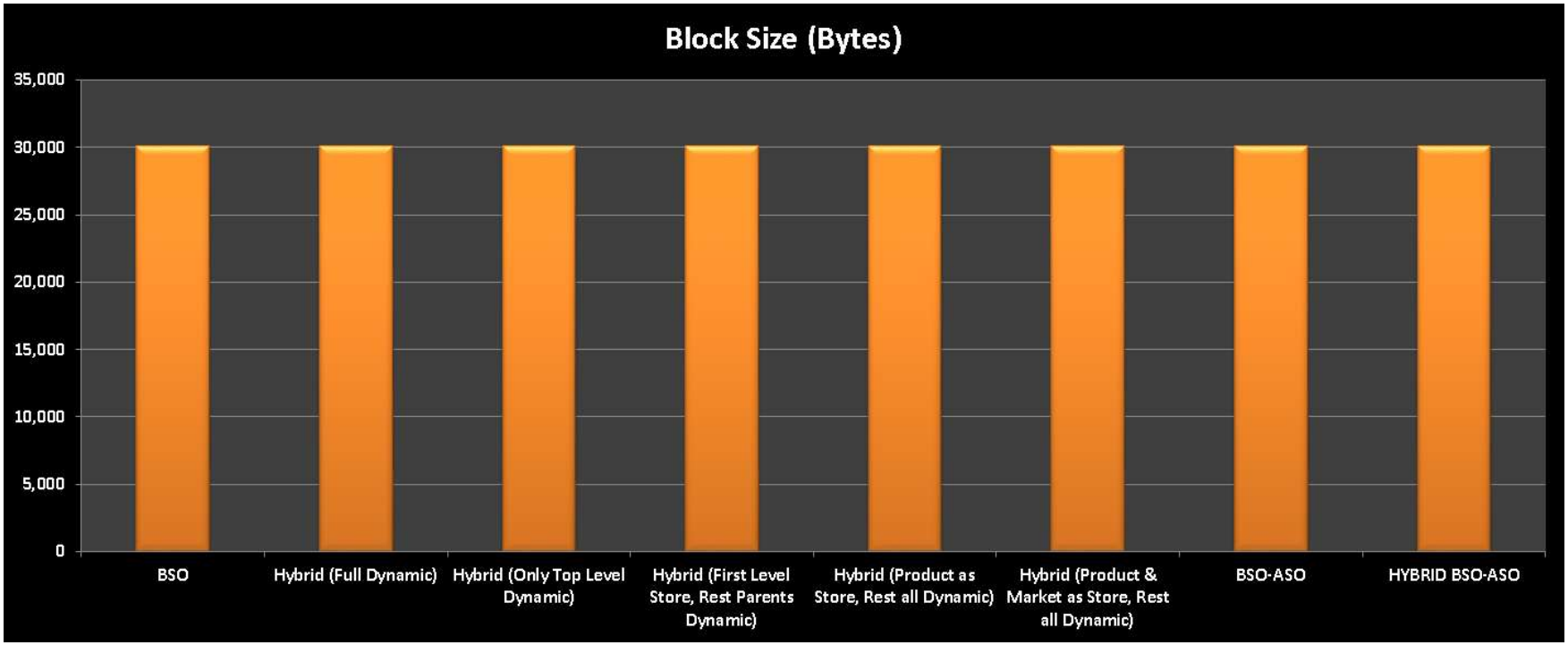
Test Scenarios							
BSO	**Hybrid (Full Dynamic)**	**Hybrid (Only Top Level Dynamic)**	**Hybrid (First Level Store, Rest Parents Dynamic)**	**Hybrid (Product as Store, Rest all Dynamic)**	**Hybrid (Product & Market as Store, Rest all Dynamic)**	**BSO-ASO**	**Hybrid BSO-ASO**
BSO with all sparse parents store	Hybrid BSO with all sparse parents dynamic	Hybrid BSO with top most sparse parent dynamic and rest all store	Hybrid BSO with level1 sparse parent store and rest all dynamic	Hybrid BSO with parent's in product dimension store and parents in all other sparse dimensions dynamic	Hybrid BSO with parents in product and market dimension store and parents in all other sparse dimensions dynamic	BSO – ASO with sparse parent members in "Plan Element" dimension set to dynamic & sparse parent members in all other dimensions set to ignore and smart push to ASO for aggregation/ reporting	Hybrid BSO – ASO with sparse parent members in "Plan Element" dimension set to dynamic and sparse parent members in all other dimensions set to ignore and smart push to ASO for aggregation/ reporting

Test Application Statistics in different modes



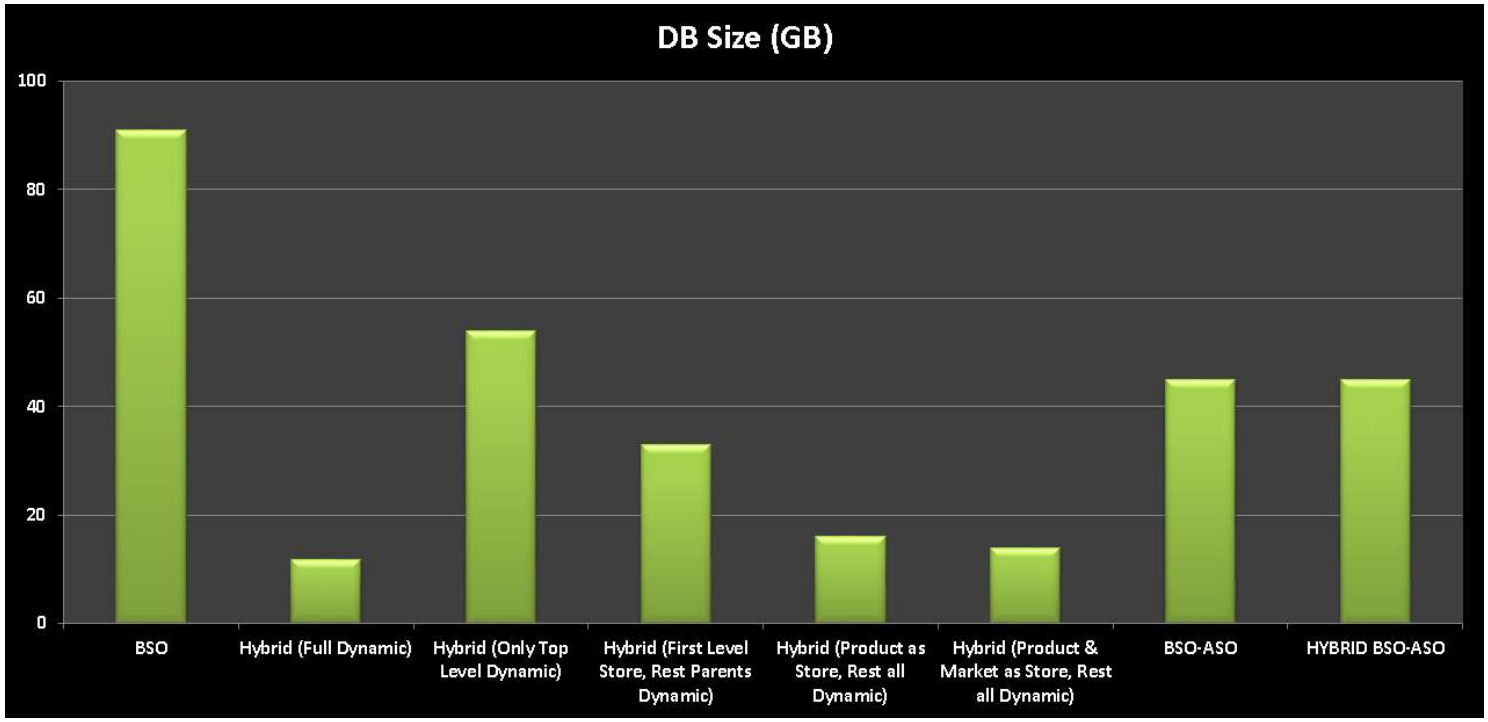
- Because of dynamic sparse parents in Hybrid BSO, the block count is significantly less in Hybrid BSO compared to BSO
- The block count can be reduced significantly in BSO by leveraging BSO-ASO design and aggregating all data in ASO

Test Application Statistics in different modes



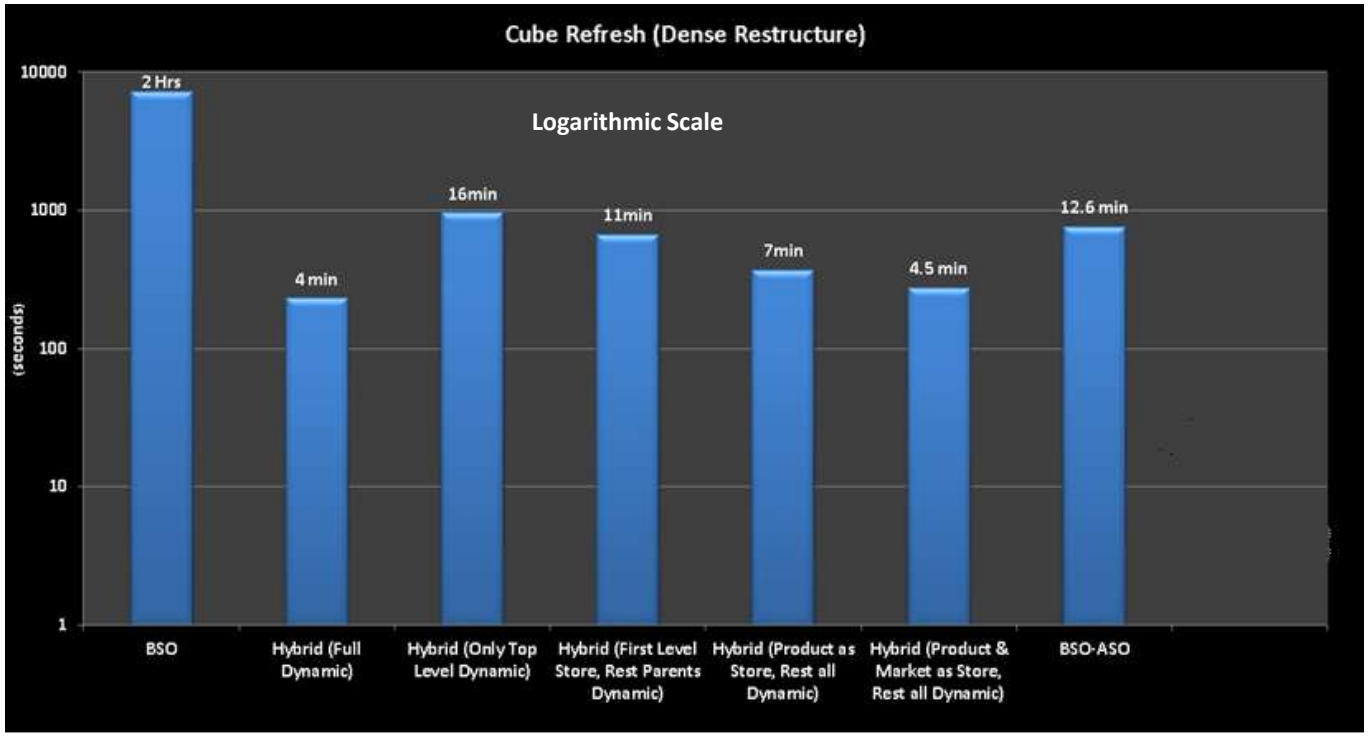
- No impact on block size since the dense parents are already dynamic in EPBCS Financials

Test Application Statistics in different modes



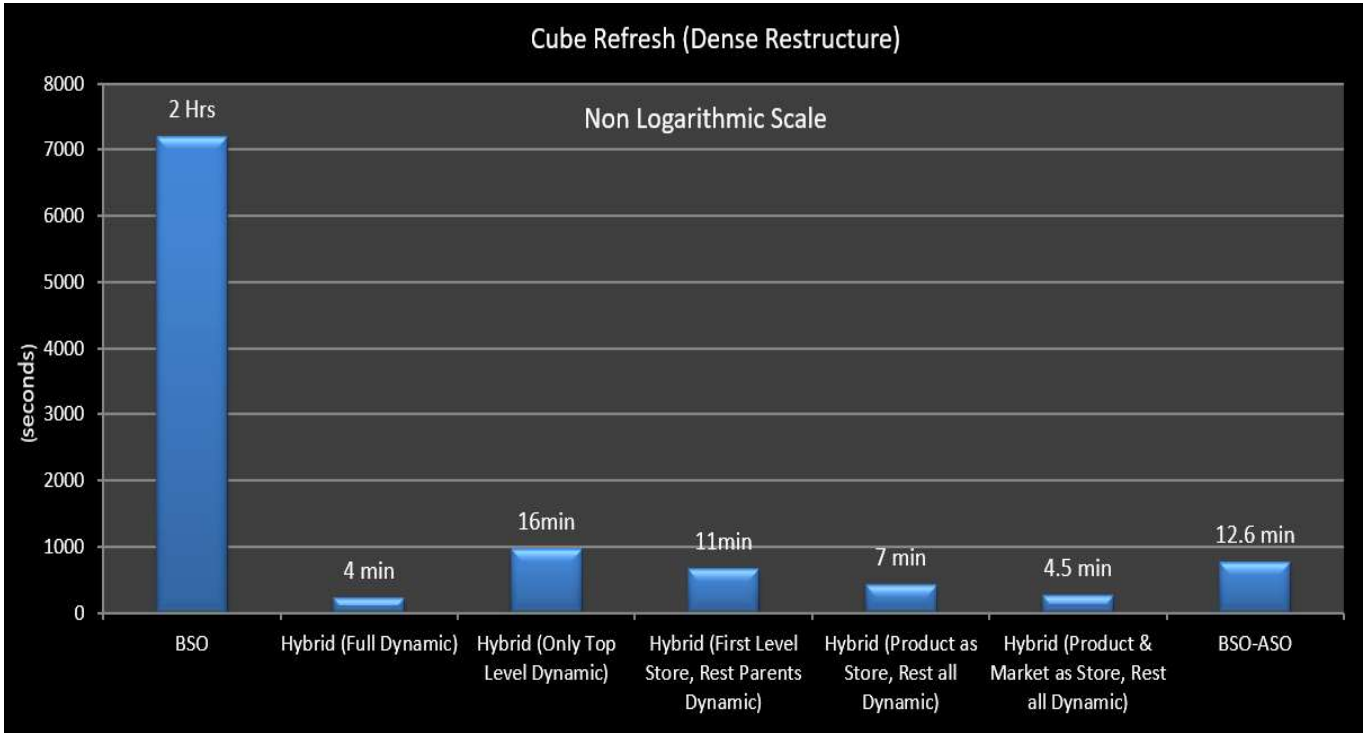
- This leads to reduced DB Size in Hybrid BSO compared to BSO

Performance Numbers for Admin Activities



**Dense restructure was tested by adding three level hierarchy of dummy Accounts with two leaf level members*

Performance Numbers for Admin Activities



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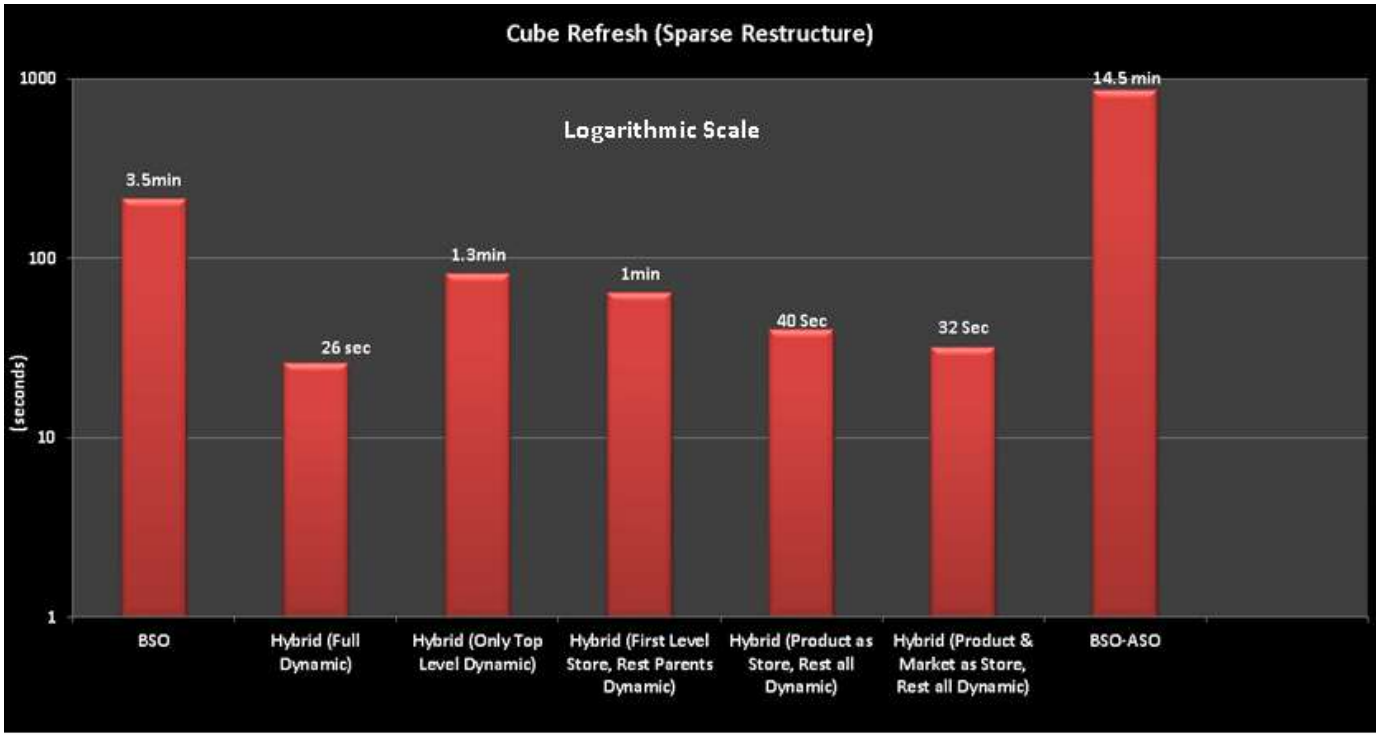
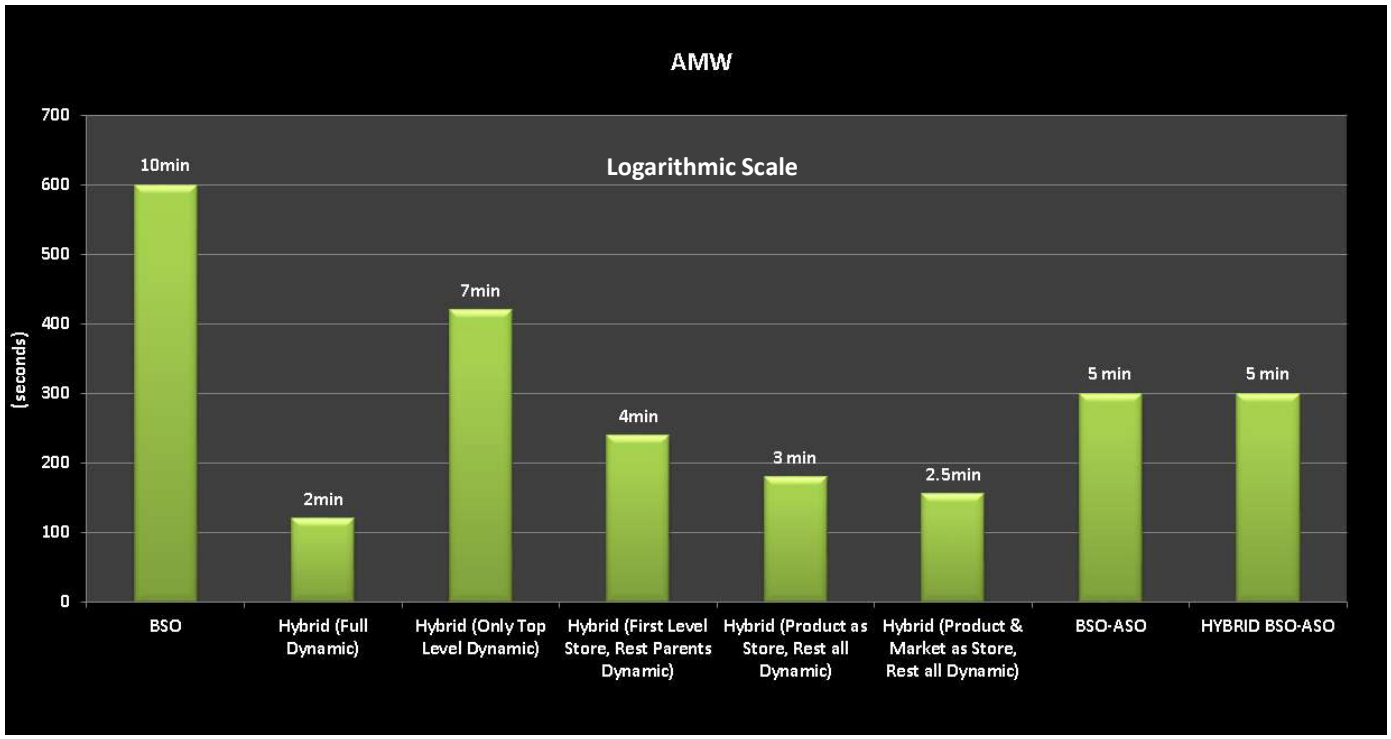
Performance Numbers for Admin Activities



- The reduced block count & database size significantly improves Cube Refresh Time in Hybrid BSO compared to BSO

**Sparse restructure was tested by adding three level hierarchy of dummy Products with two leaf level members*

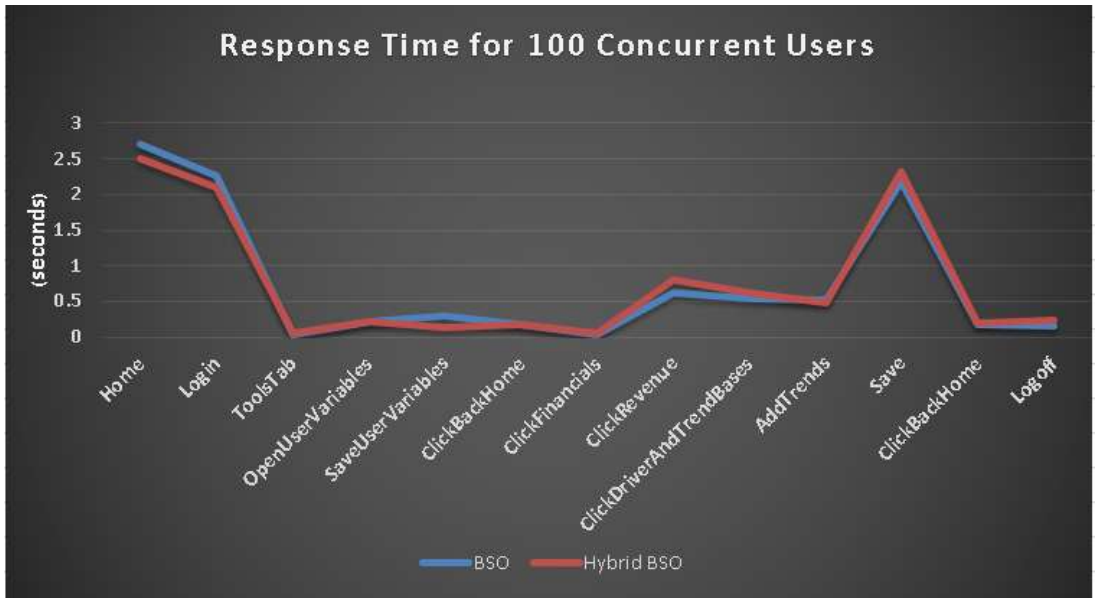
Performance Numbers for Admin Activities



- This also improves AMW time

Performance Numbers for End User Activities

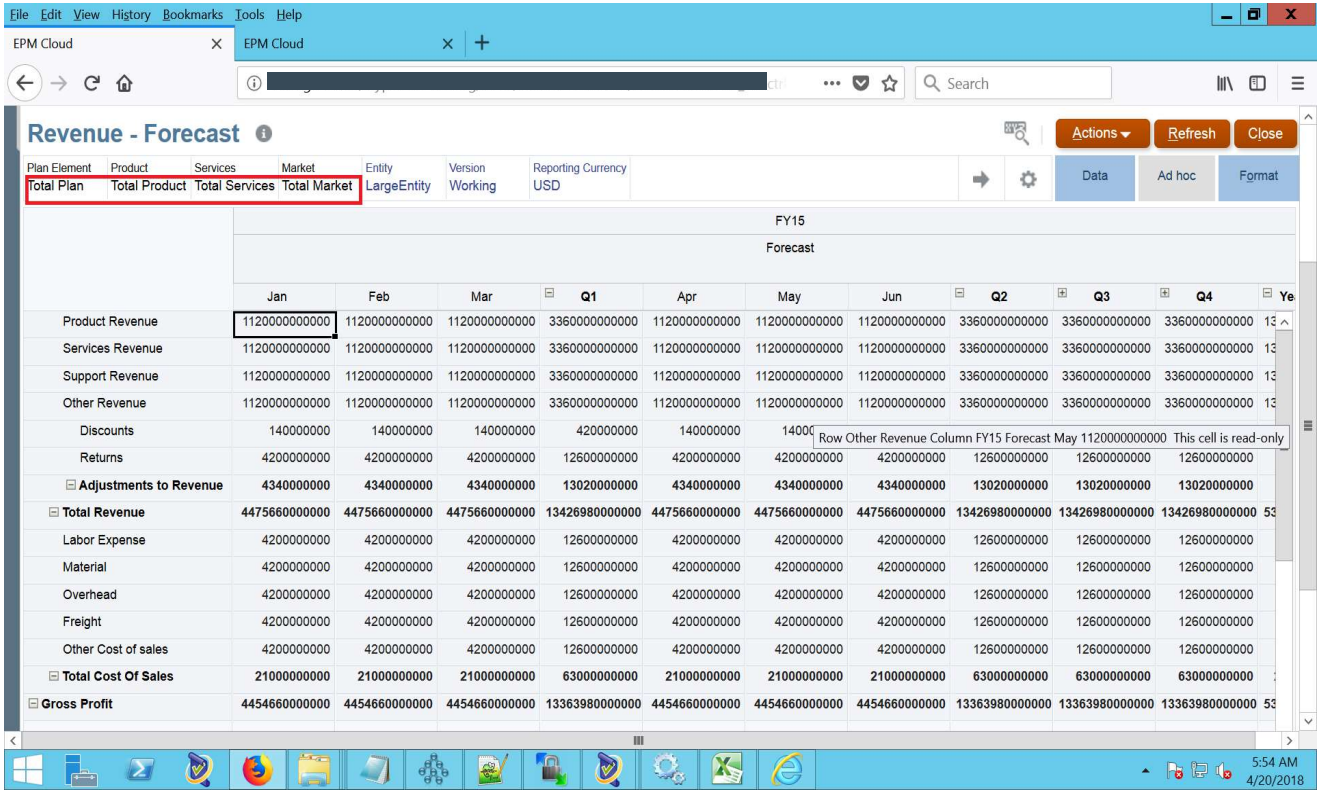
"Driver Based Revenue Planning" in multiuser mode



- Forms for trend based and driver based planning behave almost the same in BSO and Hybrid BSO.
- These forms have leaf level Entity, Product, Market, Service members in page
- The forms also have trend based calculation rule (run on save)
- The revenue/expense accounts are dynamically calculated in driver/trend based planning

Performance Numbers for End User Activities

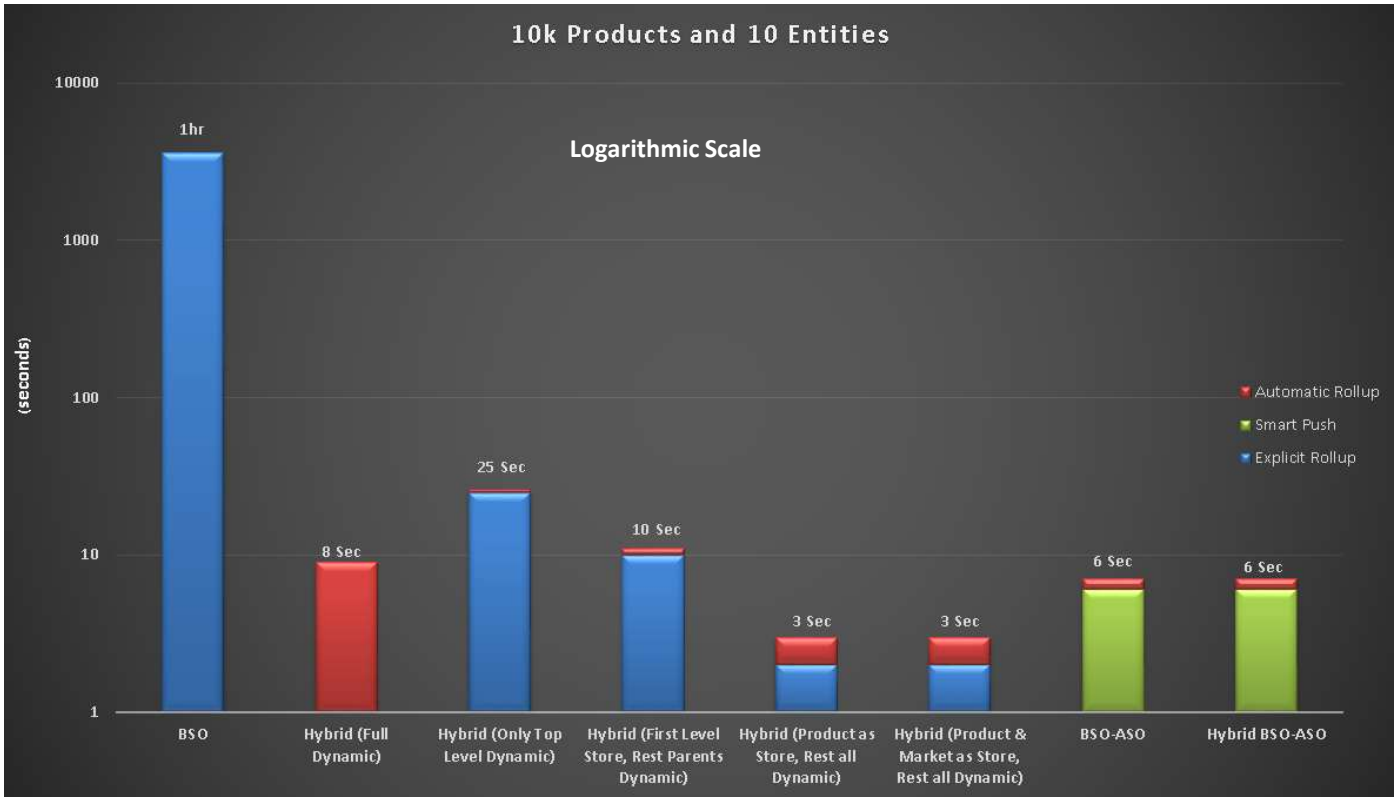
Review “Revenue - Forecast”



- The “Revenue-Forecast” form allows user to review Revenue Forecast for Entities, Products, Markets, Service, and so on.
- The Revenue Forecast can be viewed at any level (leaf or parent level)
- To view the Revenue Forecast at parent levels, the data must be aggregated or rolled up
- The performance test included time for opening the form plus explicit vs. automatic rollup

Performance Numbers for End User Activities

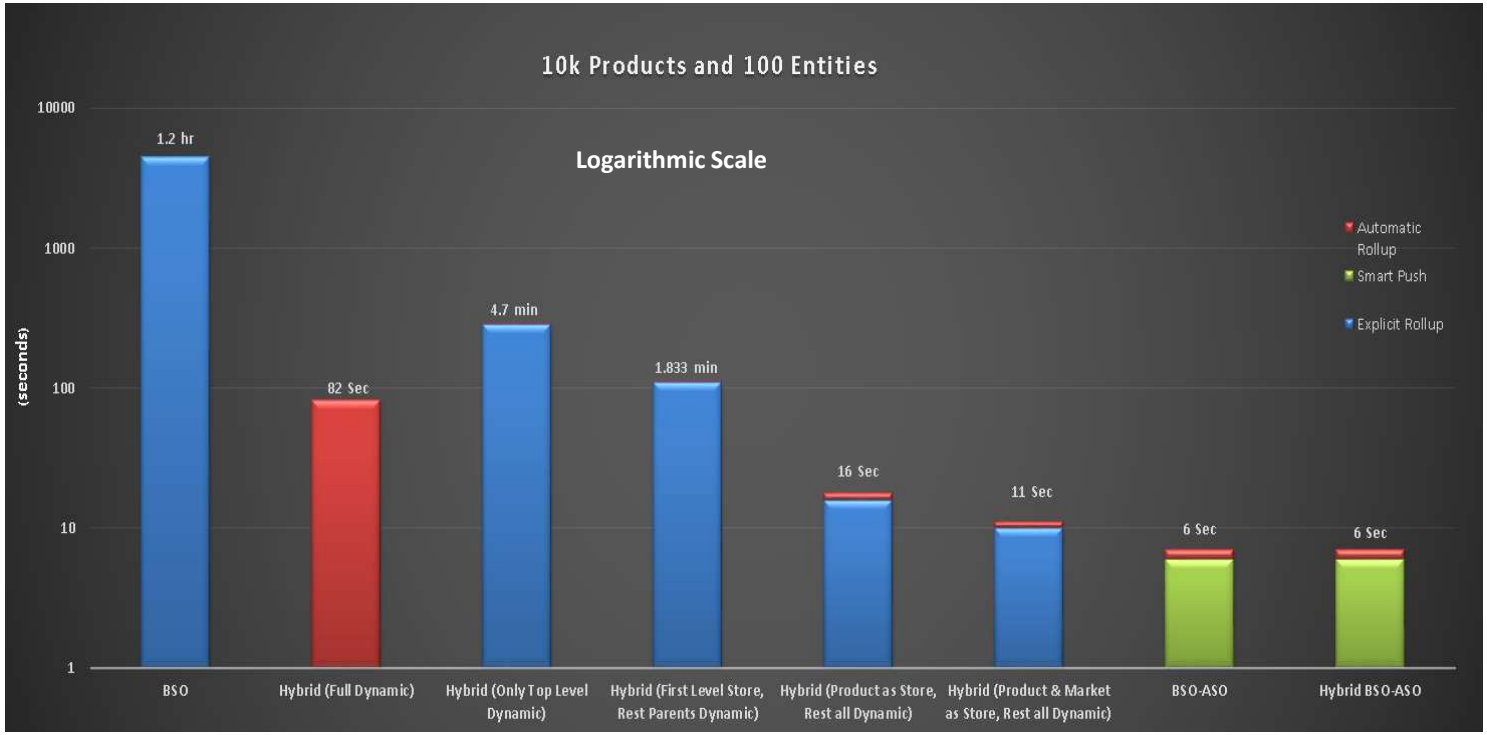
Review “Revenue - Forecast”



- Rolled up 10K Products, 10 Entities, 40 Markets, 10 Services
- Rollup takes significantly less time in Hybrid BSO compared to BSO/BSO-ASO

Performance Numbers for End User Activities

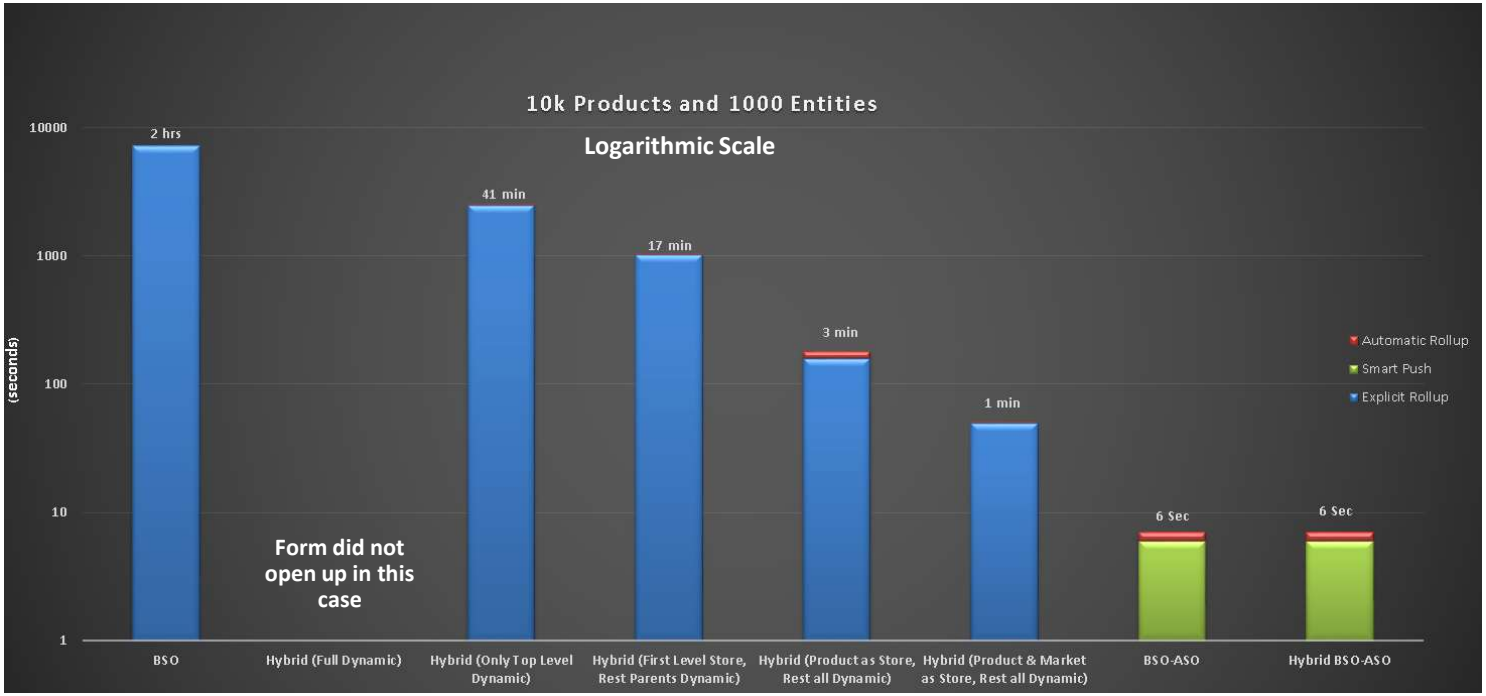
Review "Revenue - Forecast"



- Rolled up 10K Products, 100 Entities, 40 Markets, 10 Services
- Rollup is much better in ASO/Hybrid BSO compared to BSO

Performance Numbers for End User Activities

Review “Revenue - Forecast”



- Rolled up 10K Products, 1000 Entities, 40 Markets, 10 Services
- Automatic rollup in Hybrid BSO doesn’t work in this scenario
- Explicit Rollup for some sparse parents + Automatic Rollup for rest of the parents works better in Hybrid BSO compared to Explicit rollup in BSO
- Rollup takes significantly less time in ASO compared to both Hybrid BSO & BSO

EPBCS Hybrid BSO Tuning Tips

Lots of BSO Tuning Tips apply to Hybrid BSO. However, there are some new considerations as well

Performance Tuning Tip	Exposed/Handled by Oracle Internal		Exposed/Handled by Customer	
	Open Cubes	Seeded Cubes	Open Cubes	Seeded Cubes
Define **Dense** and **Sparse Dimensions** such that ▪ The model produces fewest number of densest blocks ▪ The query and calculation requirements of the business are met ▪ The dimensions tagged as Dense are not very Volatile (to avoid Frequent Dense Restructures) ▪ Don't lead to unnecessary Block Locking ▪ Dimensions with attribute dimension association can't be Dense ▪ Dimensions with formula's are good candidate for being **Dense** **Account & Period are usually dense.**	Yes (Partially)	Yes	Yes (Partially)	No
Block Size should be not too large (too much sparse) or not too small (too much swapping in and out of memory). Typical block size range is between 2KB to 200KB. Determined by number of Dense Dimensions & members in each dense dimension	Yes (Partially)	Yes (Partially)	Yes (Partially)	Yes (Partially)

EPBCS Hybrid BSO Tuning Tips

Performance Tuning Tip	Exposed/Handled by Oracle Internal		Exposed/Handled by Customer	
	Open Cubes	Seeded Cubes	Open Cubes	Seeded Cubes
Dimension Storage ▪ **Dynamically Calculate** as much of the hierarchical aggregation and member formula's as is practical. If the query results into millions of cells being retrieved/calculated, it is not going to perform ▪ **Calculate & Store** when the number of cells required for calculation is too large resulting in unacceptable query performance	No	Yes (Partially)	Yes	Yes (Partially)
Recommended **Dimension Ordering** 1. Dense Dimensions (Dynamic Non-Formula) 2. Dense Dimensions (Dynamic Formula) 3. Sparse Dimension (Calculated and Stored) 4. Sparse Dimension (Dynamic non-formula) 5. Sparse Dimension (Dynamic formula) 6. Sparse Dimension (Parallel task dimension)	No	Yes	Yes	No
Query Solve Order can be set per dimension/member for ensuring accurate results and tuning the performance of calculation scripts (aggregate before calculate wherever possible). The higher the solve order setting for a member, the lower in the order the member is calculated	No	Yes (Partially)	Yes	Yes (Partially)

EPBCS Hybrid BSO Tuning Tips

Performance Tuning Tip	Exposed/Handled by Oracle Internal		Exposed/Handled by Customer	
	Open Cubes	Factory Cubes	Open Cubes	Factory Cubes
Caches ▪ Set **Index Cache** value to minimize the wait time when a new index page is required ▪ Set **Data Cache** value to minimize the wait time when new blocks are required to complete the operation ▪ Set **Calculator Cache** for improving the performance of calculations/aggregations	Yes	Yes	No	No
Form/Report Layout Symmetric vs Asymmetric ▪ Asymmetric grids are broken into multiple Symmetric Grids by Hybrid Query Engine thereby affecting query performance. This is due to the serial nature of asymmetric report processing	No	Yes (Partially)	Yes	Yes (Partially)
Fragmentation can happen because of ▪ Frequent updates to blocks during data load or calculation ▪ Poorly focused use of CREATEBLOCK in calc script **Defragment** regularly using force restructure	No	No	Yes	Yes

EPBCS Hybrid BSO Uptake

Examples of change in behavior in Hybrid BSO

- Function @ismbr doesn't always work, for example, the following member formula for "OFS_Short Term Investment - Calc to Balance" gives wrong result in Hybrid BSO compared to BSO. We had to change "@ismbr(@relative(""OFS_Total Plan"",0))" in line 3 below to @ISIDESC("OFS_Total Plan")

if(@ismbr(@iRSIBLINGS (&OEP_CurYr)))
if(@ismbr(@relative(""OEP_Planned Scenarios"",0)))
if(@ismbr(@relative(""OFS_Total Plan"",0))) ← Changed to if(@ISIDESC("OFS_Total Plan")) in Hybrid
*If((""OFS_Total Current Assets""+""OFS_Total Non Current Assets"")-(""OFS_Total Current Liabilities""+""OFS_Total Non Current Liabilities""+""OFS_Total Equity"")>1) ((""OFS_Total Current Assets""+""OFS_Total Non Current Assets"")-(""OFS_Total Current Liabilities""+""OFS_Total Non Current Liabilities""+""OFS_Total Equity""))*1;*
*endif endif endif en*dif

EPBCS Hybrid BSO Uptake

Examples of change in behavior in Hybrid BSO

- Function “@MEMBER” doesn’t work in XRANGE, for example, the following member formula for “OEP_Projected 12” gives the wrong result in Hybrid BSO compared to BSO. To resolve this, we had to switch to “@MEMBERAT” function for Hybrid BSO.

```
if(@ismbr(@relative(YearTotal,0)))
if(@ismbr(@UDA (Account, Flow)))
@sumrange(""OEP_Rolling Forecast"",@XRANGE(&OEP_CurYr->
&OEP_FCSTMnth,@MEMBER(@nextSIBLING(@CURRMBR(""Years""))->&OEP_CurMnth));
elseif(@ismbr(@UDA(Account,Average)))
@AVGRANGE(SKIPmissing, ""OEP_Rolling Forecast"",@XRANGE(&OEP_CurYr-
>&OEP_FCSTMnth,@MEMBER(@nextSIBLING(@CURRMBR(""Years""))->&OEP_CurMnth));
elseif(@ismbr(@UDA(Account,Balance)))
@MDSHIFT (""OEP_Rolling Forecast"", 1,Years,,1, Period,);
endif
endif
```

Best Practices Monitoring/Enforcement

EPBCS Best Practices Framework

- Ensures Application Health and Optimal Performance by enforcing best practices
- Provides advance warning so that customer can take corrective actions
- Provides suggestions for taking corrective actions and follow best practices

EPBCS Best Practices Framework

The following best practices are monitored/enforced during cube refresh

- Block Size
- Number of Blocks
- Number of dense dimensions
- Max number of child members under any dynamic parent
- Max number of child members under any store parent
- Parents with single children for level 1 and above of dimensions
- Level 1 and above not set to dynamic calc/Label only in Dense dimensions.
- Usage of dynamic x-refs

Apart from this, the following additional best practices are monitored for modules

- Number of new rules that can be added per module
- Number of rules that can be modified
- Number of new forms that can be added per module
- Number of forms that can be modified

Summary

- Hybrid BSO provides multiple options for configuring/tuning applications
- Application size reduces significantly with Hybrid BSO because of dynamic sparse dimensions which has positive impact on performance & usability
- Making all sparse dimensions dynamic can be considered as an option for small size application
- A mixed approach with some sparse dimensions being store or some intermediate parents in sparse dimensions being store gives better performance for large size applications
- Hybrid BSO is definitely better than BSO but does NOT replace ASO for reporting purpose
- For very large-sized applications with large number of reporting dimensions and instantaneous aggregation/reporting requirements, Hybrid BSO- ASO with Smart Push & Aggregate Views in ASO can be leveraged
- EPBCS best practices framework monitors application health & provides advance warnings for taking corrective actions for ensuring Optimal Application Performance

Where to get more information

Steps for enabling Essbase 5xx for moving to Hybrid BSO - 1 of 4

The Hybrid BSO enhancement is available in the latest version [19.06+] of Enterprise Planning and Budgeting Cloud (EPBCS)*. However, this feature requires updating your environment with the latest Essbase 5xx version. Please follow the steps below so that we can update your environment.

*For Planning and Budgeting applications, the Enable Hybrid option is not available. To enable it, you must first convert your application to Enterprise on the Application Overview page. (You need to be licensed for EPBCS to convert from PBCS to EPBCS.) After the conversion, the Enable Hybrid option will be displayed.

1. On your **Test environment**, perform a cube refresh. Then take an LCM snapshot backup of the application on your Test environment and download it locally as a precaution. This is because the service will be recreated with Essbase 5xx Version and the application will be deleted. **Please note that a successful cube refresh must be completed before taking the LCM snapshot backup.**

Steps for enabling Essbase 5xx for moving to Hybrid BSO - 2 of 4

2. Open a Service Request (SR) to request Oracle to enable Hybrid mode for your EPBCS Test environment. Here is the information to include in the SR:

a) Run Provide Feedback from the Test environment for which you want to enable Hybrid mode. Specify that you are providing approval to enable Hybrid mode. Note the UDR filename referenced in the SR.

b) Provide your written permission to enable Hybrid mode: I <Your Name> authorize Oracle to enable Hybrid mode on my EPBCS environment <Service URL> as soon as possible on or after <date>. I know that the environment will be recreated and the application will be deleted, and I will have to either import the LCM snapshot backup that I have or recreate the application from scratch. I also confirm that I have read and understand this best practices document for using Hybrid BSO and know that I will need to redesign the existing application to leverage Hybrid BSO functionality.

3. Support will then open a bug to engage product management and development to approve and process your request.

4. Once your Test environment has been recreated, support will update the SR to inform you.

Steps for enabling Essbase 5xx for moving to Hybrid BSO - 3 of 4

5. You can then import an LCM snapshot backup on the updated environment and verify the application was successfully imported.
6. Next, go to the Application Overview page and select Enable Hybrid. Certain best practice validations will be done as part of this process.
7. Based on the recommendations, you will need to fine tune the application. You can also take advantage of Hybrid BSO by redesigning the application – make members in sparse dimensions dynamic, remove intermediate rollups from rules, and so on.

If you need Hybrid mode enabled on more than one Test environment, repeat the above steps for each of the Test environments to be updated.

Steps for enabling Essbase 5xx for moving to Hybrid BSO - 4 of 4

- If everything works correctly in your updated Test environment(s) and you would like to update your corresponding Production environment(s) with Essbase 5xx version, repeat above Steps 1 – 7 for each Production environment to be updated.
- After your environments have been updated with Essbase 5xx, all monthly updates and enhancements will be available on your Test and Production environments.
- **NOTE**: Hybrid BSO MUST first be enabled and satisfactorily validated in your Test environment BEFORE it can be applied to the corresponding Production environment. You must also confirm the requested environment is properly licensed for EPBCS or you will be subject to auditing procedures.
- Best efforts will be made to approve and upgrade to Essbase 5XX expeditiously but no guarantees are made for the timing of the upgrade. Oracle will commence on or after the date specified. Requests for specific hours cannot be honored.

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