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Association of Info Objects in BW4HANA

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1. Project Background

Client is multinational enterprise information technology company that provides products and services geared toward the data center such as servers, enterprise storage, networking, and enterprise software. Purpose of the project was to move existing Classical BW reports that shows near real time data to real time data reporting using SLT and BW4HANA inbuilt capabilities. This is one of the best approaches to use BW Query and composite provider (BW4HANA objects) as BW shell will add flexibility to do more things.

With Classical BW systems, Business needs to wait at least half a day for BW reports to get refreshed. However, SLT with BW4HANA system capabilities data get refreshed as soon as data enters Transactional systems and available for reporting. Thereby, supports your business users from Finance, Order Management and Delivery to make their tactical decisions on a day-by-day basis

2. Problem Statement

For the Business User to execute the BW report in a reporting tool, selection parameters / filters need to be entered. When user looks up the value for these parameters, value help consumes a lot of time in displaying the list of values. This search is so slow that value help takes loads of time that even for fetching 5 records it takes 10 mins. With increased complex logic, the execution time would increase to display list of values for selection screen. Apart from value help, report also takes lots of time to display the report output.

3. Pre-Requisites

1. SLT setup between S4 and B4 systems so we have live data as soon as it refreshes in source system
2. Models such as Calculation View, Composite Provider and BW query formerly known as Bex Query
3. Analysis for Office tool for reporting purpose.
4. Minimum System requirement: SLT - SAP 7.3 SP 10, HCPR – SAP 7.4 SP 5, BW Query – SAP 7.4 SP 9, BW4HANA Info objects – SAP BW 7.5 SP 0
5. Installation and activation of Standard Info objects using Business Content or creation of Custom Info objects

4. BW4HANA Architecture
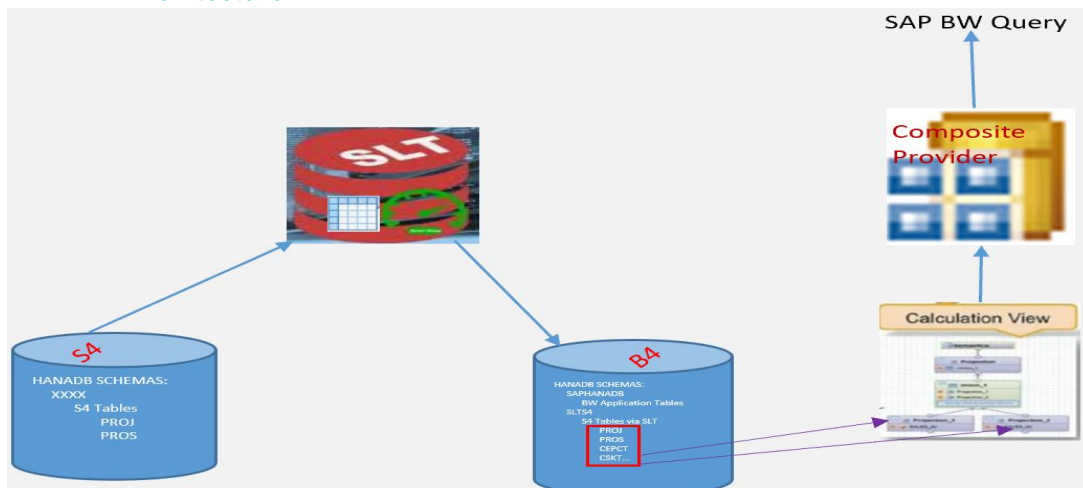
1. S4 HANA tables are replicated to BW4HANA data base
2. Calculation Views are created on BW4HANA data base to leverage in memory concept and faster data retrieval
3. Calculation based models are then consumed to BW4HANA through Composite provider for further cleansing and transformation

    4.   Composite Provider data is then consumed to create BW Query. AFO is used as reporting tool

5. Key Terms

1. Info object – Smallest Unit in SAP BW. Info objects are used to store Master data (something which do not change frequently)
2. HANA Calculation View – Virtual data objects that helps you create information view on data base itself. It helps calculate data on the fly to cut down unload and reload phases to zero when it comes to business-related changes in data staging or extension/reduction in a data model. It also keeps your operation costs for SAP HANA at a minimal level because less data in an SAP HANA database means less expense for licensing. Also, the virtual aspect of this model ensures there is no redundant data lying at multiple places in BW
3. Composite Provider / HCPR – Virtual BW data object that helps you union or join more than one info providers (on which you can create reports) to design complex business scenarios. A Composite Provider is an Info Provider, which combines data from several analytic indexes or from other Info Providers (by Join or Union) and makes this data available for reporting and analysis. UNION and JOIN operations are executed in HANA and not on application server, thereby increasing the model efficiency and faster execution time
4. BW Query – BW4HANA based query to create data models or queries
5. SLT – SAP Landscape Transformation is a trigger-based data replication method in HANA systems in real time
6. SID – Surrogate ID also known as SID is an integer value which is assigned to each master data value. Thereby, value search help access is much faster
7. Association define relationship between entities i.e., it allows you to inherit properties from the associated object, assign additional key fields (compounding) and use texts and navigation attributes of the associated objects in queries. We can also Authorize by enabling Authorizing relevant property of IO. Other operations include Restricted KPIs, Calculated KPIs, compounding objects, transitive attributes, master data access at report runtime etc.
8. AFO – SAP Analysis for Office commonly known as AFO is an Excel add-in (reporting tool) that helps you analyze data and helps in decision making

6.Solution Overview

Calculation Views and Composite provider helps us implement Mixed modelling in BW4HANA where a model from Native HANA (Calculation views) is exposed to BW object (Composite provider).

Calculation views aids in implementing logic directly on data base layer, thereby reducing execution time by eliminating the need to push the data to application layer. It helps calculate data on the fly to cut down unload and reload phases to zero when it comes to business-related changes in data staging or extension/reduction in a data model. Unlike Classical BW systems there is no need to clear delta queues whenever there is a change in logic which facilitates zero downtimes during go live.

Composite Provider helps us combines data from several analytic indexes (Calculation Views in our Scenario) or from other Info Providers (by Join or Union – Info objects in our Scenario) and makes this data available for reporting and analysis. UNION and JOIN operations are executed in HANA and not on application server. CP also help us implement complex logic such as Key and Text display for field, Attributes of Info object.
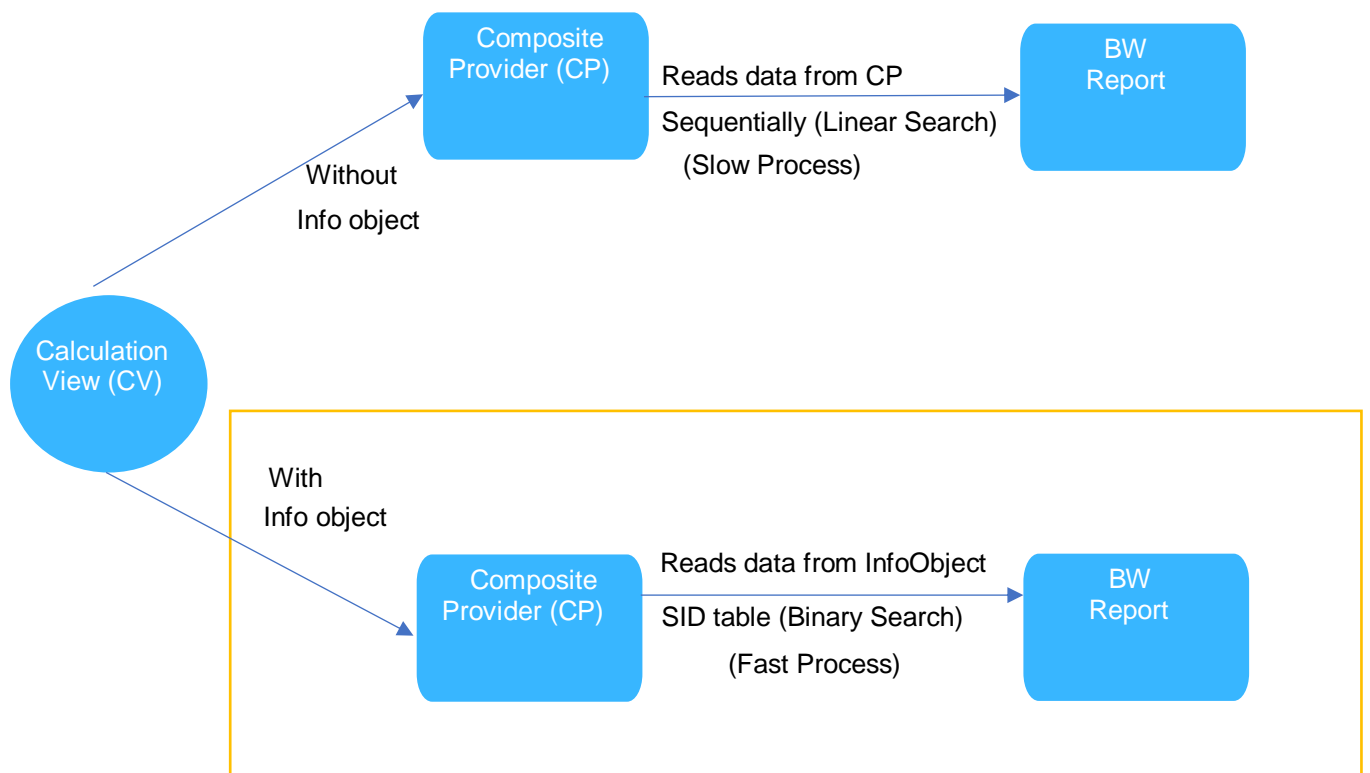
Image: Flow of data with / without Info object

6.1 Process Steps

1. In the Client environment, BW4 report should be executed using AFO tool
2. Input User selections when prompted, this would help us restrict data from getting picked from S4 system
3. Input entered through User Selections would then traverse in reverse order from Query -> CP -> CV
4. Data is then picked up based on logic implemented in CV. It is further restricted based on logic implemented in CP and Query
5. When data is pushed using Conventional approach (CV -> CP-> Query), it takes a lot of time to search relevant data as Linear search algorithm is applied and value help field executes implemented logic each time to pull list of values
6. When CP fields are associated with Info objects, an integer value is assigned to each master data value in an Info object. Thereby, value search help access is much faster
7. If the data is loaded for first time or new data is loaded, then SID values are generated for all those newly created data traversing through Info object

7. Benefits

1. If field-based approach is used in the query definition, the OLAP cache cannot be used that helps in faster data retrieval
2. If fields from InfoObject are used as navigation attributes based on an SAP HANA view in Composite Providers, performance will be impaired when processing the query filter on them in SAP HANA
3. If fields are used in the query, the Info Providers can only be read sequentially
4. Info object-based approach we can leverage the Info object Hierarchies, Text, Display and Navigational attributes that enhances the existing raw information

5. Restricted KPIs, Calculated KPIs which plays important role in Key figure information requires Info object filtering. With info object association this data search would be faster
6. Data prompted for User Selection is fast as it gets all data from SID table of Info object
7. Dynamic join is improved as Info object association can help us process complex OLAP operations and larger volumes of data

No of records	Value help execution time without Info object	Value help execution time with Info object	% Time reduction
4	3 min	4 sec	98%
10 K	10 min	8 sec	99%

8. Accomplishments and Lessons Learnt

1. Ability to prompt user selection with much lesser execution and loading time
2. Enhanced User Experience
3. Improved performance in executing complex process and larger volumes of data
4. By implementing this solution, we have reduced total loading time from 6-8 mins (with minimal filters) to 5-10 seconds (with medium or high filters) ~98% time reduction
5. Dynamic Join, Restricted KPIs, Calculated KPIs filter time reduced from minutes to seconds
6. Since the data is pulled from SID table of InfoObject and not sequentially from CP, the data dumping and execution time is improved with greater extent. As a result, Query display list of values in value help in seconds even for thousands of records
7. Reduced User Maintenance – There is no need to associate fields with Info Object at CP & re-create Variables, Restricted KPIs, Calculated KPIs Query level
8. Use Custom Info object wherever Standard SAP Info objects can not suffice the requirement to achieve improved performance results
9. When operating in a shared environment, clear communication between different project teams and a governance model around enhancing standard Info objects is key to maintaining the integrity of the existing reports. In situations like this, existing reports that consume these enhanced standard Info objects would also need to be enhanced and regenerated before they are operational

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