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SAP Environments

OUTLINE

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1 Executive Summary

As a consequence of the acquisition of Business Objects, SAP has shifted its SAP BW strategy to a more open data warehousing approach and is now focusing on the former Business Objects portfolio. In this context the widely used SAP BW frontend tools for reporting, analysis, and planning are not seen as strategic anymore and are replaced by the BusinessObjects BI products. The new Business Intelligence (BI) roadmap forces SAP customers to redevelop their existing BI strategy. The SAP roadmap has to be translated into a company specific roadmap for introducing new front-end solutions from SAP or a third-party BI vendor since there is no automated migration to SAP BusinessObjects products or any other BI tool. Also, the overall data warehousing architecture should be put to test to determine the most fitting approach to companies' requirements in light of the new options SAP offers next to the traditional SAP BW data warehouse application.

This guide is designed to help existing SAP BW customers to plan to move to the new BI environment. Most of the new opportunities arise from the more open and comprehensive architecture compared to the previous SAP BW environment.

The most important architecture options for a data warehouse strategy are outlined and evaluated in this guide: a SAP BW-only environment, a completely non-SAP DW environment and finally a hybrid environment.

2 Current developments with SAP customers

2.1 SAP BI program evolution

SAP BW. In 1998 SAP launched SAP BW, a packaged BI solution designed to complement SAP's ERP applications. The package contained connectors to SAP ERP modules, a data warehouse management system for storing data in a relational database, subject-oriented data marts, reporting, analysis, and planning tools, and predefined reports. The goal was to provide a plug-and-play BI solution that would make it quick and easy for SAP customers to enjoy the benefits of business intelligence.
However the SAP BW frontend tools (Business Explorer Suite - BEx) did not meet the customer's requirements regarding usability and end user functionality. Furthermore the performance management (PM) tools, bundled together in the product Strategic Enterprise Management (SEM) were often criticized by business users for their limited functionality and flexibility.

Thus in 2007, SAP took a major leap towards delivering a new BI product portfolio with the acquisition of Business Objects. Before the SAP takeover Business Objects acquired several BI and data integration vendors to broaden its BI and PM portfolio.

Table 1: A few of the companies acquired by Business Objects before the SAP takeover (DI = Data Integration, BI = Business Intelligence, ABM = Activity Based Management)

Date	Company	Segment
Jul 02	Acta	DI: ETL
Jul 03	Crystal Decisions	BI: Reporting
Jul 05	SRC	BI: Planning
Oct 05	Medience	DI: EII
Oct 05	Infommersion	BI: Dashboarding
Feb 06	FirstLogic	DI: Data Quality
Sep 06	ALG	ABM

As usual when a competitor is acquired, there is bound to be overlap in the product lines. Furthermore SAP and Business Objects had significant overlap in planning, consolidation, and scorecard products as well as analysis and reporting.

Consequently, SAP issued a roadmap in early 2008 that specifies which products will go forward and which will be discontinued. Briefly, SAP decided to focus future development on the former Business Objects BI product line, discontinue most SAP query and reporting products, and improve the interfaces between SAP BusinessObjects products and SAP BW to improve performance and usability. The figure below shows the BI/PM product portfolio, indicating their origin (SAP for SAP origin, BO for Business Objects origin).

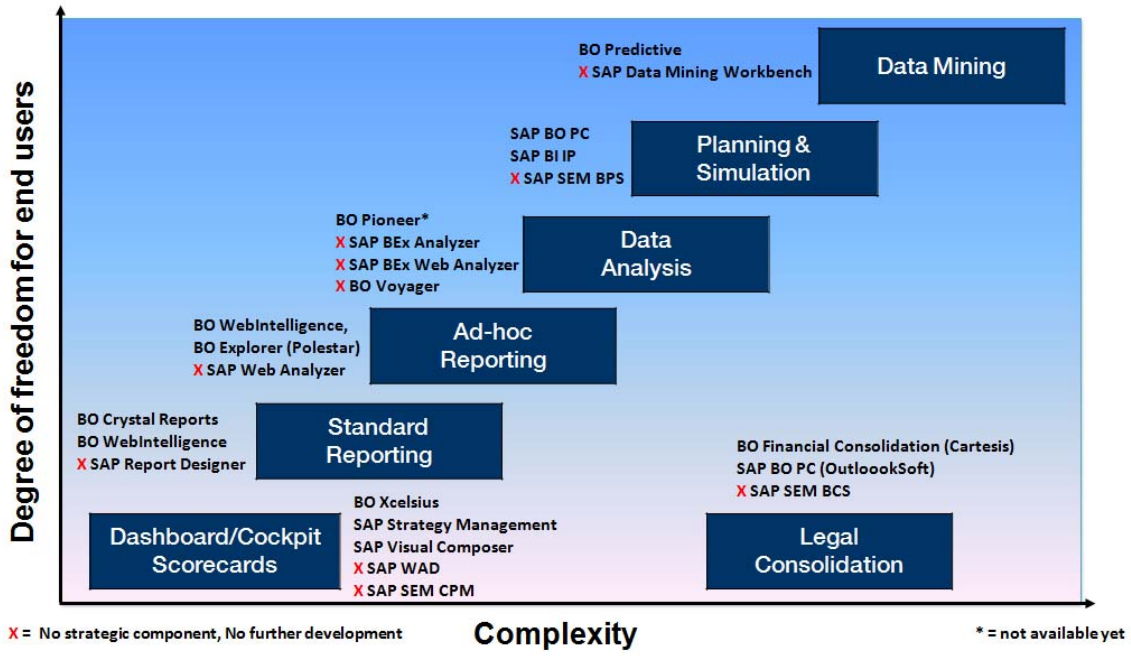

Figure 1: SAP BI/PM product portfolio and overlaps

As a result, SAP customers need to begin planning how to replace components of their existing SAP BW reporting, analysis, and planning environment with new products from the SAP BusinessObjects portfolio or third-party solutions.

More and more SAP customers have begun to shift their SAP-oriented strategy, which defined SAP tools as default, to a best-of-breed approach which takes all relevant BI tools on the market into account. A key driver of this trend is the fact that the new SAP BusinessObjects products incur additional license and migration/transfer costs. Often SAP customers put SAP BusinessObjects on a short list next to additional BI suites like IBM Cognos or MicroStrategy.

2.2 Opportunities for SAP Customers

SAP's strategy change has resulted in a more open discussion between SAP and its customers regarding BI in many respects.

Openness. SAP customers recognize that business users need to access information stored in multiple systems and locations to make effective decisions. Rather than using multiple tools to access different data sources, BI tools have to enable business users to access any data source they desire. For example, business users can query SAP BW as well as third party relational and multidimensional data sources and combine the result sets in a single report. The new strategy opens SAP up for additional architecture options, which have already been propagated by third party BI providers for many years. The three major options are outlined on page **Error! Bookmark not defined.**.

Comprehensiveness. State of the art BI portfolios contain tools for standard reporting, ad hoc reporting, analysis and dashboards, as well as budgeting and planning. Additional components for strategy management, legal consolidation, and profitability and cost management complete the picture. Modern BI platforms show clear advantages compared with the old SAP NetWeaver BW toolset. Enhanced functionalities, a better usability and a broader set of tools to choose from provide potential to meet customer requirements better.

Common architecture. Some BI suites have a common architecture to simplify administration, reduce costs, and enhance usability. For example, tools in a BI suite often share a common semantic layer, portal, security model, and look and feel.

Semantic Layer. BI products like SAP BusinessObjects, IBM Cognos or MicroStrategy use their own semantic layer to promote reuse of queries and allow self-service BI. The semantic layer defines a set of query objects in business terms that shield users from the complexity of back-end databases. Developers and casual business users then drag-and-drop these query objects into a panel to create queries, reports, dashboards, and analyses.

User roles. The ability to tailor BI solutions to roles, such as "IT report creator", "business report creator", "business analyst, "report viewer" and "business explorer". Each role corresponds to a different tool or set of functionalities in the BI portfolio. In

addition, administrators can restrict access to data and functions of each tool based on roles.

Heterogeneous Data Access. Modern BI suites enable users to easily access almost any relational or multidimensional data sources via the semantic layer. Consequently, users can combine data from multiple sources in the same report or even the same table.

Performance. From the architectural point of view BI suites can deliver significant improvements in analysis and reporting performance. In-memory databases like the SAP BW Accelerator (BWA), IBM Cognos TM1 or Microsoft Analysis Services can increase analysis and reporting performance significantly compared to a SAP BW implementation.

2.3 Challenges for SAP Customers

BI Migration. SAP customers need to redevelop their existing BI front end solutions (e.g. reports and applications) on a new platform in the not-too-distant future. The reason is that there is no automated migration from BEx to SAP BusinessObjects or any other BI solution. SAP has stopped enhancing its existing SAP BW reporting, analysis, and planning tools and will discontinue supporting them some time between 2015 and 2017. As a result, SAP customers will need to purchase and deploy new BI tools from SAP or third-party vendors. Although specific reporting objects like BEx query definitions can be reused, many parts of existing applications and reports will have to be rewritten.

DW Architecture. Another consequence of the new roadmap is that SAP customers now have many more options in the architecture of their data warehousing environment. This includes Information Management functionalities, which SAP supports with several tools such as MDM and Data Services for data integration purposes. Although SAP will continue to enhance and support SAP BW, customers can now create a data warehouse or data mart on a third party platform, if they so desire. They are no longer confined to using SAP BW as a DW platform. In contrast to its past policies SAP does not exclusively recommend SAP BW as the main data store for reporting, analysis and planning. As the SAP BusinessObjects BI suite is able to access different data sources, SAP now suggests considering different architectural approaches dependent on the customer’s situation.

3 Architectural Options for Data Warehousing with SAP

For years SAP focused on SAP BW as the only BI platform for SAP customers. However SAP customers had difficulties incorporating data from non-SAP applications into SAP BW. But even before the acquisition SAP customers had a variety of options to manage their data for analysis and reporting purposes. Now they are becoming more and more aware of them.

The three basic technology options that SAP customers have to create a data warehouse for all enterprise data (or enterprise data warehouse – EDW) are:

1. SAP BW only,
2. Standard databases only, or
3. A hybrid approach.

3.1 SAP BW only

The "SAP BW only" option defines SAP BW as the organization's technology choice to providing the single source of shared information across the organization.

SAP's Business Content for SAP BW provides standard connectors to SAP ERP sources that simplify the process of accessing and loading SAP ERP data and provide predefined data models and reports. The packaged approach also provides integrated monitoring and metadata management for creating and maintaining the EDW environment. Customers can use additional data integration solutions to extract data from SAP and non-SAP data sources for SAP BW.

Companies should adopt this approach when they

- are committed to SAP as a strategic platform for both operational and analytical processing,
- populate their data warehouse with a high proportion of data from SAP ERP applications and without greater requirements for non-SAP data integration,
- have substantial SAP BW expertise on staff, or
- have transactional SAP systems (ERP, CRM…) which match the standard business content available in BW without extensive use of custom extensions, programs and tables.

Pros

- Business Content: Broad set of predefined connectors and data models for SAP source systems (ERP, CRM, …)
- BW as framework for other SAP applications (e. g. SEM BCS, CRM)

- One vendor strategy

Cons

- Effort required to integrate heterogeneous non-SAP data sources
- Weaknesses managing large data volumes
- Complex SAP BW interfaces for third party BI and PM products (OLAP BAPI, ODBO or XMLA)
- Good performance requires either high costs (BW Accelerator) or high efforts (aggregate maintenance, cache pre-calculation)
- Missing features (e. g. simulation, end user flexibility)

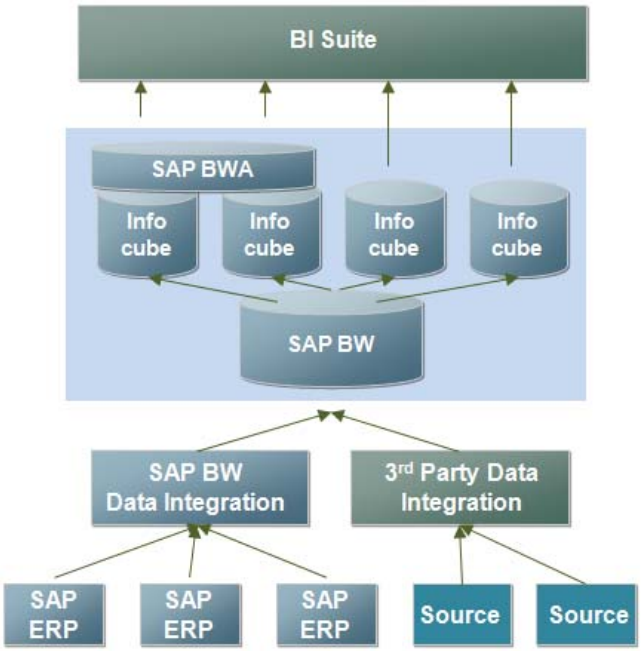

Chart 2**:** SAP BW only architecture

This option is widespread in current SAP BW landscapes and is good for SAP users that are mainly interested in analyzing data from their SAP ERP environment.
According to the BI Survey 8 most SAP BW customers load their data from SAP ERP systems, while about 86 percent of BW data is loaded from SAP ERP applications.

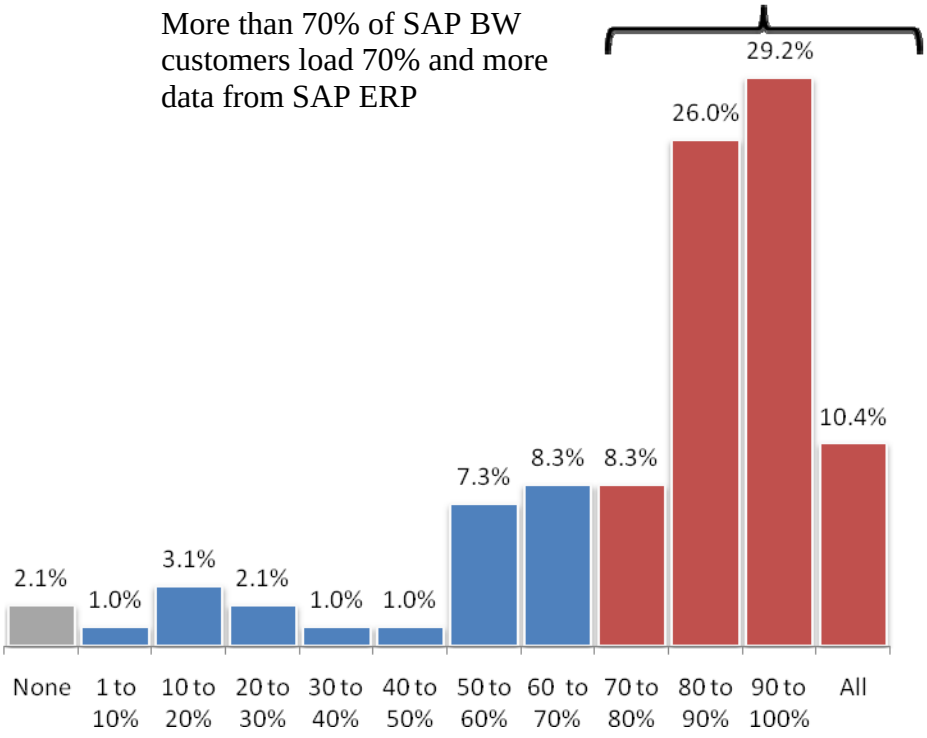

Chart 3: Percentage of SAP BW data originating from SAP ERP (Source: BI Survey 8)

However, most companies have applications and data sources in addition to SAP which have to be integrated for a comprehensive BI/PM strategy. Such non-SAP data is often processed into separate data warehouse solutions next to SAP BW. In order to cope with both SAP and non-SAP source data in an EDW approach the following options should be evaluated.

3.2 Standard Databases only

To ensure a single version of truth, organizations can gather all the data they want to analyze in an EDW. This data is stored in a standard relational (like Oracle 11g, IBM DB2 or Microsoft SQL Server) or a specialized data warehouse tool (like Teradata, Netezza or Sybase) . Optionally these tools can be combined with multidimensional databases such as IBM Cognos TM1 or Microsoft Analysis Services. These organizations may use a dedicated data integration solution to fill the EDW with data from SAP or non-SAP applications.

This option is good for organizations which

- have a significant amount of source data that runs on standard databases and non-SAP solutions
- have internal experts who know how to manage the standard database platform,
- want to reuse existing data models created outside of SAP or standardize on data modeling tools, notations, and documentation across the organization,

- have third party reporting and planning tools that run best against a standard database,
- have high volumes of data, or
- need a data warehouse that serves as a data hub to support a large number of non-SAP data marts and applications.

Pros

- Better scalability and performance options (data, users)
- Flexibility (data integration, data modeling, data management)
- Openness (best of breed approach possible in all layers)

Cons

- Business Content: limited predefined content for SAP data sources available
- Changes from SAP ERP patches/releases have to be handled manually or with third party solutions
- Weaker system integration into SAP environment

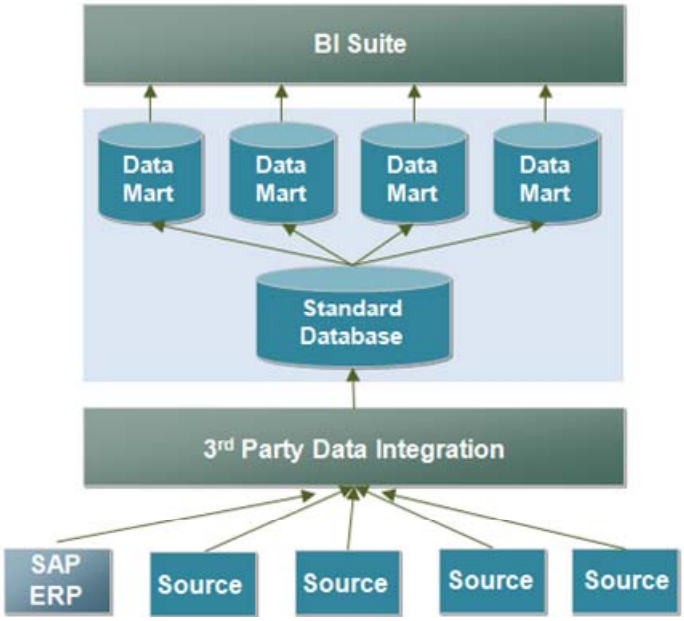

Chart 4**:** Standard DB only architecture

This option is good when organizations have a significant amount of non-SAP data sources to be integrated in an EDW. It also provides a significant increase of flexibility through all layers (data integration, data modeling and data management) and enhanced scalability and performance options compared to SAP BW (dependent on the chosen technology). However due to limited predefined connectors for SAP data sources that other data warehouse solutions provide the integration of SAP systems is not as comfortable and easy as with SAP BW. Data warehouse solution providers like Oracle, Microsoft or IBM cover all layers in their portfolio, but are also more open to other BI solutions than SAP BW does with its very specific interfaces.

3.3 Hybrid approach

Hybrid approaches mix and match SAP BW and standard databases to create an EDW environment that delivers a single version of truth. There are two major types of hybrid EDW environments which are often discussed by SAP customers.

3.3.1 SAP BW plus additional DB

One option has SAP BW serving as the platform for the EDW and dependent data marts run on additional databases. In this environment, all data marts are created from the data in the SAP BW EDW, ensuring information consistency. Organizations can use different options to extract data from SAP BW such as the Open Hub or BAPI interface. However SAP claims additional license fees for the Open Hub service for users accessing one or more data marts that do not have a SAP BW license. Many SAP customers avoid these license fees by acquiring additional SAP BW licenses for these users.

This option is useful for SAP customers who

- already have a SAP BW EDW but need specific technologies to support a data mart, such as a planning application that requires a multidimensional database or analytical applications based on standard relational or multidimensional databases.

Pros

- More choice on the BI front-end level
- Flexibility for business users on data mart level (data modeling)
- Applications can run in parallel to meet specific requirements (write back, performance, etc.)
- SAP Business Content can be used
- Clear data logistics despite mixed usage of technology options

Cons

- Effort required to integrate heterogeneous non-SAP data sources
- Weaknesses managing large data volumes
- Two different environments result in greater effort for modeling, administration and running
- Complex SAP BW interfaces for third-party BI and PM tools (OLAP BAPI, ODBO or XMLA)
- Additional data management processes necessary
- Possibly additional license costs for SAP BW Open Hub service (depends on the scenario)

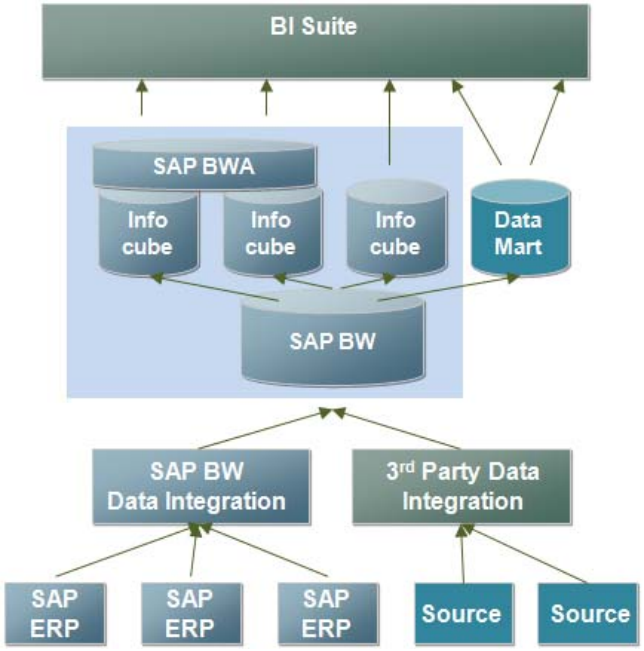

Chart 5**:** SAP BW plus additional DB

Similar to option 1 (SAP BW only) this option is good for SAP customers that are focused on analyzing data in their SAP ERP environment. Additional data marts provide more flexibility, performance and functionality in areas such as planning or special analytical scenarios which SAP BW alone cannot support sufficiently. The disadvantages of SAP BW managing large data volumes and integrating heterogeneous data sources also apply here.

3.3.2 SAP BW as Staging Area

A second hybrid approach uses a standard database as the platform for the EDW and draws data from SAP BW and other sources. Here, SAP BW serves as a staging area for loading SAP ERP data into an EDW environment. This enables SAP BW customers to make use of the good data acquisition capabilities from SAP ERP system and to preserve part of their existing investment in SAP BW. However SAP claims additional license fees for the Open Hub service for users accessing the EDW environment that do not have a SAP BW license. Many SAP customers avoid these license fees by acquiring additional SAP BW licenses for these users.

This option is useful for SAP customers who

- have already a data warehouse based on a standard database and have to integrate and analyze SAP related data residing in SAP BW
- have to consolidate two BI environments and want to keep existing SAP connectors and data models in SAP BW

Pros

- Better scalability and performance options (data, users)
- Flexibility (data integration, data modeling, data management)
- Openness (best of breed approach possible in all layers)

- Business Content: pre-built SAP extractors can be used to get the data out of SAP ERP

Cons

- Maintenance of two different environments results in greater effort for modeling, administration and running the system.
- Additional data management processes necessary
- Possibly additional license costs for SAP BW Open Hub service (depends on the scenario)

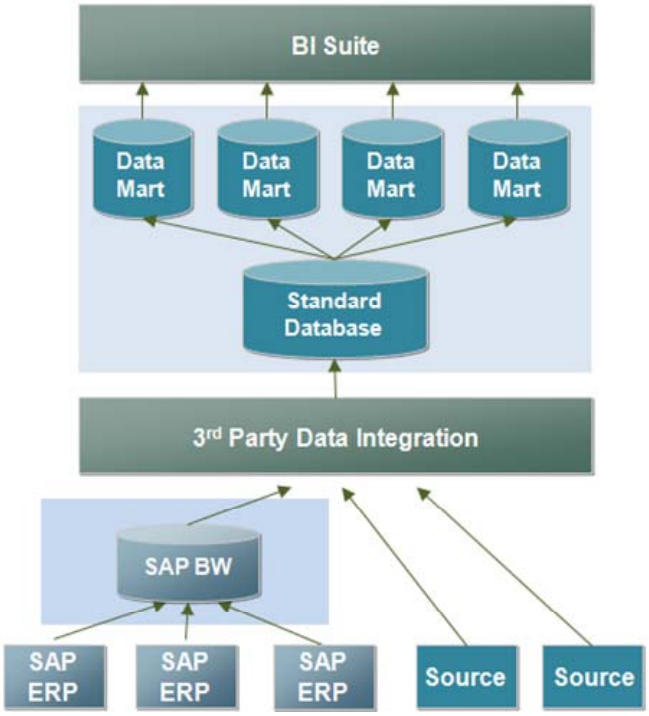

Chart 6**:** SAP BW as Data Stage for Standard DB

This option is good for SAP customers to protect their SAP BW investments but also move towards an EDW approach incorporating all relevant data sources. It combines the advantages of SAP BW and its good integration into SAP systems with the advantages of a standard database providing flexibility and scalability options required for EDW approaches. However two different environments have to be maintained. Furthermore data management including the data coordination between SAP BW and the EDW result in greater efforts for modeling, administration and operation. But this greater complexity is less of an issue for SAP customers who already have the appropriate experience running a standard database and handling the underlying technology, which we found is often the case with SAP clients.

4 Summary

The variety of architectural options described above shows that SAP customers have several choices running a data warehouse, in addition to a SAP BW pure play. SAP customers should evaluate their current situation, system landscape and data warehouse requirements before making any decision about the architecture. The main influencing factors in this context are available know-how and licenses, the variety of source data to be integrated into the data warehouse. The proportion of SAP source data and the current state and maturity of the SAP BW implementation are of particular interest here.

The simple option of putting a new BI frontend suite on top of SAP BW will definitely enhance frontend capabilities, but SAP BW limitations will still exist in the areas of data integration, data modeling and data management.

An architecture based on a standard database provides enhanced flexibility and scalability options through all layers but will probably frighten off SAP customers as a complete migration from SAP BW to this approach would require a great deal of effort.

Hybrid options are more flexible on all layers while still protecting investments made in SAP BW. In a hybrid scenario SAP customers can follow a best-of-breed-approach to build an EDW. This would allow them to choose the most appropriate tools and architecture while maintaining the original SAP BW environment. SAP customers using a hybrid approach are not forced to replace SAP BW completely. At the same time the more flexible and holistic hybrid approach enables SAP customers to enhance their BI landscape to fit their EDW requirements.

In this context third-party tools, such as Microsoft or IBM Cognos products, should be considered alongside the SAP BusinessObjects solutions to optimize investments in a new EDW landscape.

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