

# Methods of Integrating SAP BW with Cloud Services

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## ABSTRACT

In modern business, integration of local systems with cloud services is increasingly used to improve the efficiency of data processing and decision-making. The article discusses various approaches to integrating SAP Business Warehouse (SAP BW) with popular cloud platforms such as Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform (GCP). The main focus is on analyzing the advantages and disadvantages of various integration methods, including the use of API interfaces, middleware solutions, as well as native SAP tools. The issues of data security, performance and scalability of integration solutions are also considered. The results of the study show that the correct choice of the integration method depends on the specific needs of the business, the architecture of the IT infrastructure and the development strategy of the organization. The work is aimed at providing recommendations for IT specialists on optimizing the processes of integrating SAP BW with cloud services.

**KEYWORDS:** SAP BW integration, cloud services, services, SAP BW integration methods, SAP BW integration with cloud services.

## INTRODUCTION

In the rapidly evolving landscape of information technology and the increasing volumes of data, companies are faced with the necessity of effective management and analysis of business information. SAP Business Warehouse (SAP BW) stands as a key tool for integrating, storing, and analyzing data, providing business users with analytical information essential for informed decision-making. However, traditional on-premises data storage systems often fall short of meeting the modern business demands for flexibility, scalability, and processing speed. In this context, the integration of SAP BW with cloud services such as AWS, Microsoft Azure, and Google Cloud Platform becomes particularly relevant. The primary challenge lies in selecting the optimal integration method that ensures high performance, security, and scalability. The exploration of methods for integrating SAP BW with cloud services aims to address these challenges, offering businesses innovative approaches to enhance data management efficiency and adapt to the ever-changing market conditions.

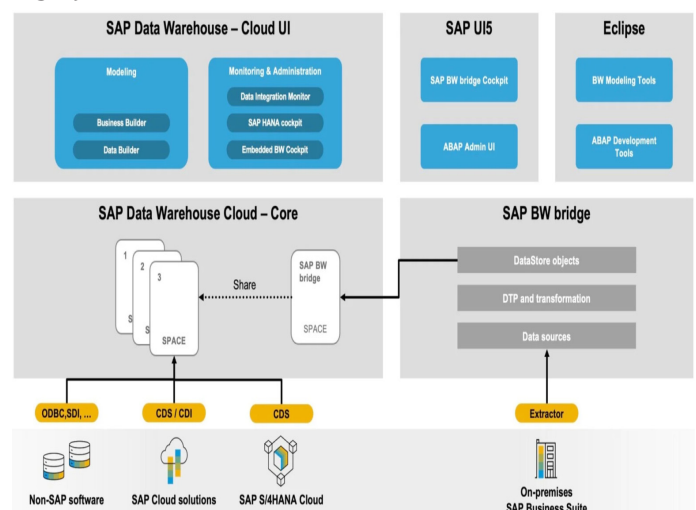
The purpose of this article is to examine the methods of integrating SAP BW with cloud services.

### General Characteristics of SAP BW

SAP BW/4HANA is a data warehouse package based on SAP HANA. As an on-premises data storage layer of the SAP

Business Technology Platform, it enables the consolidation of data across the enterprise to provide a consistent and unified view of data [1].

As a means of enhancing integration with SAP ERP systems, the SAP BW bridge offers capabilities for data extraction and storage based on ABAP in the SAP data warehouse cloud (see Fig. 1).



**Fig.1.** SAP Data Warehouse Cloud, SAP BW bridge. Overview of data integration [2]

In the future, a tool-based transfer of existing SAP BW and SAP BW/4HANA scenarios will be implemented.

Subsequently, the SAP BW bridge will ensure the smooth migration of existing ETL processes to the dedicated SAP BW bridge space in the SAP Data Warehouse Cloud. Here, the extensive ODP extractor functions and ABAP code in the ABAP environment of the SAP Business Technology Platform (SAP BTP) can be integrated into the SAP Data Warehouse Cloud using the Cross-Space-Sharing approach.

In the SAP BW bridge, clients can implement data extraction and preparation scenarios up to the CompositeProvider level. In other words, it is not possible to create new queries in the SAP BW bridge environment. Consequently, the SAP BW bridge lacks support for the OLAP engine and OLAP-dependent functionality (e.g., analysis authorizations, query as an information provider, query execution). Front-end tools cannot directly access SAP BW bridge artifacts (see Fig. 2).

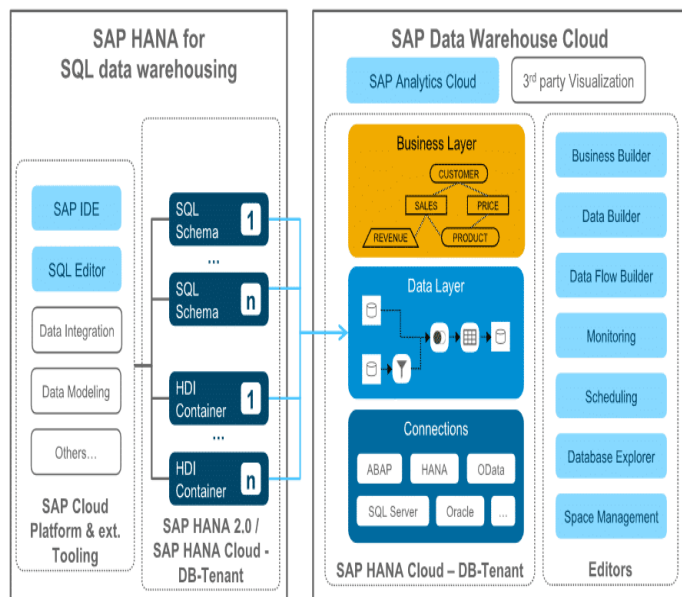


Fig.2. Future modeling capabilities in the SAP Data Warehouse cloud [2]

The SAP BW bridge environment is primarily intended for source systems based on ODP, meaning that connection scenarios are available only through Operational Data Provisioning (ODP). Non-SAP sources will be directly connected to the SAP Data Warehouse Cloud (see Fig. 2). Objects from SAP BW source systems will be transformed into the SAP BW Bridge environment using transformation tools, including SAP BW queries.

To fully leverage SAP’s data storage offerings, clients currently need to deploy both SAP BW/4HANA and SAP Data Warehouse Cloud. In the future, the SAP BW bridge will allow clients to unify these offerings into a single cloud data storage solution. With the SAP BW bridge, SAP addresses the needs of BW clients seeking a path forward from SAP BW NetWeaver and SAP BW/4HANA (see Fig. 3).

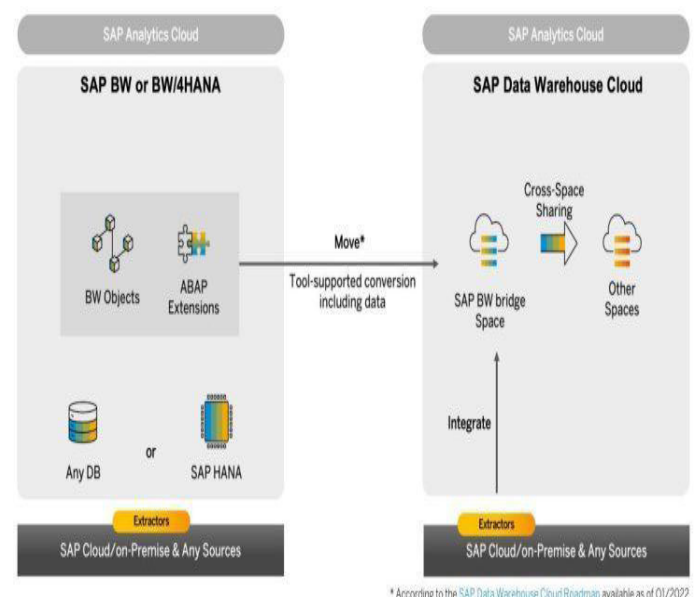


Fig.3. Future modeling capabilities in the SAP Data Warehouse cloud [2]

The functional areas of SAP BW are presented in Table 1.

Table 1. Functional areas of SAP BW

Function	Description
Data Warehouse Construction	Building data warehouses in SAP BW enables the integration, transformation, consolidation, cleaning, and storage of data. This also includes data extraction capabilities for analysis and interpretation. The data warehouse management process involves data modeling, data extraction, subsequent data processing, and administration of data warehouse management processes. The key tool for data warehouse management tasks in SAP BW is the Data Warehousing Workbench.
Analytic Engine	The analytic engine provides OLAP functions and services, as well as services for integrated planning (BW Integrated Planning).
SAP Business Explorer	SAP Business Explorer tools include querying, reporting, and analysis functions. Authorized users can analyze past or current data at various levels of detail and from different perspectives for both web applications and Microsoft Excel. These tools can also be used to create planning applications and to formulate plans and input data into the BW Integrated Planning system. BEx Information Broadcasting tools are used to distribute content from business analysis tools via email, such as in the form of historical data documents or links to real-time data. Data can also be published to a portal.

Interfaces	SAP BW provides an open architecture in various areas: data can be extracted from different systems into SAP BW and analyzed to generate reports using various client software tools.
Using SAP HANA Database	Using SAP HANA as the database for SAP BW allows for efficient query processing and data loading processes into the warehouse. By replacing old databases, SAP HANA also replaces the SAP BW Accelerator system, thus simplifying administration and the infrastructure itself [3].

### Integration of SAP Analytics Cloud with SAP BW — Best Practices

In the modern business environment, many companies aim to realize the benefits of transitioning to the cloud. As SAP clients look to migrate on-premises technologies to the cloud, one of the frequently discussed existing enterprise data warehouses is SAP Business Warehouse (SAP BW), especially since SAP plans to end support for SAP BW 7.5 by the end of 2027 and discontinue its support entirely by the end of 2030. With these deadlines approaching, it is crucial to understand how to migrate SAP BW to the public cloud using SAP DWC.

Companies utilizing BW are actively seeking new ways to support their enterprise data warehouses. With the advent of BW Bridge, several effective options are now available. BW Bridge creates a link between on-premises SAP BW systems and DWC. It is designed to allow clients with BW 7.3 and above to reuse their existing models, transformations, and settings in SAP Data Warehouse Cloud, thereby minimizing the time to value and leveraging their existing SAP BW investments. SAP offers a new way to adapt to the cloud by providing familiar tools that easily extend clients' access to new data sources.

With full functionality that can replace BW, clients can plan a greenfield implementation using BW Bridge and DWC. Using SAP HANA Studio or Eclipse, a BW Bridge project can be created. Subsequently, InfoAreas or InfoCubes can be set up accordingly. BW/4HANA clients are unlikely to notice any difference from their usual modeling processes, as this functionality has remained largely unchanged. Once the details are configured, clients can move to DWC and work in the dedicated BW Bridge space to import and deploy tables in the data builder section. After these tables are shared, they can be used in regular DWC spaces for further tasks. Finally, in SAC, a story can be created and connected to DWC spaces using BW metadata tables. After this, SAC can generate the necessary reports based on BW data.

As SAP continues to invest in DWC and enhance the features surrounding the tool, this SaaS software will continue to provide additional value to clients. Although BW Bridge is part of DWC, its pricing is determined by a separate but similar model to DWC. Using the SaaS consumption model, clients will pay for the required storage.

Protiviti understands that an organization's data is crucial to its success. However, as companies generate more and more data every day, the challenge of managing this data and

transforming it into valuable business analytics becomes increasingly difficult to address. Our data management team offers insights that help organizations throughout the entire information lifecycle, including strategy, management, and reporting, to ensure that decision-makers have the right information at the right time [4].

When discussing methods for integrating SAP BW with cloud services, various methods and tools are used to ensure efficient and secure data management. These include:

1. SAP Cloud Platform Integration (CPI): CPI enables ETL (Extract, Transform, Load) tasks to move data between on-premises systems and the cloud. CPI uses REST APIs for integration with SAP BW/4HANA, creating connections via HTTPS and RFC. To configure integration, a DataStore object must be created in SAP BW/4HANA, and integration flows need to be set up in CPI.
2. SAP Data Intelligence: This tool is used for integrating and processing data from various sources, including cloud services. SAP Data Intelligence automates ETL processes and manages them using metadata and data catalogs. Integration with SAP BW is achieved through REST APIs and Smart Data Integration (SDI).
3. SAP BW Bridge: SAP BW Bridge provides integration with SAP Datasphere (formerly known as SAP Data Warehouse Cloud). This solution includes creating a dedicated space in SAP Datasphere that connects to SAP BW via Smart Data Access and HTTP ABAP. Data from SAP BW becomes accessible as remote tables, which can be used in other SAP Datasphere spaces.
4. Using OData Services: For integration with SAP cloud applications (e.g., SAP SuccessFactors, SAP Ariba), OData APIs are often used. These APIs provide a standard way to extract and load data into SAP BW/4HANA, allowing the use of SAP Cloud Platform Integration or SAP Data Intelligence tools for data management.
5. SAP Process Integration (PI): SAP PI enables data integration between different SAP systems and external services. In the case of SAP BW/4HANA 2.0, integration can be performed using the HTTP (REST) interface. This allows data to be sent to SAP BW/4HANA DataStore objects without the need for explicit queries, simplifying the data integration process [5].

Integrating SAP BW (Business Warehouse) with cloud services offers significant advantages, making this approach attractive to modern organizations. First, cloud integration



provides increased flexibility and scalability. Cloud platforms allow dynamic scaling of resources based on current business needs. This is especially important when data volumes can change rapidly. Scalability in the cloud enables handling increasing data volumes without significant investments in physical infrastructure, simplifying IT resource management.

Second, cloud service integration leads to cost reduction. Cloud solutions eliminate the need for capital investments in expensive hardware and maintenance, offering instead pay-as-you-go models. This allows companies to pay only for the resources they actually use, which is particularly beneficial for small and medium-sized businesses. Additionally, cloud providers handle infrastructure support and updates, reducing operational costs and freeing up internal resources for more strategic tasks.

Third, an important advantage is the acceleration of solution development and deployment. Cloud platforms provide access to modern tools and services, enabling faster development, testing, and deployment of new applications and analytical solutions. This accelerates innovation processes and allows quicker adaptation to market changes. Moreover, cloud services often offer built-in capabilities for integration with other systems and data sources, facilitating the creation of comprehensive analytical solutions and enhancing their value to the business.

However, this model also has its drawbacks. The main disadvantage is that BW is a proprietary set of tools, and finding BW developers is more challenging than finding programmers for standard SQL data warehouse tools. A major advantage of BW is that once the model is defined, clients gain significant flexibility to make changes to the platform, and the system can utilize new platform features with little or no development costs.

For example, BW clients on BW 7.5 who adhered to a model-based approach could switch between Oracle and HANA databases with relatively minimal disruption. Similarly, when BW clients upgraded their systems to BW on HANA, those who remained with a model-based architecture saw many of their defined data transformations and data activation steps move from application server processing to database processing. This often resulted in noticeable performance improvements. Due to its nature as a model-based toolset, BW was able to make these processing changes without disrupting the defined model's semantics [6].

## CONCLUSION

In conclusion, the conducted study confirms the importance of integrating SAP BW with cloud services for modern businesses aiming to improve data management and enhance IT infrastructure flexibility. The examined integration methods, including the use of APIs, middleware solutions, and native SAP tools, demonstrate various levels of efficiency, security, and scalability. Each method has its advantages and limitations, necessitating careful analysis and selection based on the specific conditions and goals of the company. A significant finding is the necessity of considering security and performance factors when developing integration solutions. The recommendations provided in the article can serve as a valuable guide for IT specialists seeking to optimize integration processes and ensure reliable and efficient IT system operations in a rapidly changing technological landscape.

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