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Capture the potential of
next-generation data warehousing
with SAP BW/4HANA



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Sii SAP Team

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1. Contemporary data management – Big Data

By the term Big Data, we refer to vast amounts of data, often from new sources, characterized by high diversity and speed of growth. We are already talking about zettabytes of data, which are impossible to process through traditional software due to

their complexity and volume. The concept of Big Data itself is relatively new, although large data sets date back to the 1960s and 1970s, when data centers, computers, or relationship-based databases appeared.

We deal with Big Data if the data can be described by five characteristics:

- Quantity
- Speed
- Diversity
- Veracity
- Value

There are also three types of datasets, depending on the complexity of their indexing:

- ✓ Structured data
- ✓ Unstructured data
- ✓ Semi-structured data



Marek,
Business Development Manager

So what are the sources of such a large amount of data? We live in a time where the number of data-generating sources is growing at a phenomenal rate – from satellites to smart appliances. But for categorization, data sources can be divided into three types:

- Transactional data
- Data from machines and IoT
- Data from social media and the internet

Here we will focus on structured transactional data, which, produced in large volumes and at a high pace, must be processed and reported accordingly.

2. Processing large amounts of data for reporting purposes in SAP

With the increase in the amount of data that transactional systems hold, processing it faster for reporting has been needed. SAP has created an entirely new BW/4HANA product, which will eventually replace previous versions of BW. The support for BW version 7.5 will end as early as 2027.

Considering data sources, licensing, upgrades, testing, and validation, the migration project could take about a year, depending on the chosen method. Additional development may be needed to take full advantage of BW/4HANA functionality, extending the migration process by up to another year. It follows that starting the migration process is a good idea now.

The new data warehouse introduces modern data modeling techniques, which enables fast and highly flexible model creation. The current interface allows automatically generating views in SAP HANA without

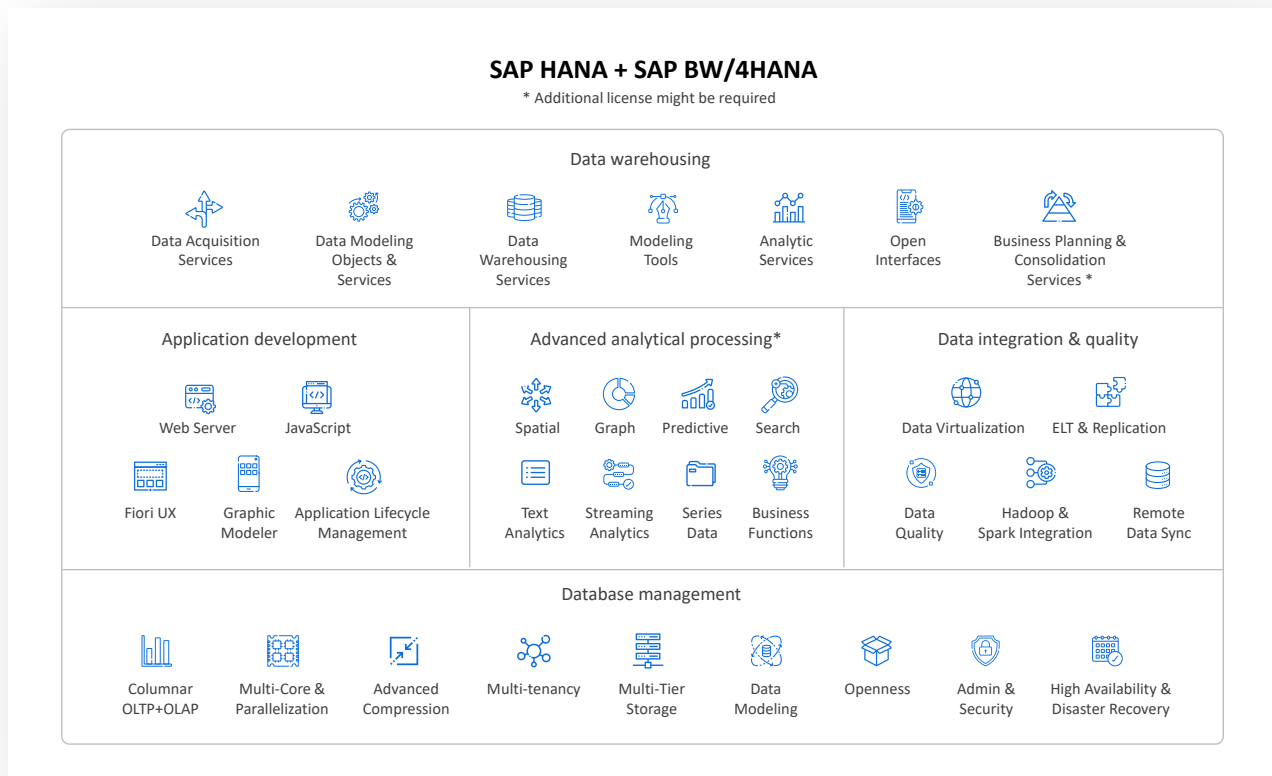
building them. Performance improvement is ensured by moving calculations to memory. Integration with S4/HANA and Big Data sources allows detailed real-time data analysis, significantly affecting managers' decision-making process. The platform enables the automatic distribution of data based on the frequency of use, considerably simplifying management and reducing memory costs. Unified data loading and horizontal scalability mechanisms ensure a smooth migration and easy deployment. Customers with



3. SAP BW/4HANA – an overview of the new solution

SAP BW/4HANA is a data warehouse that has been optimized to take advantage of the capabilities of the SAP HANA platform. Previous versions were designed with the classic RDBMS approach in mind. Great emphasis was placed on making newer BW versions as compatible as possible with previous versions. BW/4HANA breaks this approach by providing conversion software that requires user interaction. Some objects have been removed or replaced with new ones, allowing the new version of the warehouse to introduce innovation.

The new BW/4HANA provides a simple set of objects that lends itself to modeling a modern data warehouse’s agile and flexible layered architecture. It manages all types of data, whether from SAP applications or other systems, structured or unstructured, and allows access to all models via an open SQL interface. SAP BW/4HANA is equipped with state-of-the-art interfaces for all user groups and fully optimized SAP HANA processes to leverage massive amounts of data in real time, allowing you to gain a competitive advantage.



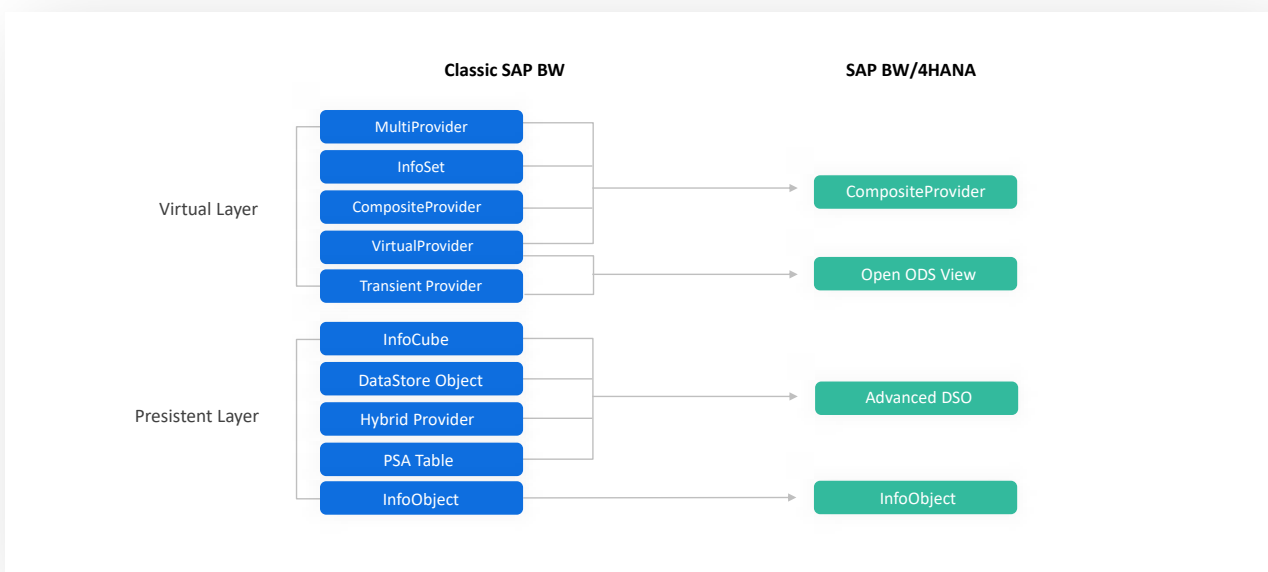
Pic. 1. BW/4HANA Architecture (source)

Key information about the new BW/4HANA:

- BW/4HANA is an entirely new product; it breaks away from previous versions and is partly a system written from scratch.
- BW/4HANA is not part of the SAP NetWeaver platform; other functionality and extensions are delivered much faster than with NW.
- SAP provides tools for migrating SAP BW to SAP BW/4HANA.
- Complex conversions are performed in the HANA database layer.
- All BW objects are replaced with new objects optimized for the HANA database works.
- We have a choice of on-premise or cloud versions.
- Simplified data acquisition, but with powerful capabilities.
- BW/4HANA allows real-time/near real-time access to data and direct access without physical storage. Data can also be acquired in batch mode.

4. Detailed comparison of SAP BW and BW/4HANA

SAP BW/4HANA is a product that gives us a whole range of new possibilities, which we will describe by breaking the new system down into its essentials. The changes are visible in the physical layer, which stores data, as well as in the virtual layer, based on which it is possible to build queries, which in turn are used by frontend tools.



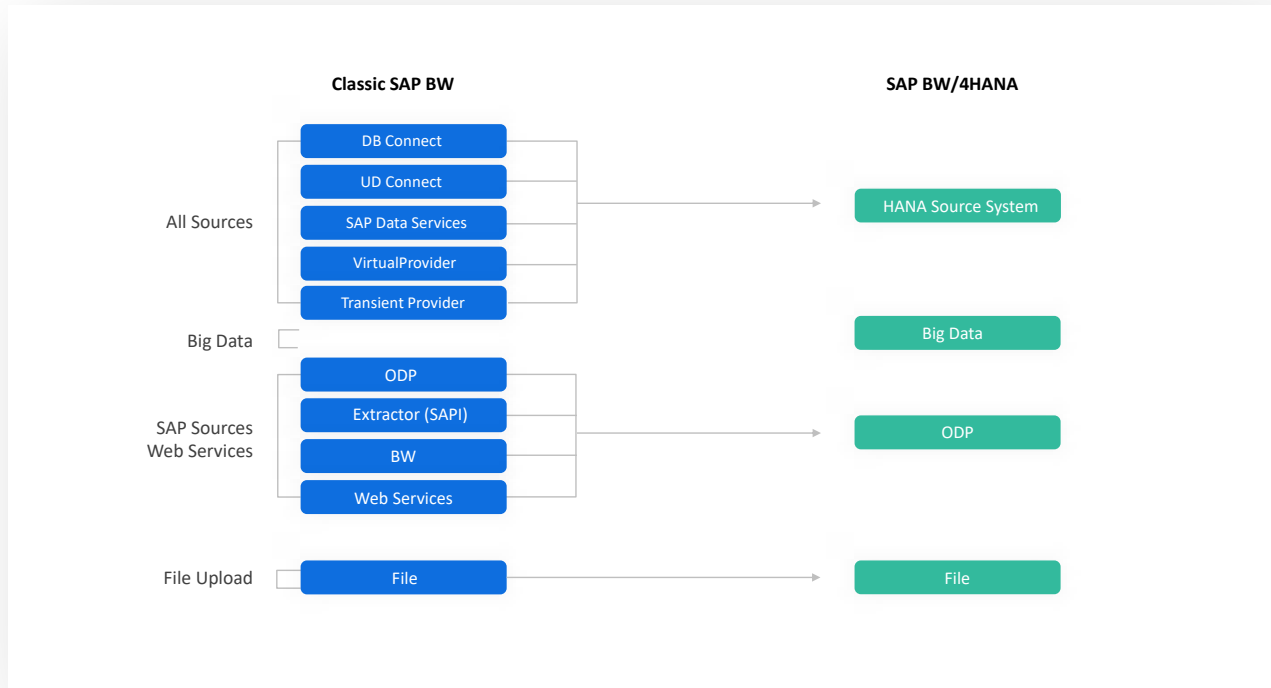
Pic. 2. Comparison of the classic BW approach and BW/4HANA (source)

There are only 4 data types in BW/4HANA, compared to 10 classes in traditional BW.

- **Better control** over physical and virtual data structures, thanks to a simplified data structure,

easier object management, and fewer places where errors can occur.

- **Support for external data** (non-SAP, e.g., MSSQL, ORACLE, TERADATA, HADOOP, DB2, maxDB, SPARK SQL, VORA, BIGQUERY, NETEZZA).



Pic. 3. Comparison of BW and BW/4HANA interfaces (source)

- ✓ The number of external source systems has been reduced by 60%, making it easier to manage.
- ✓ Non-SAP data connections are handled by the HANA source system.
- ✓ New - Big Data source system. In SAP BW/4HANA, we can transfer this data using SAP HANA Spark Controller, ODBC HIVE, and WebHDFS REST API.
- ✓ ODP for SAP and SLT sources – Operational Data Provider provides data extraction and replication to the target system, supporting the delta mechanism.
- ✓ Flat files are supported by Application Server (the ability to automate loading with strings - SAP BW compatibility). This provides us with, for example, the ability to load CSV, binary, and MS Excel files.

The BW/4HANA system is designed according to 4 principles:

1

Simplicity

- Reduced number of source objects/systems with the same functionality
- Fewer administrative tasks when managing objects
- Advanced data lifecycle management by distributing data to defined hot/warm/cold spaces

2

Openness

- Models built in BW can be quickly generated in HANA and served from within the database. This is also possible the other way around – models built in HANA (HANA Views) can be consumed in BW flows using Composite Providers. BW and HANA systems intermingle and are open to each other
- Integration with external data sources – batch mode and real-time
- It is possible to access data using SQL/MDX, ODBC, JDBC, ODBO, and OData

3

Modern User Interfaces

- UI5-based web interface (administration, UI, Fiori)
- SAP Analytics Cloud and SAP BusinessObject replace BEx
- Data modelers have SAP BW/4HANA Modelling Tools in Eclipse (objects, flows, queries, BW modeling, and HANA modeling) and SAP BW/4HANA Cockpit (administration) at their disposal

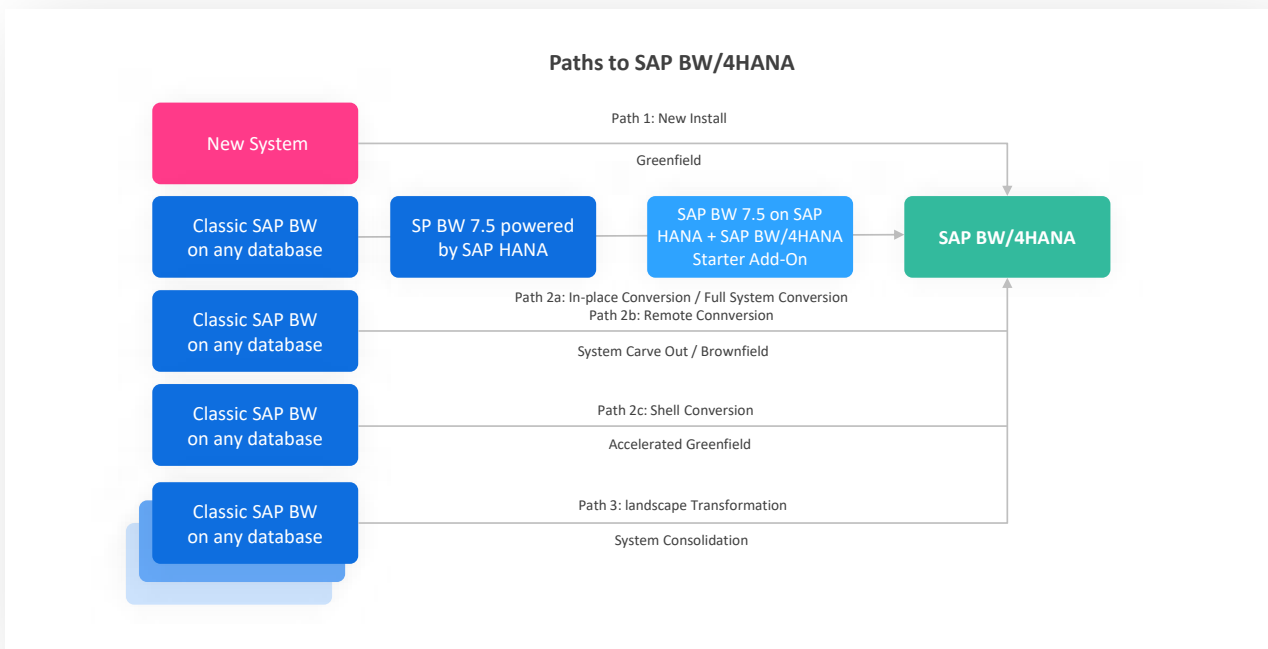
4

High Performance

- All kinds of operations and calculations are taken over by the SAP HANA database (pushdown algorithm)
- Data transfer and activation take place within the database. There is no so-called roundtrip (flow to the application server)
- Access to HANA libraries, advanced analytical functions (HANA Analysis Process, Data Mining, and Machine Learning)

5. Sii's approach to SAP BW/4HANA implementation

Several BW/4HANA implementation methods exist for different target groups, depending on their current situation and needs. In this section, we will present five options for conversion to the new BW/4HANA according to official SAP materials.



Pic 4. Comparison of the classic BW and BW/4HANA approaches (source)

1. In-Place Conversion (Full System Conversion):

- ✓ Target group: customers who want to change their SAP BW system to SAP BW/4HANA and are already working on the current release (preferred version: 7.5 powered by SAP HANA).
- ✓ In-place conversion means that the customer retains the current BW system and moves it to SAP BW/4HANA (while keeping the same system identifier (SID)).
- ✓ Non-reimplementation approach - no disruption to existing business processes.
- ✓ SAP provides tool support for all tasks: database migration (SUM-DMO or SWPM), ABAP version upgrade (SUM) and ABAP version upgrade (SUM), ABAP version upgrade (SUM), and BW application conversion to BW/4HANA (BW/4HANA Transfer Cockpit).
- ✓ Release requirements: SAP BW 7.5 SP05 powered by HANA, but the current SP level is recommended.
- ✓ General availability: as of March 2018.

2a. New Installation (Standard Greenfield Approach):

- ✓ Target group: SAP customers or net new customers.
- ✓ New installation of SAP BW/4HANA, for example, for customers setting a new greenfield.
- ✓ SAP S/4HANA environment, and in this project, they also start from scratch with SAP BW/4HANA.
- ✓ Build a system from scratch with a new data model and load only relevant data from the existing source systems.
- ✓ Re-engineering and process simplification based on modern data warehouse architecture.

2b. Shell Conversion (Accelerated Greenfield Approach)

- ✓ Target group: SAP Business Warehouse customers or net new customers.
- ✓ For customers who want a fresh start, SAP offers an option to transport particular objects (metadata of data models) from the existing SAP BW system to a newly installed SAP BW/4HANA system. These objects are converted into SAP BW/4HANA-supported objects during import into the BW/4HANA system (for example, InfoCube -> ADSO).
- ✓ Neither master data nor transaction data are transferred. The data must be re-loaded from the sources or BW system.
- ✓ The technical solution is similar to remote conversion but without data transfer.
- ✓ Release requirements for original SAP BW system: SAP BW 7. X (regardless of which database).
- ✓ Generally available from March 2018.

2c. Remote Conversion

- ✓ Target group: Customers who want to change their current SAP BW system into an SAP BW/4HANA system and who are on an older release level and not on SAP HANA.
- ✓ Remote conversion means the customer builds up a new SAP BW/4HANA system (new SID) and transfers BW applications (metadata) and data (master data, transactional data) from the original SAP BW system.
- ✓ Opportunity to pick and choose only future-proof data flows to build a clean, new SAP BW/4HANA environment.
- ✓ Convert BW objects into the newly installed SAP BW/4HANA system. Multiple persistent BW objects like InfoCubes, classic DataStore objects, and optionally PSAs are replaced by advanced DataStore objects; MultiProviders and InfoSets become CompositeProviders.
- ✓ No database migration or BW application upgrade is required.
- ✓ Release requirements for original SAP BW system: SAP BW 7.3 (regardless of which database).
- ✓ General availability from April 2019.

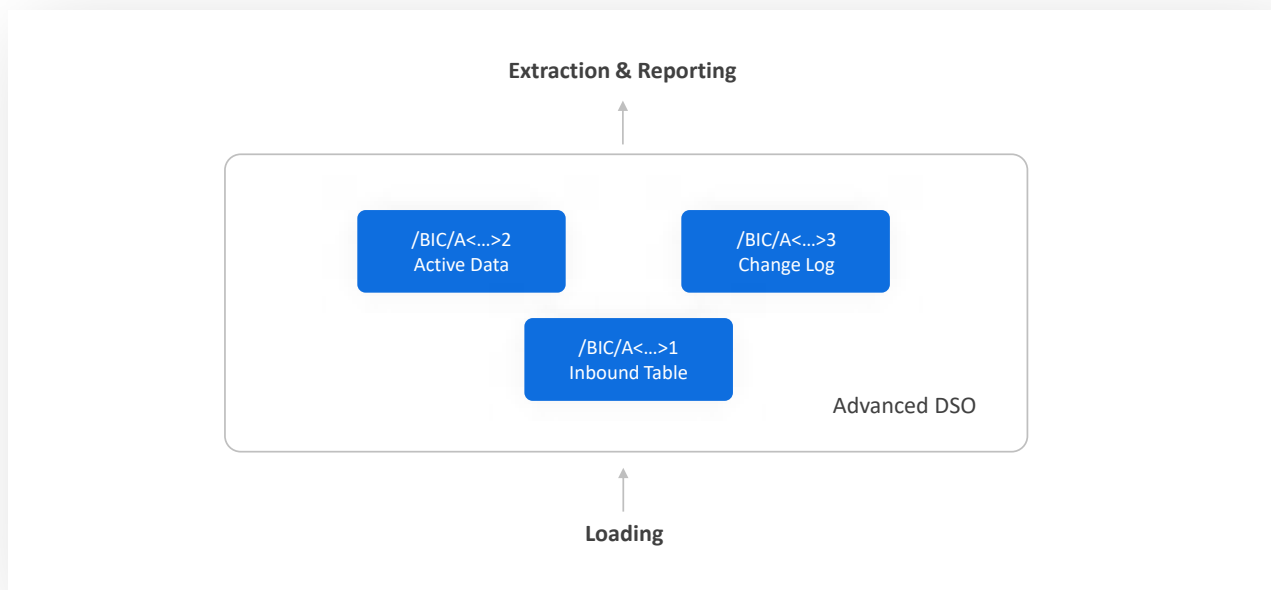
3. Landscape Transformation

- ✔ Target group: Customers who want to consolidate their SAP BW landscape (multiple production systems) or carve out selected data models or flows into a global, new SAP BW/4HANA system. These customers run numerous SAP BW and SAP BW on SAP HANA systems or hybrid cases.
- ✔ Customer-specific conversion project required with the guidance of SAP and SAP's tools for this scenario (service offering from SAP's Data Management & Landscape Transformation group).
- ✔ Stay with the current data warehouse landscape and move gradually to SAP BW/4HANA innovations.
- ✔ Harmonized data models and shared master data through consolidation.
- ✔ Carve out single entities of the company to SAP BW/4HANA and leverage the process Simplification.

As part of the migration, all objects containing information, including information cubes, will be converted to new aDSO objects. The old PSA objects may be replaced by new aDSO objects depending on the need. Such objects will have only one table, the so-called Inbound table. Currently, it is not possible to edit data in the PSA table. SAP recommends replacing this functionality by creating the so-called Error Stuck. This is a table for erroneous records during loading.

Note that in this case, too, it is not possible to edit the data. It is also possible to do away with this layer altogether.

The standard DSO is migrated to aDSO (Advanced Data Storage Layer), which consists of 3 main tables. These tables are generated during the creation and activation of aDSO. They are used depending on the selected template.



Pic. 5 Types of tables in aDSO (source)



Inbound table – at the beginning, the data is loaded into this table.

- Technical name: /BIC/ A<ADSO technical name>1
- Structure: Request ID (REQU SN), Data Package (DATAPAKID), Record number (RECORD), Record mode (RECORDMODE), Key Field 1, Key Field n, Field 1, Field n...



Active table – this table is where the data goes after activation. The modeler must determine the key after which the data will be activated, which means that if there is more than one record with the same key, the duplicates will be deleted or overwritten. In case of migration, it will be transferred from the source objects.

- Technical name: /BIC/ A<ADSO technical name>2
- Structure: Key Field 1, Key Field n, Record mode (RECORDMODE), Field 1, Field n...



Change log – this table stores all changes occurring during activation - the entire history of changes is located here. The table is helpful, for example, to verify how data will change during loading and activation.

- Technical name: /BIC/ A<ADSO technical name>3
- Structure: Request ID (REQU SN), Data Package (DATAPAKID), Record number (RECORD), Record mode (RECORDMODE), Key Field 1, Key Field n, Field 1, Field n...

Once migrated to BW/4HANA, the information cubes will be migrated with default settings for their type, and the data will be loaded into the Inbound Table. All fields are keys, meaning a different value on any field will cause the record to be added to the Active Table during activation.

Reporting is done on a Union basis from the Active and Inbound Table. Extraction is done from Active Table (complete) and Inbound Table (entire, delta).

Multidirectors will be migrated to Composite Provider objects, allowing flexible connection of component providers via Union (formerly multidirector) and outer and inner join (formerly Infoset). Nested models are

also possible, giving a wide range of possibilities.

Infosets are being replaced by Composite Providers, which are more efficient. Infoobjects have mostly stayed the same, and their functionality is mainly to enrich reports with a wide range of information related to the selected feature (attributes, texts, hierarchies). Also new is the appearance of new functionality – transitive attribute, i.e., attribute of an attribute.

Transformations are processed in ABAP or the SAP HANA environment. Within the transformation methods, a new rule called LOOKUP can be used to supercharge data from another information provider.

However, older tools such as Query Designer and Bex Analyzer are no longer supported after migrating to BW/4HANA. They are replaced by HANA Studio/Eclipse and Analysis For Office, respectively. On the

other hand, for HANA data modeling and Cloud and UI solutions, SAP recommends using web-based versions (Web IDE, Web IDE for HANA, Web IDE Full-Stack).

Once the migration process is complete, in cooperation with the client, Sii conducts the following:

- Functional tests – comparing data in reports between BW and BW/4HANA
- Security tests – checking permissions for users, consultants, and administrators
- Performance tests – comparing data loading and execution times for individual reports

6. Sii's support for SAP BW-based data warehouses

- Building data models based on SAP sources: FI, CO, CRM, SD, HR, PP, PS, PM, MM, etc.
- Building data extractors (extracting data from ERP)
- Creating reports in Query Designer (SAP HANA Studio)
- Creating dashboards in SAP Analytics Cloud
- Integration of data from non-SAP sources
- SAP BW/4HANA pre-implementation consulting
- Technical support for various versions of the system
- Construction of Native HANA data models
- Creation of specifications and documentation
- Post-implementation testing – functional, security, and performance tests
- SAP BI/BW 7.x/BW/4HANA implementation
- User trainings

7. Sii Poland's full offering within the scope of SAP



End-to-end SAP implementations

- S/4HANA, EWM, and HCM implementations
- Deployments on local and foreign markets



Development & optimization

- Custom development (ABAP/JAVA, Fiori/UI5)
- SAP system extensions



Support & maintenance

- Local customizations
- Application support
- SAP BASIS maintenance



Rollout

- Fit/Gap analysis
- Country-specific requirements



Upgrades & migrations

- ECC and S/4Hana upgrades
- Database conversions (Hana)
- Migrations to S/4Hana (Greenfield/Brownfield)



Experts outsourcing

- Nearshoring
- Offshoring
- Extended Delivery Team



Integrations & interfaces

- Solution development based on SAP PI/PO and BTP
- Monitoring interfaces in SAP solutions

8. Benefits from cooperation with Sii



One-stop shop solutions

– from engineering, software development, and testing to BI data analysis, ERP systems, and more



Knowledge and experience

in all SAP modules and technologies



Flexible collaboration models

– whether dedicated consultants, teams, or agile projects and managed services



Reliable partner at your service

– 16 years of experience in providing top-quality solutions and services



Nearshoring and offshoring

– cost-effectiveness, top IT competence, excellent English language skills, geographical and cultural proximity



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including automotive, healthcare, retail, and public & utilities

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