

Review Article

Embedded Architecture of SAP S/4 HANA ERP Application

Venkata Pavan Kumar Juturi *

Delaware, United States

*Correspondence: Venkata Pavan Kumar Juturi (venkata.juturi@gmail.com)

Abstract: The SAP HANA Application to handle operational workloads that are consistent with transactions while also supporting intricate business analytics operations. Technically speaking, the SAP HANA database is made up of several data processing engines that work together with a distributed query processing environment to provide the entire range of data processing capabilities. This includes graph and text processing for managing semi-structured and unstructured data within the same system, as well as classical relational data that supports both row- and column-oriented physical representations in a hybrid engine. The next-generation SAP Business Suite program designed specifically for the SAP HANA Platform is called SAP S/4HANA. The key features of SAP S/4HANA are an intuitive, contemporary user interface (SAP Fiori); planning and simulation options in many conventional transactions; simplification of business processes; significantly improved transaction efficiency; faster analytics.

Keywords: Enterprise Resource Planning, Cloud ERP, Artificial Intelligence, Big Data, Business Intelligence System

How to cite this paper:

Juturi, V. P. K. (2024). Embedded Architecture of SAP S/4 HANA ERP Application. *Universal Journal of Computer Sciences and Communications*, 3(1), 6-9. Retrieved from <https://www.scipublications.com/journal/index.php/ujcsc/article/view/899>

Received: January 12, 2024

Revised: February 26, 2024

Accepted: March 5, 2024

Published: March 6, 2024



Copyright: © 2024 by the author. Submitted for possible open-access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Platforms for enterprise resource planning (ERP) are perhaps the biggest requests in an official's data center. ERP systems combine product planning, procurement, revenue and distribution, finance, controlling, and other key professional domains into a one system. Organizations using the current ecosystem of traditional ERP platforms are unable to accept and handle disruptive innovations [1]. Organizations are constantly faced with new opportunities and difficulties as a result of the digital transformation. These outdated ERPs must optimize themselves in order to change into more intelligent versions that can take use of cloud computing and emerging technology. The traditional relational database management systems (RDBMS) used by the majority of current ERP systems make it difficult for them to handle the dynamic demands of digital platforms and ever-changing business models. SAP S/4 HANA is a commercial software package that, under the assumption that every module is acquired and used, claims to fully integrate all information flow through a particular stand-alone business. SAP S/4HANA, the intelligent ERP configuration of the present era, was offered as a replacement for the core component SAP ECC. The Software as a Service (SaaS) version is designed to help enterprises transition to digitalization and help normalize their cycles due to modern improvements. Business users may conduct transactions and execute real-time analytics on live transactional data with SAP S/4HANA since both transactions and analytics are available on a single platform. With the help of a set of preconfigured and prepared self-service data representations, or virtual data models, SAP S/4HANA embedded analytics combines a number of analytics features to enable users to extract actionable insights from data in real time without having to worry about the underlying data structure. While earlier SAP ERP arrangements supported the most well-known databases, SAP S/4HANA exclusively makes use of the SAP HANA in-memory data set [2]. Customers benefit from

increased execution and receive the greatest specialized advantage from this. "Straightforward" is what the "S" in S4 HANA stands for, while the "4" refers to the age succession. In contrast to the SAP center item SAP ECC, which is still in use by many businesses, SAP S/4HANA provides a wealth of innovative features that alter the framework scene from the very beginning. As SAP aims to halt the standard support of its current ERP arrangements by 2027, several SAP ECC clients are as of now thinking about a transfer to SAP S/4HANA. This system can help a business operate more productively and efficiently because it is an integrated information system. With the use of this system, businesses can exchange data and examine their business processes at the same time [3]. The SAP application system known as SAP HANA (high-performance analytic application) makes use of in-memory database technology to analyze massive amounts of real-time data quickly. The HANA in-memory computing engine enables data to be processed directly from RAM rather than having to be read from a permanent storage medium like a hard drive. HANA systems are able to execute advanced analytics, spatial data processing, text analysis for text search and also incorporates the ETL (extract, transform, load) capabilities in addition to perform as an application server. Because the Hana system stores data on dedicated servers' main random-access memory (RAM) rather than in intricate relational databases, users can access, and cache data more quickly than they could with a traditional system. This is a next-generation ERP system. Simultaneously, decision makers are able to swiftly identify information trends by instantly examining large amounts of data in the same database [4].

2. SAP Hana Database

The SAP HANA database, which has a built-in set of natively implemented business functions and supports numerous domain-specific languages. Although SQL was formerly the standard language for relational database systems, it is no longer able to satisfy all of the needs of contemporary applications, which require close integration with the data management layer. The SAP HANA database allows for the interchange of application semantics with the underlying data management platform, which can be used to decrease the number of separate application-to-database round trips and improve query expressiveness. The core data management system for both freshly produced and refurbished SAP applications is provided by the SAP HANA database, which is a part of the larger SAP HANA Application [5]. The SAP HANA Application is made up of the SAP HANA database at its centre, modelling services to build business models that can be deployed and utilized during runtime, and replication and data transformation services to make it simple to transfer both SAP and non-SAP data into the HANA system. The SAP HANA database is the particular topic of this paper's remaining sections. The SAP HANA database is a memory-centric data management system designed to enhance the speed of analytical and transactional applications by utilizing the capabilities of contemporary hardware, particularly very large quantities of main memory, multi-core CPUs, and SDD storage. The HANA Application's high-performance data processing and storage engine is provided by the HANA database [6].

3. SAP S4 Hana Embedded Architecture

As the name implies, SAP S/4HANA embedded analytics are included with the basic installation of SAP S/4HANA and are used to conduct advanced real-time reporting and analysis on transactional data that is being processed in real time. The SAP HANA database, virtual data model, analytical engine, OData service, and interfaces are the main architectural elements of SAP S/4HANA embedded analytics. For the purpose of creating and utilizing semantically rich data models, which are represented as CDS views, SAP established a collection of domain-specific languages and services known as Core Data Services (CDS). In addition, CDS provides features not found in other data modelling tools,

such as built-in functions, extensions, and support for conceptual modelling and relationship definitions.

4. Interfaces

Depending on the client tools, SAP S/4HANA analytics offers data access via OData, SAP HANA, and Business Intelligence Consumer Services (BICS) interfaces. OData is the primary communication protocol used by the frontend applications within the SAP Fiori interface. Certain applications, such as SAP Lumira, SAP Design Studio, and enterprise search, are an exception as they rely on SAP HANA In a protocol as they haven't yet implemented OData. A reorganized and personalized customer experience is provided by the new Fiori interface concept. Customers receive priority assistance and notices in addition to having quicker access to important data. This promotes job-based, productive work. The applications can also be used on mobile devices according to the new plan regulations. Customers can access their data gradually thanks to the SAP HANA in-memory data set [7]. Information is stored in principle memory in an aggregate structure that avoids information excess, as opposed to being stored on a rigid circle. This enhanced information model reduces the amount of data set while also enabling you to do spontaneous research and conditional procedures inside a comparable framework.

5. Reporting and Graphics

You can develop custom SAP BEx queries using all SAP S/4HANA CDS views, which are automatically available as ODP transient Info Providers (in the integrated BW system). It's advised to limit the creation of SAP BEx queries to SAP S/4HANA CDS consumption and query views. Because a transitory provider is formed with the same technical name in all systems, SAP BEx queries created on the ODP transient providers can be carried around the SAP S/4HANA landscape. Variables, restricted key figures, exceptions and conditions, currency conversion, report-to-report interface, and SAP S/4HANA analytics capabilities are just a few of the SAP BEx features that are supported by SAP BEx queries on ODP transient providers.

The SAP HANA database is positioned as a cutting-edge data management and processing layer to support sophisticated enterprise-scale applications and data-intensive business processes, as described in our introduction. Apart from the technical layer improvements and enhancements, the system's primary advantage lies in its capacity to comprehend and manipulate business objects that are stored within the database. One key feature that sets the SAP HANA database apart from traditional relational stores is its ability to leverage knowledge of complex-structured business objects and execute highly SAP application-specific business logic steps deep inside the engine [8]. Apart from operators designed expressly for it, the SAP HANA database comes with an integrated Business Function Library (BFL) that enables application code specific to SAP. The database kernel natively integrates all business logic modules with the highest level of parallelism possible. The BFL incorporates all the technological benefits of deep integration with the database engine, in contrast to traditional stored procedures or stored functions. The operational data (which comprises SAP S/4HANA's transactional and master data tables) is functionally represented by a set of CDS views that SAP offers. The SAP S/4HANA system is built on these virtual data models, which are utilized to access data from the underlying physical tables by analytics and business processes [9]. The SAP S/4HANA system's virtual data models are also utilized for data extraction to external systems like SAP BW. There are various installation models and structures available for SAP S/4HANA. Customers now have the option of using the cloud version, which is reliant on a membership model, the crossover model, or the on-premises version due to a movement. The final one is based on an SAP employee and allows customers to save

money on assets like maintenance and equipment. They also benefit from shorter advancement cycles and response times [10].

6. Conclusion

Strong and effective data management and processing capabilities with specific support for transaction, analytical, graph traversal, and text retrieval processing are necessary to deliver effective solutions for enterprise-scale applications. The HANA database, which is a part of the SAP HANA Application, is the first of a new breed of database systems created especially to respond to queries from demanding enterprise applications. As was previously said, business users are enabled by SAP S/4HANA integrated analytics to conduct business transactions and obtain insights in a single application by utilizing a single source of truth. In order to make more informed decisions, these analytics elements can also be connected with key business processes (such as customer segmentation, investigating opportunities for cross-selling and up-selling, providing suggestions, planning & forecasting, etc.). Lastly, SAP S/4HANA embedded analytics can also look beyond historical facts and data to estimate the future by utilizing the underlying advanced analytics capabilities in the SAP HANA platform.

Reference

- [1] Prasetyo, Y. T., & Soliman, K. O. S. (2021, April). Usability evaluation of ERP systems: A comparison between SAP S/4 Hana & Oracle Cloud. In 2021 IEEE 8th International Conference on Industrial Engineering and Applications (ICIEA) (pp. 120-125). IEEE.
- [2] LUBIS, I. T., LUBIS, P. D. K., Muda, I., & Nedelea, A. M. (2021). Management Process Administration in Enterprise Resources Planning (ERP) Systems Applications and Products in Data Processing (SAP) in PTPN III SEI Dadap. Ecoforum Journal, 10(3).
- [3] Singh, V. (2017). *Manage Your SAP Projects with SAP Activate: Implementing SAP S/4HANA*. Packt Publishing Ltd.
- [4] Plattner, H., & Leukert, B. (2015). *The in-memory revolution: how SAP HANA enables business of the future*. Springer.
- [5] Chang, V., Arunachalam, P., Xu, Q. A., Chong, P. L., Psarros, C., & Li, J. (2023). Journey to SAP S/4HANA intelligent enterprise: is there a risk in transitions? *International Journal of Business Information Systems*, 42(3-4), 503-541.
- [6] Vanstechelman, B. (2017). *The SAP HANA Deployment Guide*. Espresso Tutorials GmbH.
- [7] Poschadel, F. (2019). *SAP S/4HANA: Performance Management in Real Time? Performance Management in Retail and the Consumer Goods Industry: Best Practices and Case Studies*, 137-151.
- [8] Jain, N., & Bagga, T. (2021, September). SAP S/4 HANA Framework: I-ERP towards Digital Transformation. In 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO) (pp. 1-6). IEEE.
- [9] Garayo Maiztegui, F. (2023). Design Guideline for the Conceptualisation and Implementation of an E-Learning Artefact for SAP S/4 HANA. In *Design and Evaluation of an E-Learning Artefact for the Implementation of SAP S/4HANA®* (pp. 159-165). Wiesbaden: Springer Fachmedien Wiesbaden.
- [10] Bhattacharya, T. (2020). An Understanding on SAP HANA-In Light of Speed, Agility and Resilience & It's Implementation Strategies on Post COVID Scenario. *Globsyn Management Journal*, 14(1/2), 145-150.