International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 07 | July – 2025 DOI: 10.55041/ISJEM04913
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

Integration between SAP S/4 HANA & Google Cloud Platform using SAP Datasphere

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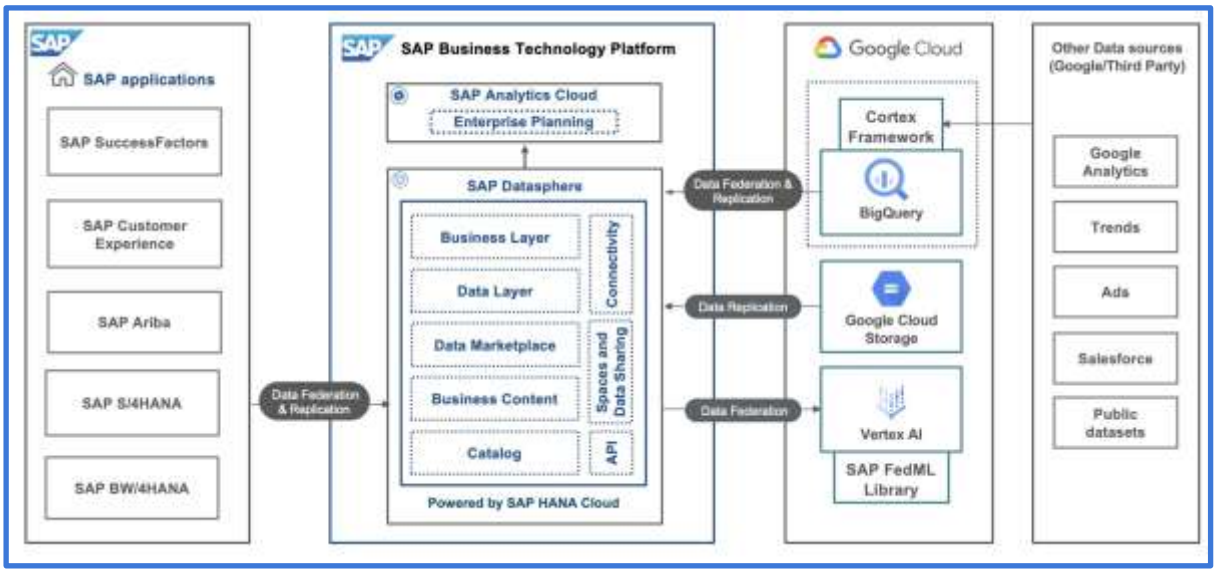
Abstract: In today's world, organizations are increasingly relying on data for performing analytics, reporting, and decision making. Managing large volumes of data comes with its own set of challenges and requires use of one of the hyperscalers like Google Cloud Platform(GCP), Microsoft Azure, and Amazon Web Services(AWS) to name a few. While the Business transactions are being performed in ERP systems like SAP, it becomes very important to have a robust data integration approach between SAP and the hyperscaler, so that the near real time data can be provided for the analysis and reporting. In this paper we will deep dive into the approach for Integration of SAP S/4 HANA system with Google Big Query using SAP Datasphere by utilizing ABAP CDS view based replication.

Key words: SAP S/4 HANA, Google Cloud Platform(GCP), Big Query, SAP Datasphere, ABAP CDS Views.

1 Introduction:

Google Cloud and SAP have been working together for many years to help customers run their business critical SAP workloads on Google Cloud. BigQuery is Google Cloud's fully managed, petabyte-scale, and cost-effective analytics data warehouse that lets businesses run analytics over vast amounts of data in near real time and is very essential specially for the very large data volumes. SAP Datasphere offers robust data transformation capabilities and ensures the data is loaded correctly into BigQuery. SAP Datasphere's Replication Flows are helpful in keeping the business semantics intact and transferring the data to BigQuery for performing analytics and further processing.



To federate data from the SAP S/4HANA source system, we can use one of the following replication methods:

1. CDS-based replication: This method uses Core Data Services (CDS) views, which are semantically rich and offer predefined models of your business data within SAP S/4HANA.
2. SLT-based replication: This method directly replicates underlying database tables from your SAP S/4HANA system, typically using SAP Landscape Transformation (SLT) as the replication technology.

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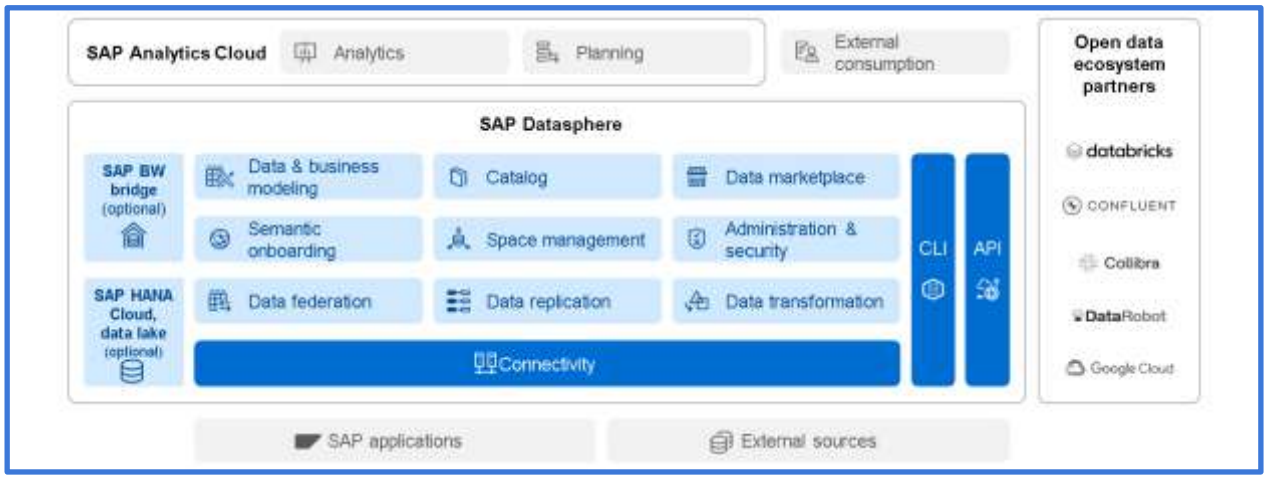
If you are looking for a quick setup mostly on the standard business data, then CDS-based replication is a good option. However, if there is more specialized data or have heavily customized tables, then SLT-based replication could be a better choice. CDS based approach offers advantage with the team having an existing SAP and CDS related skill set.
In this paper we will deep dive into what can be a reference architecture for building data integration between SAP S/4 HANA ERP system which has business data with Google Cloud Data Analytics solution like BigQuery using SAP BTP Data and Analytics solution like Datasphere. Now let us take a look at the key technologies at play here and how they can be integrated.

2 SAP Datasphere:
SAP Datasphere enables a business data fabric architecture that uniquely harmonizes mission-critical data throughout the organization, unleashing business experts to make the most impactful decisions. It combines previously discrete capabilities into a unified service for data integration, cataloging, semantic modeling and data-warehousing. SAP Datasphere preserves the full meaning and context of SAP data across systems and clouds. It integrates with other data vendor's platforms, delivering seamless and scalable access to one authoritative source for your most valuable enterprise data.



It supports mainly two connection types for data integration.

- The remote tables feature supports building views. After we create a connection in the graphical view editor of the Data Builder, a modeler can add a source object (usually a database table or view) from the connection to a view. The source object deploys a remote table.
- The flow features support building data flows, replication flows, and transformation flows. After we have created a connection, in the respective flow editors of the Data Builder, a modeler can add a source object from the connection to a data flow to integrate and transform your data.

3 ABAP CDS View:
ABAP CDS views are developed, maintained, and extended in the ABAP layer of the SAP S/4HANA system. They are ABAP artifacts, and are physically stored in the ABAP repository, where the ABAP programs reside. They do not reside in SAP HANA. CDS views can be used to federate data virtually due to their extraction capability. When a CDS view is used in the context of data provisioning with annotation *@Analytics.dataExtraction.enabled:true* it helps enable extraction of data from the CDS views to other systems, like BW/4 HANA or SAP Datasphere.

4 BigQuery:
BigQuery offered by Google Cloud Platform is a fully managed, AI-ready data analytics platform that helps maximize value from the data and is designed to be multi-engine, multi-format, and multi-cloud. It provides built-in capabilities to create and run machine learning models for the BigQuery data. It helps make analytics easier by bringing together data from multiple sources. SAP datasphere provides an option to connect to BigQuery using BigQuery connection.

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5 Integration Architecture:

Below is the high level approach for the integration.

- Connect SAP Datasphere to the SAP S/4HANA source system.
- Connect SAP Datasphere to the Google Cloud project that contains the target BigQuery dataset.
- Create a replication flow.
- Run the replication flow.
- Validate the replicated data in BigQuery.

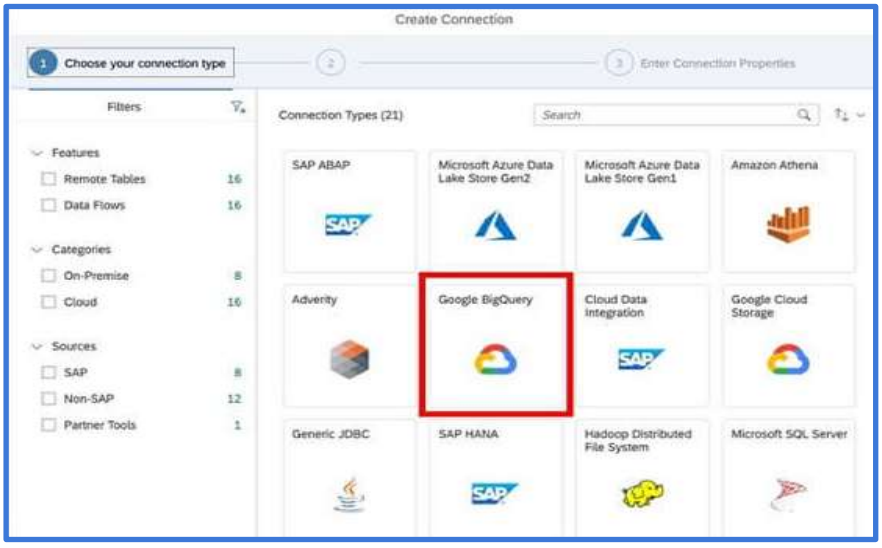
To securely connect SAP Datasphere tenant to the SAP S/4HANA source system, SAP Cloud Connector is required when SAP S/4HANA source system is running on-premises, hosted on any cloud environment, or if you're using the SAP S/4HANA Cloud Private Edition. However, if you're using the SAP S/4HANA Cloud Public Edition, then the SAP Cloud Connector is not needed.

In SAP Datasphere, it is required to create a local connection to use the SAP S/4HANA source system for data access. You use this connection to create replication flows.

To connect SAP Datasphere to Google Cloud project, we need an IAM service account in the Google Cloud project and grant roles to the service account that contains permissions to interact with BigQuery. We also need to create a JSON key for the service account. We upload the JSON key to SAP Datasphere to authenticate with Google Cloud. Additionally we need to create a BigQuery dataset, Upload SSL certificates to SAP Datasphere, and Upload the driver for BigQuery to SAP Datasphere. The details for all these steps can be found from the reference links towards the end of this paper.

Finally, to replicate data from your SAP S/4HANA source system to the target BigQuery dataset, we need to create a replication flow in your SAP Datasphere tenant. To create a connection, perform the following steps:

- In SAP Datasphere, go to Connections, and create a new connection in your space.
- Choose the connection type as Google BigQuery.
- In the Connection details sections, specify the following:
- Project ID: enter your Google Cloud project ID in lowercase.
- Location: enter your Google Cloud project location.
- In the Credential section, upload the JSON key file that is used for authentication.
- To validate the connection between SAP Datasphere and BigQuery, select your connection, and click the Validate Connection icon.



Once this is done, replication flow can be created in the Data Builder and run to perform the data transfer. Here the source connection will be of type SAP S/4HANA On-Premise that was created first. The CDS view created as extraction enabled will be the source object for the data extraction. Target will be the Google Cloud project that contains the target BigQuery dataset. Then the target mappings can be defined as per the requirement where we have options to change the name, data type of the columns etc.

6 Other Considerations:

There are some considerations as below which are worth mentioning before you create the Data Integration flow between SAP S/ HANA and BigQuery.

- Enable the Premium Outbound Integration blocks in the Tenant Configuration page of your SAP Datasphere. Premium Outbound Integration is the recommended way to move data out of any SAP system to external targets.
- Check the latest considerations and limitations of SAP Datasphere replication flows provided in the SAP Note 3297105.
- Check the required SAP software versions, recommended system landscape, considerations for the supported source objects, as described in the SAP Note 2890171.
- Check the CDS views that are being used are enabled for extraction using correct annotation.
- Check that the BigQuery API is enabled in your Google Cloud project.

Conclusion:

Customers are continuously looking for better ways to gain insights into their business and drive innovations, but are challenged with the prototypical fragmentation of data across multiple applications and data warehouses. The integration between SAP S/4 HANA using SAP Datasphere and Google Cloud enables customers to seamlessly access and analyze large volumes of data at a lightning speed. Businesses can combine SAP and external data sources in real-time, facilitating comprehensive analytics and decision-making. This approach leverages SAP Datasphere's data federation capabilities, allowing for efficient data management and eliminating the challenges associated with data duplication. Additionally, integrating with Google Cloud services such as BigQuery enhances the ability to perform advanced analytics and machine learning directly on combined datasets, streamlining operations and providing richer insights.

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