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Unifying Salesforce and SAP S/4HANA for superior business gains

Thinking Breakthroughs

Content

Introduction

In a customer-centric world, organizations are constantly innovating to deliver services and products that meet customer expectations. Technology is a crucial enabler.

For instance, a CRM platform streamlines marketing, sales, and customer service processes and helps organizations obtain a 360-degree view of customer data. Data-driven insights help organizations better understand the customer and build relevant products. Meanwhile, an Enterprise Resource Planning (ERP) platform helps organizations digitalize and automate back-office business processes like products and pricing management, supply chain and inventory management, order fulfillment, invoice handling, and payments.

When we integrate CRM and ERP, they act as a cohesive unit offering many more benefits such as improved data visibility, streamlined business processes, a deeper understanding of buyer behavior, and more sales opportunities.

This whitepaper focuses on integration of two of the widely used CRM and ERP systems - Salesforce and SAP S/4HANA respectively.

Before beginning the Salesforce and SAP S/4HANA integration journey, it is important to assess if integrating of CRM and ERP is worth the effort and also be aware of the core challenges one must overcome to make this integration successful. Traditionally, CRM and ERP systems have been considered two separate systems, making it difficult to leverage the data and realize its full potential. Their integration doesn't just offer a holistic view of the customer data but also provides several other business benefits.

Benefits of integrating CRM and ERP

Enhanced data visibility across systems for a customer 360° view

Creating a holistic view of customer data empowers teams across functions to provide fast, detailed, and personalized customer engagement across channels.

Streamlined business and technical processes

Streamlining data and business processes ensures that the entire team is on the same page. Managers get a one-stop view of all the operations, leading to higher productivity and profit margins.

Improved accuracy of quotes

Providing sales teams with accurate and real-time access to inventory and product pricing, quotes, and shipment dates results in a shorter opportunity-to-cash cycle. This helps customers to be happy & loyal.

Improved sales with a holistic order visibility

Enabling service and sales representatives with an end-to-end order information helps organizations mine smarter upsell and cross-sell opportunities with their customers. This also improves customer trust.

Faster decision making with the right business KPIs

Constant data analytics allows the evaluation of business goals and KPIs at a comprehensive level. Organizations can take prompt action basis the result of these evaluations.

Key business and technical challenges

While the benefits of integrating CRM and ERP system are many, organizations must understand that this integration journey can throw surprises at their business and technical teams and make things difficult. That said, the best approach is to be aware of such challenges before hand and build a strategy to make the integration seamless.

1. Business challenges

The most important task while initiating a CRM and ERP integration is to have clear definitions for business processes and user journeys. For each business process, it is extremely crucial to identify and define:

- Involved user groups
- Entry point of the process
- Actions that trigger the integration
- Data required by the receiving system and its format
- Receiving the system's response to the data

You need to be aware that while transforming your IT landscape with modern and innovative technology solutions like Salesforce and SAP S/4HANA, it is essential to review existing business processes and optimize those to follow best practices.

Since many companies have either adjusted their business process to accommodate the technology capabilities or have stretched their applications to enable specific business processes, the overall transformation always starts with business process optimization.

Since customer data resides in two (or more) systems, it is crucial to develop a solid strategy to define master systems for the respective data, i.e., how to handle master data management for Accounts, Contacts, Products, Prices, Quotes, and Orders.

2. Technical challenges

After defining business requirements, organizations must focus on the technical challenges. Since the market and business requirements are very dynamic, you will require a technology landscape that is robust, extendable, and scalable for any future extensions.

Another major challenge is standardizing data across all business processes.

Organizations must ensure that each system that is integrated can accept the data being exchanged. This would require data transformation that supports various formats.

To tackle these challenges, organizations must:

- Decide on an integration strategy. For example, whether a point-to-point integration is sufficient or there is a need to implement a middleware-based integration.
- Understand if involved systems can exchange data & assess the effort required to perform protocol/format transformations or mappings.
- Identify if there are any technical limitations while integrating CRM and ERP systems, especially if a significant data volume exchange is involved.

Building robust integrations is the ultimate goal, but what happens if there are errors during the integration flow? How do users get notified about errors? How are these errors handled, evaluated, and addressed? The overall integration architecture must be well established and able to handle unexpected situations.

Salesforce & SAP S/4HANA integration landscape

To design the integration pattern and capabilities for data integration, you need to define the end-to-end processes upfront. Then you can easily derive the involved data and the direction of integration. The diagram below shows the typical objects that are synchronized between Salesforce and SAP S/4HANA.

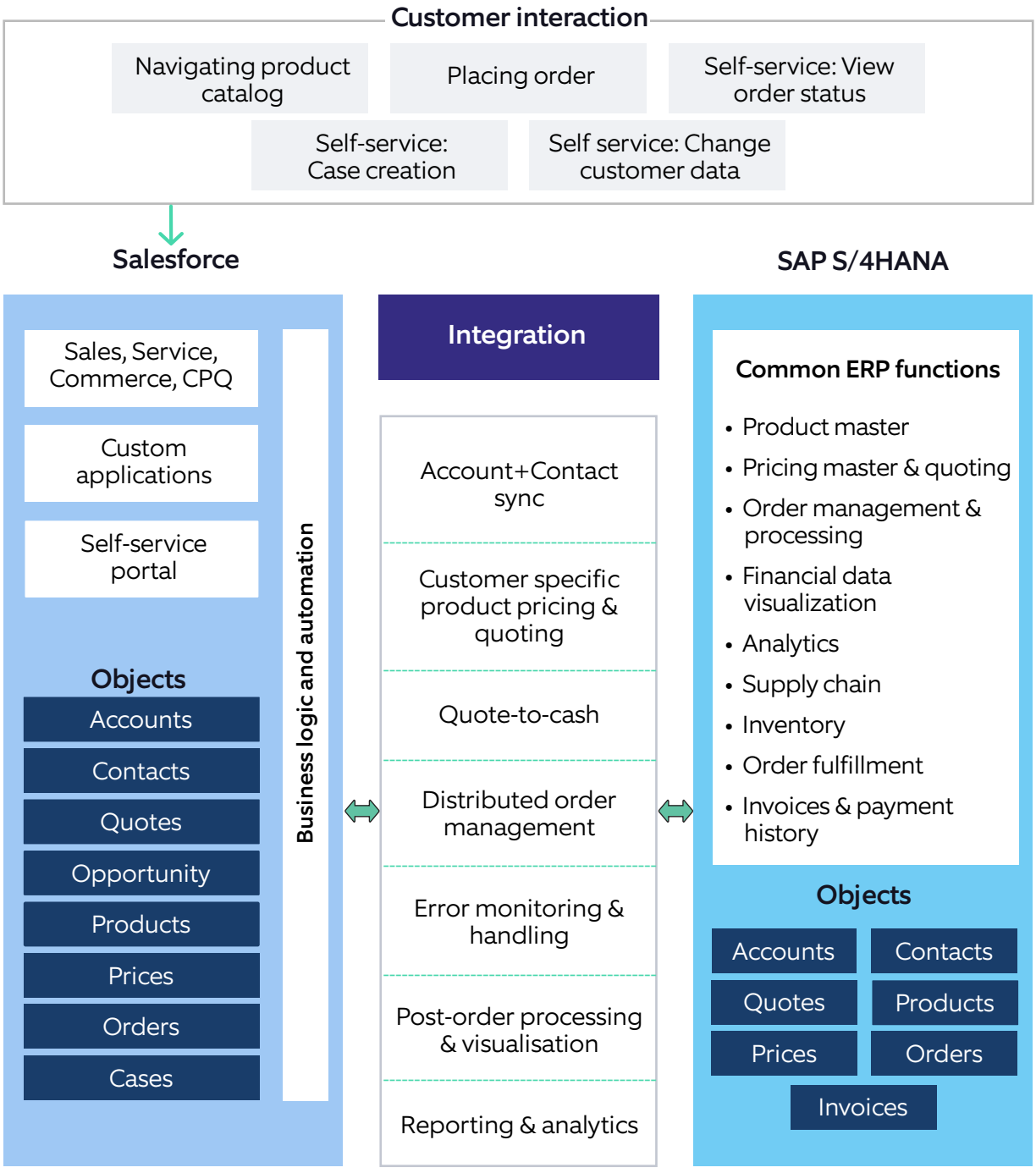


Figure 1: Integration landscape of Salesforce and SAP S4/HANA

Now let us deep dive into the sales and service processes within the Salesforce - SAP S/4HANA integration landscape.

Sales Process and Configure-Price-Quote (CPQ)

The sales process starts from a lead to an actual sales opportunity in Salesforce. Quotes are then created to show the customer the product/service prices. Complex pricing logic based on certain pricing conditions can be either done in Salesforce via "Configure-Price-Quote" features or in SAP S/4HANA. Once the quote is finalized, it is synced to SAP S/4HANA where the quote is usually converted into an actual order. The order number, including any further order status updates, can be synced back to the opportunity or quote in Salesforce.

Customers can also use a self service platform to view the product catalog, add products to their shopping basket and eventually place an order. Based on the customer type and order history, companies can offer special bundles and discounts on the webshop. These customer-based pricing logics are usually retrieved near-real-time from the back-end SAP S/4HANA platform through web service integration.

Once the order is placed, the integration is triggered to transmit the customer data and the order data, including product details to the back-office system for order processing and fulfillment, including shipment and invoicing. Order status updates, including each order line item, can be synced back to Salesforce to allow sales and service reps, and customers keep track of all orders.

Service Case Creation and Order Creation

Imagine that the order was delivered to the customer, but the content of the delivery was wrong. The customer calls customer care to complain about the wrong delivery. Since the customer data, including order history, is synced into Salesforce, the service representative can quickly access the customer history and offer a specific discount on the next order, while resolving the issue at hand. This can help build customer's goodwill and fix the unexpected experience he/she went through.

The service agent can directly create an order from within the service interface. Since SAP S/4HANA is integrated with Salesforce, the service rep sees the actual storage available from the SAP S/4HANA inventory to allow a realistic delivery time estimate for the new order. Salesforce can deploy analytics to issue upselling suggestions to the service representative based on customer and order history.

Key objects in Salesforce - SAP S/4HANA and their interactions

Based on the processes aforementioned, we can derive the actual data endpoints that organizations must consider during their integration journey. The diagram below shows the key objects and their interactions within the Salesforce - SAP S/4HANA integration landscape.

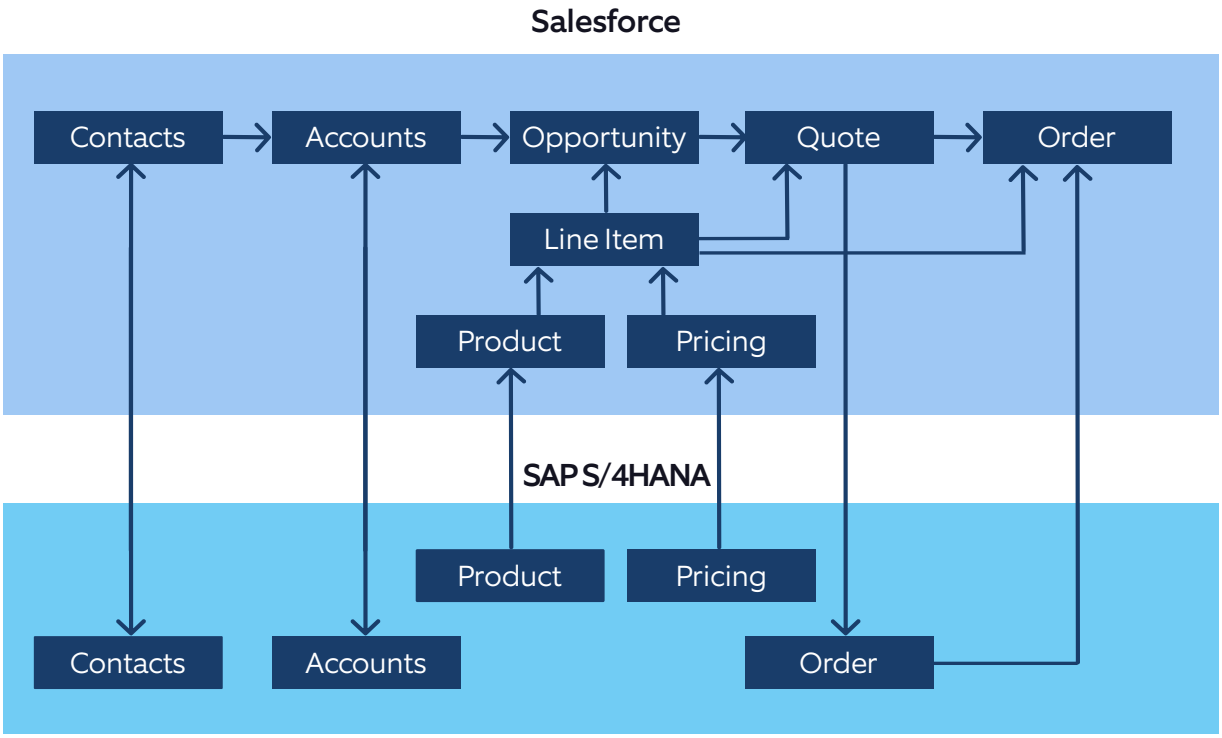


Figure 2: Key objects and their interactions

Accounts and Contacts

Organizations need to tailor integration flows to match business flows, but for the sake of simplicity, we assume Accounts and Contacts to be only created from Salesforce. Once the initial set of required data like names and addresses are in place, the integration is triggered to sync the Accounts and Contacts to SAP S4/HANA, where data enrichment takes place. This ensures availability of the customer contact information throughout the business process as required (e.g., fulfilment and invoicing). The integration is then triggered to sync the Accounts and Contacts back to Salesforce and keep data objects in sync at all times and enable a 360-degree view of the customer data.

In Salesforce and SAP S4/HANA, business processes usually rely on the Account and Contact data, as all other related information is linked to those data sets. Organizations need to have Accounts and Contacts synced with the systems. Here, a near-real-time bi-directional integration pattern usually applies. This is followed by identifying the master for given data sets and the allowed integration flows.

Another very important aspect is sales area data. Typically, the sales area data defines the complex sales structures like sales organization, distribution channel, division, and much more. By default, Salesforce does not offer a standard object to reflect this kind of information. Here it is best practice to create a custom object that is linked to the Salesforce Account object. S4/HANA remains the master for these sales-relevant data, and Salesforce is simply consuming the data in read-only mode.

Lastly, Territory Management should also be considered. Here, Salesforce offers good out-of-of-the-box functionality. Territories should be configured and mastered in Salesforce. If need be, SAP S4/HANA can reflect territory assignments to users by adding partner roles to the SAP S4/HANA Account.

Products and Price Books

Anyone browsing through the product catalog expects that product data to have the latest prices. Product data and pricing logic are typically created and maintained in SAP S/4HANA. Since this product data doesn't undergo multiple changes, syncing product data from SAP S/4HANA to Salesforce periodically should suffice. Prices may be calculated on the fly via SAP S/4HANA-provided web service when products are added to the Opportunity/shopping basket, allowing customer-specific discounts or other special deals. If an organization is maintaining just a few price lists within SAP S/4HANA, it can synchronize the entire price list to Salesforce Price Books or define Salesforce as a master for pricing.

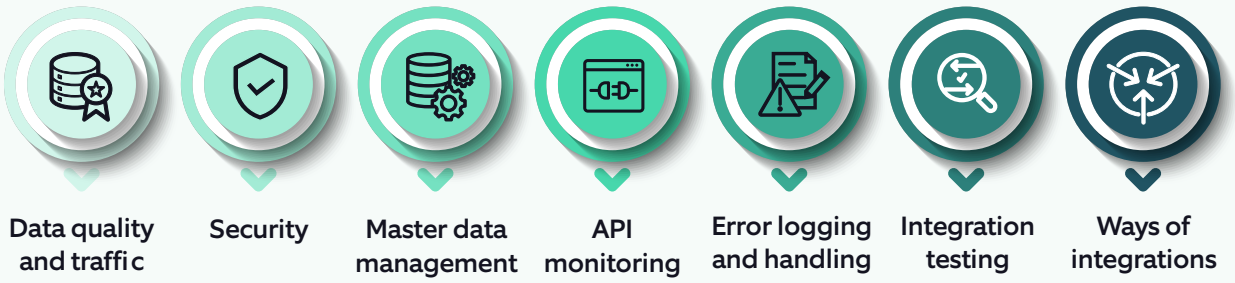
The overall pricing setup depends on the business complexity, the number of price lists, currencies, frequency of price updates, and the existing customer price conditions maintained inside SAP S/4HANA. While organizations should be able to see all their products in Salesforce, they should reside in ERP so that the changes to product information are done only in SAP S/4HANA, while in Salesforce, the product records remain read-only.

Quotes & Orders

Once all products are added to the Opportunity as Opportunity line items, a Quote can be generated. Once Quotes are generated in Salesforce, the integration gets triggered to either create Quotes in SAP S/4HANA or to create Orders in SAP S/4HANA, depending on your business process. For organizations using both Salesforce and SAP S/4HANA, order processing is done in SAP S/4HANA, and only status updates are synced back to Salesforce.

Best practices for integrating Salesforce with SAP S/4HANA

A successful integration strategy is determined by how effectively organizations leverage robust Salesforce APIs to integrate data, streamline operations and maximize return on investment. Having worked on several Salesforce and SAP S/4HANA integrations, Nagarro has devised the following best practices which can help organizations to streamline Salesforce and SAP S/4HANA integration.



Data quality and traffic

Salesforce and SAP S/4HANA integration address data inaccuracies such as missing, incomplete, and duplicate data. Organizations should not simply mirror a source system's data structure, but focus on meeting user needs with a simple and process-oriented data model.

An estimation of the expected daily data traffic will help stay within the Salesforce governor limits. Identifying the expected average number of records created and updated per day will help design the integration pattern.

While syncing data bi-directionally, it makes sense to store the Salesforce-ID inside S/4 and store the S/4-ID inside Salesforce. Salesforce allows custom fields to be flagged as external-ID fields allowing DML operations like UPSERT to target certain records specifically. Often, the customer number given by the SAP S/4HANA is mapped on a custom text field in Salesforce that acts as the external-ID field.

Security

To ensure system security while integration, organizations can take the following measures:

- **Login IP Ranges:**

  Users must set Login IP Ranges for their Salesforce Org. Login IP Ranges limit unauthorized access by requiring users to log in to Salesforce from designated IP addresses — typically your corporate network or VPN.

- **Dedicated integration user:**

  Create a dedicated user solely for integration purposes. That way, if an actual user leaves the organization, a user with the correct permissions will be in place. It is advised to use a full Salesforce license for the user to be able to set the required permissions and have full access to avoid any other errors. With a dedicated integration user, it's easy to identify the changes made by external systems and it saves hours of additional analysis figuring out how and why a record was created.

- **'API-Enabled' and 'API-Only' permissions:**

  Clone a standard user profile and enable 'API-Enabled' permission and the 'API- Only' permission specifying that the user can only log in through the API. This prevents the user from being used for any purpose other than integration scenarios. Integration users should also get the 'Modify All' permission to be able to do CRUD (create, read, update, and delete) operations on all the platform's data.

- **Connected App and OAuth:**

  A Connected App is a framework that enables an external application to integrate with Salesforce using APIs and standard protocols, such as SAML, OAuth, and OpenID Connect. Connected Apps use these protocols to authenticate, authorize, and provide single sign-on (SSO) for external apps. Familiarize yourself with the different OAuth flows that Salesforce offers and choose the right integration flow.

  Depending on a company's security requirement, it may be required to set up mutual authentication certificates in both systems. This mechanism, also known as "2-way SLL," prevents security from being compromised by simple impersonation. Organizations can ask the clients and servers to prove their identity to each other with a mutual authentication certificate. In addition to that, the company's proxy and firewall settings are to be adjusted so that they whitelist Salesforce IP Ranges to allow inbound data traffic.

Master data management

It is crucial to define what system is master for which data. The table below shows the key integration entities while integrating Salesforce and SAP S/4HANA.

Object	Comment	Direction
Accounts	Customer data needs to be synced in both systems, since they are the starting point for all processes	Bi-Directional
Contacts	Customer data needs to be synced in both systems, since they are the starting point for all processes	Bi-Directional
Products	Product information is defined in SAP S/4HANA and must be synced to Salesforce	Uni-Directional (ERP → CRM)
Price Books	Price information is defined in SAP S/4HANA and must be synced to Salesforce	Uni-Directional (ERP → CRM)
Quotes	Quotes created in Salesforce and pushed into SAP S/4HANA should sync to SAP S/4HANA as an order. If Quotes are created in SAP S/4HANA, they should translate to Quotes within Salesforce	Bi-Directional
Orders	Orders are handled within SAP S/4HANA and should be synced with Salesforce	Uni-Directional (ERP → CRM)
Invoices	Invoices are usually created within SAP S/4HANA and should be synced with Salesforce	Uni-Directional (ERP → CRM)

API monitoring

Since Salesforce is a CRM solution that operates on a multi-tenancy cloud environment, the governor limits must always be kept in mind, else the integration will fail, resulting in loss of data and a bad user experience.

One important governor limit is the API request limit per 24-hour period, especially while integrating multiple external systems with Salesforce. Organizations must carefully select integration patterns to keep the number of API calls to an absolute minimum.

API monitoring gives you access to detailed performance, security, and usage data on all your Salesforce apps. Every interaction is tracked and accessible via the API, so you can view it in the data visualization app of your choice. Organizations must monitor who is accessing the critical business data, when they are accessing it, and how they are getting access. Understand user adoption across your apps. Troubleshoot and optimize performance to improve end-user experience. Event monitoring data can be easily imported into any data visualization or application monitoring tool like Tableau CRM, Splunk, or New Relic.

Error logging and handling

In an ideal world, there are no errors, no bugs. However, these errors will occur in a real-world scenario. Being prepared for these scenarios helps your organization focus on actual integration instead of being blocked by failed integration processes.
For example, what if the sync of an Account record from Salesforce to SAP S/4HANA fails for some reason. Error logging and handling should be able to handle the error if your system landscape consists of a middleware solution. It is important to define a course of action for such errors. Such as defining the number of times a failed action can be retried.

From Salesforce's perspective, synchronization errors may be stored inside a custom error object. Every time the sync fails inbound or outbound, the middleware creates an error object record inside Salesforce via the standard REST-API. Logging these errors in Salesforce makes reporting easy and adds to the overall robustness of the integrated systems. Depending on the root cause of errors, bugs may be identified and eventually resolved. Single regular users can be informed about a sync fail through emails or custom notifications that get triggered via Salesforce flow whenever an error object record is created.

Integration testing

Exhaustive testing is a must for end-to-end integrations and can often be challenging. Organizations must allocate enough time for an intensive system-integration test before it goes live. A good testing strategy evaluates both performance and scalability. Performance refers to the speed and effectiveness of a system under a given workload within a given time frame. Scalability is the ability of a system to meet its response time or throughput objectives under increasing application and system processing demands. Once these pre-steps are complete, the organizations must look at design considerations for creating a future-proof enterprise landscape that integrates Salesforce with SAP S/4HANA.

Ways of integrations

While implementing Salesforce, organizations must frequently integrate it with other applications. Even though each integration scenario is unique, there are common requirements and issues that integration architects must resolve. But before that, it is important to specify an integration style from the following three integration styles.

- **Process integration**

  This style of integration is used for the processing of functional flow across two or more applications. These integrations typically involve a higher level of abstraction and complexity, especially for transactionality and rollback.

  Example: **Process-driven platform events** are event messages (or notifications) that your apps send and receive to take further action. Platform events simplify communicating changes and respond to them without writing complex logic. One or more subscribers can listen to the same event and carry out actions.

  When you implement this pattern, Salesforce calls the remote system to create the order but doesn't wait for the call's successful completion. The remote system can optionally update Salesforce with the new order number and status in a separate transaction.

- **Data integration**

  This is the integration of the information used by applications. These integrations can range from a simple table insert or upsert to complex data updates requiring referential integrity and tricky translations.

  Example: **Enhanced External Services** allows you to invoke an externally hosted service in a declarative manner (no code required). This feature is best used when the following conditions are met:

  - The externally hosted service is a RESTful service and the definitions are available in an OpenAPI 2.0 JSON schema format.
  - The request and response definitions contain primitive data types such as boolean, DateTime, double, integer, string, or an array of primitive data types. Nested object types, and send parameters such as headers within the HTTP requests are supported.
  - The transaction can be invoked from a flow.

- **Virtual integration**

  By using this style of integration, Salesforce interacts with data that resides in an external system without replicating the data within Salesforce. Virtual integration is always triggered via an event from the Salesforce platform, such as a user action, workflow, search, or record update, resulting in real-time data integration with an external source.

  Example: **Salesforce Connect** lets you access your Salesforce data as well as external data. And pull data from other systems such as SAP S/4HANA, Microsoft, and Oracle in real-time without copying the data in Salesforce. Salesforce Connect maps data tables in external systems to external objects in your org. External objects are similar to custom objects, except that they map to data located outside your Salesforce org. Salesforce Connect uses a live connection to external data to always keep external objects up-to-date. Accessing an external object fetches the data from the external system in real-time.

Below figure points out the key capabilities offered by Salesforce Connect.

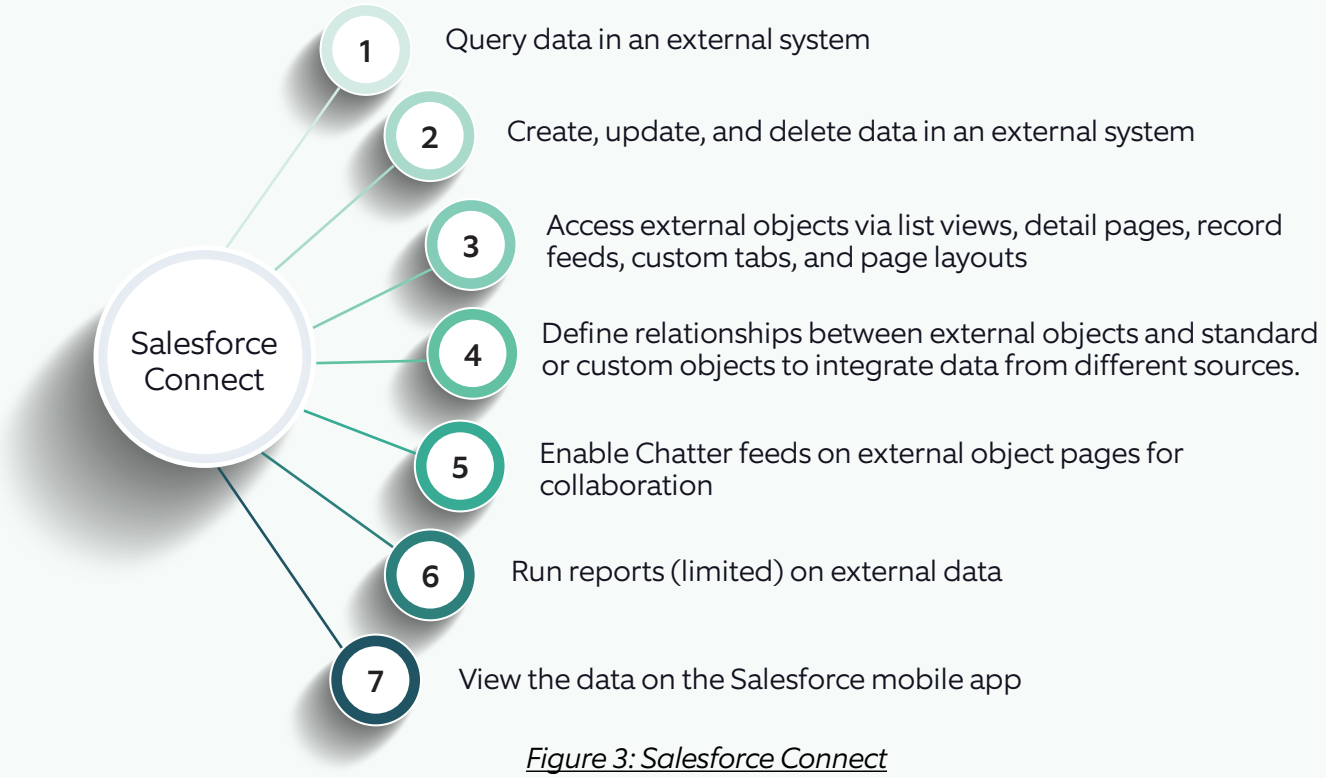


Figure 3: Salesforce Connect

Many customers use this feature to dynamically fetch invoices from SAP S/4HANA without the need to physically store the invoice records in Salesforce which would also count against the storage limitation.

Nagarro and Salesforce

Our association with Salesforce started back in 2012. In the past decade, Nagarro's Salesforce practice has grown 40% year on year to become one of the best service providers in the Salesforce ecosystem. We have delivered more than 200 projects across 80+ clients during this period. We don't just offer digital solutions but act as a strategic consultant to help you through your entire tech journey.

We partner with our clients building robust enterprise integrations for current and future needs. From analyzing enterprise's current system landscape to designing and developing step-by-step processes and timelines, we build a smooth and carefree integration landscape that creates the so often mentioned customer 360-degree view.

Kian Parwini

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About the author

Kian is a Salesforce Technical Consultant and has been working in agile environments with international teams.. With his strong analytical ability and profound technical background he has supported multiple Salesforce to SAP S/4HANA integrations.

He has experience in the entire lifecycle of a product from its requirement gathering, designing, prototyping as well as implementation and deployment with focus on Service Cloud, Sales Cloud, Integrations and Custom Solutions.

About Nagarro

Nagarro is a global digital engineering leader with a full-service offering, including digital product engineering, digital commerce, customer experience, AI and ML-based solutions, cloud, immersive technologies, IoT solutions, and consulting on next-generation ERP. We help our clients become innovative, digital-first companies through our entrepreneurial and agile mindset, and we deliver on our promise of thinking breakthroughs.

We have a broad and long-standing international customer base, primarily in Europe and North America. This includes many global blue-chip companies, leading independent software vendors (ISVs), other market and industry leaders, and public sector clients.

Today, we are over 17,000 experts across 32 countries, forming a Nation of Nagarrians, ready to help our customers succeed.

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