



# Powering-up Salesforce

Effective ERP application integration with the leading CRM software



# Table of contents

- 3 Introduction
- 4 A complex evolution
- 5 Integration Platform as a Service (iPaaS) and API management
- 8 Integration patterns in iPaaS/API management
- 11 Your integration: the way forward
- 14 A hybrid approach to systems integration
- 15 Conclusion

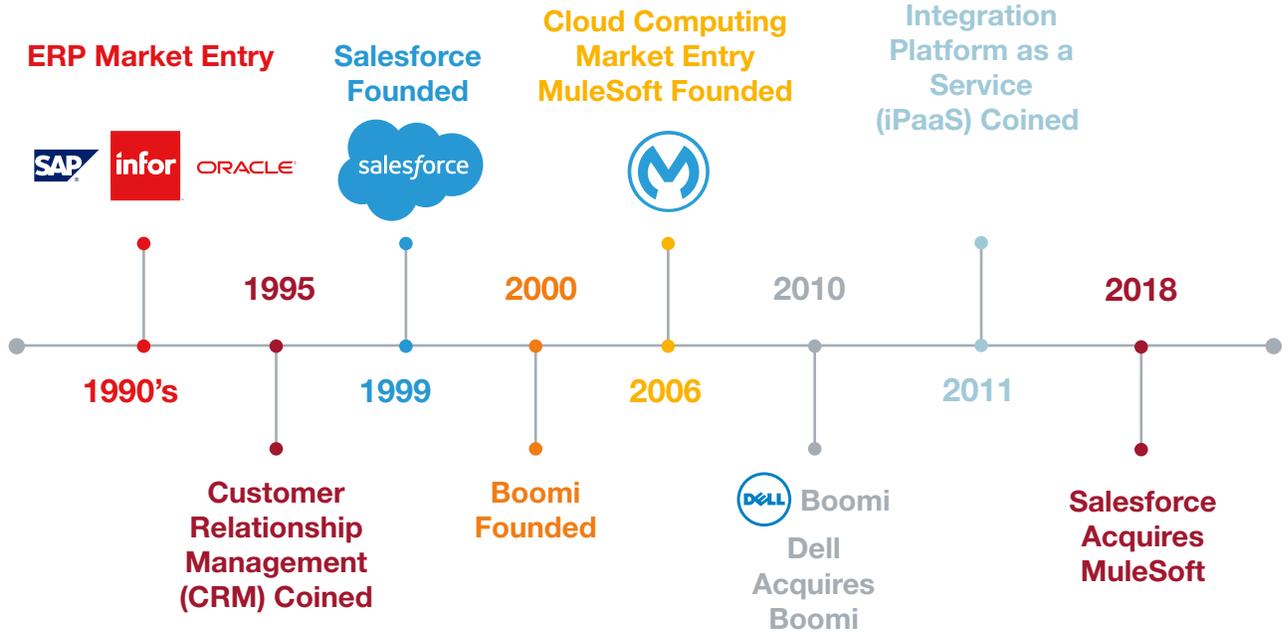
# Introduction

Salesforce has become one of the most widely-deployed customer relationship management (CRM) platforms across the globe, but it is most powerful when integrated with enterprise supporting applications, delivering better insights and influencing rapid decision-making.

For large enterprises, multiple enterprise resource planning (ERP) systems, data analytics tools and middleware need to be orchestrated to organize and distribute sales information for customers, internal sales teams, external sales teams and channel partners – without disrupting front-line customer interactions, timely product development or overall business efficiency.

But when integrating ERP platforms with Salesforce, IT teams often realize they need to take a step back for a broader view. After considering variables such as the business units impacted, sales teams affected and supporting systems required – the need for a systems integrator becomes apparent. System integrators today specialize in bringing together component subsystems into a whole, and ensuring high functionality among the subsystems serving a business.

Here, we discuss the various systems and their evolving connection points along with the effective approaches CGI deploys for getting the most out of Salesforce while empowering decision-making and enabling the beneficial, accessible and secure flow of data throughout the enterprise.

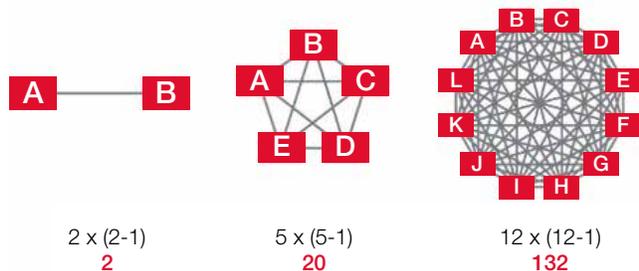


# A complex evolution

The evolution of manufacturing enterprise software systems, coupled with the evolution of the customer journey has led us to system architecture complexity. The journey of individual enterprise systems is far from linear. However, it is unrealistic to expect that ERP and supporting production systems are performing well together since they were most likely installed years, even decades, apart with differing purposes. ERP systems are being hit by Industrial Internet of Things (IIoT) and digital transformation initiatives. Customer relationship management applications such as Salesforce have emerged as equally important as ERP with the goal of 360-degree customer views. Over time, organizations added more complexity as product lists, customer and contact details, quotes, etc., needed to be shared with the ERP. This bred a market need for middleware. Middleware, the software layer that lies between the operating system and applications on each side of a distributed computing system in a network, gained popularity in the mid 1980's.

The need to address the complexity of point-to-point integrations as illustrated here (fig #1) spurred the growth of middleware. Additionally, the rise of standards for web services paved the way for the enterprise service bus (ESB), process orchestration and business activity monitoring.

$N \text{ systems} = N \times (N-1) \text{ point-to-point integrations}$



Salesforce is one of the earliest Software as a Service (SaaS) platforms. SaaS has largely become synonymous with cloud as applications such as Salesforce have moved into cloud-based infrastructure. As cloud applications gained popularity, middleware evolved into the cloud space. Middleware has evolved to iPaaS (Integration Platform as a Service) and API (Application Programming Interface) management platforms. From an industry perspective, the evolution of systems integration began with basic point-to-point integrations. From there, the evolution continued into application integrations with more complex data exchanges – then moving into business process integrations, where business processes need information from multiple applications and systems. Today, organizations are faced with enterprise-level integration, with data moving internally and externally throughout multiple systems.

Each organization's integration evolution is unique and dependent on the company size, number of systems and long-term integration goals. Smaller companies that do not need to provide external access to data can operate efficiently with simple point-to-point integrations. However, companies that require third-party access to data require API management, regardless of size.

# Integration Platform as a Service (iPaaS) and API management

Integration Platform as a Service (iPaaS) is a suite of cloud services that enable development, execution and governance of integration flows connecting any combination of on-premises and cloud-based processes, services, applications and data within individual or across multiple organizations.

There are many vendors in the iPaaS and API management space. CGI has partnered with Mulesoft and Dell Boomi because of their capabilities, market share and relationships with other key vendors such as Salesforce and SAP. In addition to iPaaS, API management has become a key factor in cloud-based integration. APIs have taken the forefront as interfaces for integration endpoints since they enable a standards-based, common approach. These can be consumed by any number of channels such as enterprise applications, web UI, and mobile applications. CGI's experience with API platforms such as Mulesoft, APIGEE and Kong can complement iPaaS platforms that are not fully capable in the API ecosystem.

A modern iPaaS with API management capabilities enables an organization to develop, publish, manage, monitor, deprecate and consume APIs to orchestrate business processes that span multiple clouds and on-premises systems inside and outside firewalls. Forward-thinking enterprises are investing in iPaaS solutions. However, as the number of vendors grows, and the complexity iPaaS solutions increases, organizations must consider a growing number of factors before selecting the right vendor.

Criteria that organizations must consider when evaluating iPaaS vendors include:

- Reusability
- Adaptation
- Developer DIY capability
- Governed access
- Hybrid-readiness

## Reusability

The principle of reusable assets, emerging from a service-oriented perspective, is one that can increase developer capability and speed delivery time. Instead of creating a custom connectivity solution every time a developer wants to integrate an application, reusable connectors, templates, and assets make the job simple. In addition, a reusable asset can be assessed and governed by the central IT organization more easily. The ideal iPaaS solution should ensure the provision and documentation of reusable business assets.

An example of this kind of reusable technology asset would be an API for accessing product information in SAP and/or other systems. This API offers a self-serve developer portal allowing users to gain access to the API and make calls against it. It is governed and managed through policies that central IT sets and evolves. The value of systems access through the API is that IT can see which applications are using the data and how frequently data is being used. IT can then throttle traffic flow if the API is being accessed too frequently. Furthermore, the API can be incorporated into an integration template to connect the data to another system, such as an analytics platform. This means a business analyst could consume the data from the API into a data warehouse or reporting engine without having to write code.

## Adaptation

Integration often includes the need to connect to different protocols, proprietary interfaces and a variety of data formats. The use of adapters or connectors to hide the complexities involved with these challenges greatly increases the success and reliability of integrations. In addition, adapters and connectors should follow the same framework to deliver error handling, logging and notification such that common patterns can exist regardless of the underlying technologies.

## Developer DIY capability

With demands on the central IT organization originating from across the business, it is nearly impossible for central IT to serve every request in an efficient and timely manner. Developing a DIY developer culture is one way to scale IT capability without the need for additional resources. An iPaaS vendor must offer this capability in order to accommodate the growing technology needs of a modern business. In order to develop a DIY culture, the organization must have:

- **Training and skill building** - Assets that allow developers to build and innovate with freedom to do interesting things within a managed and governed infrastructure helps retain staff.
- **Easy-to-use tooling** - iPaaS vendors that offer simple tooling improves efficiency and reduces the burden on developers.
- **Access to building blocks** - Reusable building blocks create a foundation for the efficient development and timely launch of new products or services.

## Governed access

As a system evolves to accommodate reuse and self-service, governance becomes paramount. Central IT needs to limit access to systems to the right people and ensure that data is being used the right way. In the best case scenario, security, access management and governance should be built into the platform to avoid additional complexity.

As evidenced by the previous example, an API that allows access to systems and data provides a manageable, scalable way for central IT to monitor the use of data, which can be governed with policies. The advantages of a policy-based model – the preferred approach – include the ability to place policies on APIs immediately, allowing maximum flexibility as your requirements change.

These policies have other advantages. They allow IT managers to set alerts and notifications when there are too many calls on an API, for example, or when it is not being used in an appropriate way. APIs can help authenticate the identity of the user, making sure the right people have access. And finally, a policy-based governance model implemented with APIs allows flexibility in offering access to systems and data for certain business groups. Access can be given, removed, limited or expanded to different business groups in different geographies, functional groups, or any other criteria the organization chooses to recognize. This is advantageous for businesses that want to expand globally and offer tailored access to systems based on local needs. Simply changing the governance policies on APIs make implementing these policies very efficient.

## Hybrid-readiness

Due to multiple requirements for speed, reliability and compliance, businesses have a multi-faceted array of requirements regarding integration platform hosting. For some businesses, regulations necessitate a fully on-premises solution, while others need hybrid solutions, a private cloud or a completely cloud-based solution. Many vendors can accommodate these needs, but a cloud-hosted iPaaS solution is the most effective. The advantages of a fully cloud-hosted solution are:

### Faster time-to-live

Cloud-based iPaaS vendors should offer an expedient time-to-live experience. Cloud-hosted integration platforms can be set up and made operational in a fraction of the time required for standing up on-premises solutions.

### Cloud cadence of new product capabilities

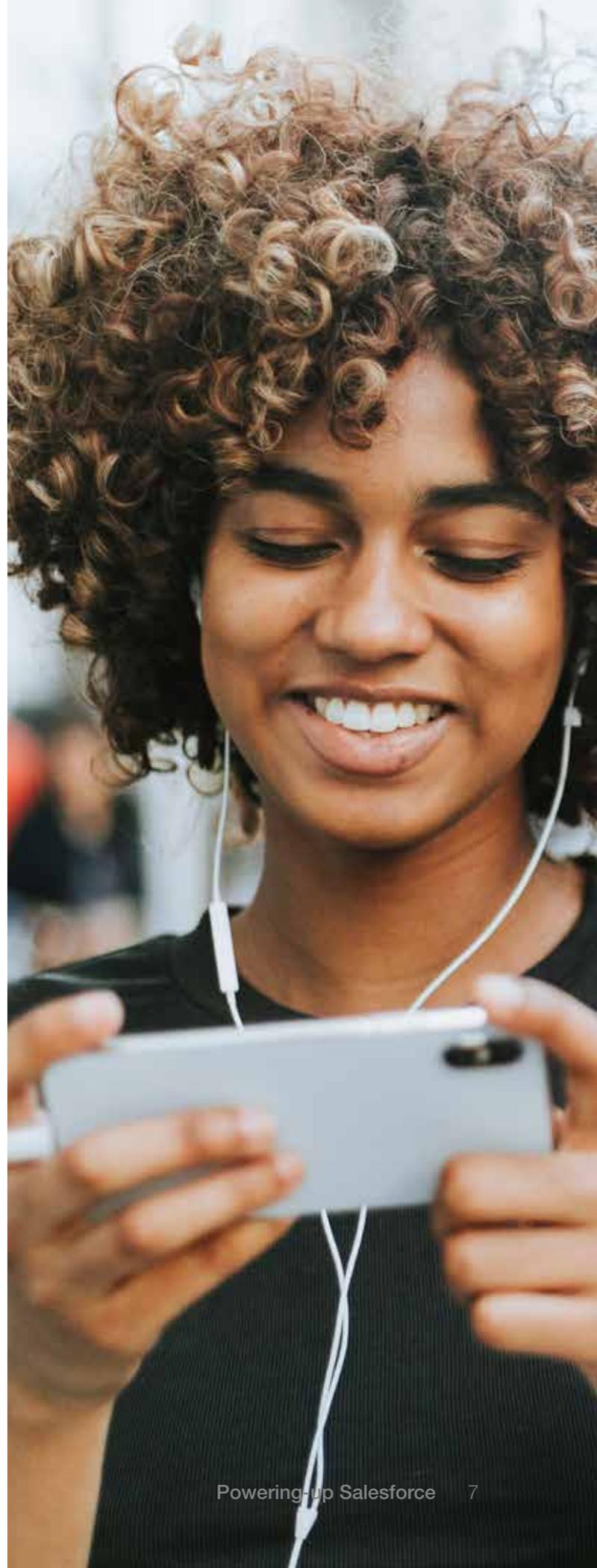
Cloud-based iPaaS vendors should update their products on a regular basis; most are updated monthly, with a key advantage being a decrease in IT maintenance burden. When fully hosted and managed by the vendor, there is no need to maintain an infrastructure, install updates or apply patches.

### Zero-touch, automatic updates

Users must be able to take advantage of updates as soon as they are released, with zero effort required on their part.

### Global reliability

Cloud infrastructures are typically hosted in numerous locations around the globe, offering maximum redundancy, zero downtime and rapid disaster recovery.



# Integration patterns in iPaaS/ API management

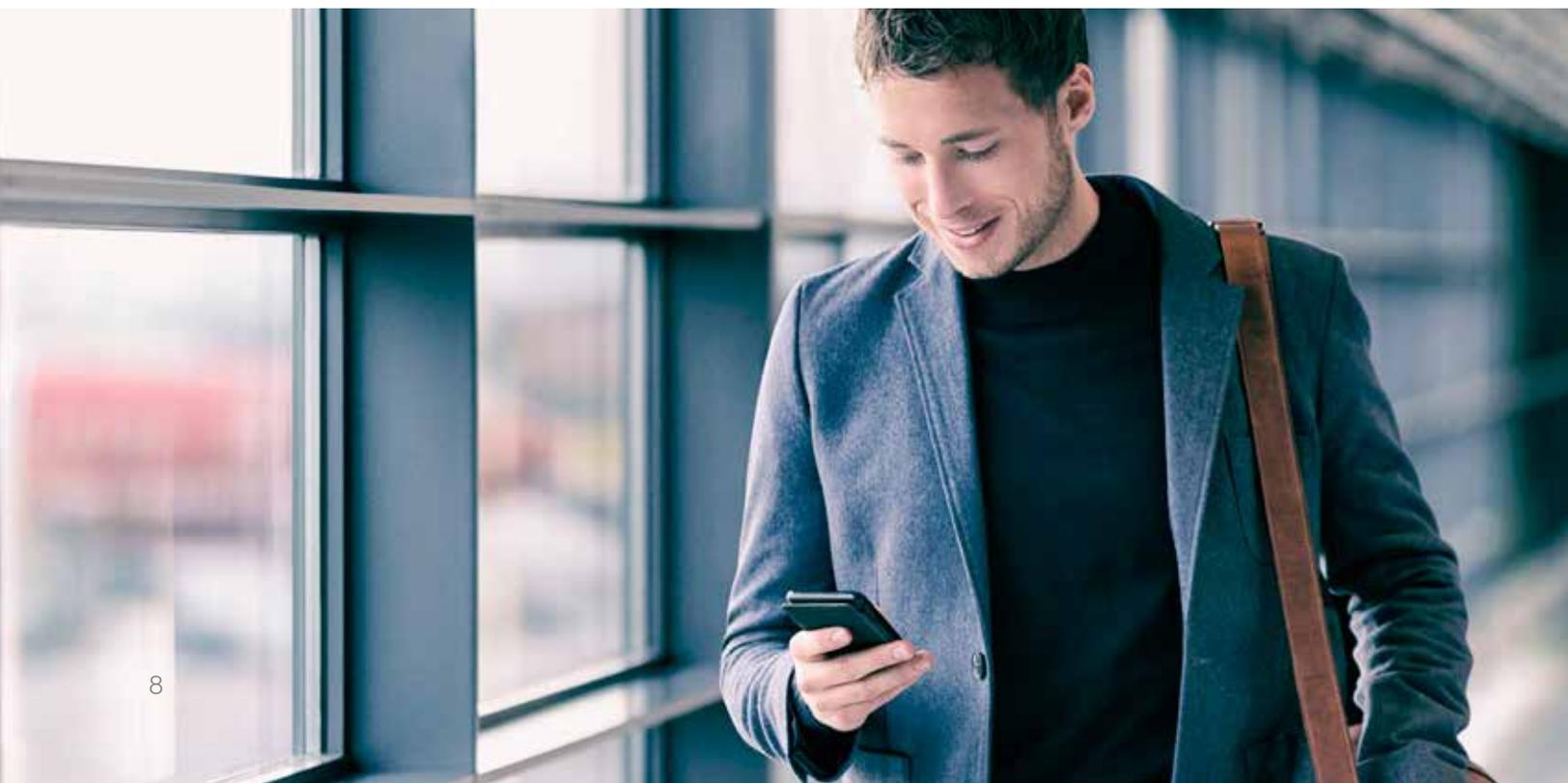
The on-board integration functionality of most ERP systems is typically sufficient for core, commonly used integration patterns such as initial data migration, broadcast to target and bidirectional target synchronization.

However, when integration patterns become more complex, the need for a robust, dedicated integration solution arises. The flexibility of an integration solution is paramount to the success of the ERP implementation.

Advanced, flexible integration solutions can help companies by providing cross-application functionality to streamline business processes across various departments and systems. Complex, multi-step integration patterns can be created to function as workflow monitors, and offer superior connectivity options provided by dedicated integration solutions. While it is impossible for any integration solution to have pre-built adapters for every possible application, it is important to choose a solution with maximum flexibility. Out-of-the-box support for database and web connectivity, communication protocols, encryption/decryption, file systems and networking must all be considered.

## **API-led approach**

An API provides a well-defined interface that is both easily consumed by multiple channels such as internal applications, mobile applications and web-based user interfaces. This is critical for reuse. Modern applications are often built leveraging APIs as well. For example, Salesforce can access business objects in its local database but in many cases, can also be configured to access via a URL-based API. This “virtualized” approach provides a lot of flexibility along with changes to the approach or pattern of available integrations. This provides accessibility to more real-time data versus traditional batch synchronization.



## Batch vs. realtime

A challenge encountered during application integration projects often involves integration pattern choice. While real-time data access from a single source of truth is the goal, it is not often a requirement (or attainable). A common API could be built that either presents a view from a single source of record (SOR) that can even be cached such that performance is optimized. However, if an application requires customer data locally, and it is not the SOR, then somewhere the required portion of customer data needs to be synchronized. Many decisions on how often, how to handle errors, and other variables must be considered. Decisions on which system is the actual SOR is also a major factor that will influence the approach.

CGI's best practice is to provide access through an API. APIs can aggregate data from multiple systems and, if needed, act as the central processor for data synchronization. Ideally, an API with data at a single source should be the goal.

## The iPaaS/API management value proposition

CGI maintains partnerships with some of the leading iPaaS/API management platform vendors including Mulesoft and Dell Boomi, both of which provide development productivity tools that reduce the effort of building highly resilient integrations and APIs. Each provide flexible deployment models that can connect SaaS applications with on-premises or cloud applications such as custom-built or commercial off-the-shelf (COTS) applications deployed in AWS or Microsoft Azure.

Both Mulesoft and Dell Boomi provide out-of-the-box connectors for several SaaS and on-premise applications such as SFDC, Workday, Oracle EBS and SAP to name a few. These connectors include not only the standard development aids but are also “application aware” to reduce complexity.

In order to achieve maximum API effectiveness, a common interface is required, ensuring consumers a seamless experience regardless of backend changes. Common models can be difficult to design and implement however, they are not always “common” across specific business functions. If a common, “Canonical” model can be leveraged across an organization, it should be used – but balanced with Bounded Context models.

API specifications such as REST API Markup Language (RAML) and Open API Specification can use these common models to deliver APIs that are reusable, and easily understood and consumed.

## Microservices

CGI has experience with API management platforms such as APIGEE and Kong that can be used to enable API implementations where customers have non-MuleSoft technologies in place. In today's dynamic integration space, some organizations are moving to more discrete services that are deployed in containers known as microservices. MuleSoft has its own implementation of a microservice-based architecture but again, customers may elect to use other technologies, such as Python Flask, Spring Boot, and Apache Camel. An API management platform can help tie these service implementations together independent of what technology is used to build them. CGI has expertise in these patterns as well.

## **SAP to SFDC Integration – Benefits using SAP Process Integration / Process Orchestration**

API framework-based integration using SAP PI/PO between SAP and Salesforce.com provides numerous benefits including its ability to design E2E efficient business models, improved dexterity to act on new sales information, and an ability to completely automate business processes within shortened timeframes.

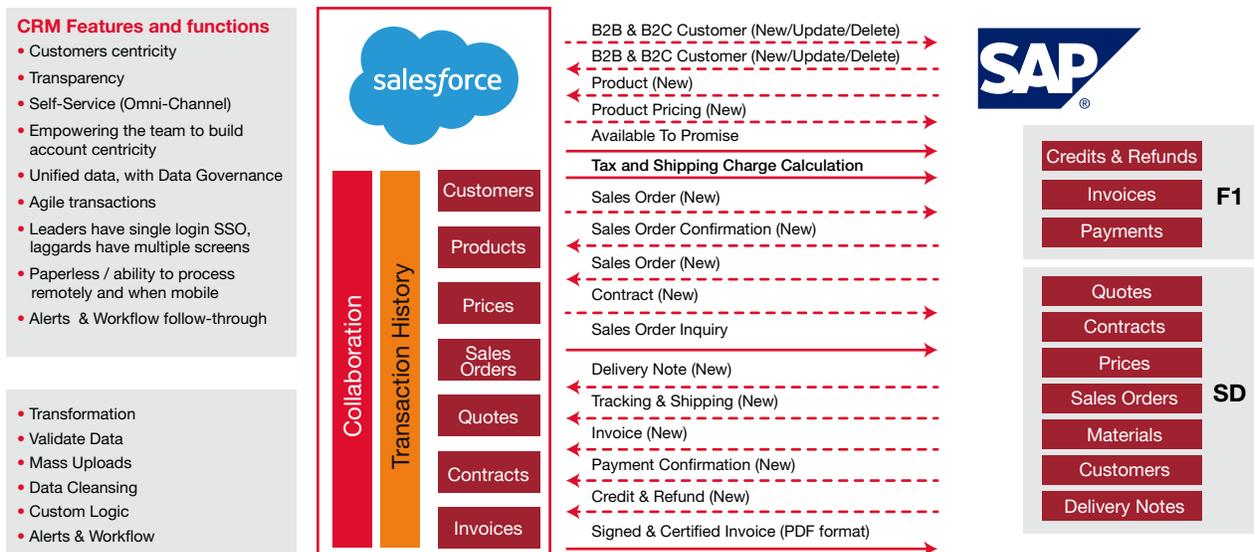
The API framework also allows the building of harmonized and uniform data models across ERP & CRM systems, but with the ability to designate any one system as SOR or Truth. It can synchronize bi-directional interfaces for consistent and reliable data synchronization, including the removal of data duplication – thus leading to fewer errors caused by manual data entry. Finally, it is an essential building block for establishing a master data governance framework.



# Your integration: the way forward

Salesforce and SAP play specific roles within the enterprise supply chain. Salesforce typically is the system of engagement while SAP provides back office operations. An engagement layer is important and valuable when providing a working environment for users without the need to jump back and forth between multiple systems to complete a business process.

Below is a table that provides some likely flows of data elements between Salesforce and SAP.



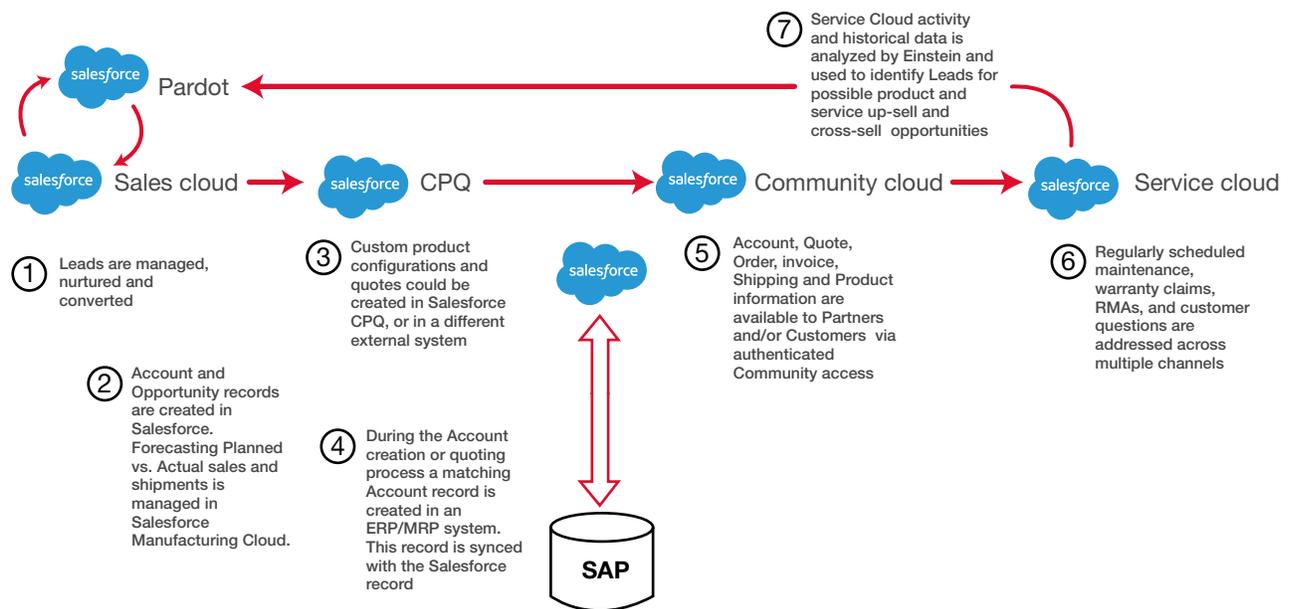
When defining guiding principles for standing up an engagement layer, consider that processes are not executed in the engagement layer. Therefore, decisions must be made regarding the execution locations for processes, but first, it is vital to understand the customer journey, including:

- Where are orders initiated?
- Where are orders processed?
- Where are quotes initiated?
- Where is pricing processed?

By answering these key questions, the integration is more likely to keep the strategic business goal – whether it is enhanced customer engagement or operational efficiency – clearly in sight throughout any integration initiative.

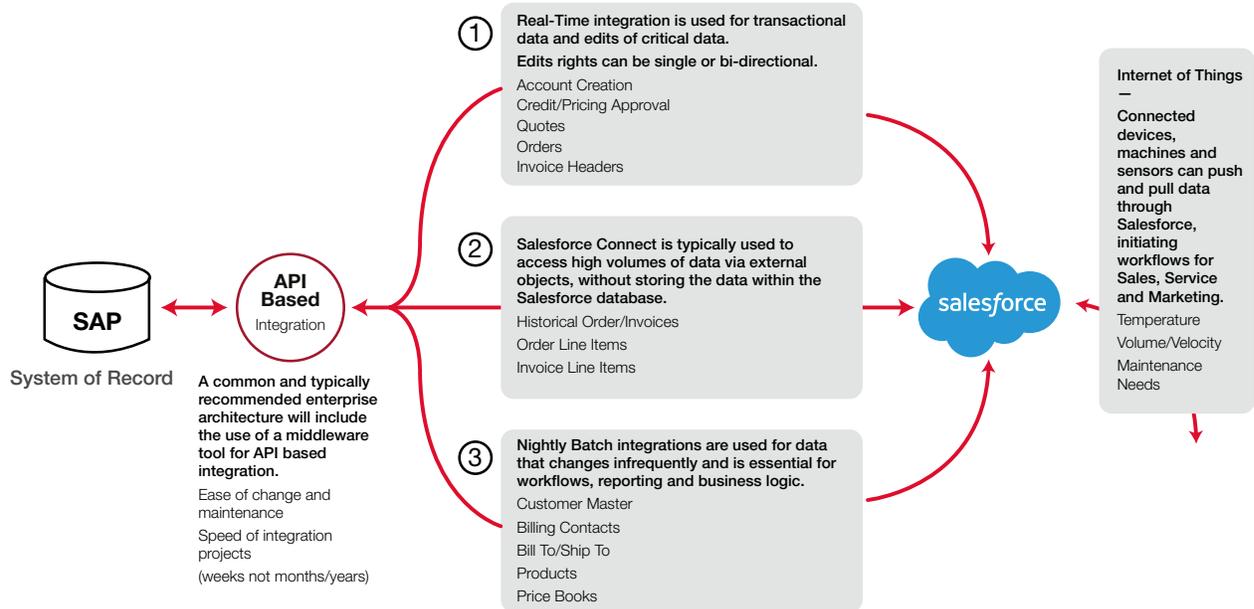
Once use-case requirements are understood, clearly documented and prioritized, the following must be considered: data cache, mapping, sync orders and exposure. At CGI, we work to achieve project alignment through the following steps:

1. We take a human-centered design approach. We interview, understand, document and communicate customer journeys and user requirements. We talk to business users to uncover constraints and enlist their support to drive adoption.
2. We act as intermediaries for client requests – a conduit for information coming from multiple business units.
3. We conduct a technical review with architecture experts to build a technical roadmap for proof-of-concept.



Enterprise applications like Salesforce and SAP provide tremendous capabilities. However, this can come with complexity. Both provide their own mechanisms for integrating with their components but with challenges as well.

Salesforce has multiple patterns for integration. Salesforce Connect can be used to access remote data in a virtual fashion. Heroku could come into play in some scenarios for data synchronization. Mulesoft, which is owned by Salesforce provides endless capabilities to integrate by responding to Salesforce events, perform batch processing or call APIs. But none of these are as straight forward as it would seem. SaaS applications such as Salesforce require a good understanding of security and access management to execute them. In addition, complex data sets, data transformation, reliability and resilience all also need to be considered.



SAP, on the other hand, has its own set of challenges. Somewhat proprietary interface mechanisms such as iDocs and BAPI are not easily understood without SAP experience. Being able to troubleshoot those technologies and interact with them requires solid SAP skills.

CGI believes that the best practices described earlier in this document provide a sound approach to easing some of the pain introduced by these challenges. For example, adapters/connectors to SAP hide the complexity of using iDocs or BAPI. These connectors function similarly for BAPI as they would for other technologies. In the case of Salesforce, Mulesoft has a connector that eases the complexity of secure access as well as being able to respond to events or format the API calls properly. iPaaS platforms like Mulesoft provide common features for transformation and error handling, reliable messaging etc. iPaaS solutions provide common and easy to use wizards for configuring security access such as OAuth and the ability to orchestrate flows to deal with complex interactions. Bundling all these facets into an API led approach provides the reuse and flexibility to future proof integrations and CGI can lead the way in this endeavor.

# A hybrid approach to systems integration

The traditional linear approach to large-scale implementation projects must yield to new ways of thinking, especially during times of rapid and unexpected change. Organizations that want to achieve agile at scale should consider blending old and new approaches to help transformational programs get unstuck and move in the right direction.

Traditional systems integration approaches based on decades of best practices have an important role to play – providing a stable foundation for operations to meet the baseline needs of users and create a framework from which to evolve existing solutions. Operational and innovation excellence do not need to be mutually exclusive goals. A flexible and contemporary hybrid approach provides the best of both worlds, reducing pressure on organizations who may not be fully agile in their pursuit to achieve their business outcomes.

The CGI AdaptiveSI approach to systems integration combines agility, design thinking and change management to reduce risk, improve speed to market and enable sustainable transformation for our clients. The approach is based on over 20+ years of real-world system integration experiences and best practices from Scrum, SAFe, agile principles, and traditional techniques. The main components of CGI AdaptiveSI are:

- Govern – ensures there is alignment between all major project components, managing a risk profile, and putting the constructs in place so that control is evidenced across the engagement.
- Align – workshops are conducted to facilitate dialog and alignment between key program stakeholders.
- Deliver – teams iterate on program increments to design, build and test specific user stories.
- Achieve – a sequential set of activities that relate to the operational readiness of each functional phase, both pre and post-deployment.

CGI's AdaptiveSI testing is a best practice for large, complex systems. The approach requires a comprehensive test plan to uncover all the operational defects before pre-production deployment and employs a parallel run activity to validate the performance outcomes of the new system with the old to ensure seamless cut-over without effecting production data. Proven automated tools and approaches are employed to migrate large volumes of secure production data (PHI & PII) and validate the successful migration of that data. Finally, the AdaptiveSI process allows us to buildout, measure, and verify performance of the various modules and to perfect data migration early in the SDLC to address issues early and deliver on time. This also helps to identify infrastructure performance issues associated with the new application.

# Conclusion

Well-orchestrated, integrated solutions provide a solid foundation for operating a high-functioning, responsive and adaptable business. CGI helps organizations optimize their systems integrations through a hybrid methodology that preserves the “best of” traditional methodologies but also incorporates agile, user-centered design and organizational change management principles to achieve results. Especially in uncertain times, a cookie-cutter approach must give way to a methodology that fosters collaboration and organizational agility, and enables a relentless pursuit of innovation.

Application integration, or integration in general, can be dramatically improved by making the right decisions on approach, patterns and technologies. An iPaaS can reduce the complexity of the required frameworks to integration between disparate systems. An API management platform can improve governance, access and management of integrations in order to better ensure return on investment and finally a center of enablement will greatly improve the success and visibility of this approach.

CGI has iPaaS and Salesforce centers of excellence with deep expertise and knowledge on how to select the best integration platform. We partner with our clients to implement an API and iPaaS ecosystem that can be leveraged across an organization to integrate Salesforce and other systems with any application or other channels such as mobile, UIs, B2B portals and even EDI. Partnering with CGI to design a combined CRM and integration roadmap, and an implementation plan for that roadmap, will greatly improve the likelihood for a successful Salesforce implementation and enterprise-wide integration capability.



“From our Manufacturing industry work, we have seen that customers who have integrated their ERP systems with their Salesforce CRM system have significantly accelerated their digital transformations into more agile, collaborative, and responsive companies.”

Tony Kratovil, AVP and Chief Solutions Officer  
- Manufacturing Industry, Salesforce

The following CGI experts contributed to the development of this white paper.

**Katie Ashton**, Director, United States

**Paul Bruno**, Director, United States

**Steve Lippock**, Director, United States

**Don Nemitz**, Director, United States

**Arnab Ray**, Director, Canada

# About CGI

## Insights you can act on

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world.

We are insights-driven and outcomes-based to help accelerate returns on your investments. We are insights-driven and outcomes-based to help accelerate returns on your investments. Across hundreds of locations worldwide, we provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

[cgi.com](https://www.cgi.com).