

SAP Reference Architecture for Retail

Disclaimer

The content in this presentation is based on publicly available information, industry frameworks, vendor documentation, and common practices across retail and convenience store sectors.

All insights and references are for general knowledge sharing and do not reflect or disclose specific business practices, systems, or strategies of any clients.

Retail Model

Unified Retail Commerce for Digital Business Execution

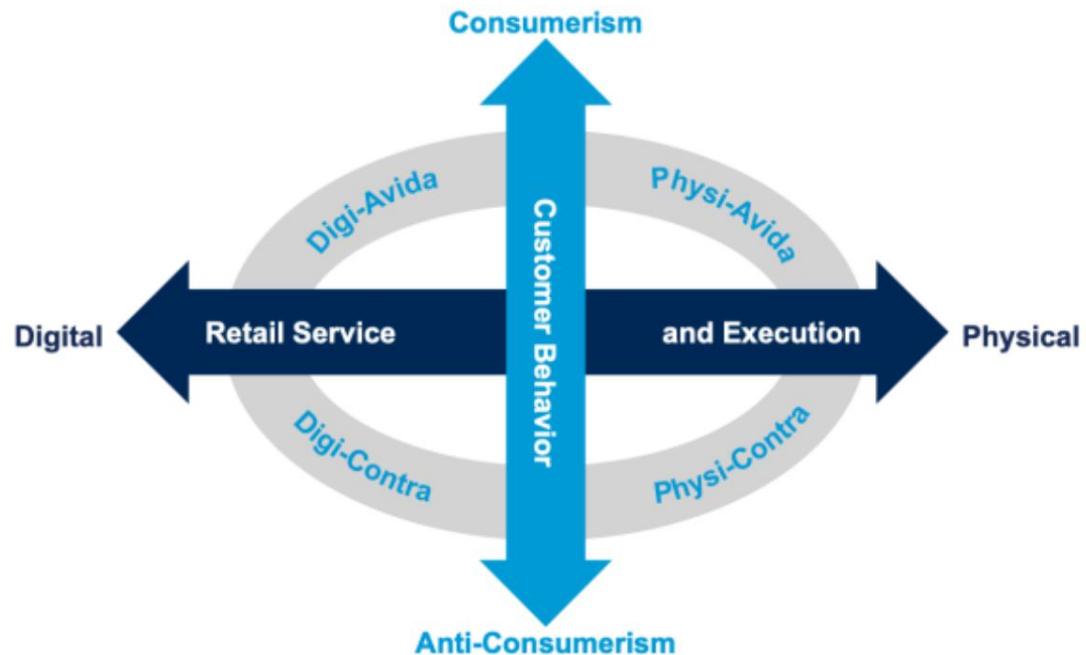
- What are the business and technology trends impacting the retail industry?
- How can I help the business prioritise technology investments that support immersive retail experiences for customers?
- How can I support the business to be more agile through a robust technology ecosystem?
- How can I prepare my organisation for transformative technology by identifying current and future technology use cases?
- How can I leverage technology to support the organisation's goals for environmental, social and corporate governance?
- What are the merchandising business and technology trends supporting unified commerce?
- What is the role of AI in automating and optimising merchandising processes and decision-making?
- How can I understand and support the business as changes in pricing and promotions are driven by unified commerce?
- How do I manage assortments, planograms and inventory across touchpoints to optimise for unified commerce?
- What is the role of data and analytics in merchandise planning and execution?
- What are the store trends supporting unified commerce?
- How can I advise the business on technology investments to digitalise the store to support unified commerce operations?
- How do I create a unified commerce fulfilment strategy, leveraging my stores and all available inventory to reduce costs and time for customer acquisition?
- How do I achieve the correct balance between the human workforce and automation to deliver a superior associate experience for competitive advantage?
- What is the role of data and analytics for in-store execution?



Source: Gartner
779152_C

Two Critical Uncertainties and Four Global Scenarios

The New Retail Scenarios



Source: Gartner
775760

Detailed analysis of the market forces, client interactions and behavioural changes in society at large has caused us to propose two critical factors that will drive the future of retail:

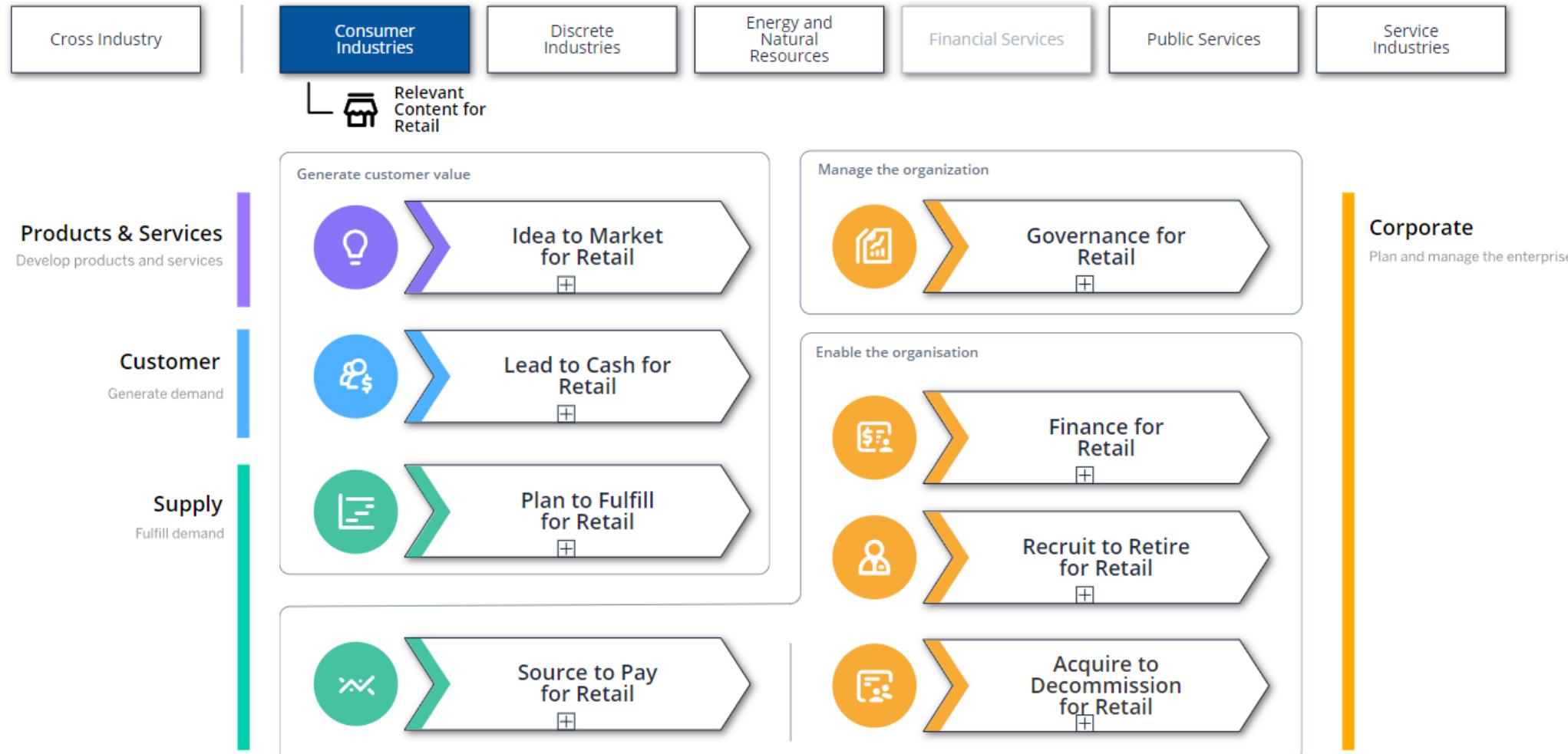
1. Consumer behaviour along a consumerism/anti-consumerism continuum.
2. A wide spectrum of retailer-provided service and execution options for the consumer to choose from, entailing “digital only” at one end and “physical only” at the other, and everything in between. The interplay between these factors creates scenarios that represent various ways in which the future of unified retail commerce may unfold to strongly influence executive decision making.

Above the horizontal Retail Service and Execution axis at the centre, consumers pursue consumerism, choosing to shop predominantly either in the digital realm or in a physical location.

Retail CIOs should use these scenarios, as well as the other Gartner tools and referenced research, to address the immediate imperative of managing continued market volatility (such as bankruptcies, government policies, inflation, social influence, continued fluidity of human behaviors, uncertainty of epidemiology, environmental concerns, economics or other major disruptive forces).

SAP Reference Business Architecture

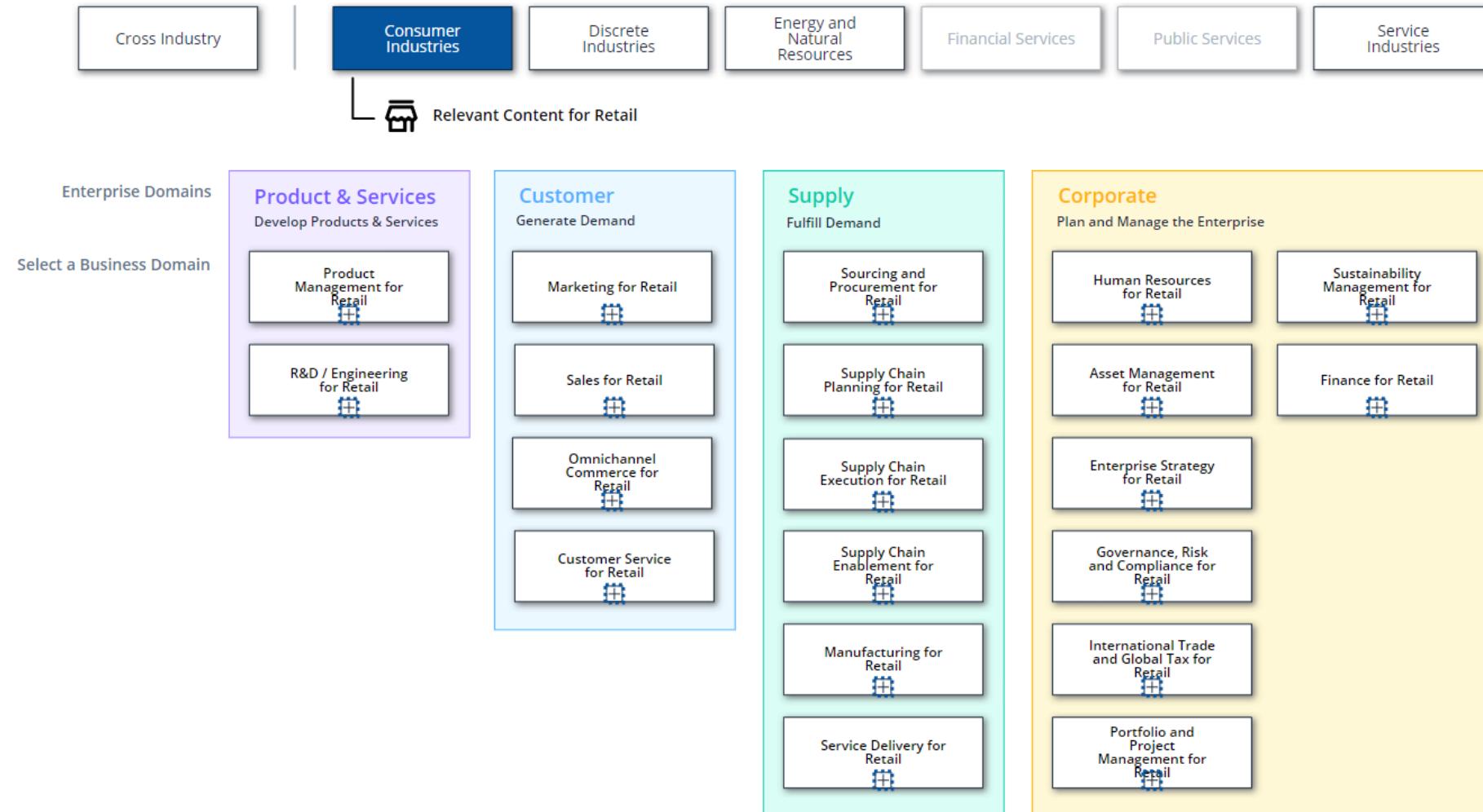
Retail End-to-End Processes by APQC Process Classification Framework



source: [SAP Signavio Process Explorer - End-to-End Processes for Retail](#)

SAP Business Capability Model

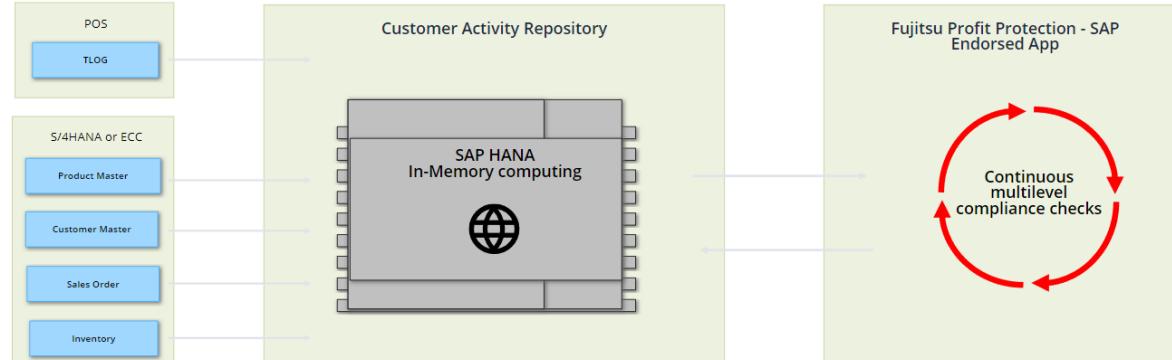
Retail Capability Map



source: [SAP Signavio Process Explorer - Capability Map for Retail](#)

Retail Industry Value Accelerator from Fujitsu and Capgemini

Fujitsu Profit Protection - SAP Endorsed App | Reference Model for Retail Industry

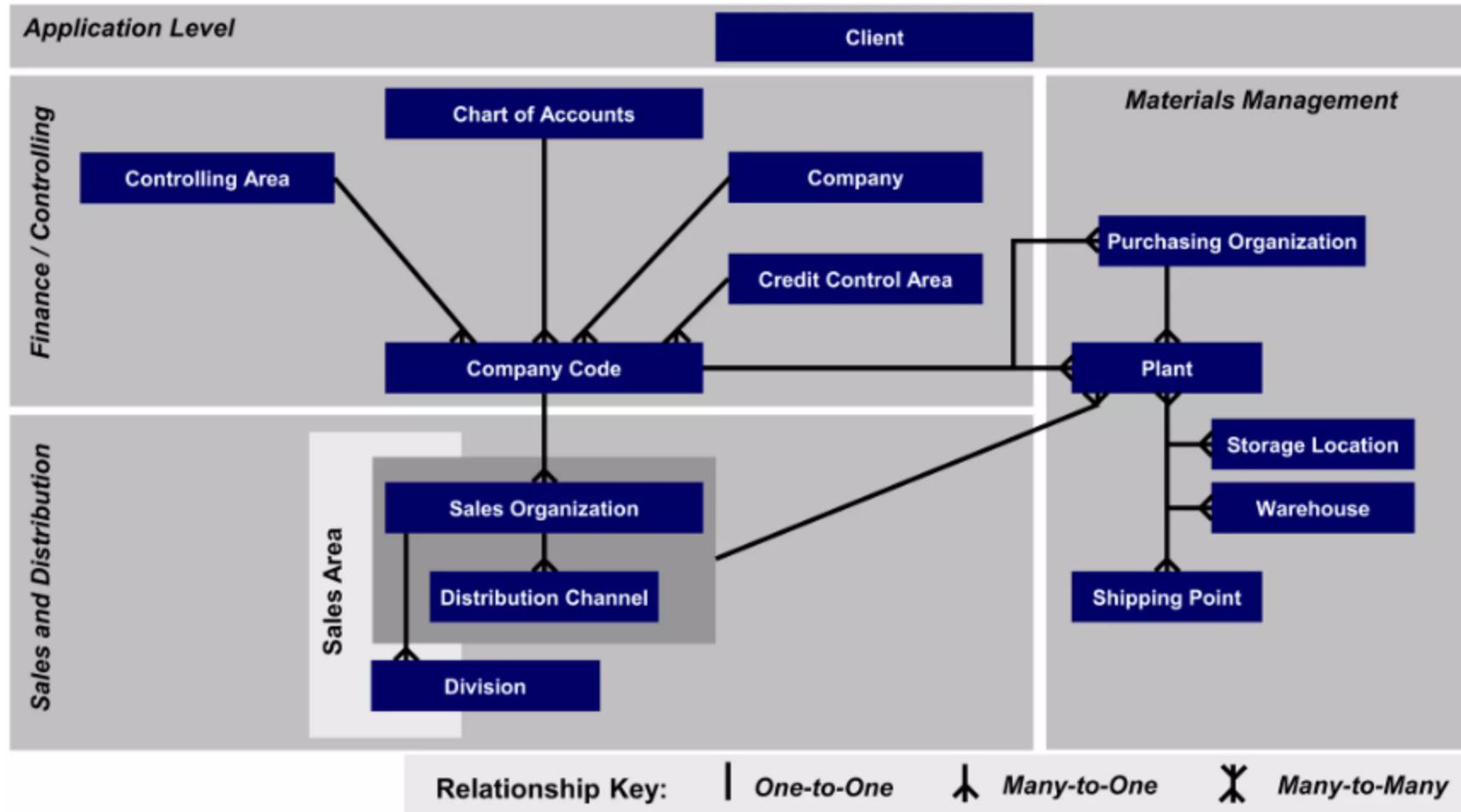


source: [Retail Industry Value Accelerator from Capgemini | Model | Hub | SAP Signavio](#)

source: [Fujitsu Profit Protection - SAP Endorsed App | Model | Hub | SAP Signavio](#)

SAP Organisation Structure Relationships

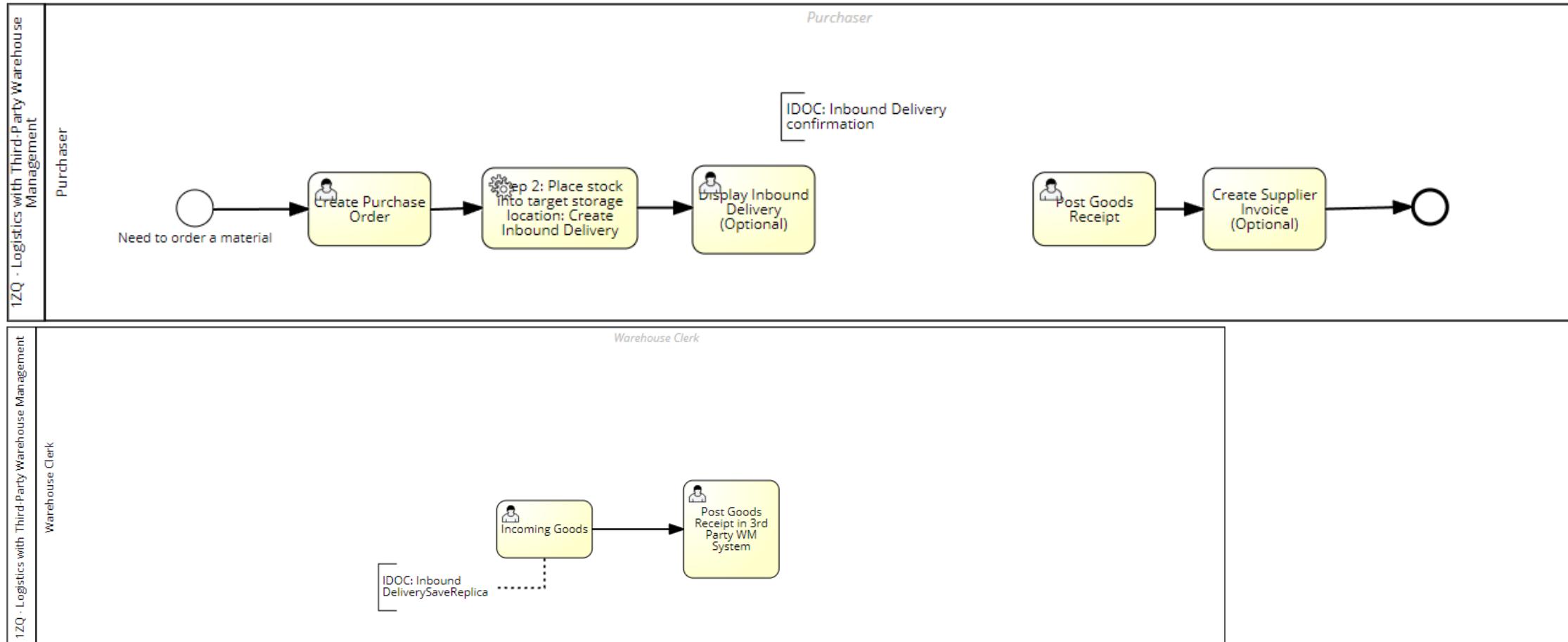
Accenture's SAP Implementation Guide



source: [SAP Organization Structure V1.2.ppt](#)

Retail Logistics with Third-Party Warehouse

Retail Warehousing in SAP S/4HANA Cloud, Public Edition (US, DE)

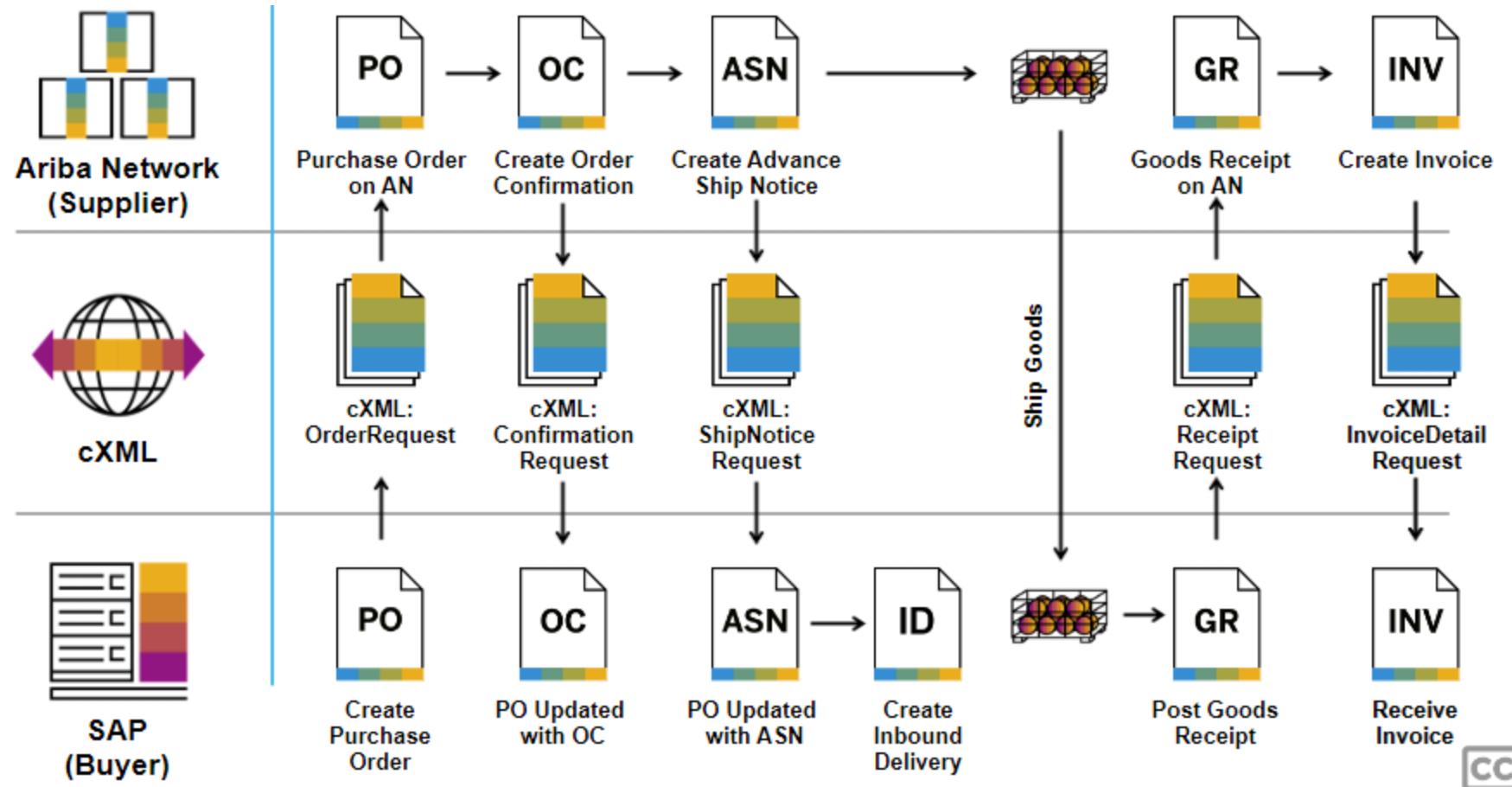


source: [69M - Retail Logistics with Third-Party Warehouse | SAP Signavio](#)

source: [Integration Options and Process Flows for 3PL with Warehouse Management Systems in SAP \(sap-press.com\)](#)

Receive an Invoice in the SAP Business Network

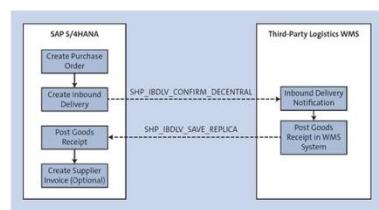
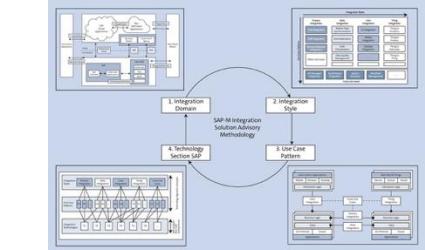
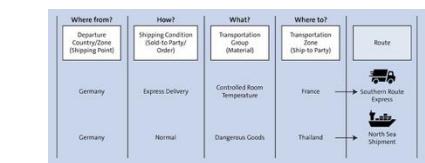
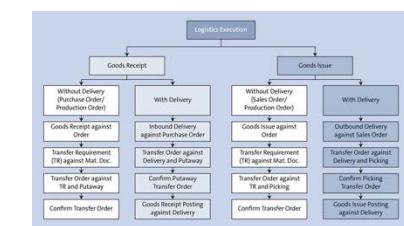
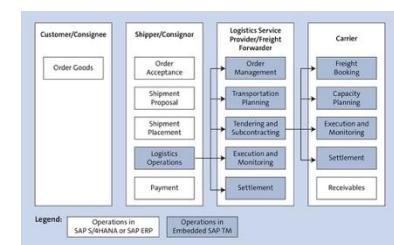
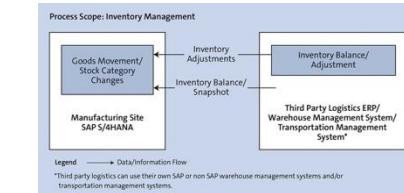
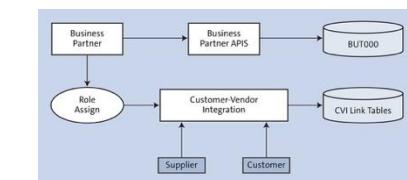
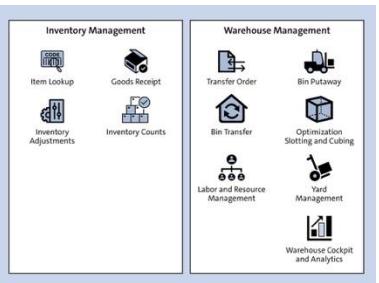
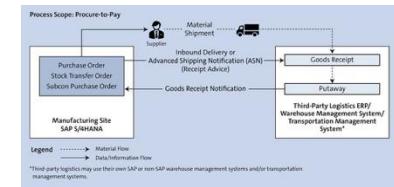
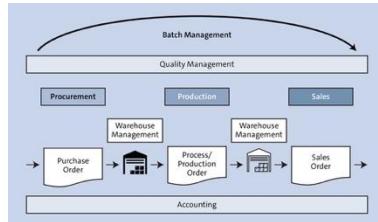
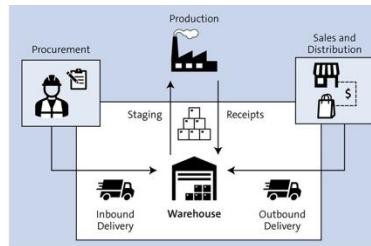
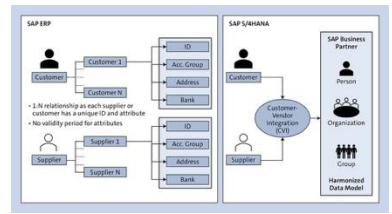
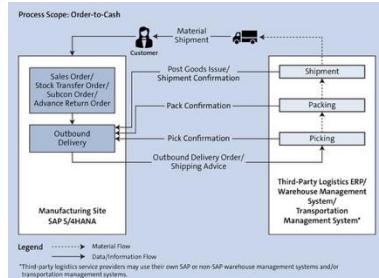
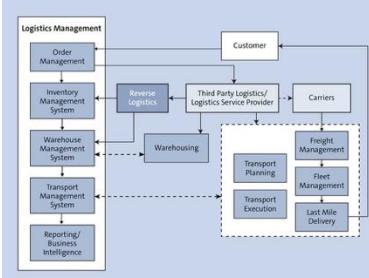
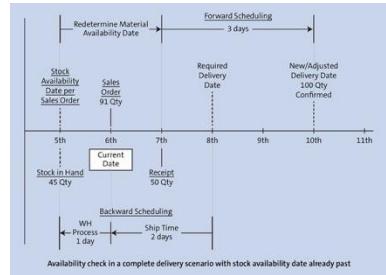
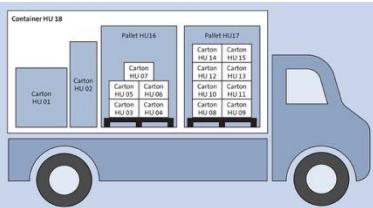
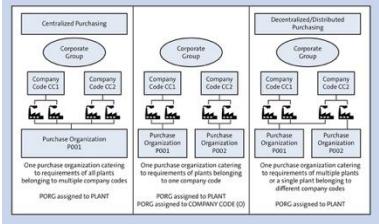
Discovering SAP Business Network Supply Chain Collaboration Features and Functions



source: [Receiving an Invoice in the SAP Business Network](#)

Integrating Third-Party Logistics with SAP S/4HANA

Generic View (non-Retail specific)



source: [Third-Party Logistics \(3PL\) with SAP S/4HANA | Book an - by SAP PRESS \(sap-press.com\)](https://sap PRESS.com)

Architecting EDI with SAP IDocs

Exchange Data Interchange

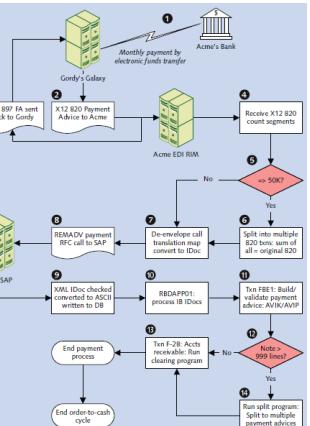
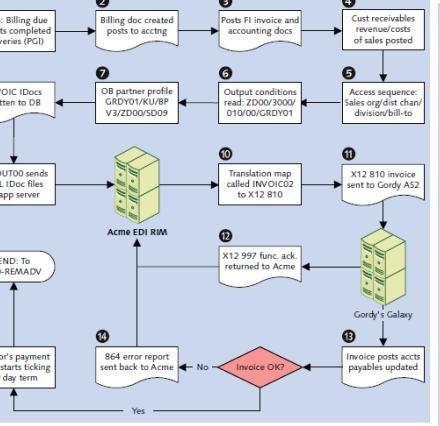
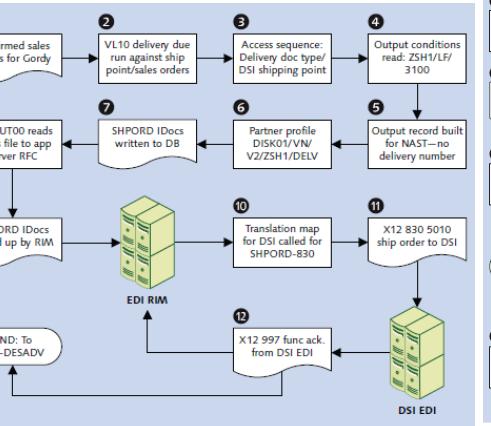
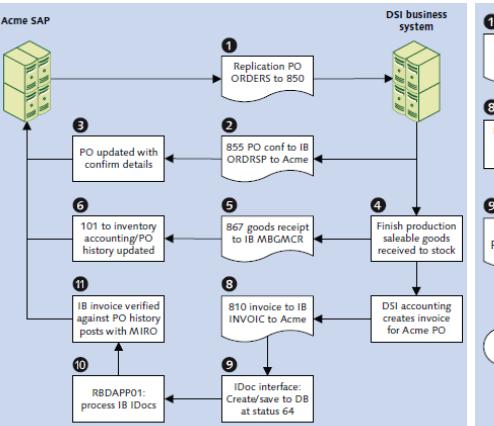
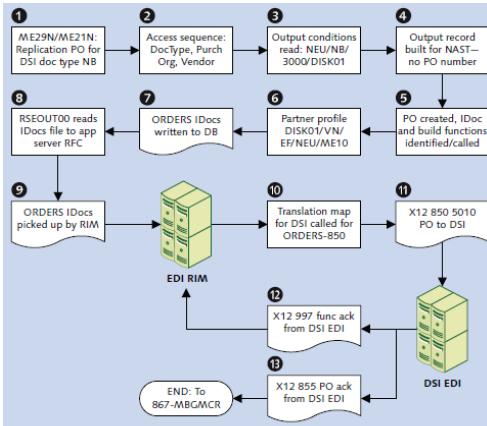


Figure 9.4 The Outbound Purchase Order Process Flow

Figure 11.5 The Inbound Goods Issue/Goods Receipt Process Flow

Figure 14.4 Outline of the SHPORD-830 Interface Processing Flow

Figure 17.4 Outbound Customer Invoice Process Flow

Figure 18.1 An Overview of the Inbound Shipping Confirmation Process Flow

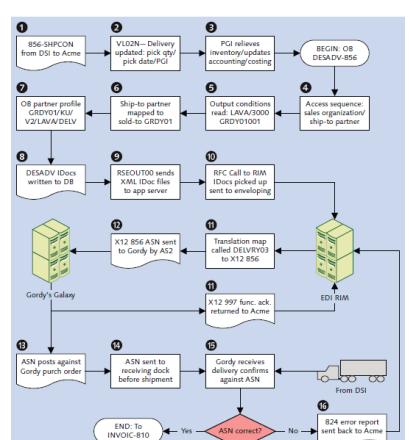
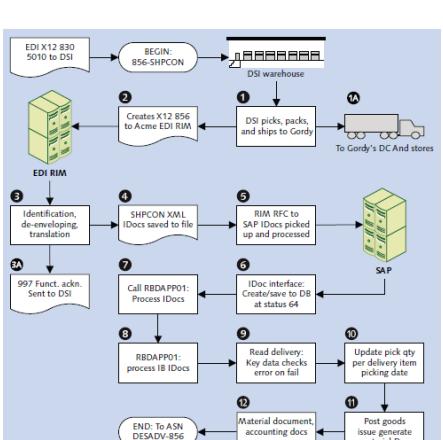
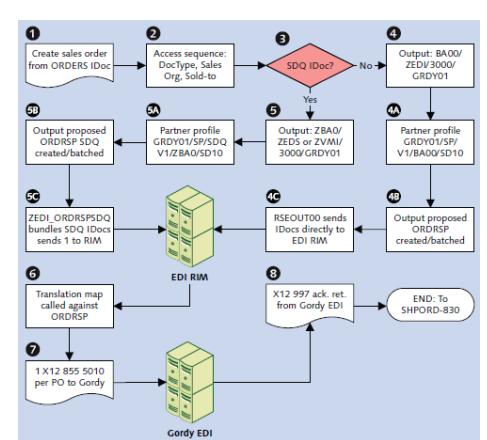
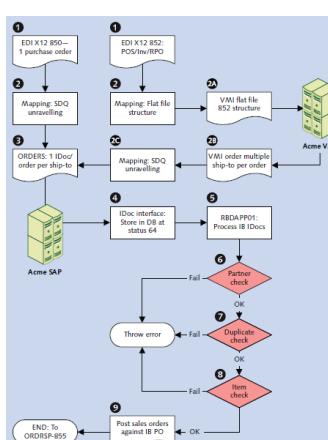
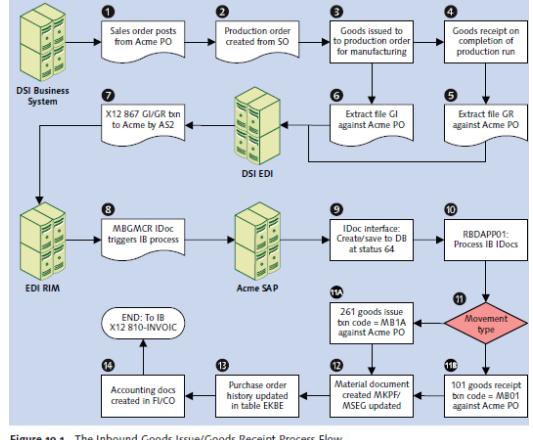


Figure 10.1 The Inbound Goods Issue/Goods Receipt Process Flow

Figure 12.1 The Inbound EDI/VMI Order Creation Process

Figure 13.6 The Outbound Order Confirmation Process Flow

Figure 15.1 Acme's Inbound Ship Confirmation Process Flow

Figure 16.4 Outline of the DESADV-856 Interface Processing Flow

source: [Architecting EDI with SAP IDocs: Comprehensive Guide | - by SAP PRESS \(sap-press.com\)](http://sap-press.com)

EDIFACT PRICAT Example in the EDI Workflow

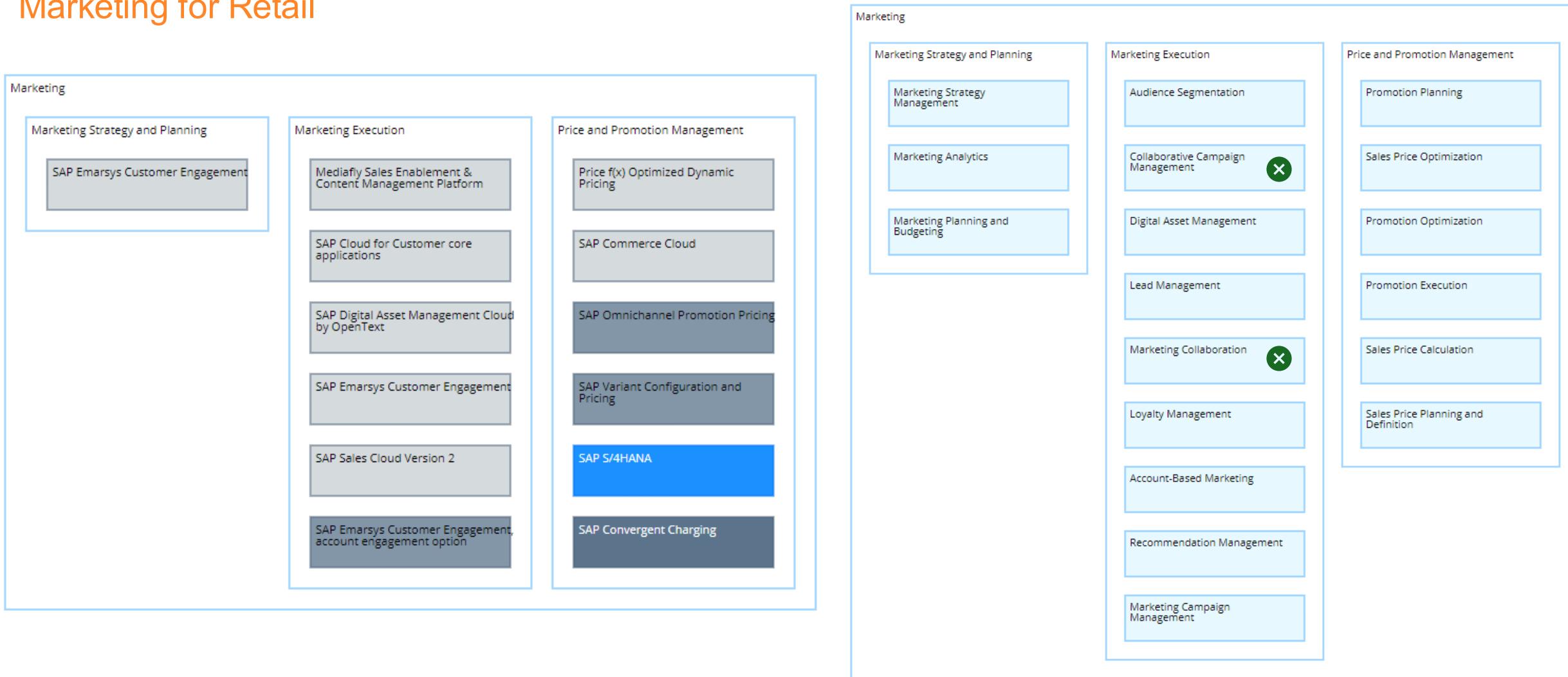
Typical Workflow Example From The Retail Industry



source: [SEEBURGER: EDIFACT PRICAT Message: Usage, Structure and Standards](#)

SAP Reference Business Architecture

Marketing for Retail

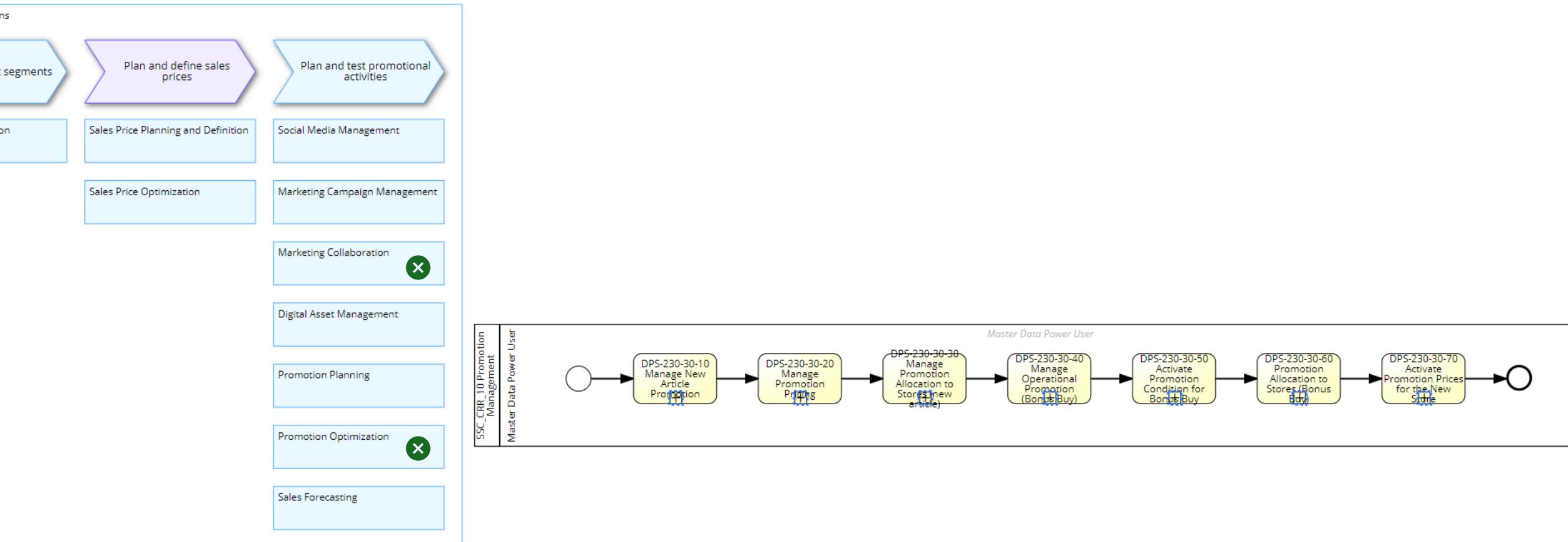


source: [SAP Signavio Process Explorer - Marketing for Retail \[Hybrid Solution Component Map with Solution Capabilities\]](#)

No SAP recommendation

SAP Reference Business Architecture

Plan to Optimize Marketing and Sales | Core Retail Merchandise Management

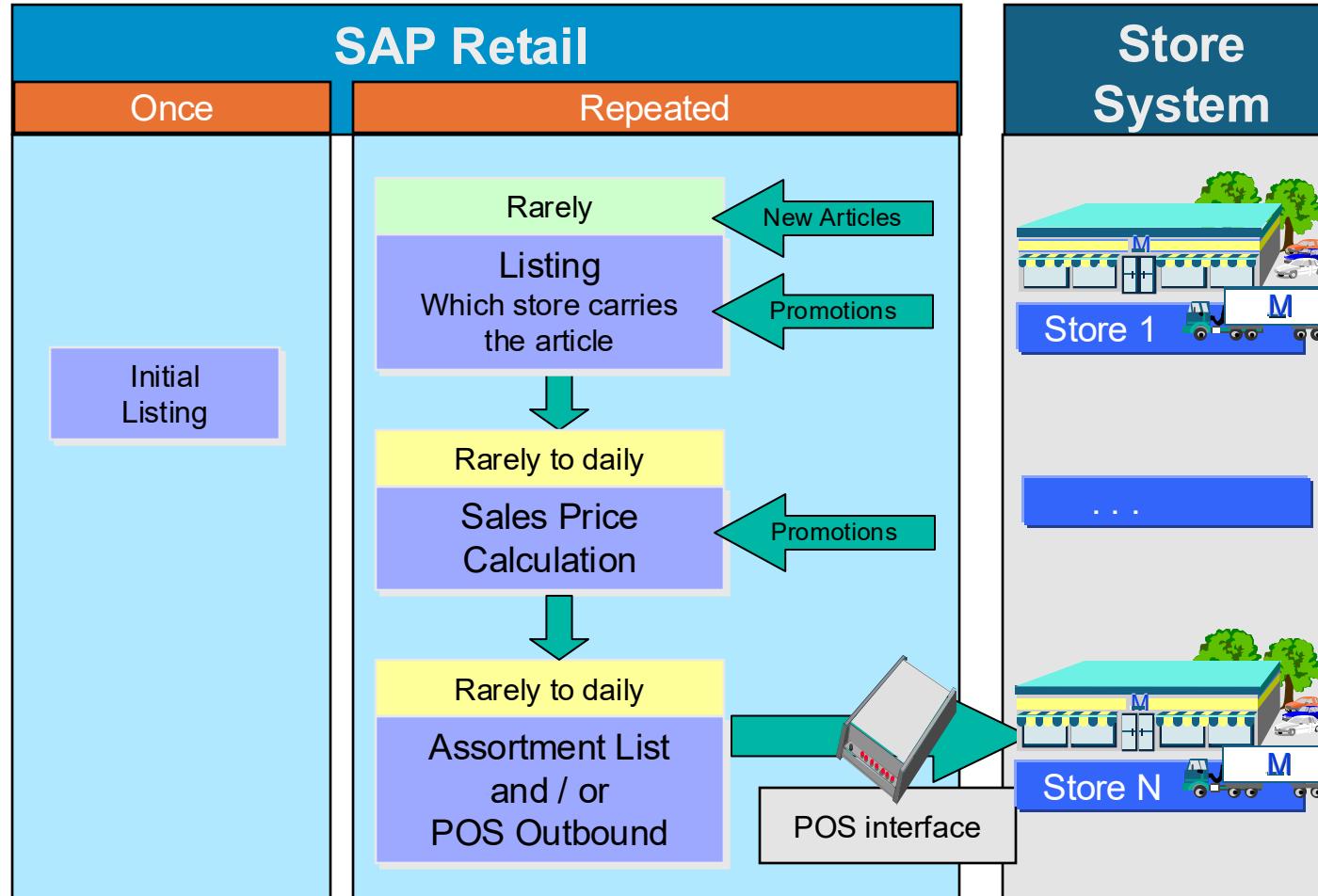


source: [Plan to Optimize Marketing and Sales \[Hybrid Solution Value Flow Diagram with Solution Capabilities\] | Model | Hub | SAP Signavio](#)

No SAP recommendation

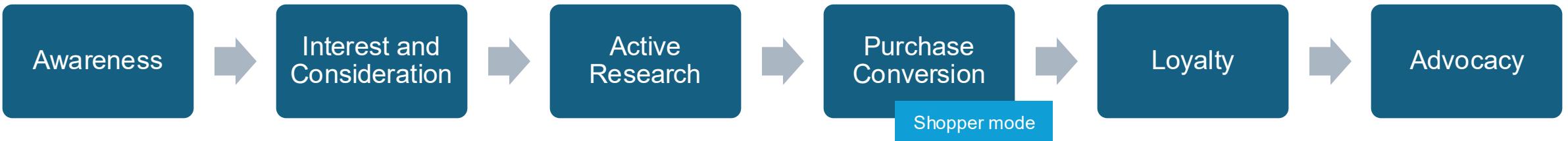
Typical Retail Process Chain

Prices and Assortments



source: [Plan to Optimize Marketing and Sales \[Hybrid Solution Value Flow Diagram with Solution Capabilities\] | Model | Hub | SAP Signavio](#)

Customer Decision Journey



1. Map out how customer will likely move through each stage.
2. Support them with marketing activities that bring them to each stage.

Different customer path to purchase – different online and offline touchpoints.



Retail Tactics Checklist

ALIVE Retail Strategy

- Availability
- Linkage
- Inspiration
- Value for Money
- Experience

Quality Distribution

- Right product range is available and visible
- Right channels and stores
- Right place
- Right time

Unique Selling Proposition (USP)

Unique Value Proposition (UVP)

Simple value

Added value

Promotion

Loyalty card

Free shipping

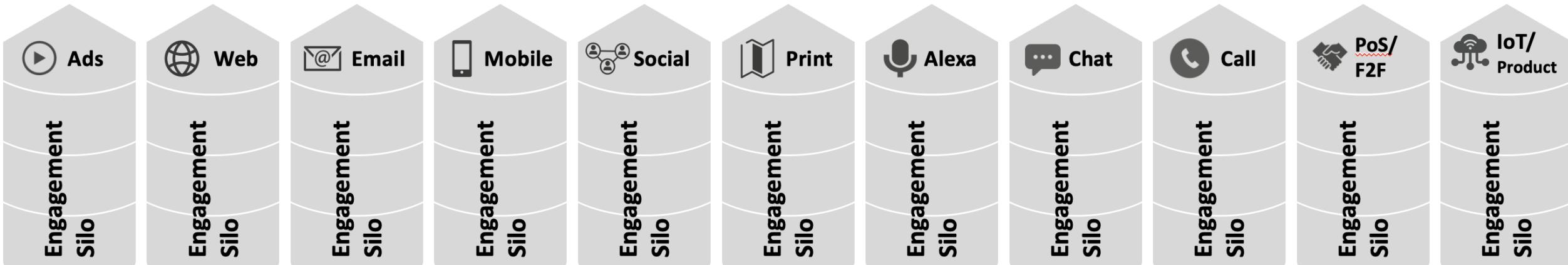
Supply Chain

Space Planning

Category Management

Different consumers and shoppers have different needs, habits, and expectations of what good looks like in retail, both brands and retailer need to think about their different target audiences. Some will have limited expectations and requirements, but others will expect a highly tailored shopping experience. It is important to think about the different needs and adapt strategies to reflect this.

Enterprise Target Reference Model for an Integrated Customer Experience



Omnichannel Operations: Cross-team collaboration and planning

Consistent messaging

Unified Customer Data: Single source for definitive customer data & segments

"They know me..."

Journey Orchestration: Omnichannel personalization and next-best-action rules

Coherent interaction

Omnichannel Content: Single source of the truth for re-usable assets

Story consistency

Customer Intelligence: Analytics, reporting, and modeling

Relevant options

SAP Retail Omnichannel Commerce Foundation

1. C-store implemented and upgraded SAP ERP for Retail.
2. SAP CARAB is not implemented to replace SAP POS DM.
3. In 2019-20, CDT (Customer Digital Transformation) implemented Adobe Experience Cloud.
4. In 2022, Fiori Apps is launched.
5. In 2023-24, New POS Toshiba replaces NCR.

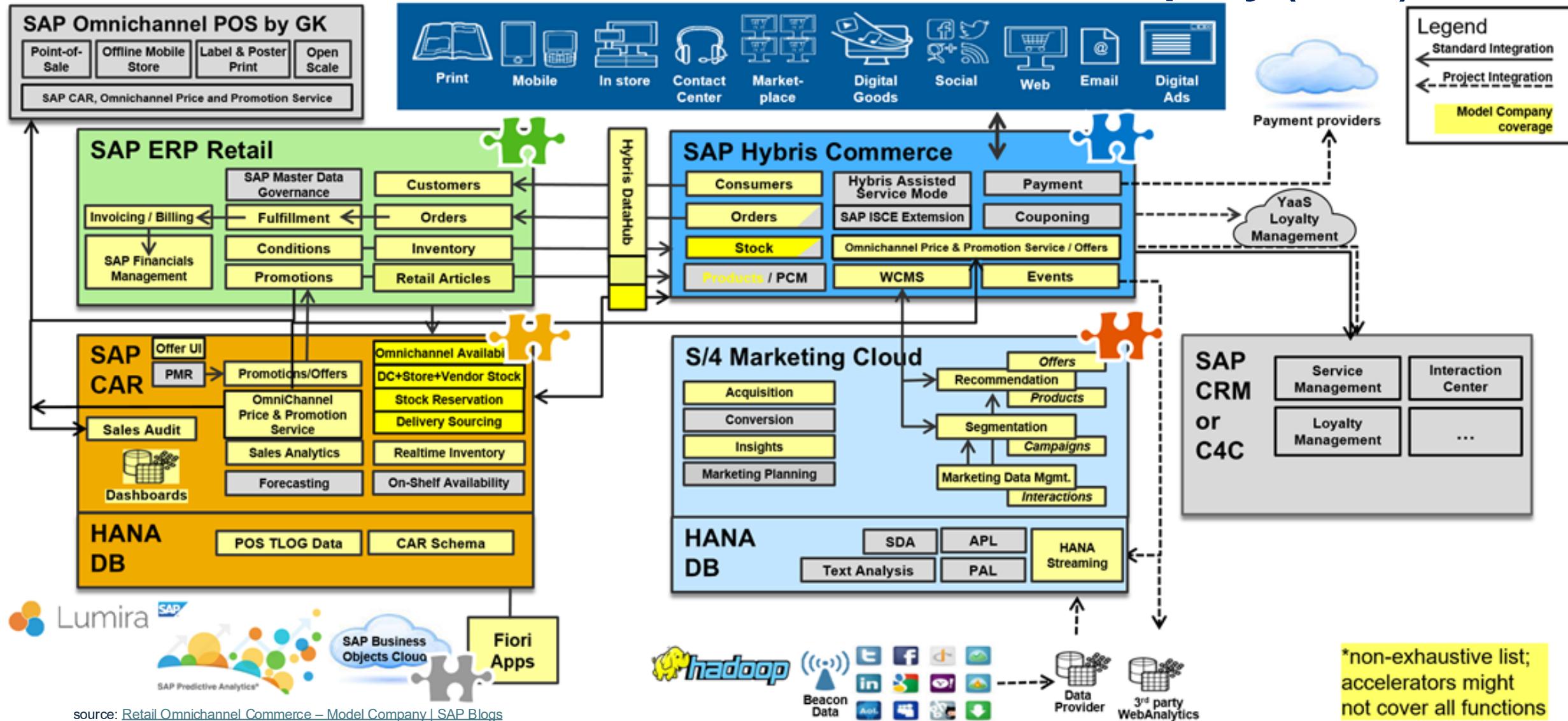
- Commercial advantage was negotiated for SAP POS DM, which cannot be carried over to SAP CARAB (POS DTA).
- Licence is based on revenue, and it does not include fuel. However, half of C-store's revenue is from fuel, which would double the licence cost. In FY25, no investment to migrate or replace it, so C-store needs to negotiate extended customer maintenance fee with SAP.
- GAINS for Forecasting and Replenishment is implemented, and replaced by RELEX in 2023-24.
- As part of the CDT, Microsoft Dynamics CRM replaced SAP CRM, and the Enterprise Data Platform was established to also replace the Customer Information System (CIS) and SAP BW reporting.

A C-store chooses multi-vendor over strategic partnership, outsourced over in-house, decentralised over managed, short-term solutions for faster go-to-market over long-term changes, modularity over performance, flexibility over simplicity.

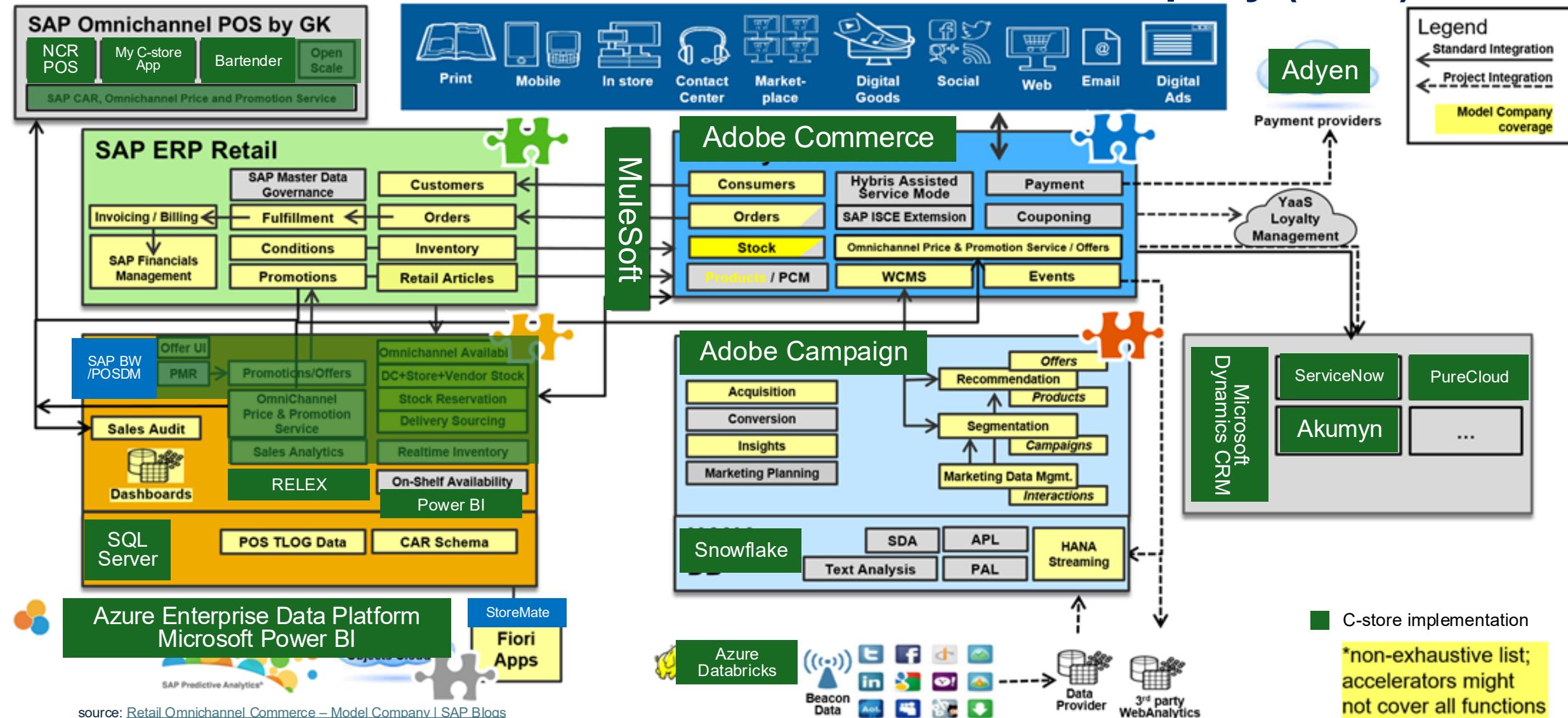


source: [SAP Retail Omnichannel integration with SAP Commerce Cloud and SAP Commerce on-premise editions | SAP Blogs](#)

Retail Omnichannel Commerce based on Model Company (2016)



Retail Omnichannel Commerce based on Model Company (2016)



Elkjøp: Delivering the Retail Experience of the Future with SAP Customer Experience Solutions and SAP Integration Suite



Before: Challenges and Opportunities

- Need for a next-generation customer experience and smooth integration of 12 legacy systems

Why SAP

- SAP ERP application as a core component managing all transactional and financial processes and serving as a hub for the business systems
- SAP Customer Experience solutions (including SAP Service Cloud, SAP Marketing Cloud, SAP Commerce Cloud, and SAP Sales Cloud solutions), supporting customer-facing processes such as marketing, commerce, service, customer care, store, and others
- SAP Customer Activity Repository application, delivering a unified view of customer activity across channels to improve omnichannel order management and support planning applications
- Optimal implementation of the lead-to-cash process by leveraging the Open Connectors, Event Mesh, API Management, and Cloud Integration capabilities in SAP Integration Suite with prepacked content
- SAP Forecasting and Replenishment, SAP Transportation Management, SAP Event Management, and SAP Extended Warehouse Management applications, as well as SAP Fiori apps and SAP SuccessFactors solutions to support Elkjøp's "Next Generation Retail" (NGR) platform

After: Value-Driven Results

- Replaced legacy systems in retail focusing on customer- and employee-facing front ends
- Integrated SAP and non-SAP systems with additional third-party systems smoothly and securely
- Reduced risk and gave Elkjøp a robust IT platform for the future
- Improved customer experience and satisfaction, and made processes simpler and faster for employees
- Increased profit through efficiency gains and improved revenue and margins

"Building our 'Next Generation Retail' platform with the core based on **SAP Customer Experience solutions** and **SAP Integration Suite** gives us a sustainable foundation for flexibility and rapid innovation in a highly competitive market."

Bjørn Dalen, Program Director NGR, Elkjøp Nordic AS

500

Interfaces connected through SAP Integration Suite

5 million

Messages processed on average daily through the Cloud Integration capability in SAP Integration Suite

50 million

API calls per month through the API Management capability in SAP Integration Suite

Elkjøp Nordic AS
Oslo, Norway
www.elkjopnordic.com

Industry
Retail

Products and Services
Consumer electronics retail

Employees
>12,000

Revenue
€4.2 billion

Featured Solutions

SAP ERP, SAP Customer Experience, SAP Customer Activity Repository, SAP Integration Suite, SAP Forecasting and Replenishment, SAP Transportation Management, SAP Event Management, SAP Extended Warehouse Management, SAP Fiori, and SAP SuccessFactors solutions

THE BEST RUN The SAP logo, consisting of the word "SAP" in a bold, blue, sans-serif font with a registered trademark symbol.

Automating Inventory Management

Satisfying More Customers with Optimally Stocked Shelves Using the SAP® Forecasting and Replenishment Application

Before: Challenges and Opportunities

- Cumbersome annual inventory count process, causing inaccurate inventory data and restricting optimal use of the SAP® Forecasting and Replenishment application for most product categories
- Complex systems and processes limiting stores from easily maintaining accurate inventory records
- Multiple different applications used for ordering stock
- No comprehensive view of stock availability for the e-commerce channel

Why SAP and retailolutions AG

- Long-term investment in SAP solutions, including the SAP Forecasting and Replenishment application and its add-on for fresh products, to streamline forecasting and replenishment processes
- retailolutions' status as a trusted SAP partner specializing in retail forecasting and replenishment processes as well as expertise in the SAP Fiori® user experience and Neptune front-end technologies

After: Value-Driven Results

- Eased the manual effort involved in the annual inventory count process, enabling store associates to maintain accurate inventory data using new apps to record goods receipts, returns, and stock transfers
- Boosted the use of SAP Forecasting and Replenishment thanks to one consistent source of stock information, reducing overstocks, out-of-stocks, and food wastage in stores
- Created an opportunity for future forecast improvements through the rollout of the SAP Customer Activity Repository application, unified demand forecast component in 10 stores for entire store replenishment



"Using Neptune-based store apps, we have simplified inventory management to give us comprehensive visibility. Now, we can make the most of our automated forecasting and replenishment processes to keep our shelves stocked and our customers happy."

Stein Johnsen, Project Manager, Coop Norge SA

85%

Of product categories now covered by fully automated forecasting and replenishment tools

>€30 million

Savings per year by improving stock availability, reducing fresh food waste, and increasing revenues and sustainability

Featured Partner



Coop Norge SA
Oslo, Norway
www.coop.no
(Norwegian)

Industry
Retail

Products and Services
Groceries, electronics,
hardware, and household
goods

Employees
29,000

Revenue
~NKR 64 billion
(US\$6.5 billion)

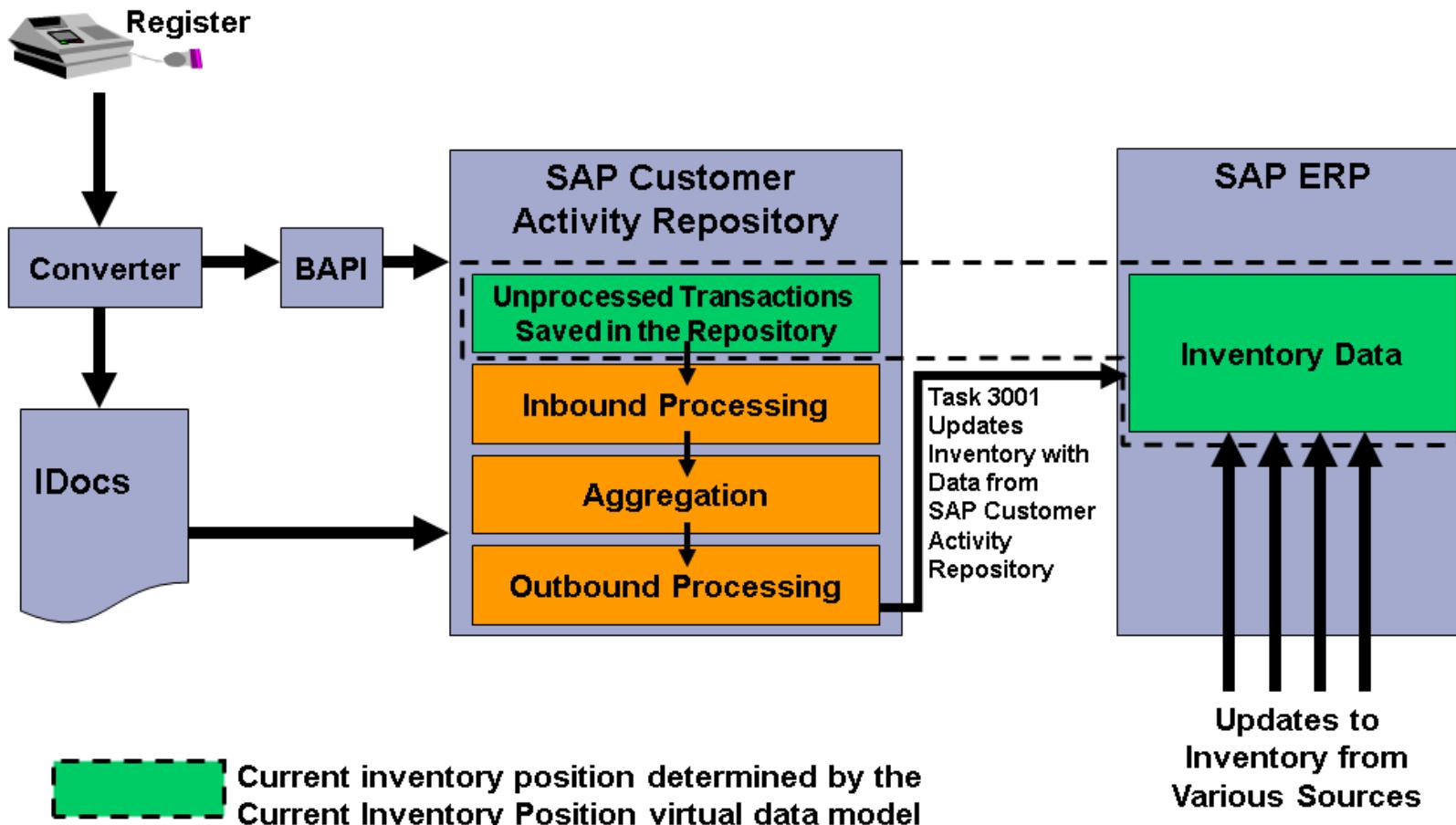
Featured Solutions
SAP Forecasting and Replenishment,
SAP Forecasting and Replenishment, add-on for fresh products, and SAP Customer Activity Repository, unified demand forecast

source: [Coop Danmark – Largest S/4HANA transformation in the Nordics - KPS](#)

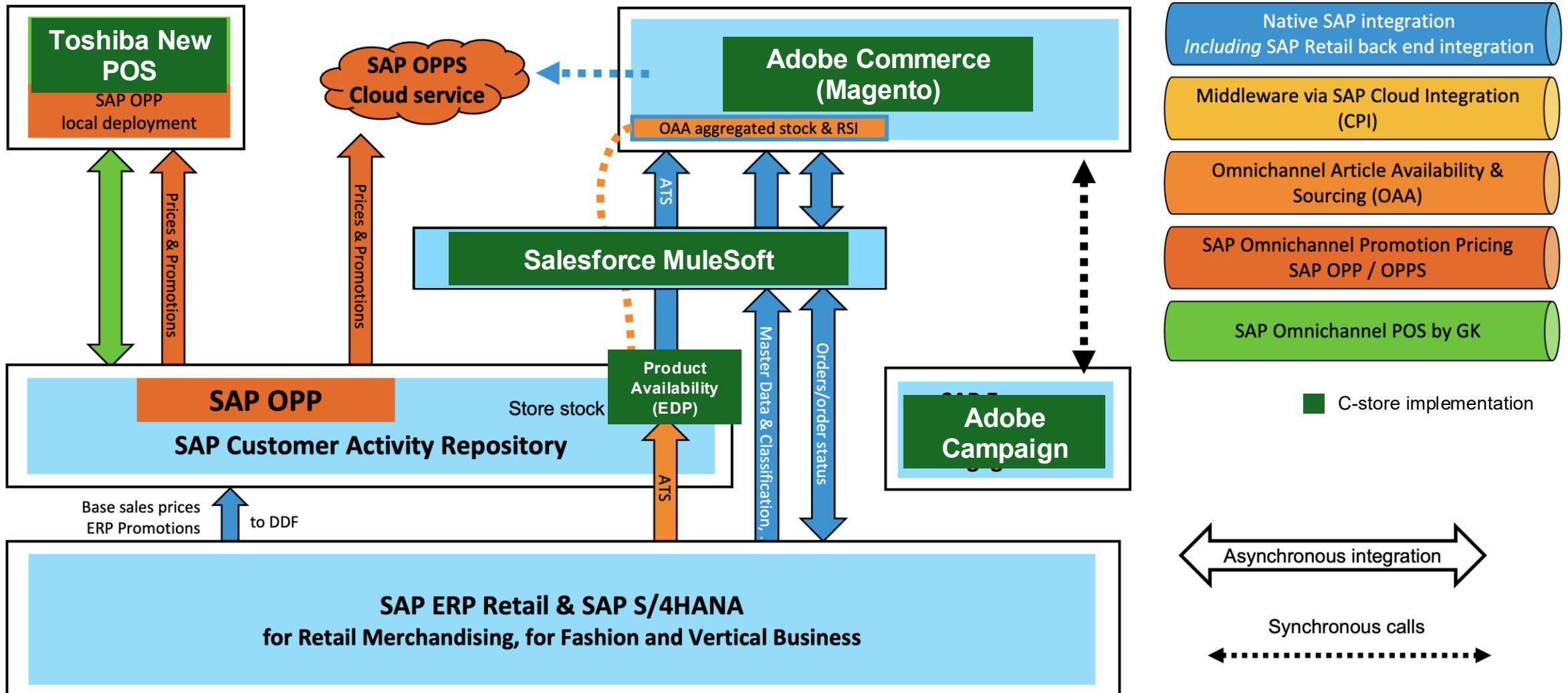
source: [Coop Norge: Optimizing Forecasting and Replenishment by Automating Inventory Management \(sap.com\)](#)

Inventory Visibility

SAP Customer Activity Repository

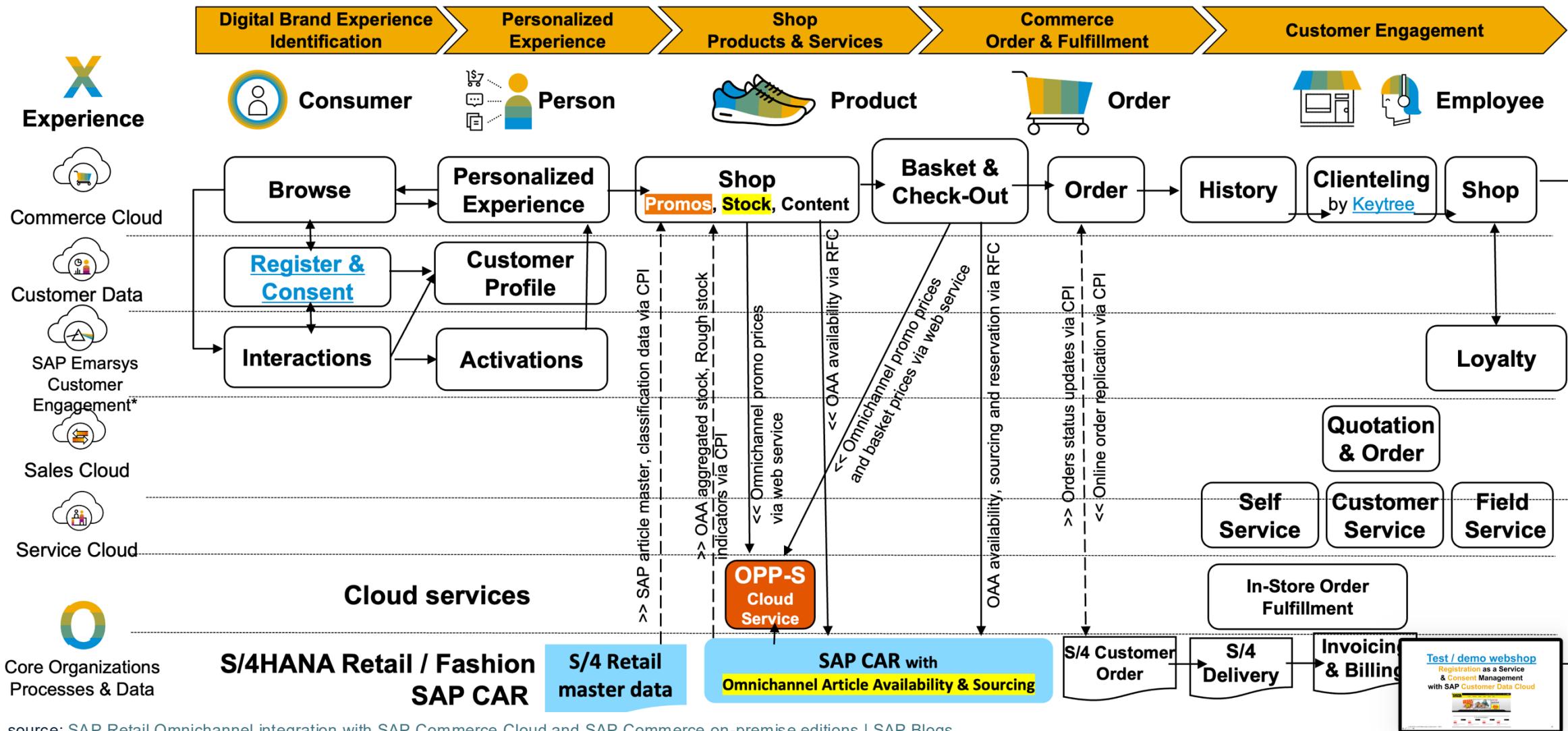


SAP Retail Omnichannel Commerce Integration Pattern



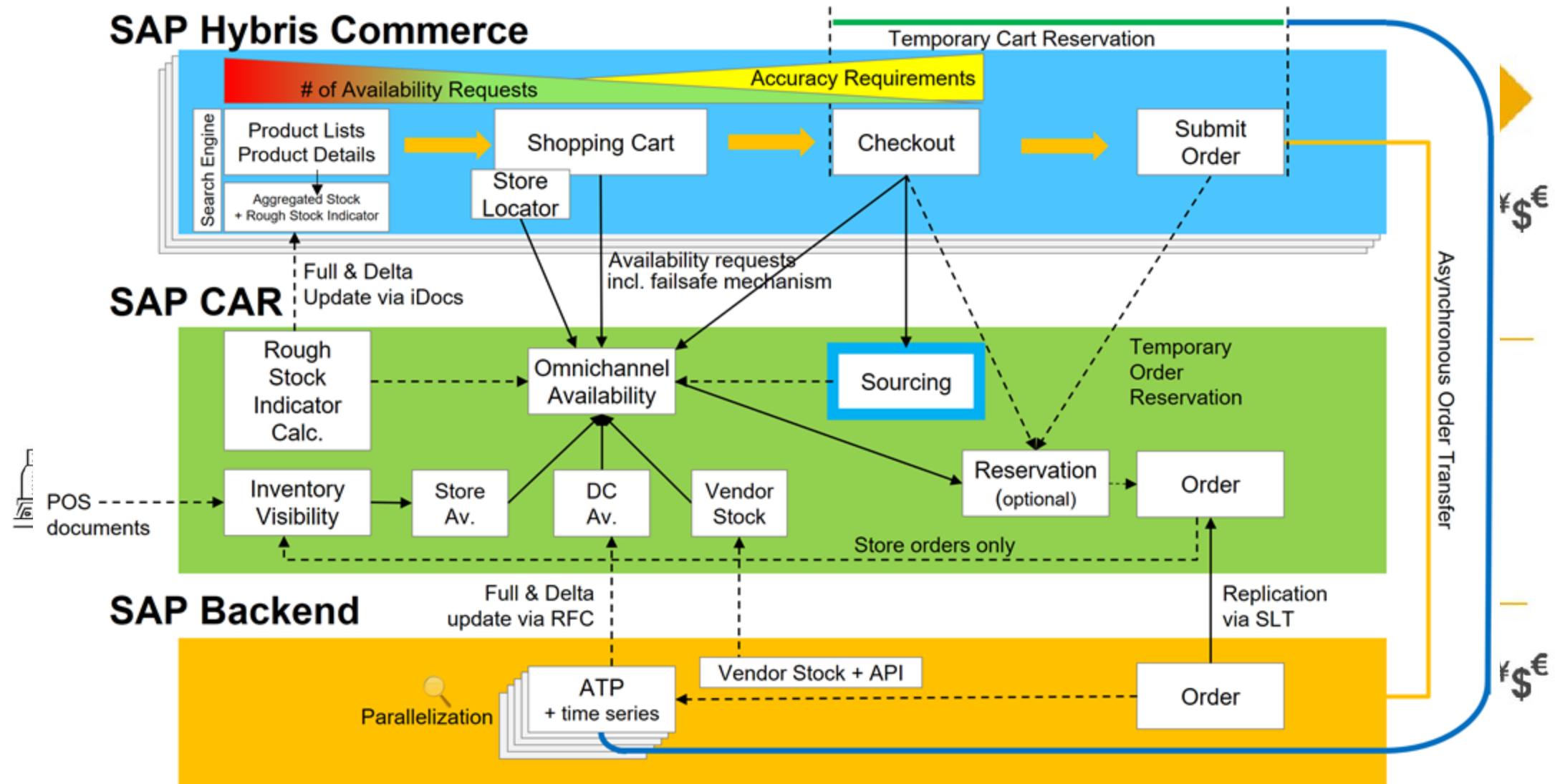
source: [SAP Retail Omnichannel integration with SAP Commerce Cloud and SAP Commerce on-premise editions | SAP Blogs](#)

SAP Customer Journey for Retail Omnichannel Commerce



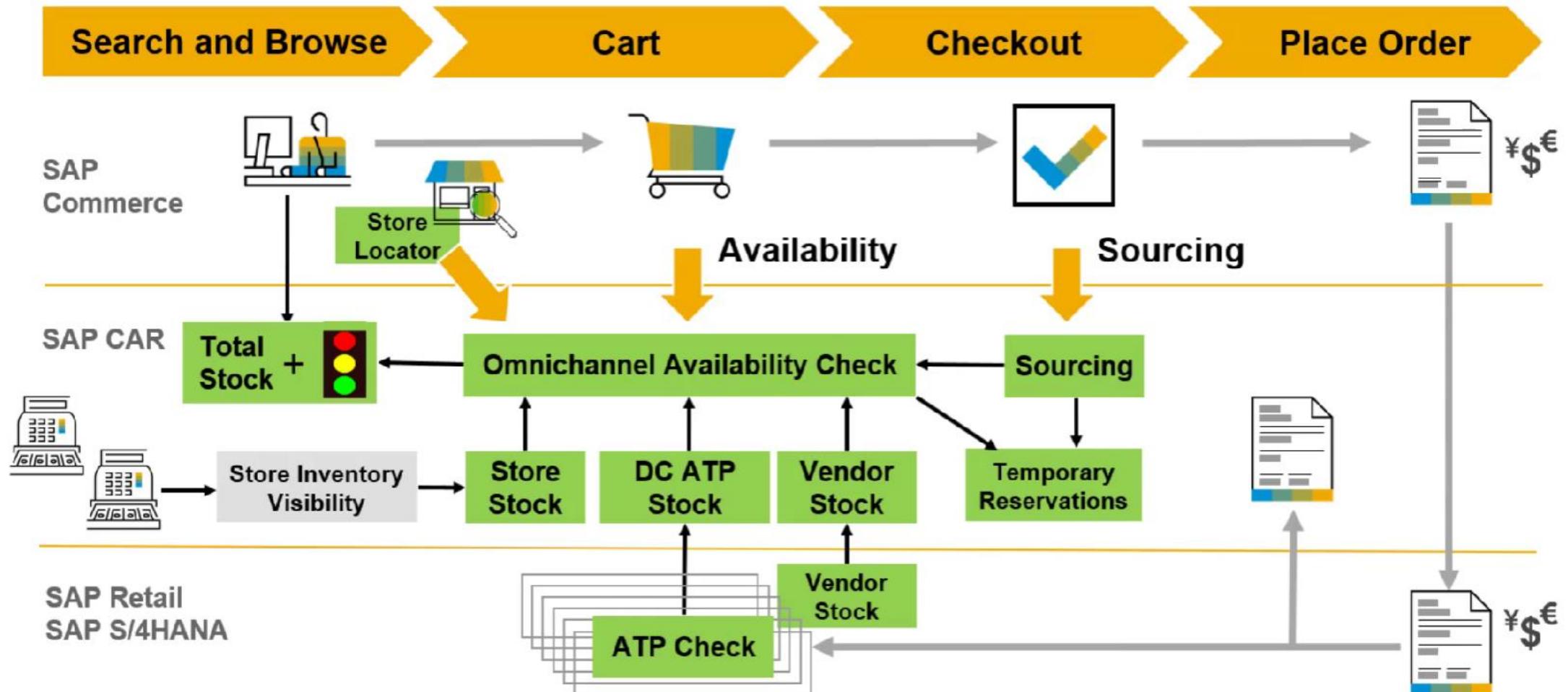
source: [SAP Retail Omnichannel integration with SAP Commerce Cloud and SAP Commerce on-premise editions | SAP Blogs](#)

SAP System Landscape and Process Flow for OAA



source: [How to integrate Omnichannel Article Availability ... - SAP Community](#)

SAP System Landscape and Process Flow for OAA

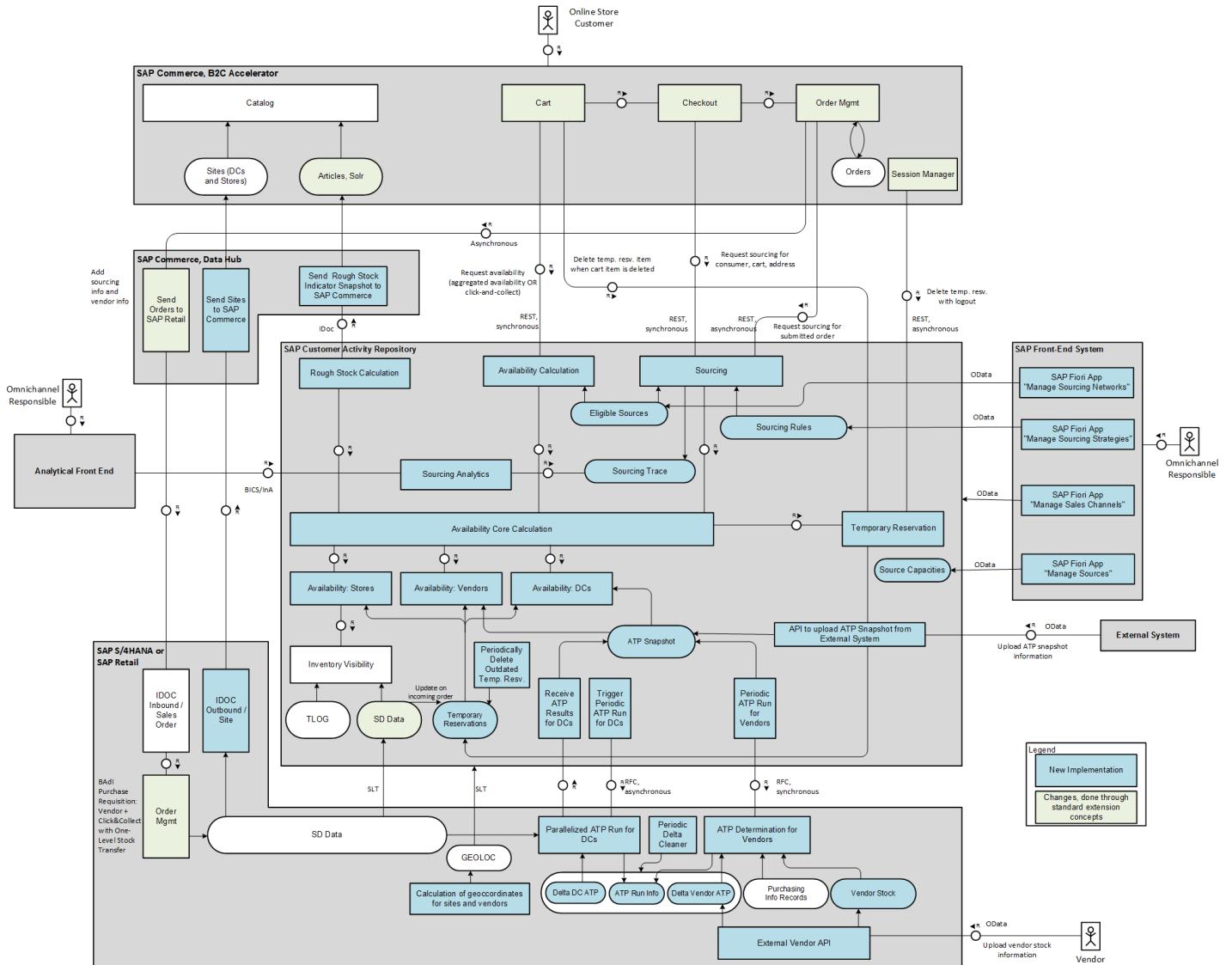


source: [How to integrate Omnichannel Article Availability ... - SAP Community](#)

SAP Data Flow for Omnichannel Article Availability (OAA)

- Due to C-store's tactical decisions, SAP CAR might no longer have value:
- POS Data Transfer and Audit (POS DTA):** relates to the current POS DM that is not highly used
 - Multichannel Transaction Data Management:** workaround for order numbers.
 - Unified Demand Forecast (UDF):** forecasting and replenishment is performed in GAINS/RELEX
 - Demand Data Foundation (DDF):** Demand planning is performed in GAINS/RELEX
 - Promotion Pricing (OPP):** currently manual spreadsheets; proposed applications are Eagle Eye AIR (customer/loyalty), RELEX (product/supply chain)
 - Inventory Visibility (OAA):** custom Article Availability dashboard on Power BI (EDP)
 - On-shelf availability:** No business requirement.
 - SAP Fiori:** StoreMate is the latest store portal, although it is not integrated with other C-store applications like Workjam.

source: [SAP Help Portal](#)



SAP Customer Activity Repository

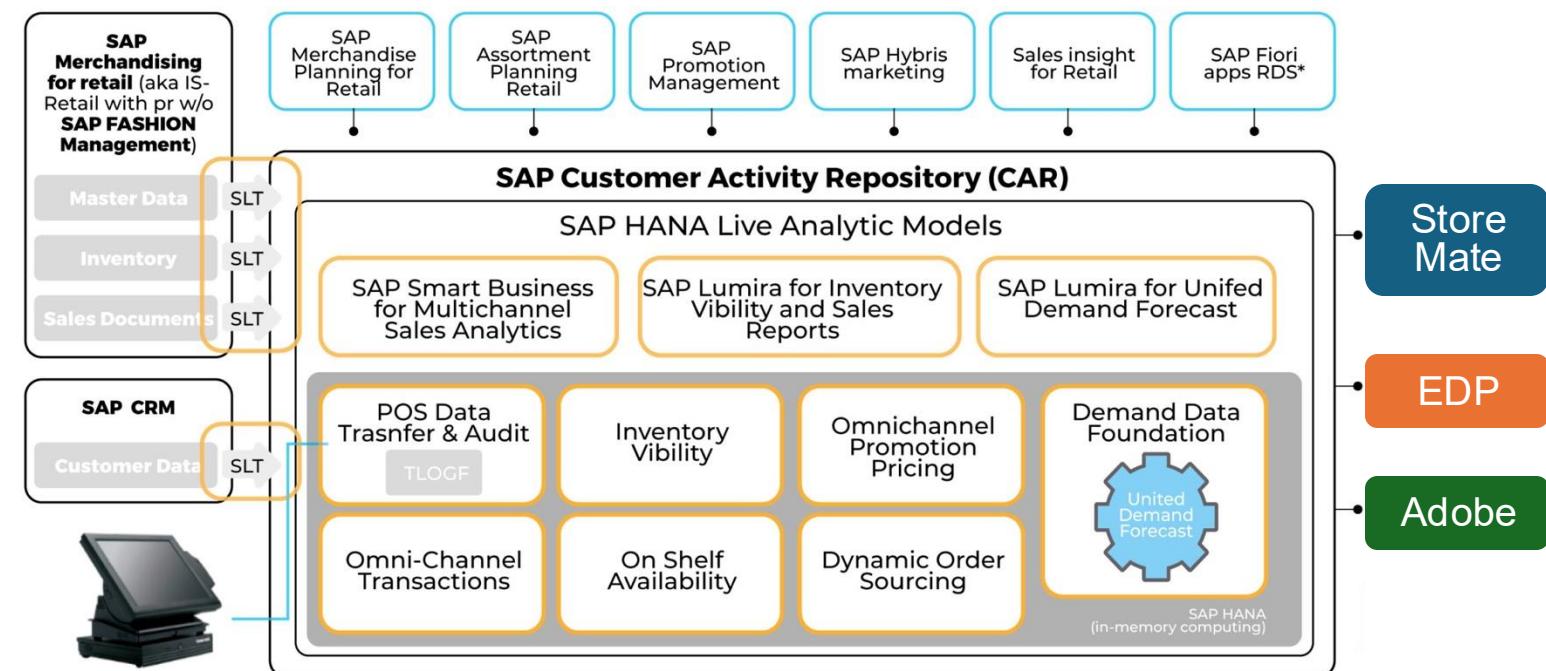
SAP CAR was initially developed as a replacement for POS Data Management (POS DM), SAP's sales audit solution with basic analytics capabilities. Even though SAP CAR's early use cases were limited essentially to sales audit, as the technology matured, more and more use cases were added, such as omni-channel support and an array of additional executional and planning applications: omni-channel inventory availability, retail planning, assortment management, allocation management, store replenishment and promotional management.

Today, SAP CAR is the foundation that integrates transactional sales data that is often spread across multiple applications and formats to support omni-channel sales. SAP CAR leverages SAP HANA's real-time computing capability to transfer sales data from stores and Ecomm platforms to SAP CAR and has many built-in standard capabilities for efficient business and operational tasks. The ability to use CAR for real-time inventory queries from various omni-channel platforms allows retailers to execute orders knowing exactly how much and where inventory is available thereby keeping happy customers coming back.

CAP supports Available to Promise (ATP) capabilities so order orchestration improves CAR and also helps keep the overall SAP environment streamlined while lowering operational costs with fewer systems to support.

When it comes to omni-channel support and inventory analytics, POS DM had certain limitations. It lacked the ability to support omni-channel sales and had no support for planning and execution capabilities required to transform the way retailers work in today's fast changing omni-channel environment.

SAP CAR overcomes these limitations by providing near-real-time access to transaction-level omni-channel sales data as well as instant analysis and reporting at the most granular level (TLOG) for POS and individual sales transactions from other channels. With SAP CAR, new data is available for reporting just moments after the sale is completed. Beyond sales auditing, retailers can use SAP CAR to examine the current inventory status of a specific product across the chain to support real-time inquiries for inventory availability and assess sales performance and promotion efficacy.

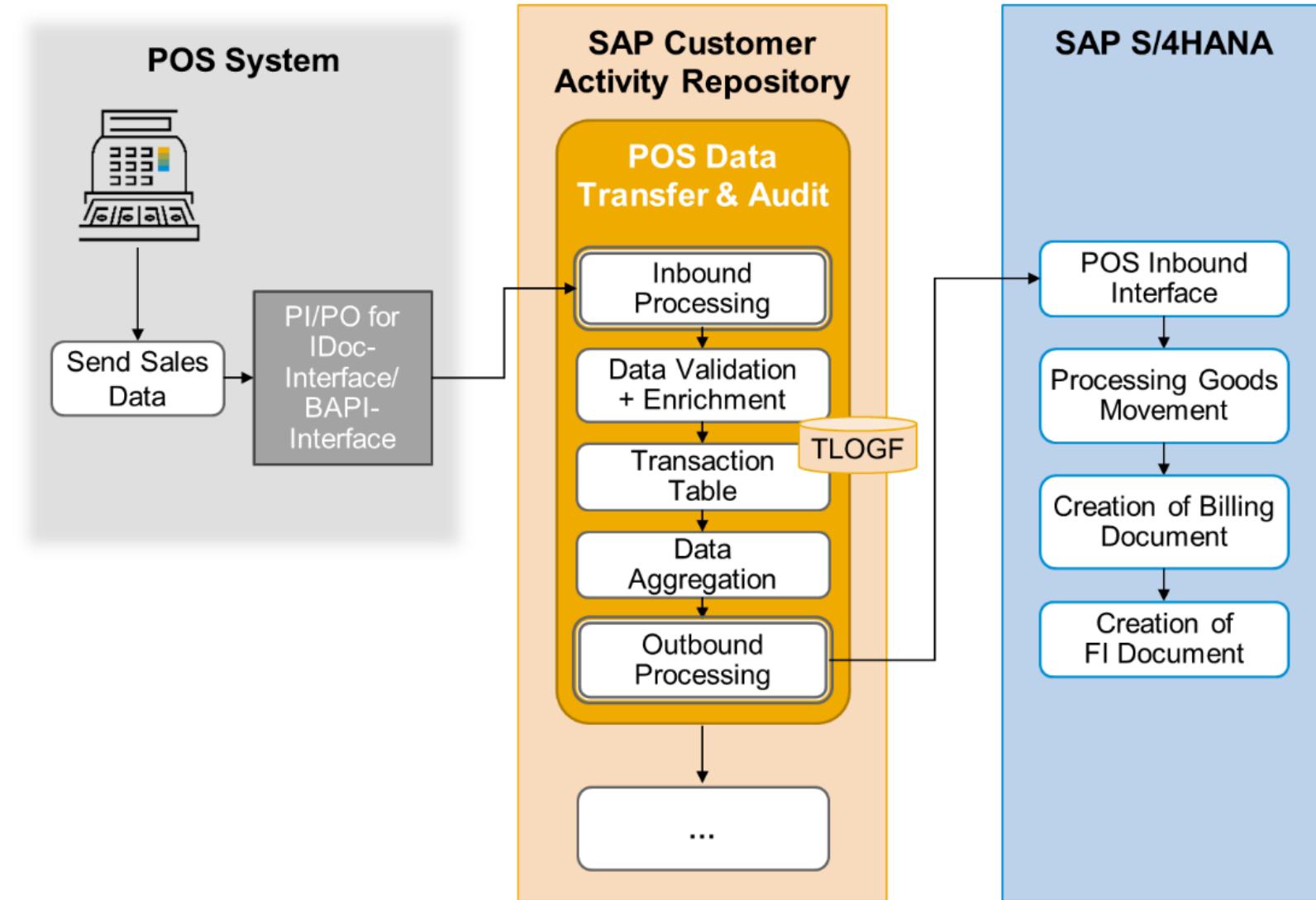


source: [SAP CAR Retail Solution | Implementation of SAP CAR for Retail \(appexus.com\)](https://appexus.com/sap-car-retail-solution/)

SAP POS Process Flow and System Integration

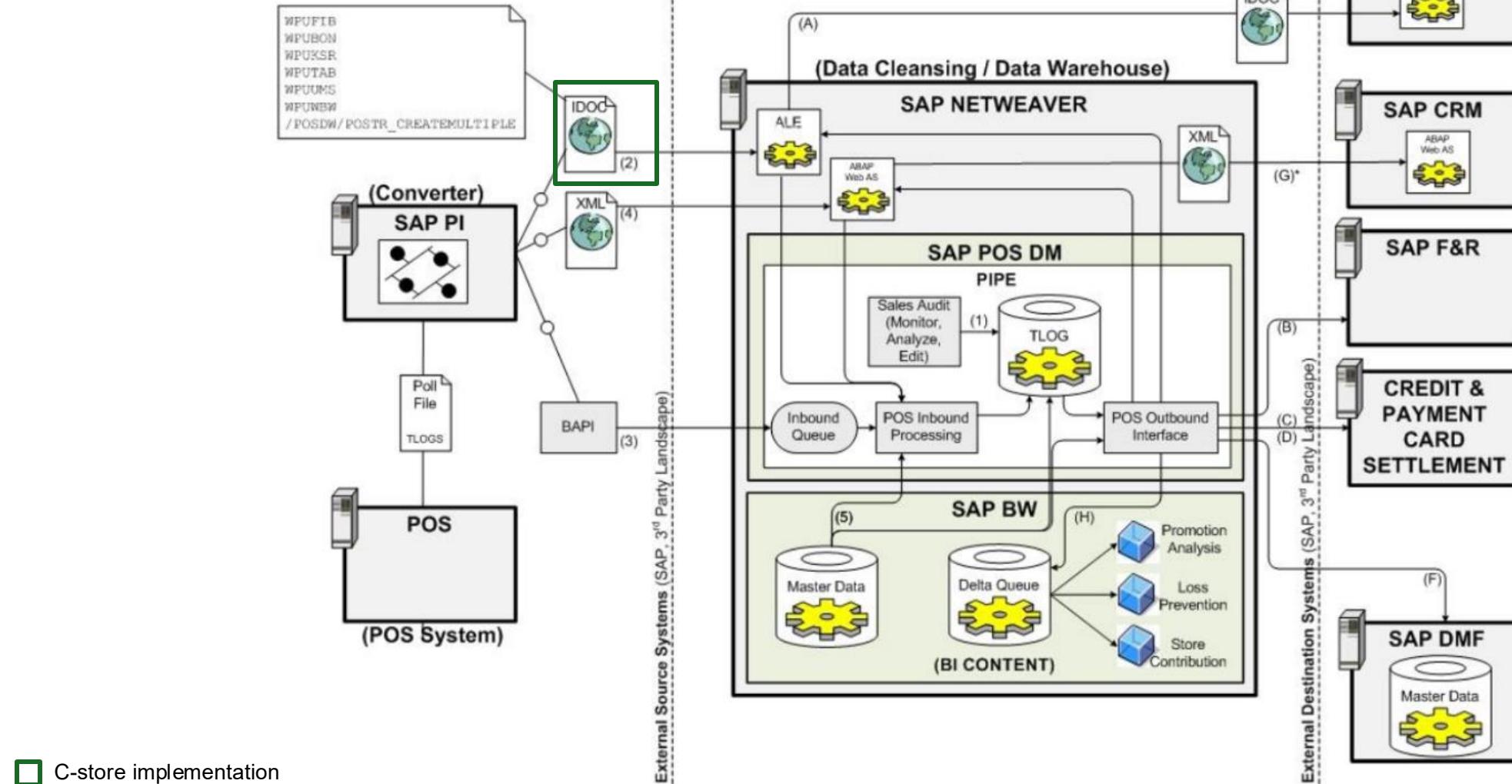
SAP POS DTA can be used to load the stores' POS sales data into SAP Customer Activity Repository, and to analyze and stage it for use in other applications. The POS data is checked and corrected centrally (sales audit) before it is passed on to further central components (such as SAP Retail), or made available for analytics. A key advantage of SAP POS DTA is that the POS data can be transferred with different degrees of granularity for different target systems at different times. This means for example sales as per receipt data is sent from the POS system to SAP POS DTA for detailed editing and evaluations, and can then be aggregated for the transfer to Demand Data Foundation (providing the time series used for forecasting), to SAP Retail, SAP FI, SAP Forecasting and Replenishment, or to a customer loyalty management system, and further systems. So the editing and correction tasks (sales audit) only have to be done once, and data consistency across systems is ensured.

SAP Customer Activity Repository (SAP CAR) is a foundation that collects granular sales data previously spread over multiple siloed applications in diverse formats. As the basis for multi-channel transactions, SAP Customer Activity Repository captures information on customer / consumer sales activities across all interaction channels enriched by master and transactional data. The Repository stores data at the most granular level of detail, allowing the embedded science layer to execute advanced statistical algorithms and pattern predictions. SAP CAR offers real time visibility into the current stock situation in the stores by taking unrestricted use stock in SAP Retail, and unprocessed sales into account.



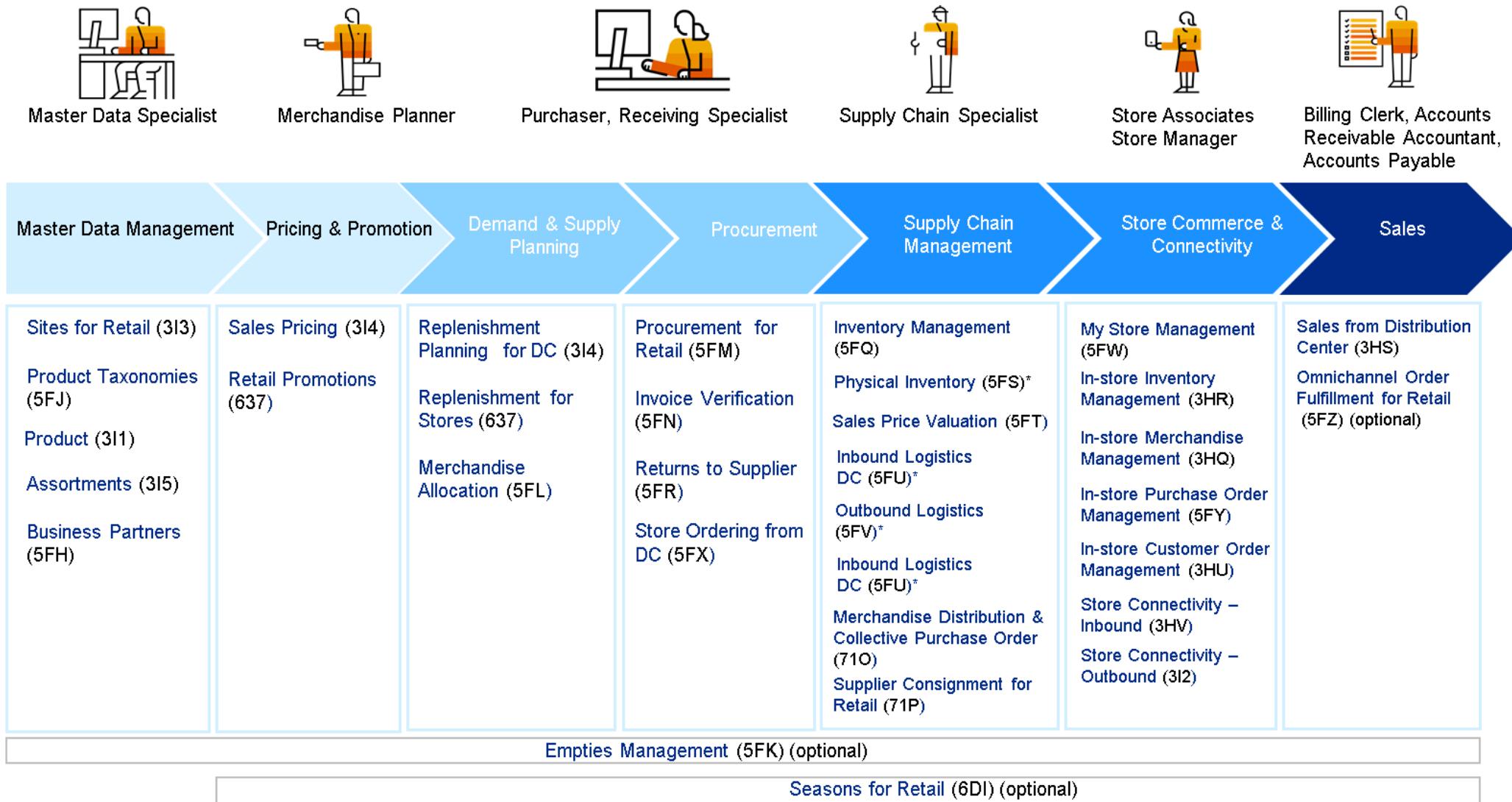
source: [SAP CAR: The Untold Analytics Story - Rizing](#)

Data Flow for SAP POS DM



* using SAP PI for non-P2P communications

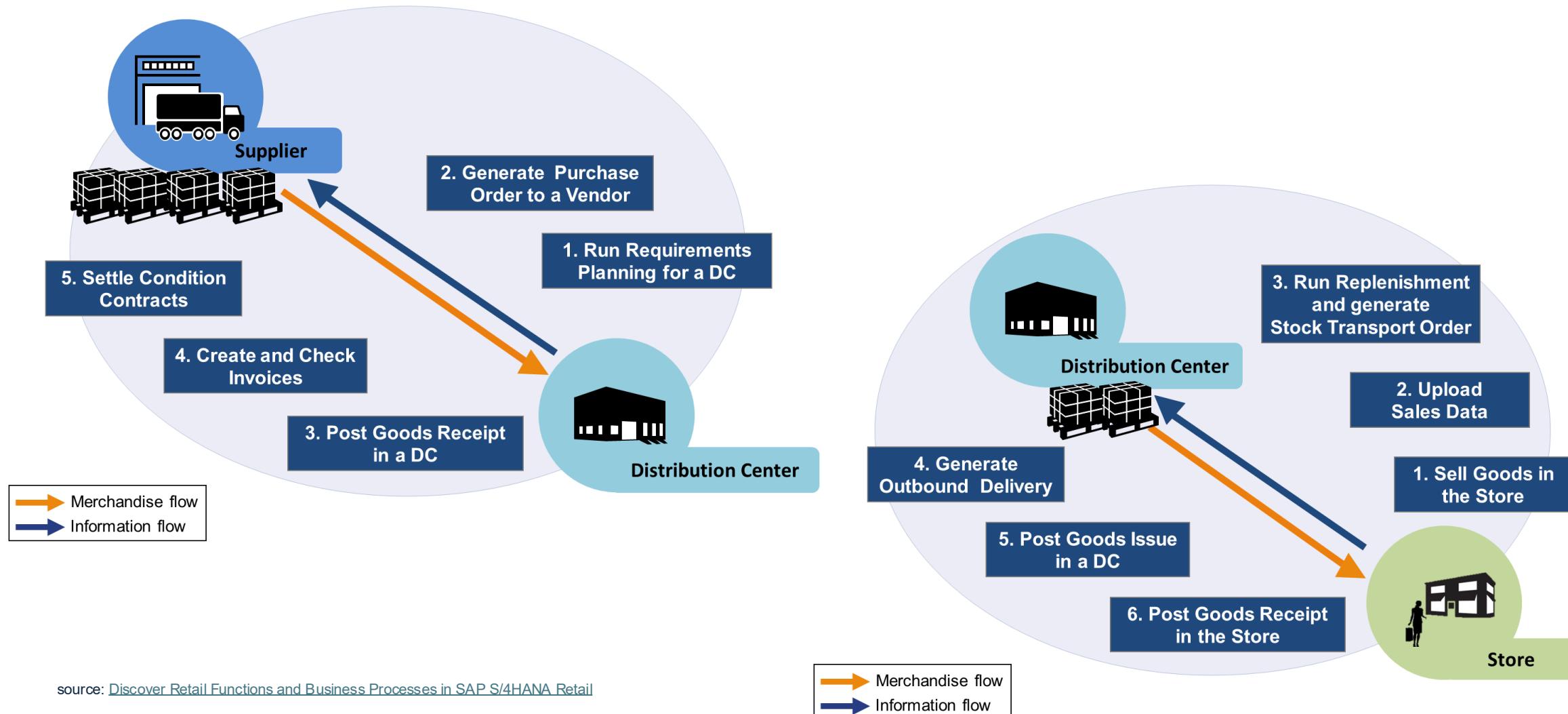
SAP S/4HANA Cloud for Retail Best Practices Processes



source: [RISE with SAP for Retail](#)

SAP Retail Functions and Business Processes

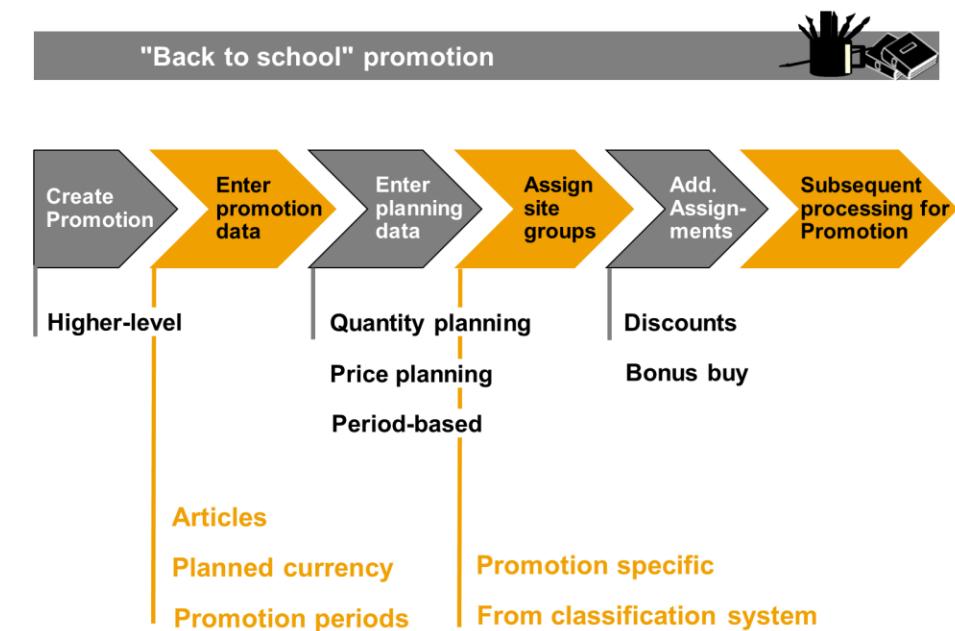
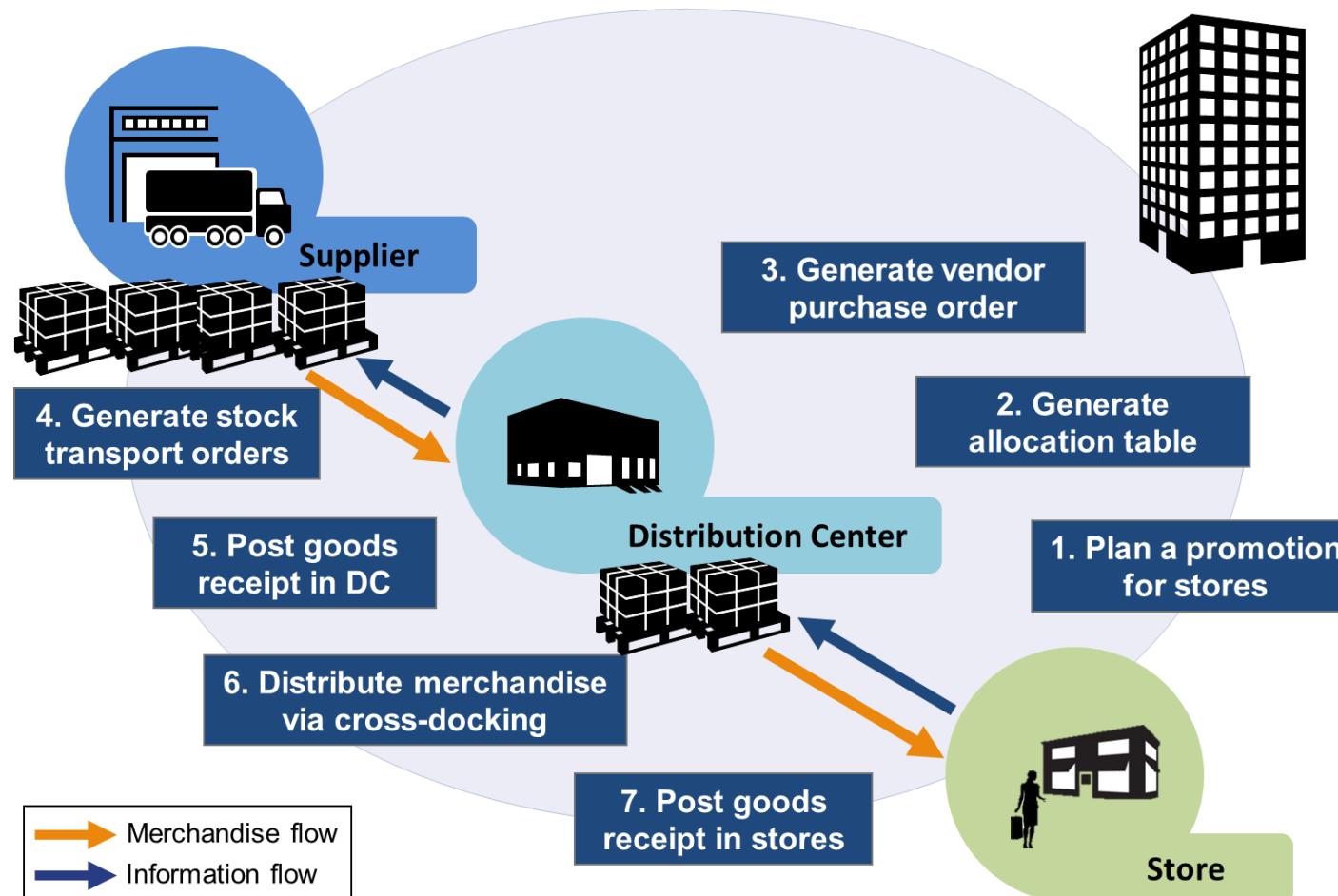
Requirements Planning from Supplier to Distribution Centre | Replenishment Planning for Stores



source: [Discover Retail Functions and Business Processes in SAP S/4HANA Retail](#)

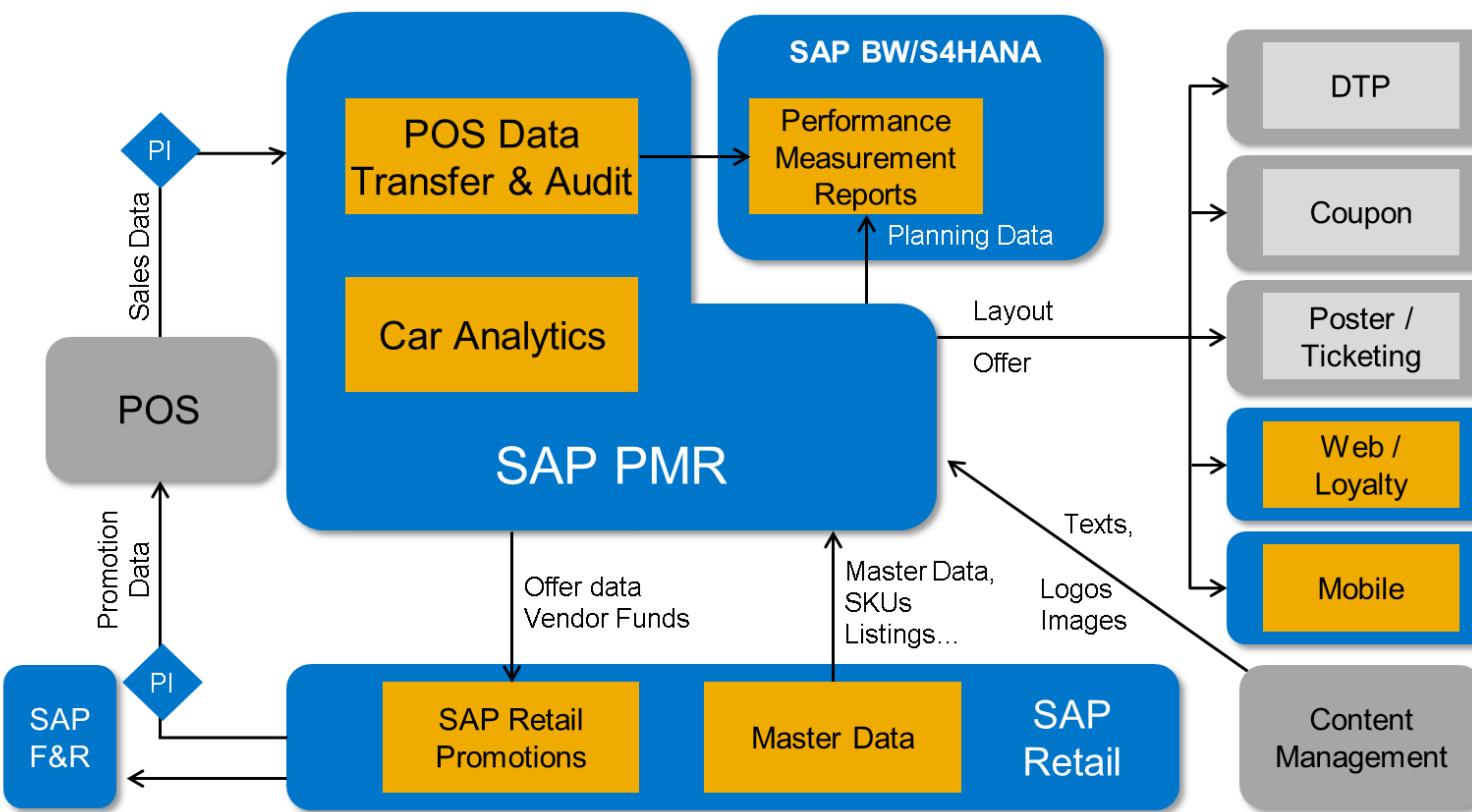
SAP Retail Functions and Business Processes

Promotion Creation in SAP Retail



SAP Retail Functions and Business Processes

SAP Promotion Management



Screenshot of the SAP Retail Promotion Management interface, showing the 'Standard Search' screen and a list of retail promotions.

Search Bar: Standard Search: Define Variants

Search Results:

Retail Promotion	Promotion Start	Promotion End	Created On	Description	Processing Status
200000107	07.11.2022		02.11.2022	Sunny Monday 00	
200000129		14.11.2022			

Details View:

General Information:

- Promotion Type: Promotion of sales (0002)
- Organization: Sales Organization General Merch. S...

SAP S/4HANA Cloud for Retail Best Practices Processes

Retailers typically use consumption-based requirements planning methods, instead of production-planning based methods.

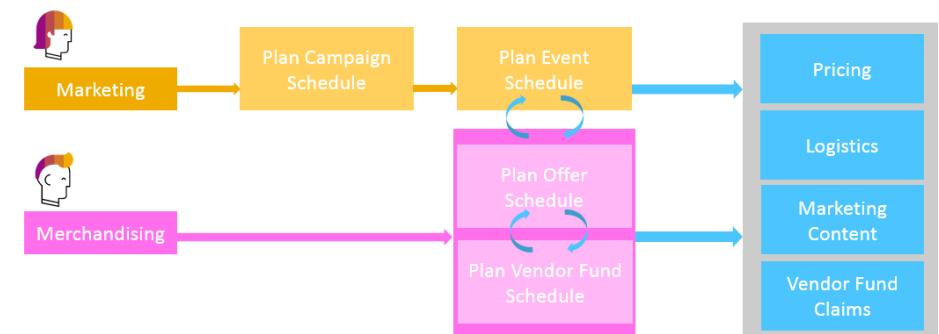
The following forecast models are typically used: Constant, Trend, Seasonal, Seasonal trend.

Retailers typically use consumption-based requirements planning methods, instead of production-planning based methods.

In SAP Retail, bonus buy conditions are special conditions that only apply when certain prerequisites and requirements you define are met. For example, you could offer a price reduction if customers buy a certain quantity of particular articles at the same time or if they pay using a credit card.

SAP Retail	SAP ERP Core
Article	Material
Site	Plant
Logistics calendar	Factory calendar
Order proposal	Purchase requisition

Events and Offers



source: [Integration with Third-party Vendor Fund Tools | SAP Help Portal](#)

source: [SAP OPP "BLACK BOX Concept" - Implementation guide... - SAP Community](#)

Trade Promotion Management (TPM)

B2B Marketing

Focus

- Supply Chain: seasonal, stock, supplier
- Finance: price, revenue growth
- Data Integrity: omnichannel, process
- Marketing: loyalty, planning, execution

Trade Promotion Types

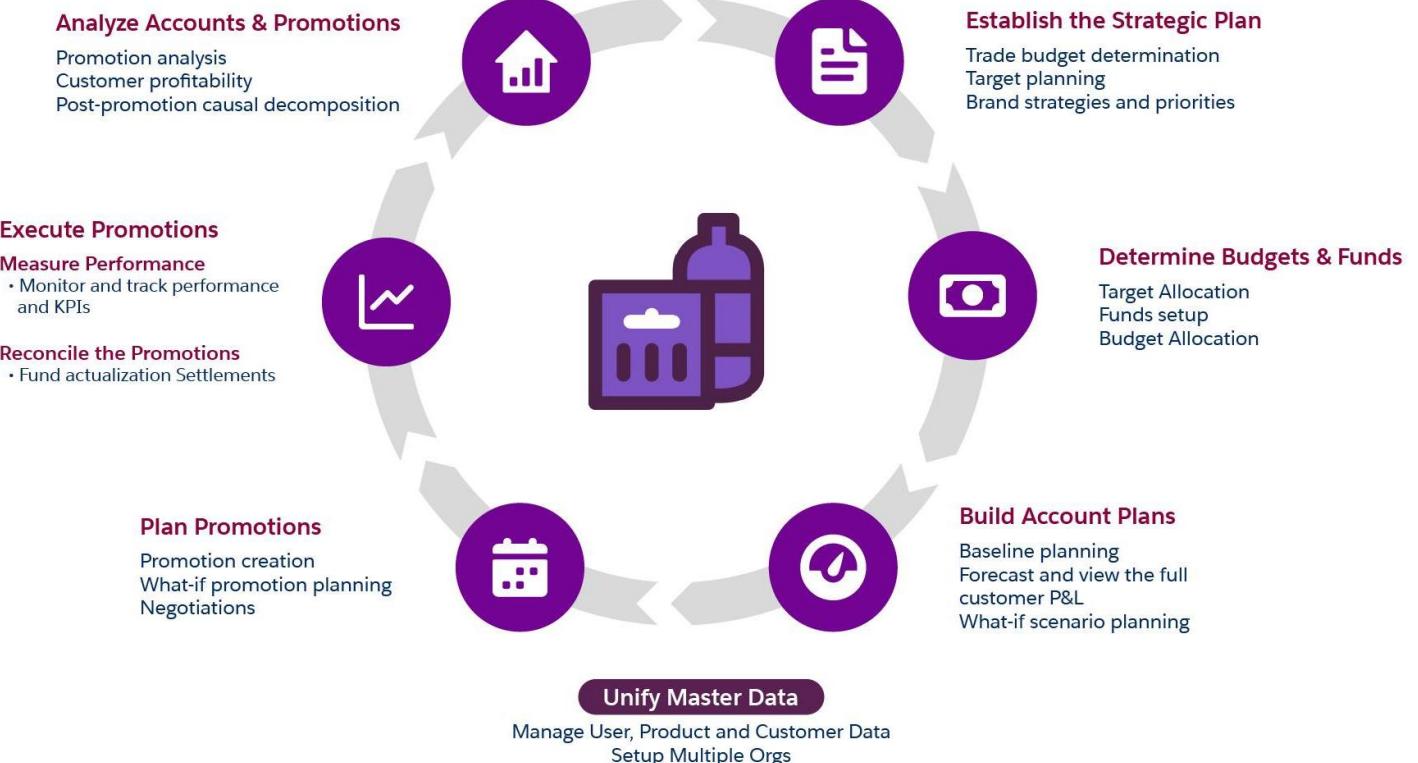
- Deals and discounts
- Exhibitions and trade shows
- Incentives to sales staff
- Demonstrators or brand ambassadors

Consumer Promotion Types

- Percentage and dollar amount discounts
- BOGO (Buy One, Get One)
- Product or coupon giveaways
- Loyalty points
- Seasonal offers
- Collaborations

Prerequisites for Success

- Strategy and implementation
- Data and resources
- Culture and mindset



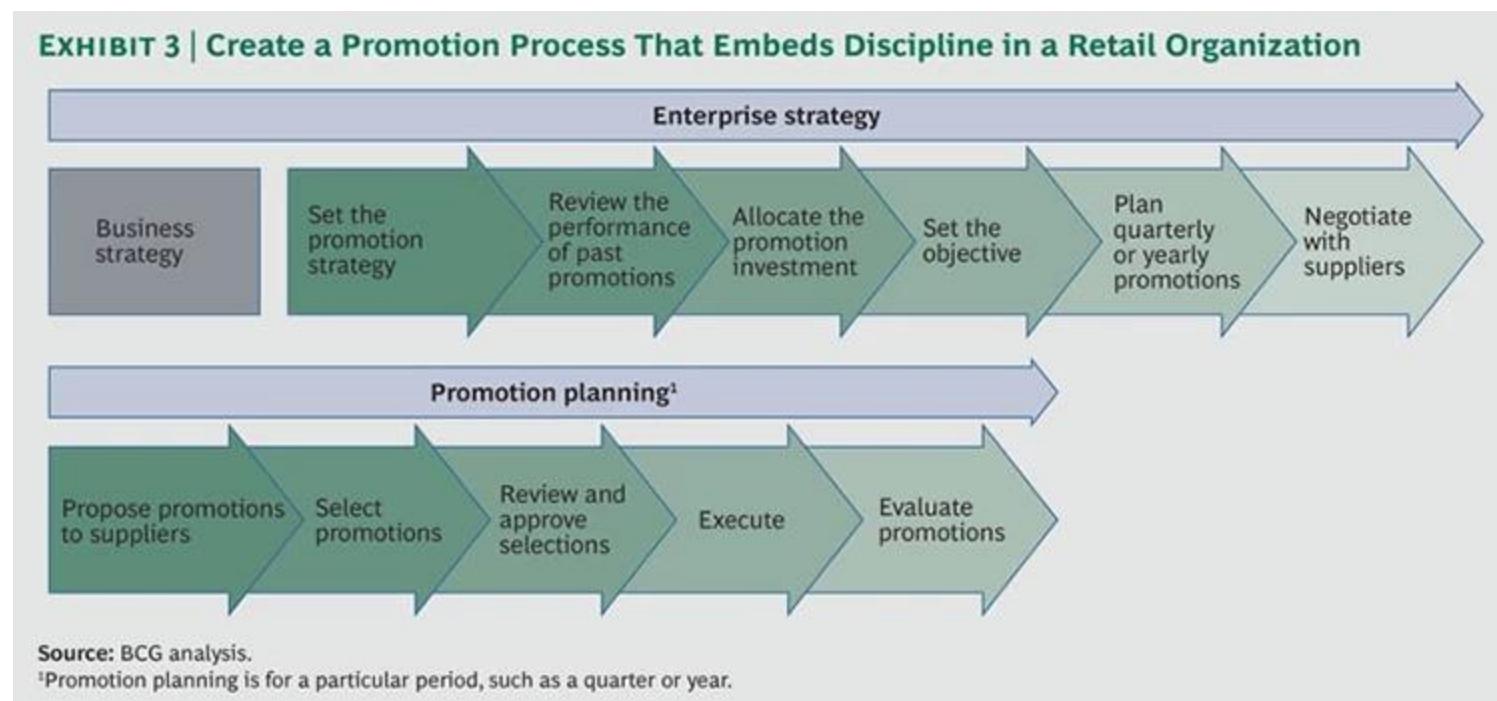
Trade Promotion Management (TPM)

TPM Process Phase	What Happens
Strategic Planning	<ul style="list-style-type: none">• Review previous year's performance• Define the strategy including target sales volume and revenue for the current fiscal year• Determine priorities• Set objectives• Set top-down targets and budgets
Funds Management	<ul style="list-style-type: none">• Allocate budget to cover promotion cost• Sponsor promotions which are created to achieve the targets• Organize the promotion funds
Account Planning	<ul style="list-style-type: none">• Review account-related data including the baseline of products that are sold without any promotional activity• Create account plans• Identify products and categories for promotions• Monitor account performance and plan promotions for the customer• Use and store target data at the respective account level which can be accessed by the user in the Account Plan Profit and Loss (P&L) screen.
Promotion Planning	<ul style="list-style-type: none">• Create and plan specific promotions• Review the volume, revenue, and cost of all planned promotions in the account plan• Review the funds allocated to sponsor the cost of the promotion• Negotiate promotion terms with retail partners
Promotion Execution	<ul style="list-style-type: none">• Start promotions• Execute tactics like price cuts, displays, and weekly flier placement at retail stores• Track and monitor performance• Pay retail partners for any tactics executed at their retail stores
Post-Event Analysis	<ul style="list-style-type: none">• Review the actual sales volume and actual cost in the Promotion and Account Plan P&L Sheet.• Determine promotion success• Extract data for the next round of account and promotion planning

source: [Get Started with Trade Promotion Management | Salesforce Trailhead](#)

Retail Promotion Process

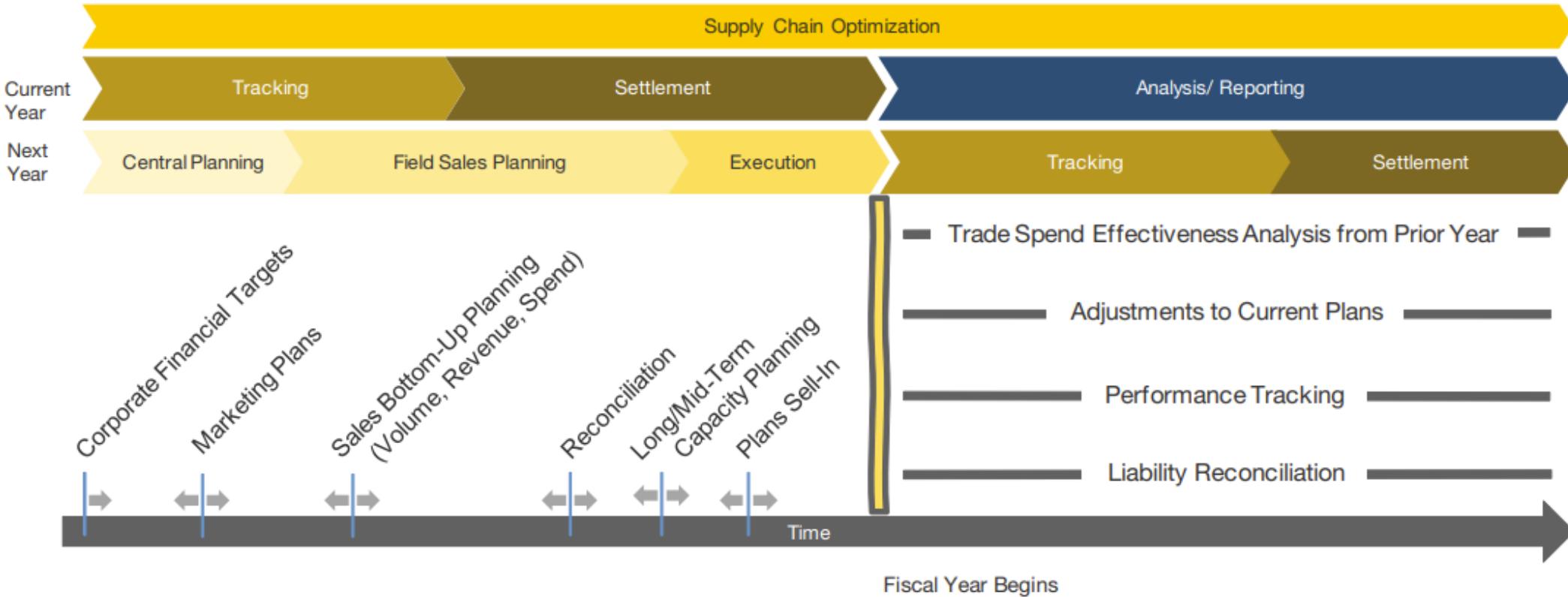
Trade promotion management (TPM) and trade promotion optimization (TPO) are the processes and technologies that consumer goods manufacturers leverage to plan, manage and execute the activities that require collaborative promotional activity from their retail partners. Collectively, we refer to them as “trade promotion execution” (TPx). The solutions in the market are currently offered either separately or as part of a combined package, and to date, have largely been used to deliver promotional activity in brick-and-mortar locations.



source: [How Retailers Can Improve Promotion Effectiveness \(bcg.com\)](http://bcg.com)

Trade Promotion Management (TPM)

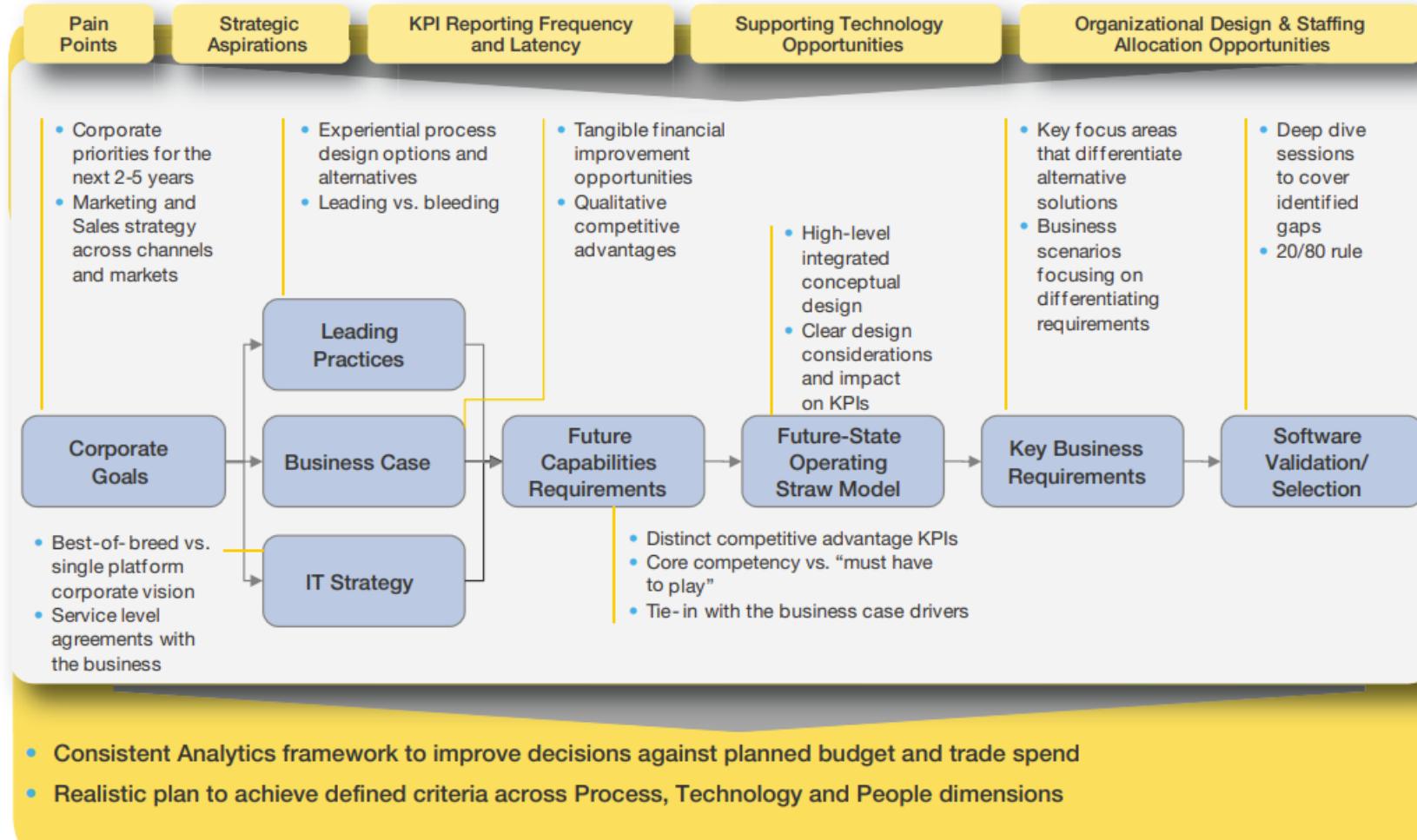
Trade Planning Cycle



source: [The_Financial_Framework_for_Trade_Promotion_Optimization_Success.pdf](#) (capgemini.com)

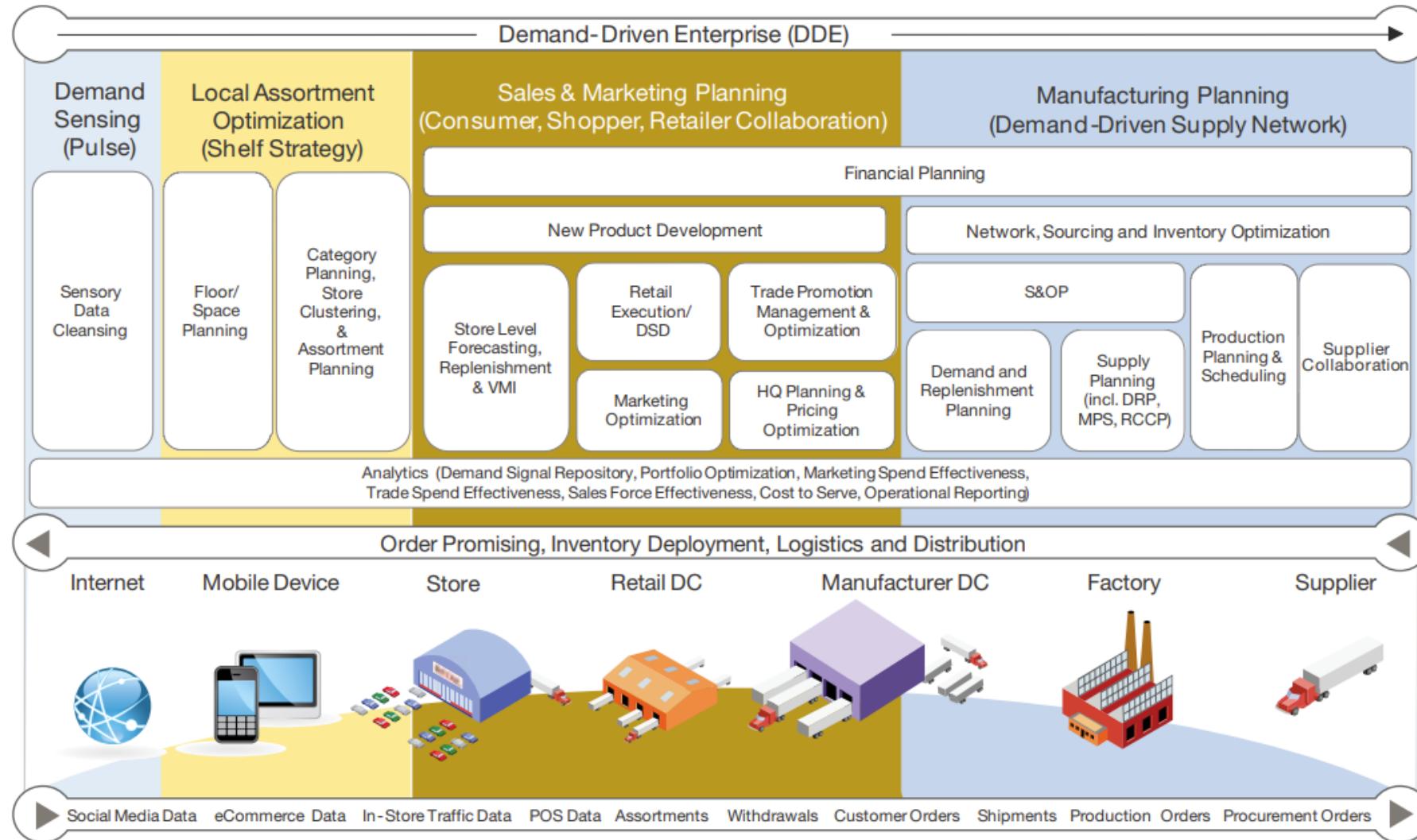
Trade Promotion Management (TPM)

Developing the Future-State Operating Model



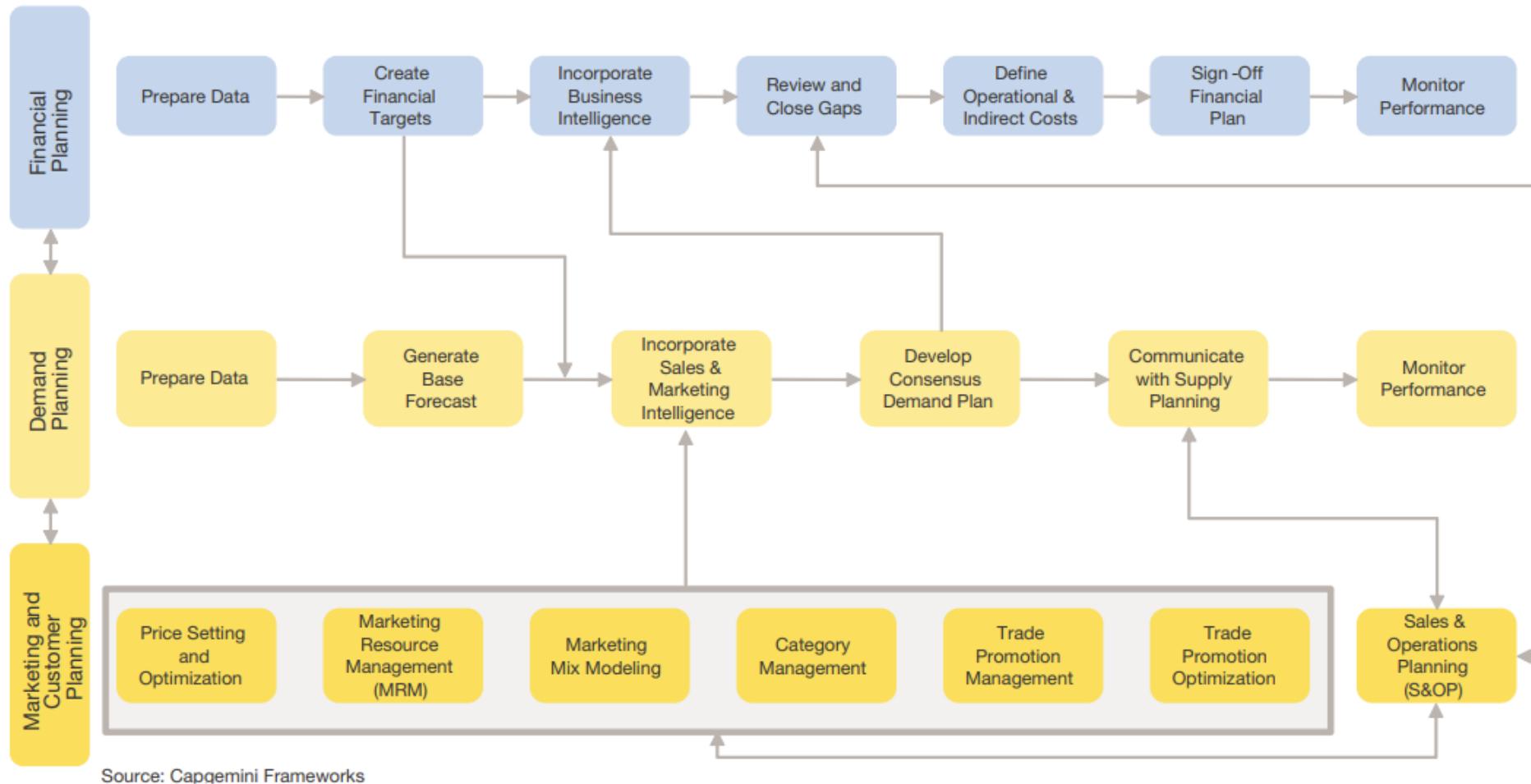
source: [The_Financial_Framework_for_Trade_Promotion_Optimization_Success.pdf \(capgemini.com\)](https://www.capgemini.com/)

Demand-Driven Enterprise



source: The_Financial_Framework_for_Trade_Promotion_Optimization_Success.pdf (capgemini.com)

Financial Framework Architecture for Promotion Optimisation

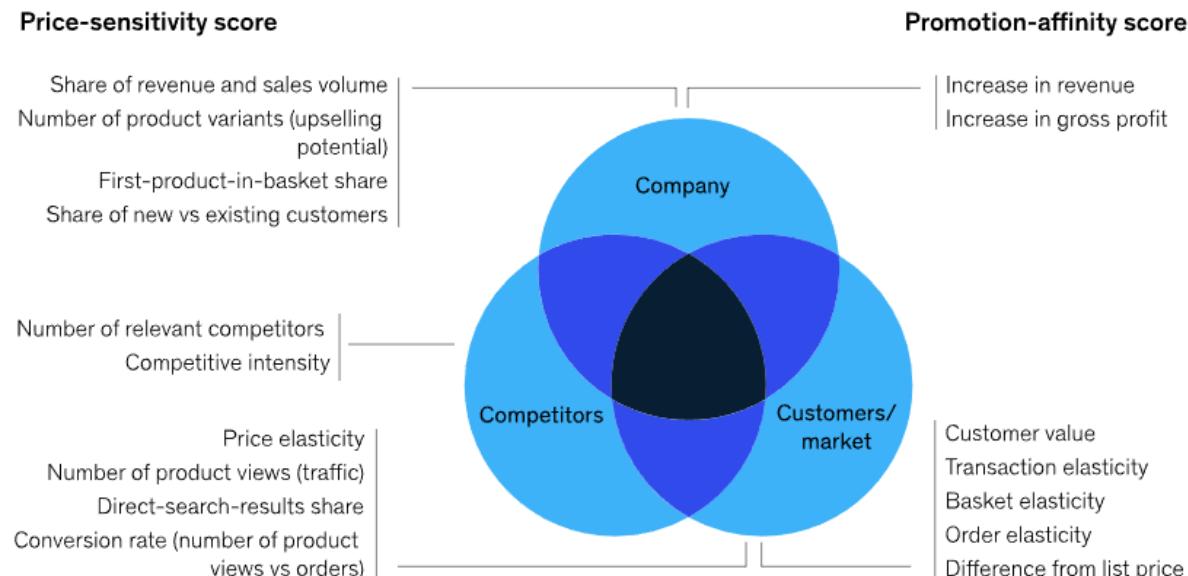


source: [The_Financial_Framework_for_Trade_Promotion_Optimization_Success.pdf \(capgemini.com\)](#)

Dynamic Price and Price Management

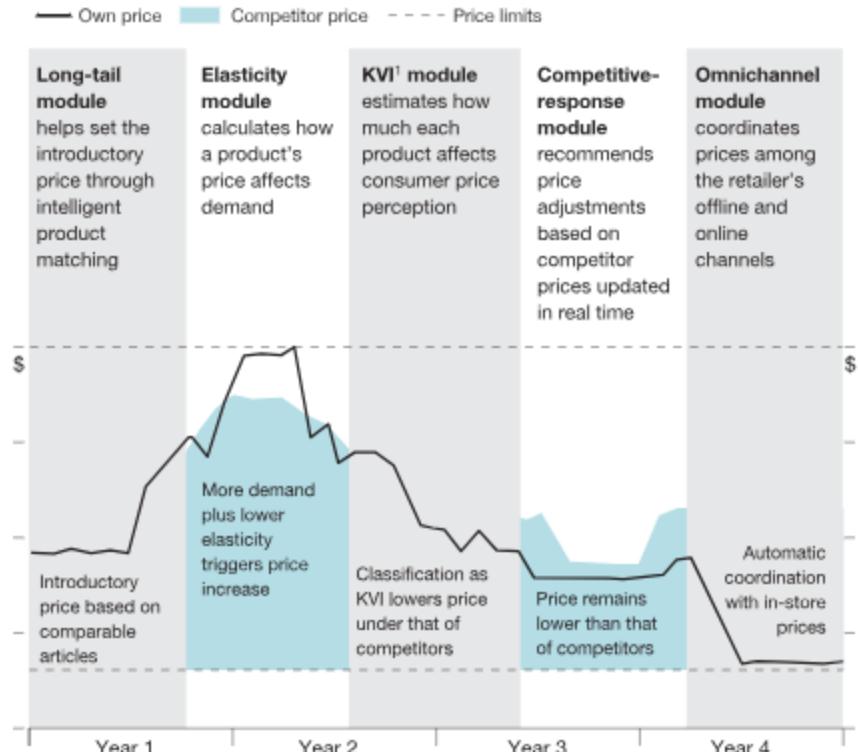
- Fuel pricing is already tailored to each store.
- In 2023, there are two pricing per state (NSW, QLD, VIC, WA): metro and regional.
- Clustered pricing introduced pricing by group of stores which can also be tailored to each store.
- Membership pricing for loyalty (low priority) shows low interest/value.
- "Pay with Points" (Points engine) brings greater complexity, particularly with the balance sheet impact and cost of point brings further franchisee network complexities.
- C-store uses (Boston Consulting Group) BCG's "Retail" Catalyst for category and supplier profitability. Could it be extended for promotion pricing or marketing like Periscope by McKinsey?

A variety of input factors can be used to determine each product's precise price sensitivity and promotion affinity.



Source: McKinsey analysis

How the modules might generate price recommendations over a product's life cycle



¹Key value item.

McKinsey&Company

SAP On-Shelf Availability (OSA) on SAP CAR

For RELEX (and C-store), on-shelf availability is improved by implementing a better Advanced Planning System that provide improved forecasting and replenishment.

With the on-shelf availability (OSA) module in SAP Customer Activity Repository, you gain insight into the on-shelf availability of the products in your stores. Find out where out-of-shelf situations occurred in the past. Get real-time alerts for products that might have an out-of-shelf situation now.

You can use the OSA module for these two scenarios:

Analytical scenario: Using the analytical processing of OSA, you can determine past out-of-shelf situations.

This information can be used to determine hotspots of out-of-shelf situations and to determine appropriate measures to improve the on-shelf availability in your stores. By continued observation of the KPIs that can be built on top of the OSA results, you can measure the success of the realized measures. For example, improvements are possible through the following measures:

- Optimization of delivery cycle, pack sizes, shelf capacity, shelf replenishment
- Organizational measures
- Optimized workforce planning

Operative scenario: Using the OSA monitoring, you can receive real-time alerts for products that probably have on-shelf availability issues.

- Employees can react to these alerts by either refilling the shelf with products or triggering other appropriate activities.
- For example, OSA can be integrated into the following business processes to improve the on-shelf availability:
 - Backroom replenishment
 - Correction of inventory figures
 - Ordering
 - Shelf tidying

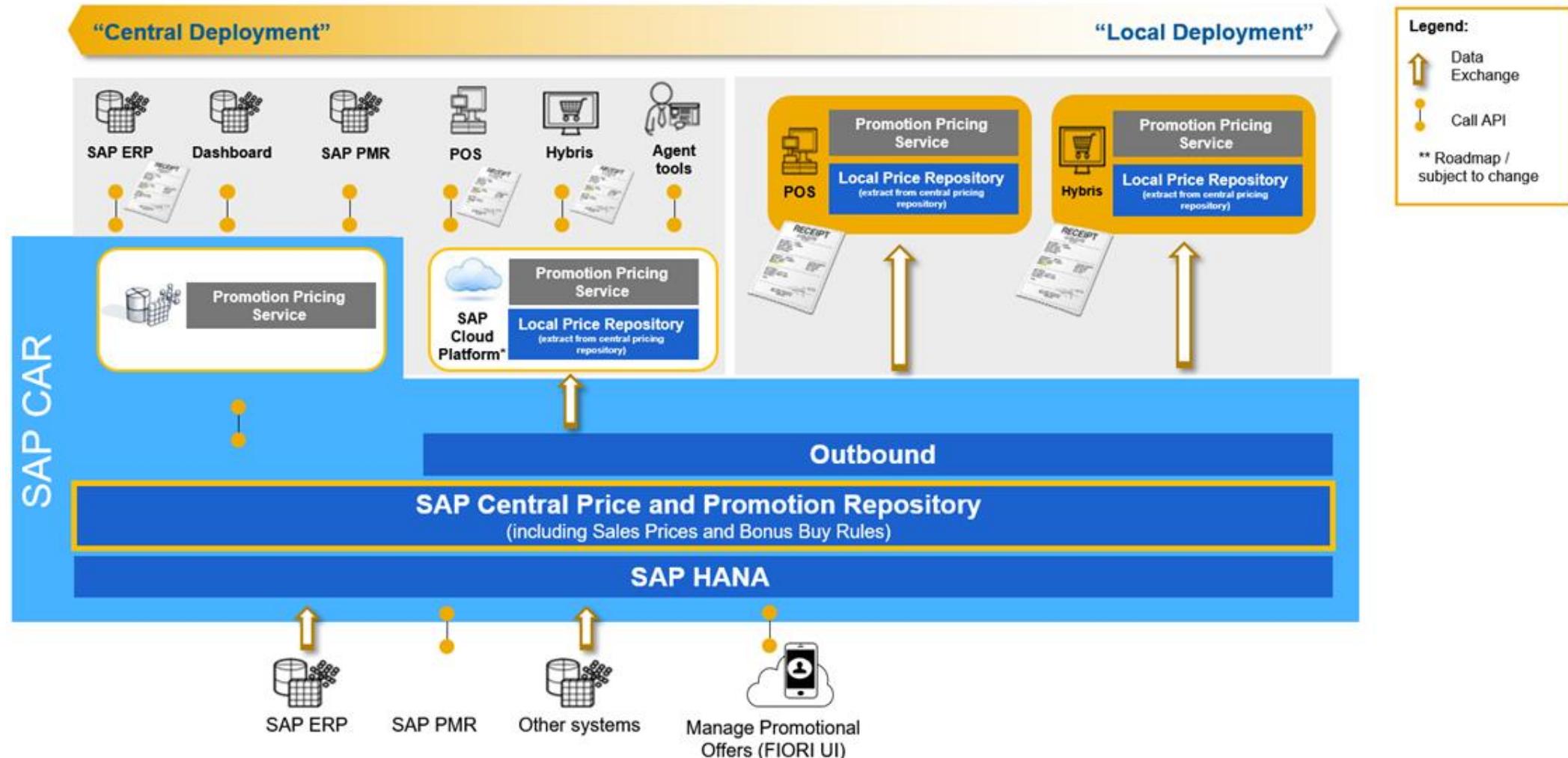
The OSA algorithm considers the sales of a product at a specific store. This algorithm extracts the sales transactions from the POS Data Transfer and Audit transaction data. The algorithm then analyzes the length of each sales interval between two subsequent sales of that product. Typically, long intervals indicate potential on-shelf availability issues.

SAP Promotion Management on SAP CAR

SAP Promotion Management is the defined way to create promotional offers and customer-facing advertising for retail, wholesale, and digital consumer industries. The application is a mature offering by SAP to support these main functions among others:

- Manage all of your promotional activities in an easy and convenient set of modules using the SAP FIORI user interface.
- Create a promotional offer that can vary by location and language.
- Define your promotional offer by type (percent off, amount off), by tactic (flyer, in-store, end cap), and with incentives (coupon, points).
- Create a coupon represented as an offer that can be provided to the consumer for later redemption.
- Export offers to SAP Marketing cloud for digital marketing, SAP IS Retail for price activation, Omnichannel Promotional pricing for price activation through GK Omni POS.
- Create a promotional advertising vehicle which includes multiple promotional offers which can vary by geography.
- Export advertising vehicles to XML to be consumed by agencies for final production.

SAP Omnichannel Promotion Pricing (OPP)



source: [SAP Omnichannel Promotion Pricing for SAP Retail O... - SAP Community](#)

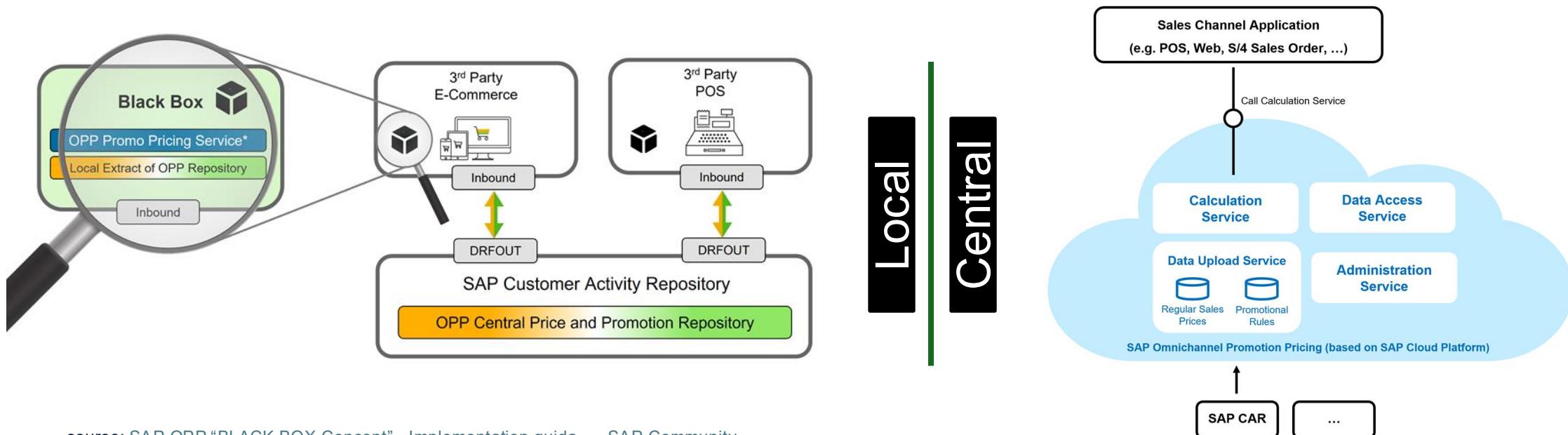
Central and Local Deployment

SAP's vision is to ensure correct and consistent effective sales prices across all sales channels along with the ability to introduce new pricing rules with low implementation effort.

The first step to achieve this is to provide a central price and promotion repository as part of omnichannel promotion pricing (OPP). This repository is located within SAP Customer Activity Repository, an application that is based on SAP HANA. It contains all regular prices and OPP promotions that are used to calculate the effective sales prices in the sales application:

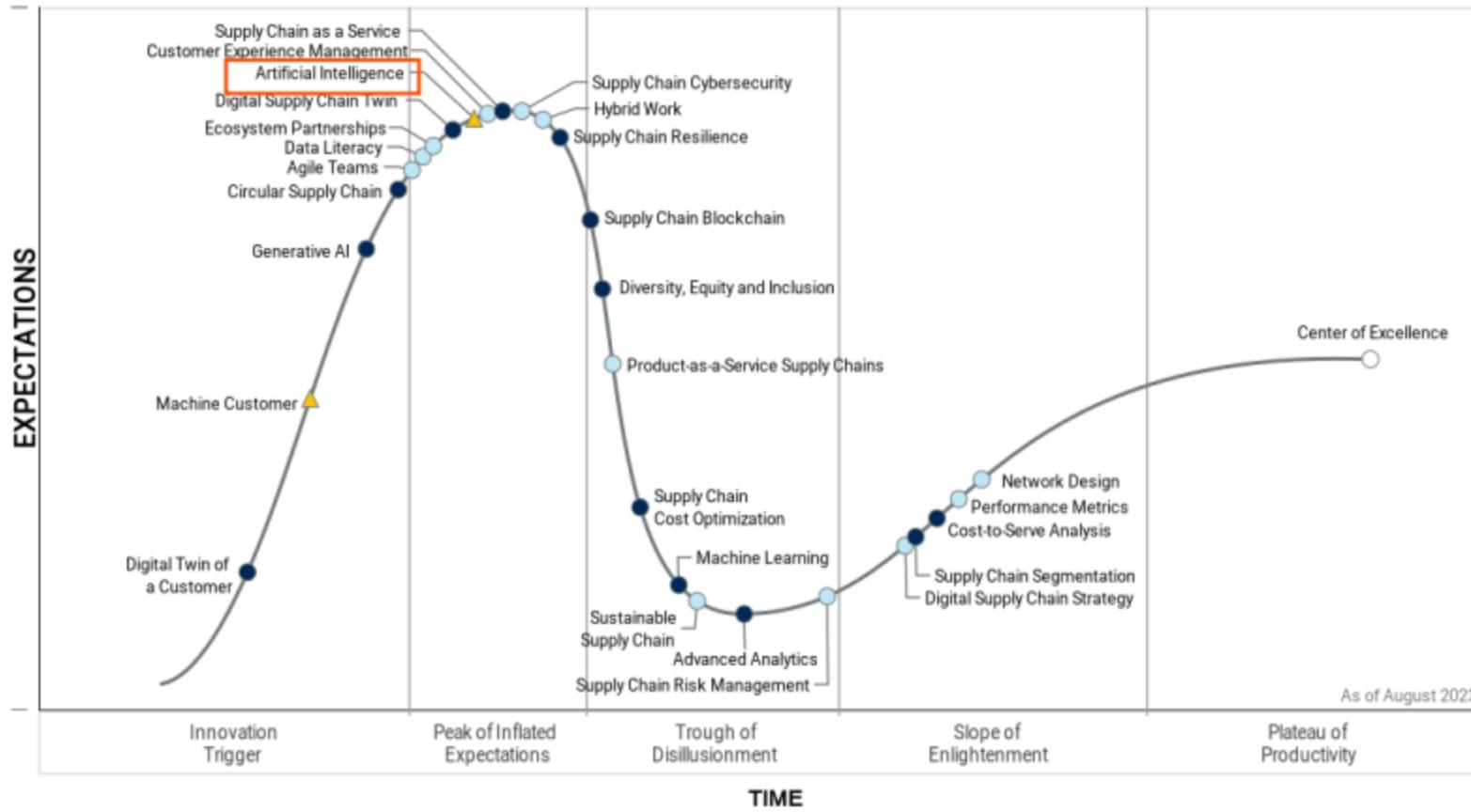
Regular prices can originate from an SAP Retail system, an SAP ERP or SAP S/4HANA system, or any other non-SAP system.

Offers can be maintained in the Manage Promotional Offers app or they can be imported from other systems. After the offer has been created, it is transformed into a format that is based on the format of the Association for Retail Technology Standards (ARTS). An offer with this format is called OPP promotion.



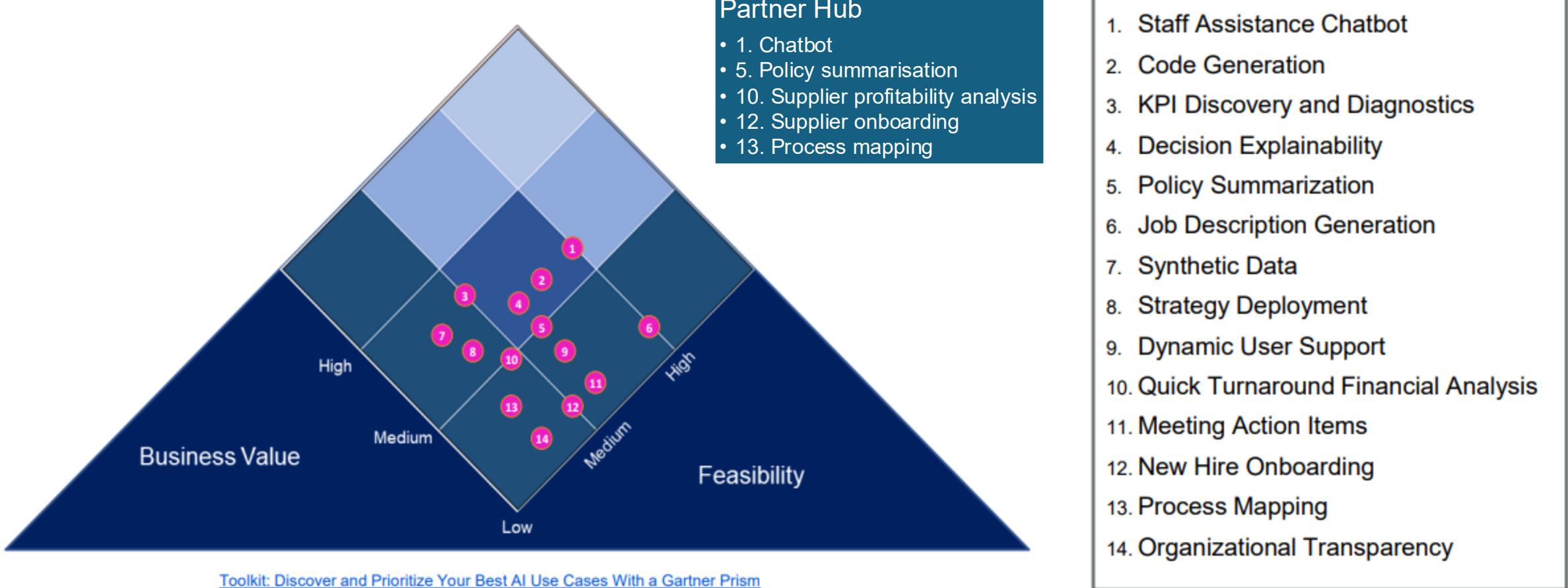
Get Started on the Generative AI Journey In Your Supply Chain

Hype Cycle for Supply Chain Strategy, 2023



source: [Gartner Webinars](#)

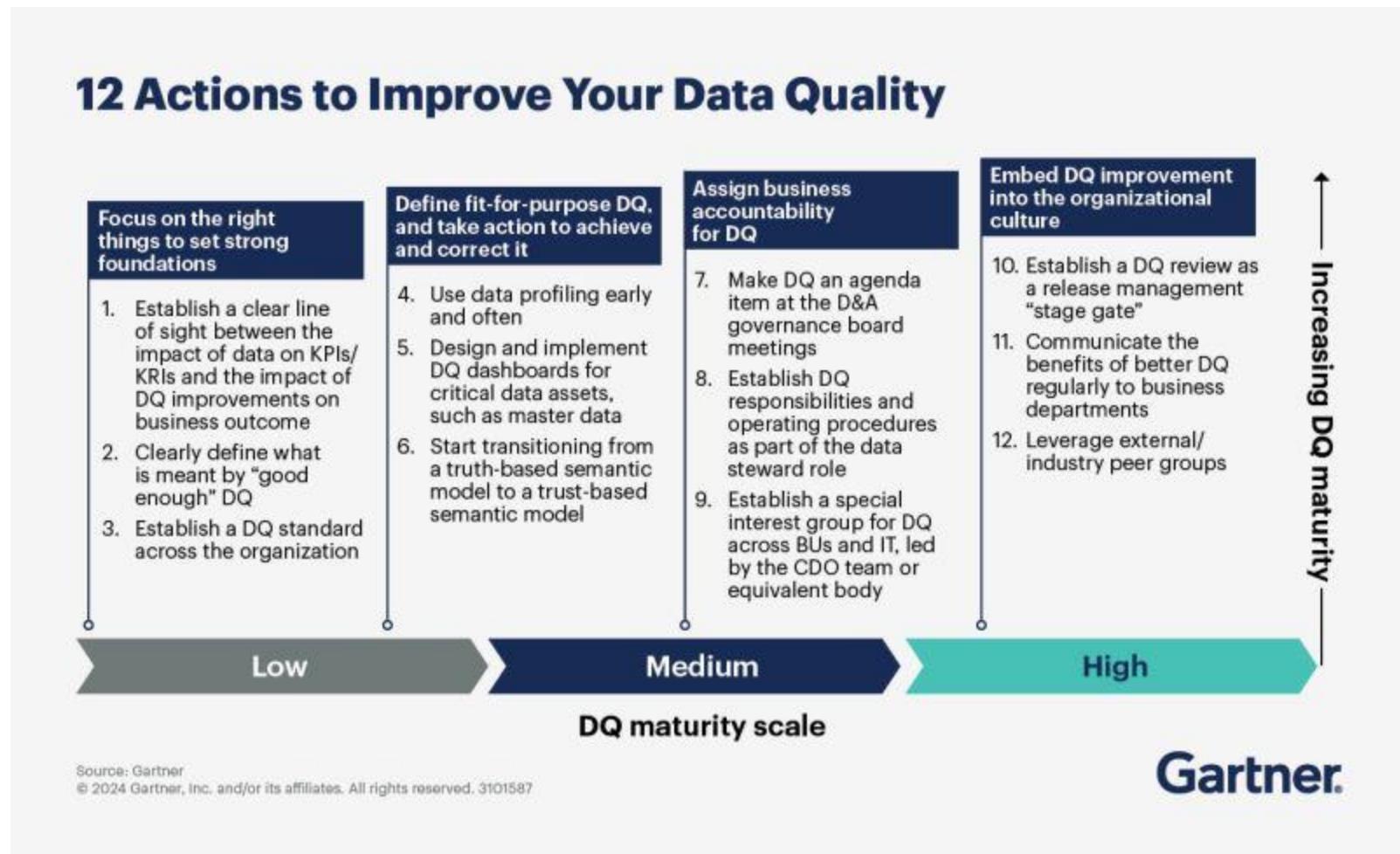
Get Started on the Generative AI Journey In Your Supply Chain



source: [Gartner Webinars](#)

Data Management

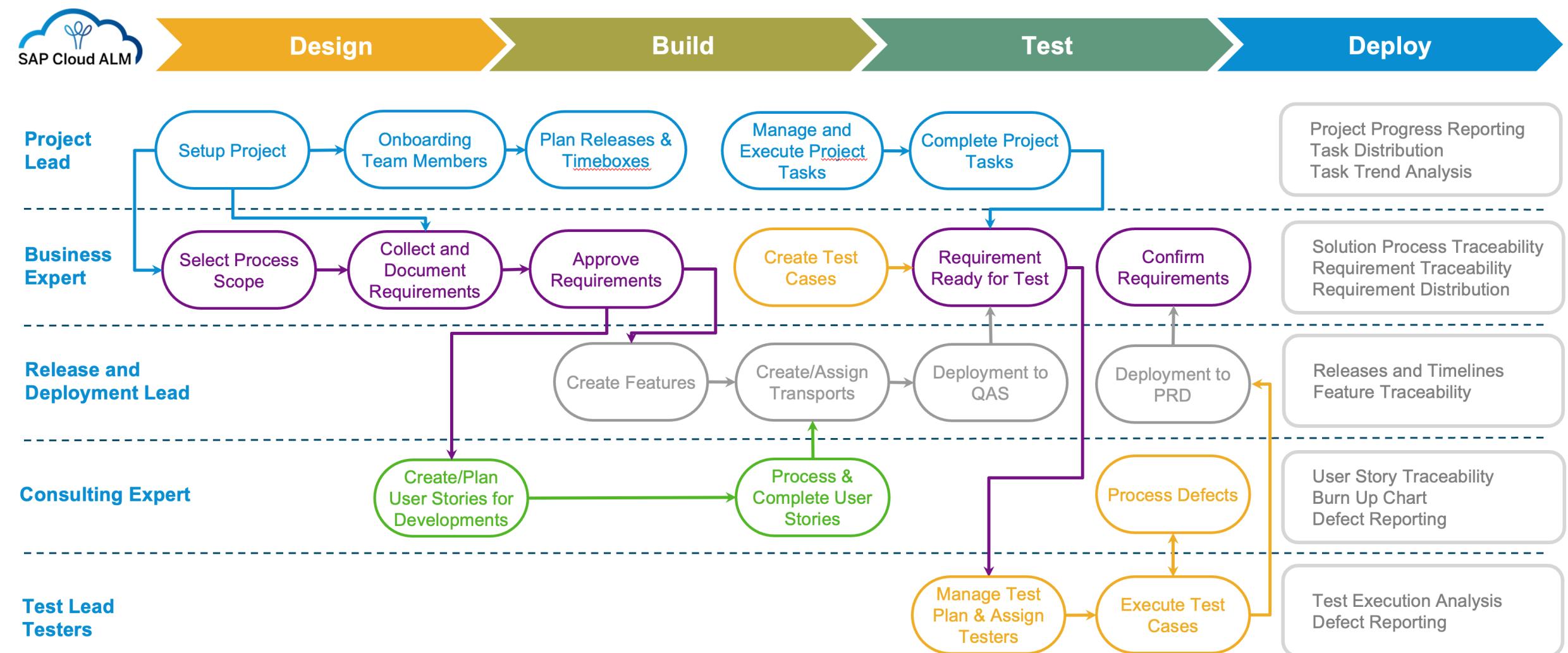
Data Quality



source: [Data Quality: Why It Matters and How to Achieve It](#)

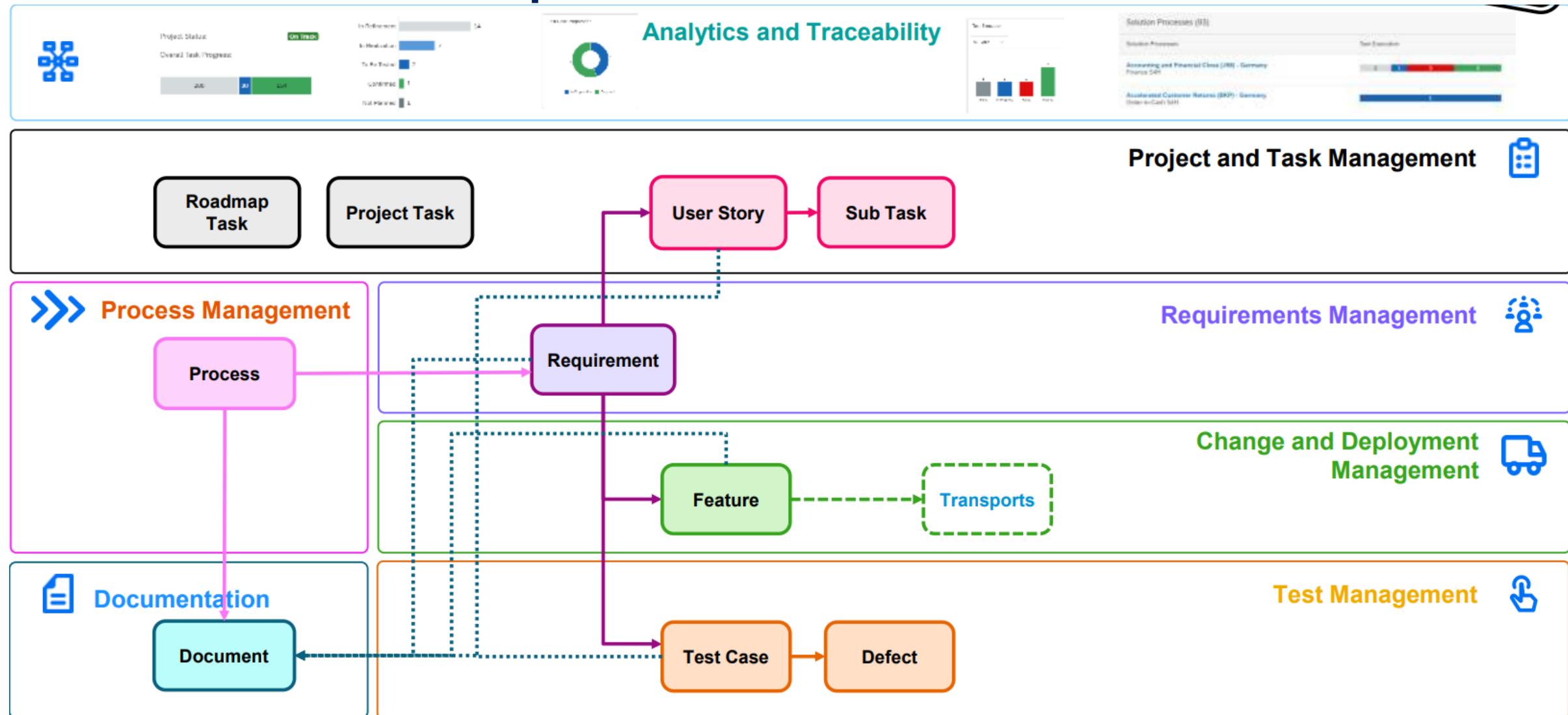
Quality Assurance

SAP Cloud ALM for Implementation Process



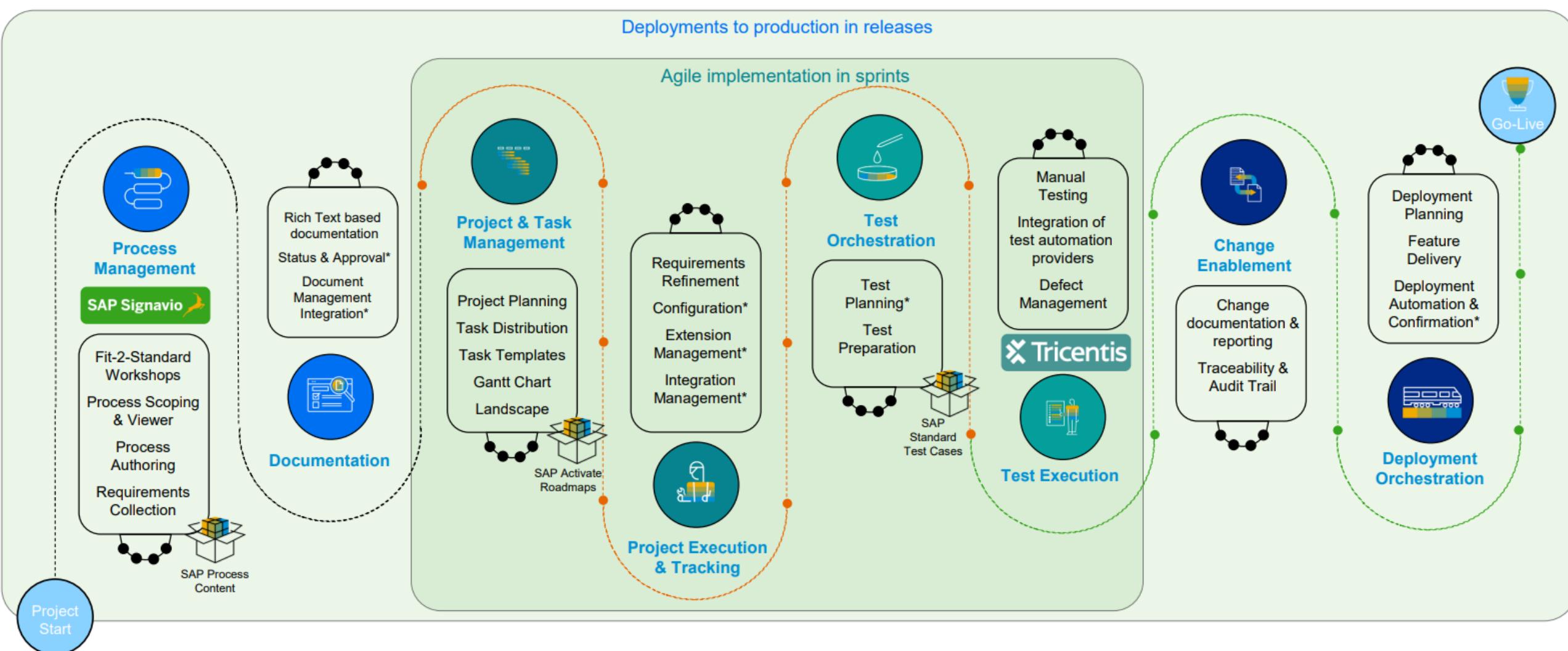
source: [SAP Cloud ALM for Implementation Expert Portal](#)

SAP Cloud ALM for Implementation Elements



source: [SAP_Cloud_ALM_Functional_Overview.pdf](#)

SAP Cloud ALM Capabilities



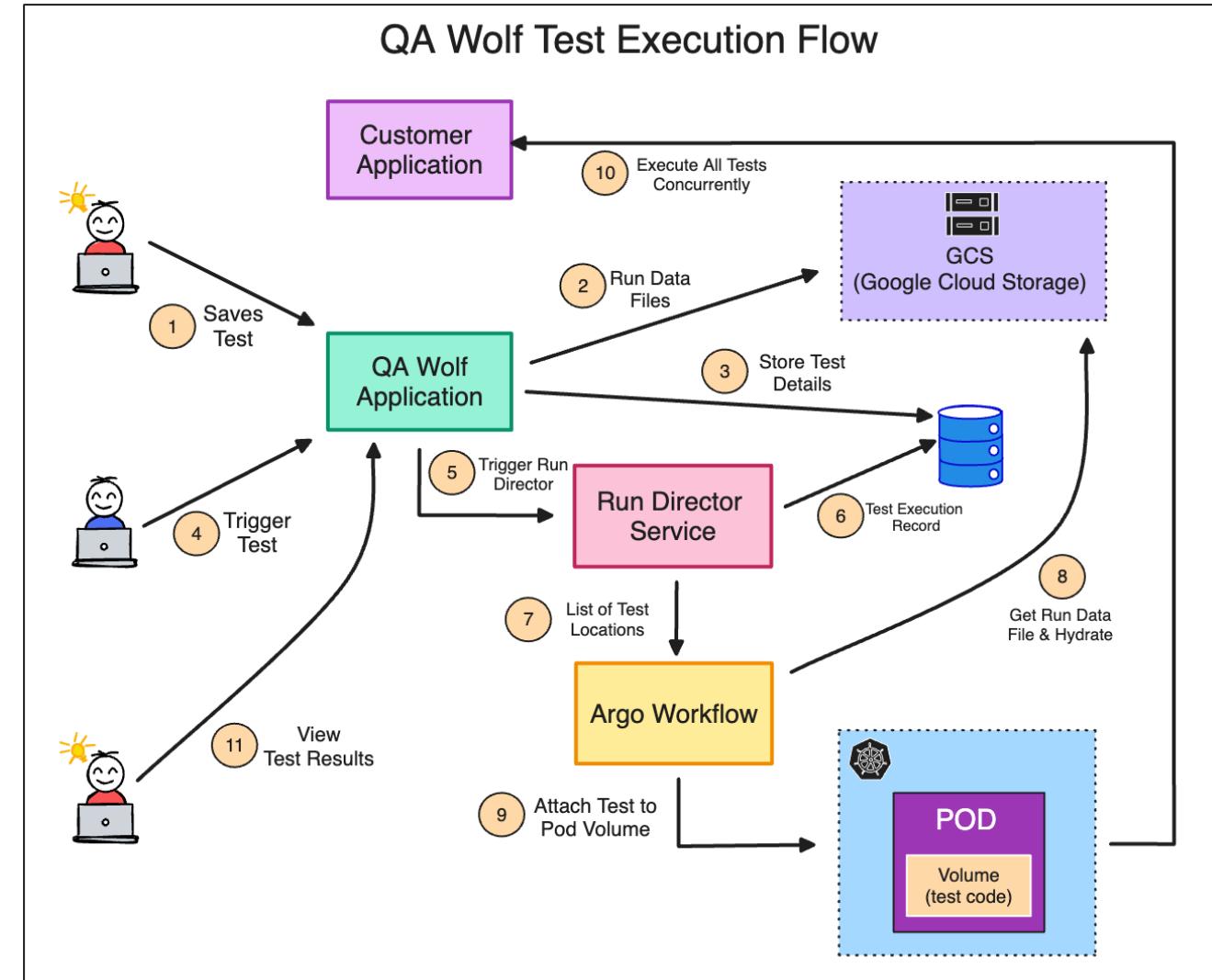
source: [Change and Deployment Management overview \(sap.com\)](https://www.sap.com/capabilities/methodologies/alm.html)

How to Execute End-to-End Tests at Scale

QA Wolf Test Execution Flow

The Challenge of Running E2E Tests

- Running E2E tests reliably and efficiently is a critical piece of the puzzle for any software organization.
- There are mainly two expectations software teams have when it comes to testing:
 - Ship as fast as possible without introducing (or reintroducing) bugs
 - Run tests as cheaply as possible without compromising on quality.
- In today's issue, we are fortunate to host guest author John Gluck, Principal Testing Advocate at QA Wolf. He'll be sharing insights into QA Wolf's specialized infrastructure capable of running thousands of concurrent E2E tests in just a few minutes and meeting the expectations of their customers.
- [QA Wolf](#) is a full-service solution for mid-to-large product teams who want to speed up their QA cycles and reduce the cost of building, running, and maintaining comprehensive regression test coverage.
- Also, [Mufav Onus](#) of QA Wolf spoke at Kubecon 2024 in Paris about how they automatically resume pods on spot instances after unexpected shutdowns. [Take a look](#).



source: [How to Execute End-to-End Tests at Scale \(bytebytego.com\)](#)

Tricentis and SAP

Tricentis and SAP have partnered to accelerate SAP Cloud adoption.

	Tricentis Tosca	Tricentis Test Automation
Included in C-store's SAP ES and SAP Cloud Subscription (OEM offering with a <u>subset of functionalities</u>)	Tricentis Test Automation for SAP integrated with SAP Solution Manager	Tricentis Test Automation for SAP integrated with SAP Cloud ALM
SAP Rebranding	Test Management in SAP Solution Manager	Test Orchestration in SAP Cloud ALM
Features Scope	Resold by SAP as SAP Enterprise Continuous Testing by Tricentis GUI and non-GUI, API, Test Data Service, Orchestrated Service Virtualization, Data Integrity, Mobile	Resold by SAP as SAP Test Automation by Tricentis GUI and non-GUI, API, Test Data Service
Focus (Apps)	On-premise	Cloud
Compatibility (Admin)	Windows	Windows

source: [Test Automation Solution Overview - Tricentis](#)

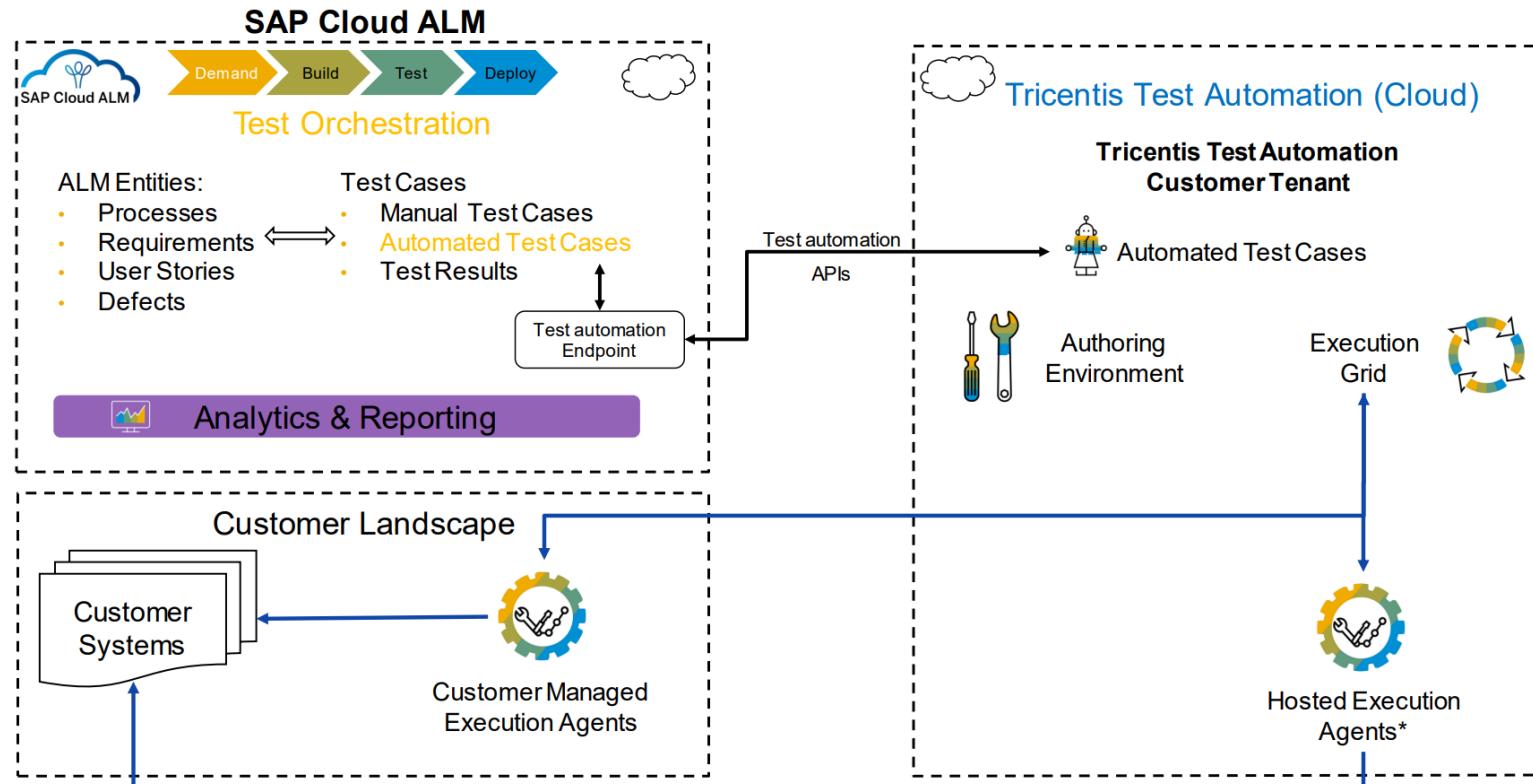
Tricentis Test Automation for SAP integrated with SAP Cloud ALM

As of January 2023, a Term License for Tricentis Test Automation for SAP is granted with SAP Enterprise Support, cloud editions, with SAP Enterprise Support and with Product Support for Large Enterprises. This Term License is currently granted until July 31st, 2026.

Offer focus on SAP Cloud solutions, and it has been launched for web-based applications (SaaS).

Roadmap: SAP GUI testing is planned for 2023 Q1, and API testing is planned for 2024 Q1.

Usage rights is limited to SAP applications.

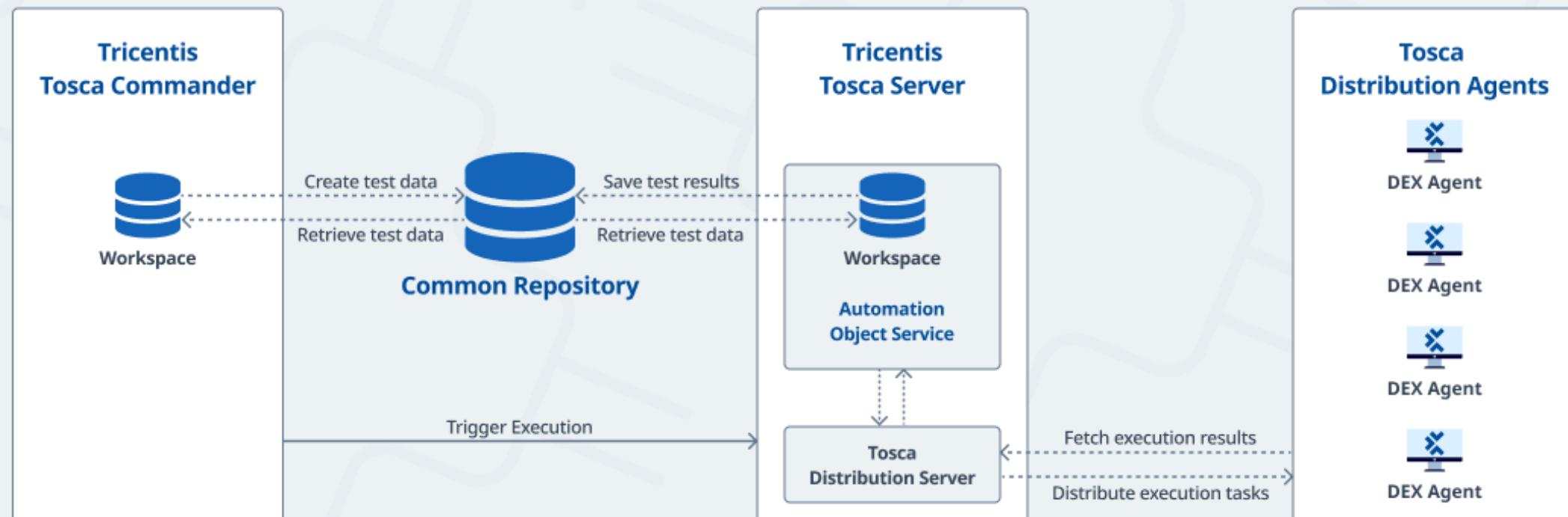


source: [Tricentis Test Automation for SAP integrated with SAP Cloud ALM.pdf](#)

source: [Test Automation \(sap.com\)](#)



Distributed Execution with Automation Object Service

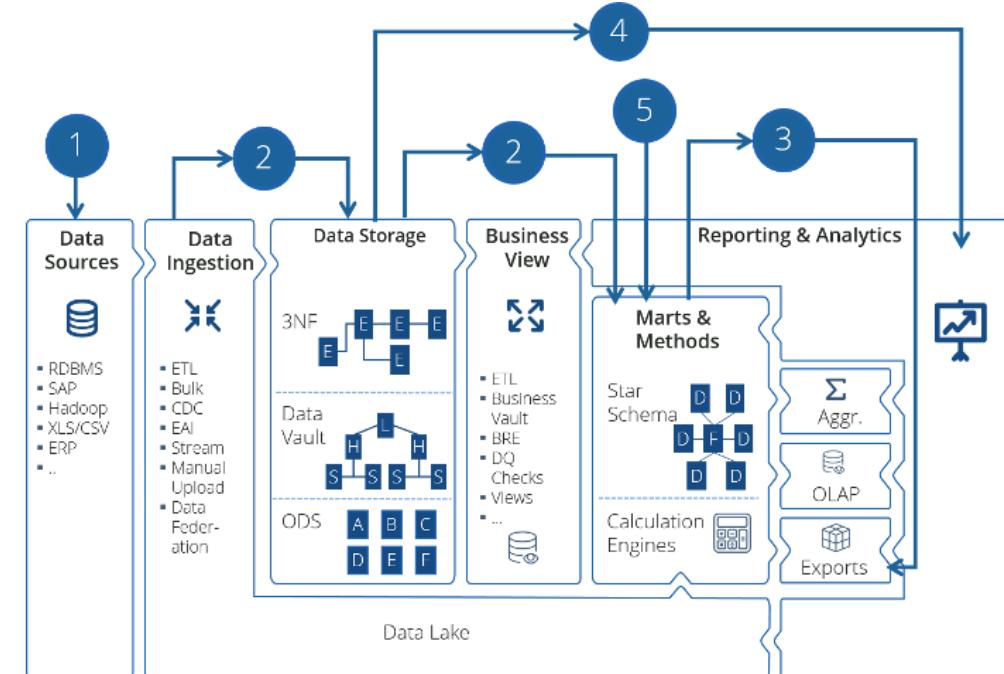


source: [Tosca Distributed Execution \(tricentis.com\)](https://tricentis.com)

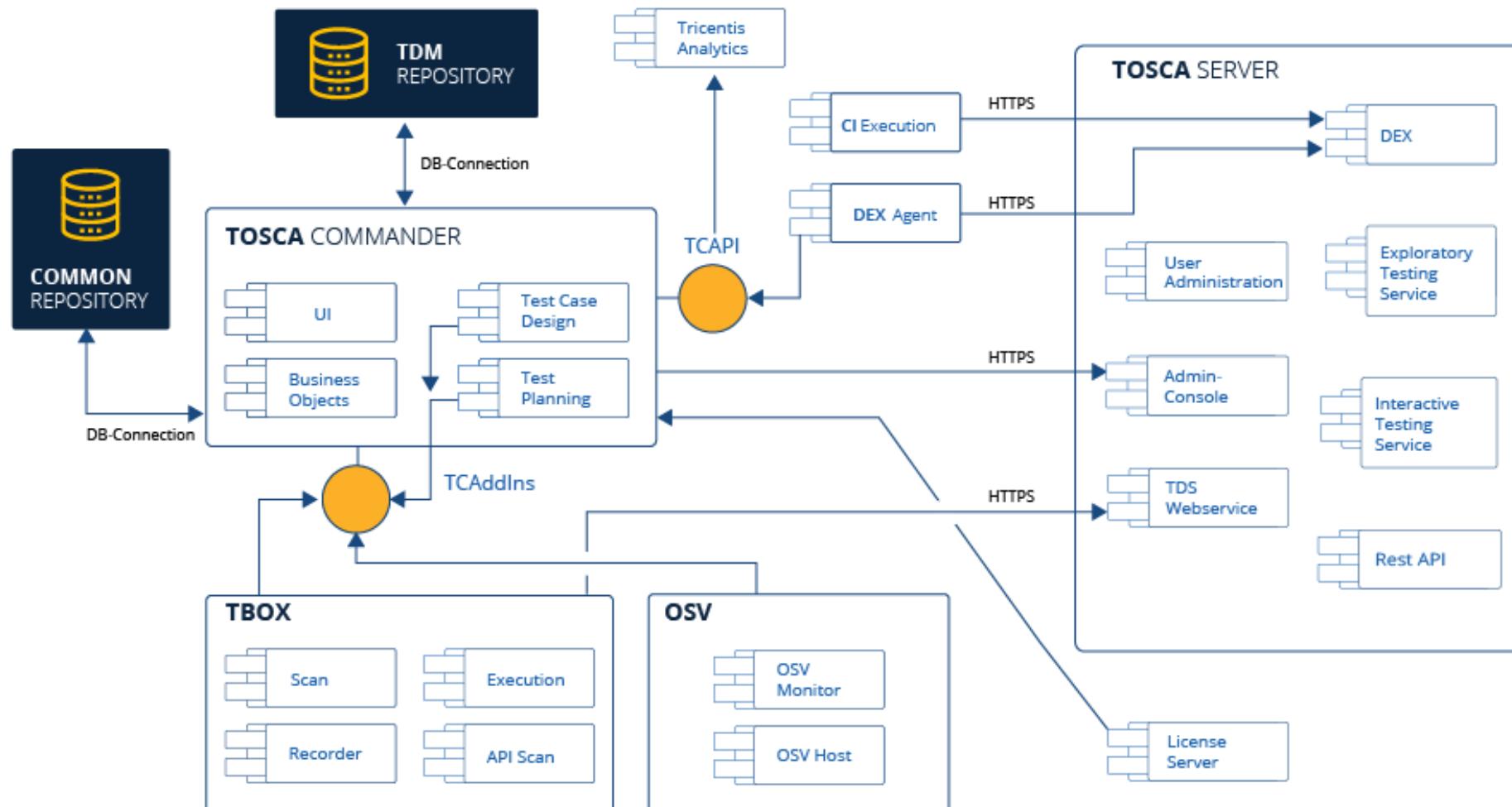
Tricentis Data Integrity

The following main test types help you ensure data quality throughout all stages of your Data Integrity testing cycle:

1. Pre-Screening Tests: verify whether your files contain the expected data.
2. Vital Checks and Field Tests: ensure the integrity of your data as well as the completeness and correctness of tables and fields.
3. Reconciliation Tests: compare two data sets from two different systems.
4. Report Testing: check the presentation and the content of reports.
5. Profiling: validate data from a business perspective for logical consistency and correctness.



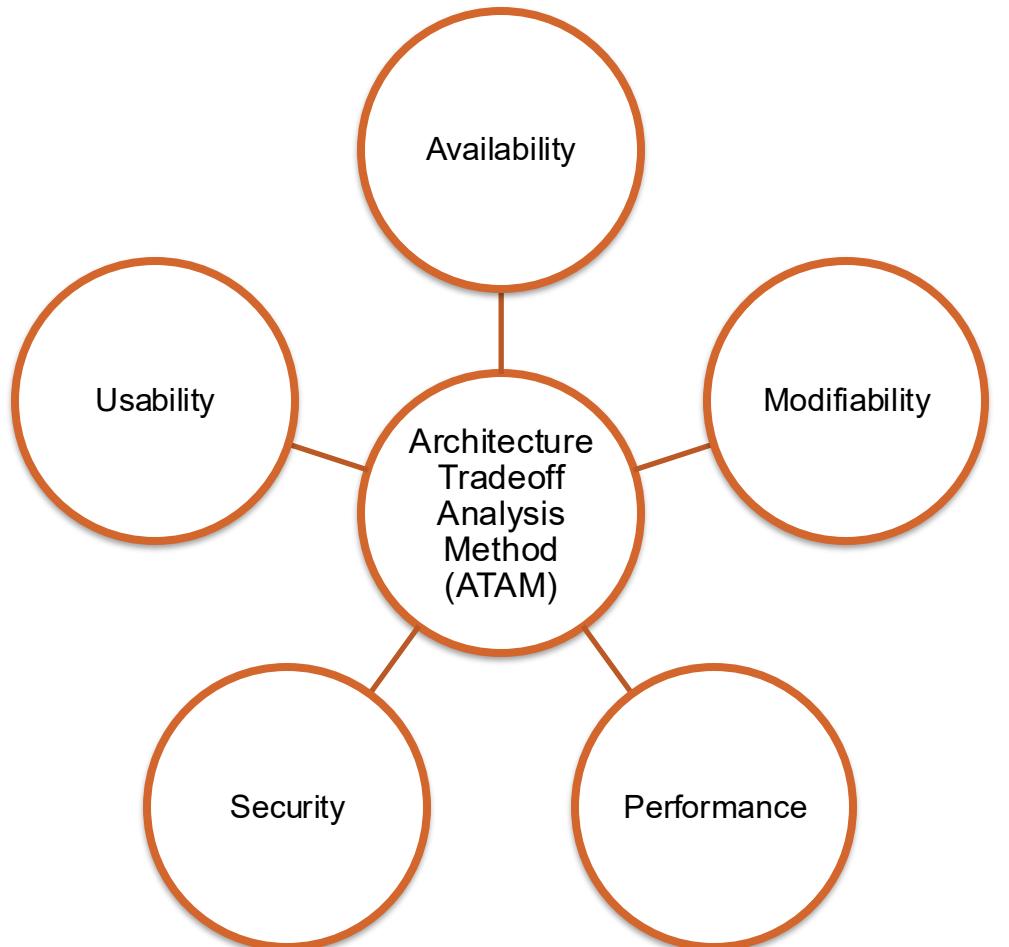
Tricentis Tosca 13.3 Architecture



source: [Tricentis Tosca architecture](#)

Key Non-Functional Requirement (NFR)

Quality Attribute Requirements (QAR)



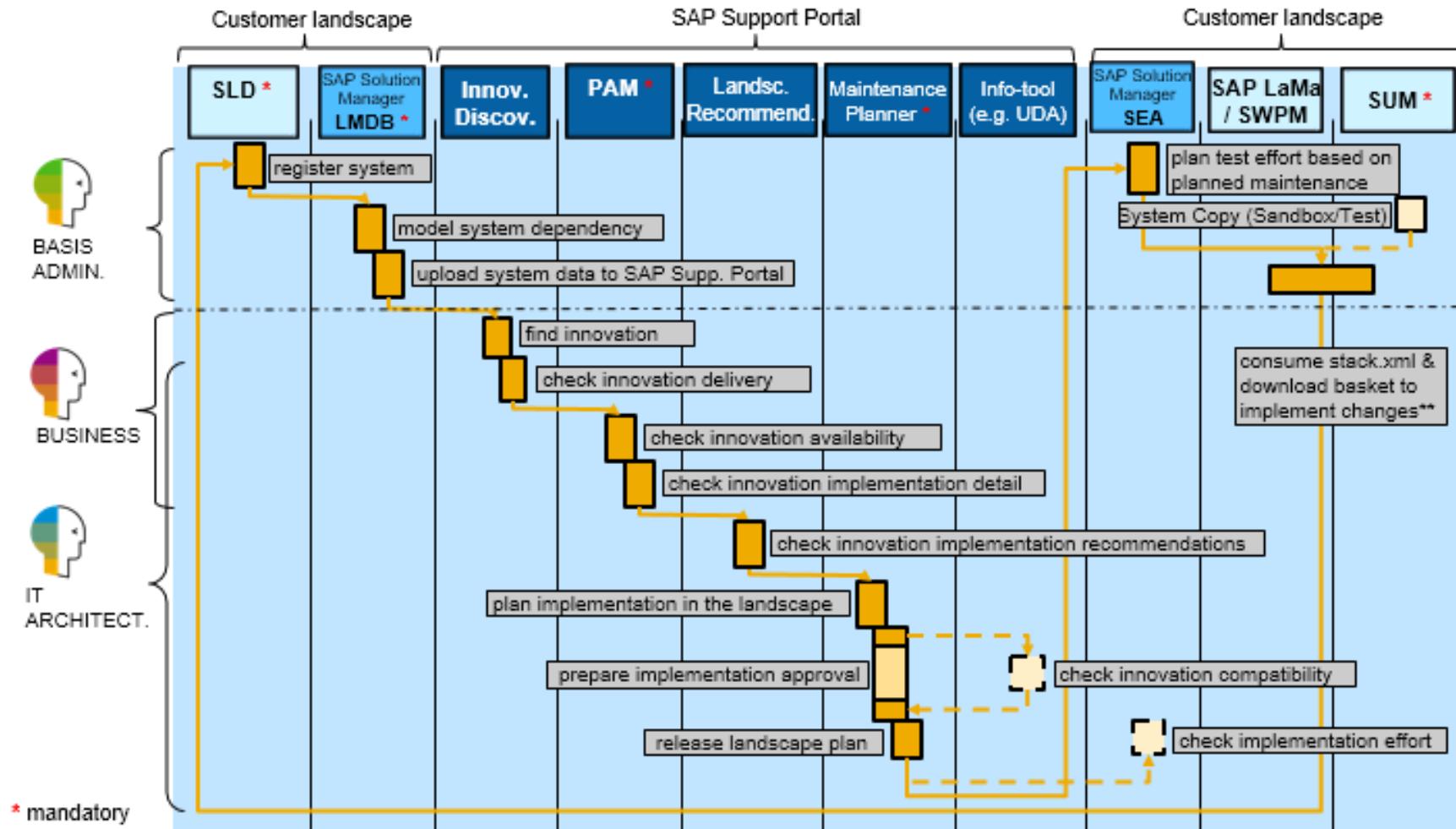
Key Non-Functional Requirement (NFR)

SAP Seven Suite Qualities for Intelligent Enterprise

Seamless user experience	Core set of UX aspects applied to all major SAP products; consistent and modern user experience
Consistent security and identity management	Consistent and centrally administered user management for identity authentication and identity provisioning throughout the application landscape
One workflow inbox	SAP Task Center provides a single inbox for users to approve arbitrary SAP software workflows
Aligned domain models and integration content	Aligned domain models used by SAP applications to synchronize business objects reducing SAP-to-SAP solution integration efforts; 3400+ pre-built integrations and 3800+ APIs to jump-start
Embedded and cross-product analytics	Unified analytics running inside and across your applications enabling a 360-degree view
Coordinated lifecycle management	Offer insights into customer entitlements, system availability, and one central place to directly trigger provisioning; comprehensive automation capabilities and guided workflows to simplify setup efforts
End-to-end process blueprints	Support architecture decisions and reduce planning efforts for implementation projects; reference architectures for customer transformation embedded in the SAP Enterprise Architecture Framework

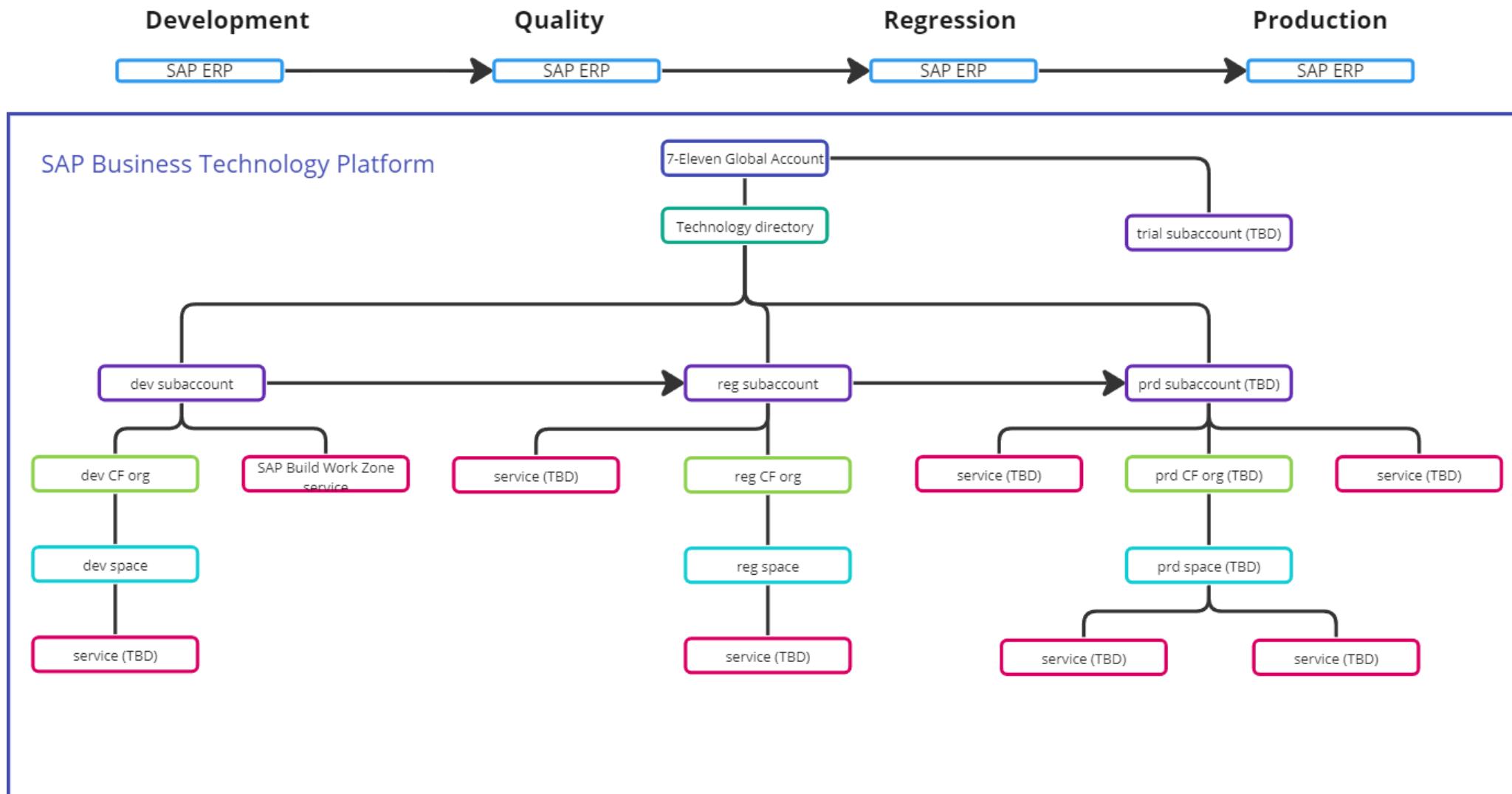
SAP Best Practices Guide to Planning Landscape Changes

Example of the EHP-update of an SAP ERP 6.0 system

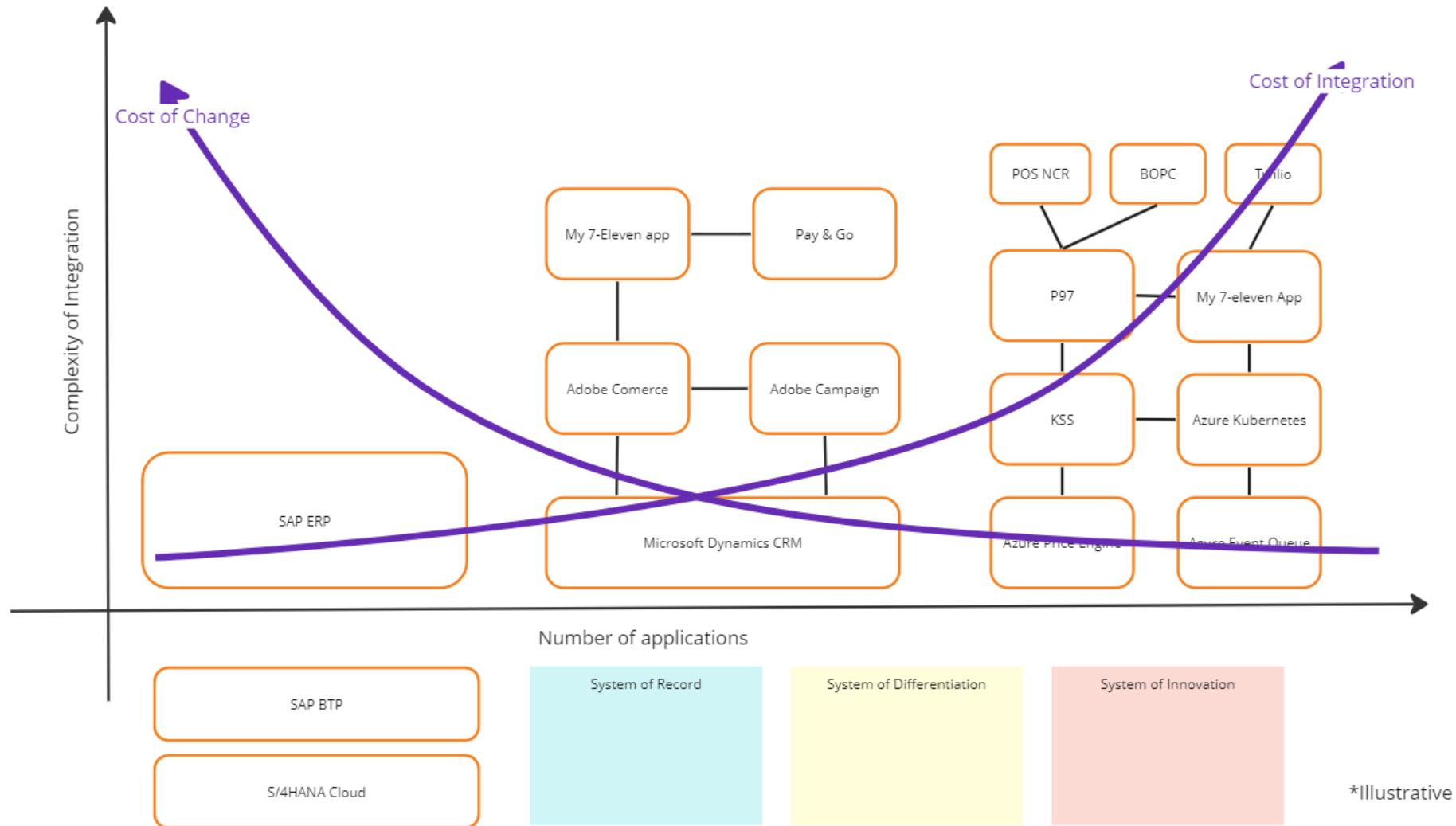


Integration Platform

SAP BTP Landscape & Governance

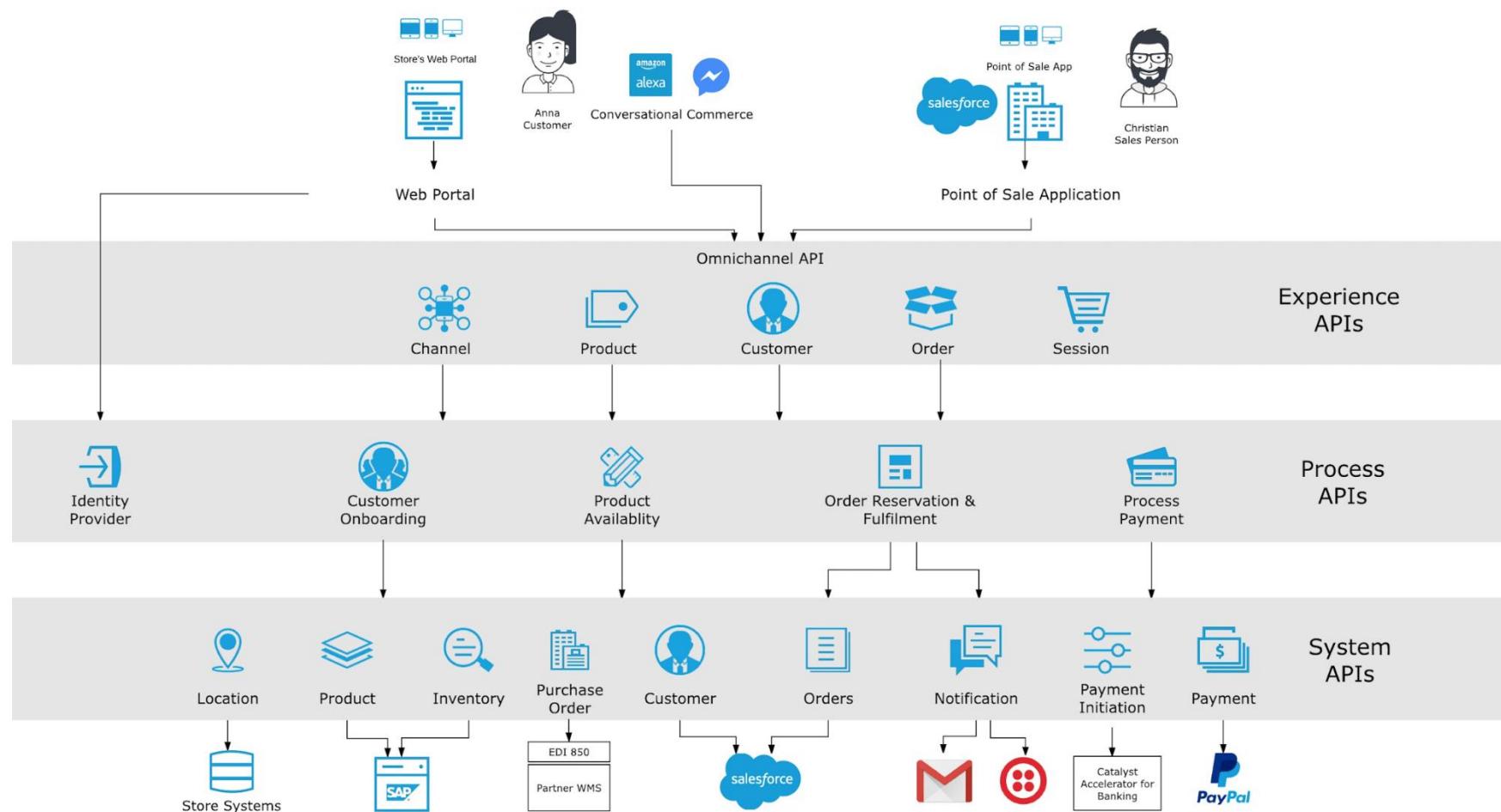


Pace-layered Architecture



source: [A Pace-Layered Integration Architecture \(deloitte.com.au\)](#)

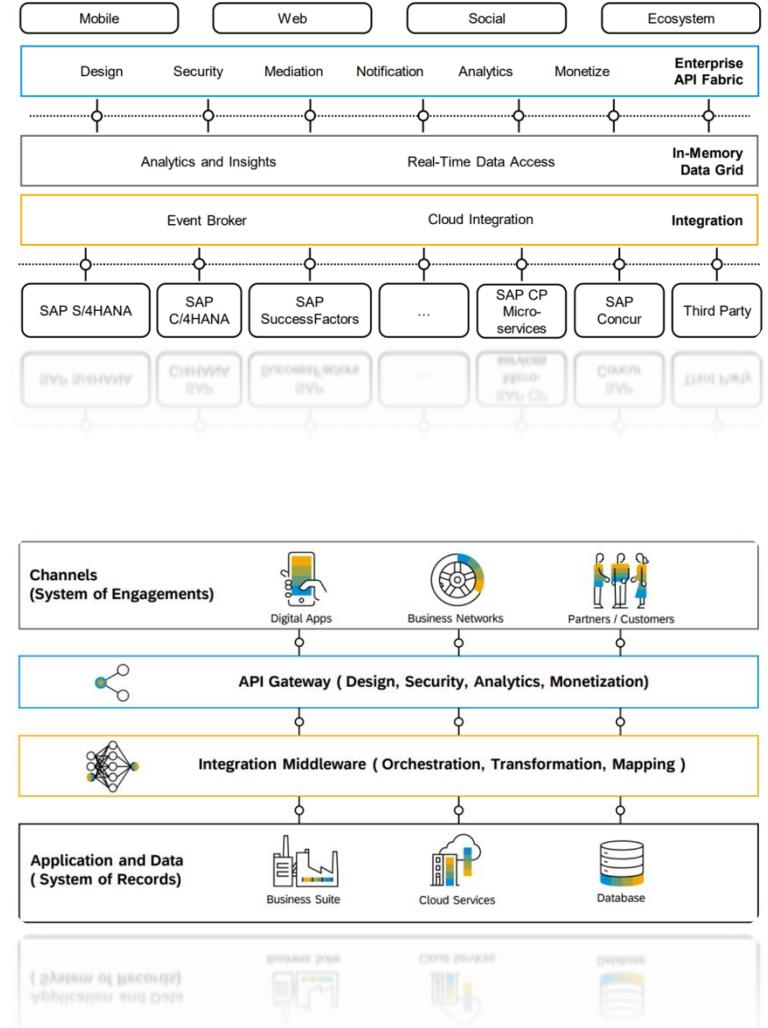
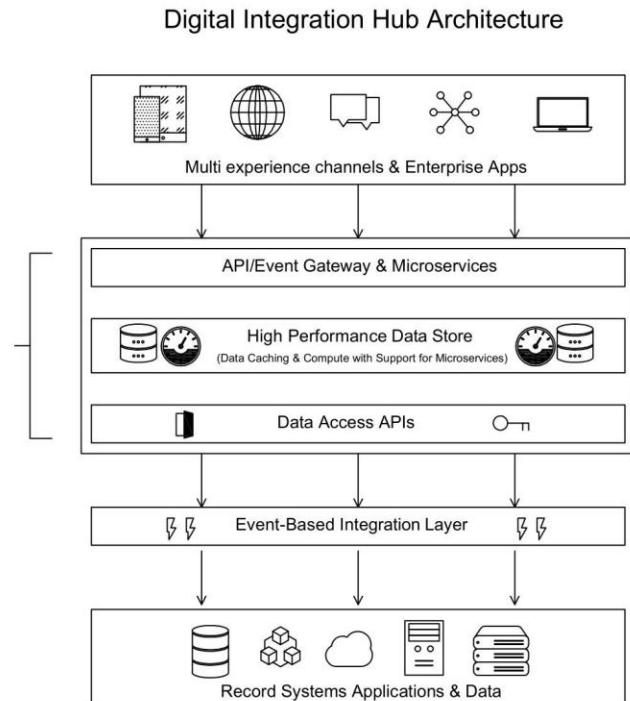
Salesforce MuleSoft Catalyst Accelerator for Retail



source: [Demo: Introducing Catalyst Accelerator for Retail | MuleSoft Blog](#)

API-based Integration Architecture

Headless Approach



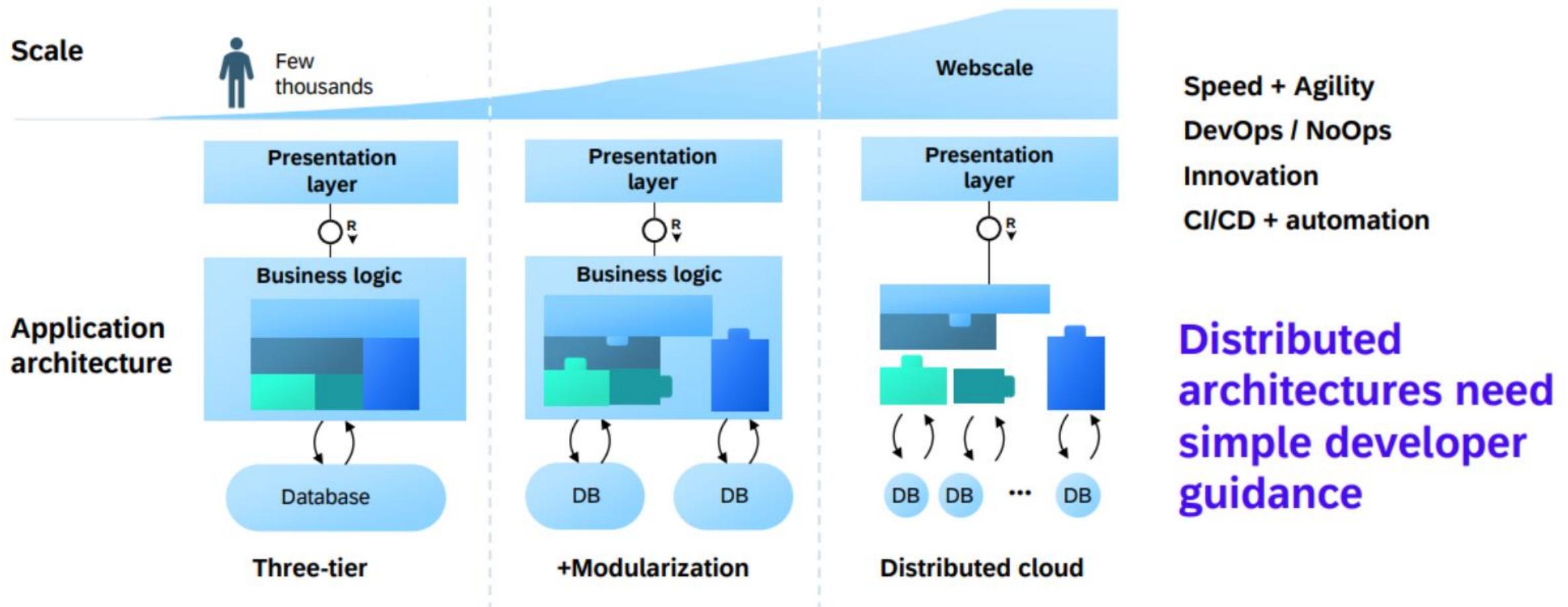
source: [It is not Cloud first or API first but Strategy first. API Management Strategy in Multicloud Environments | SAP Blogs](#)

source: [Understanding the API-First Approach to Building Products \(swagger.io\)](#)

source: [Digital Integration Hub \(gridgain.com\)](#)

Technology disruption: an architecture point-of-view

Guiding Developers to Implement Business Applications on



SAP's investment in integration

A history of continuous innovation

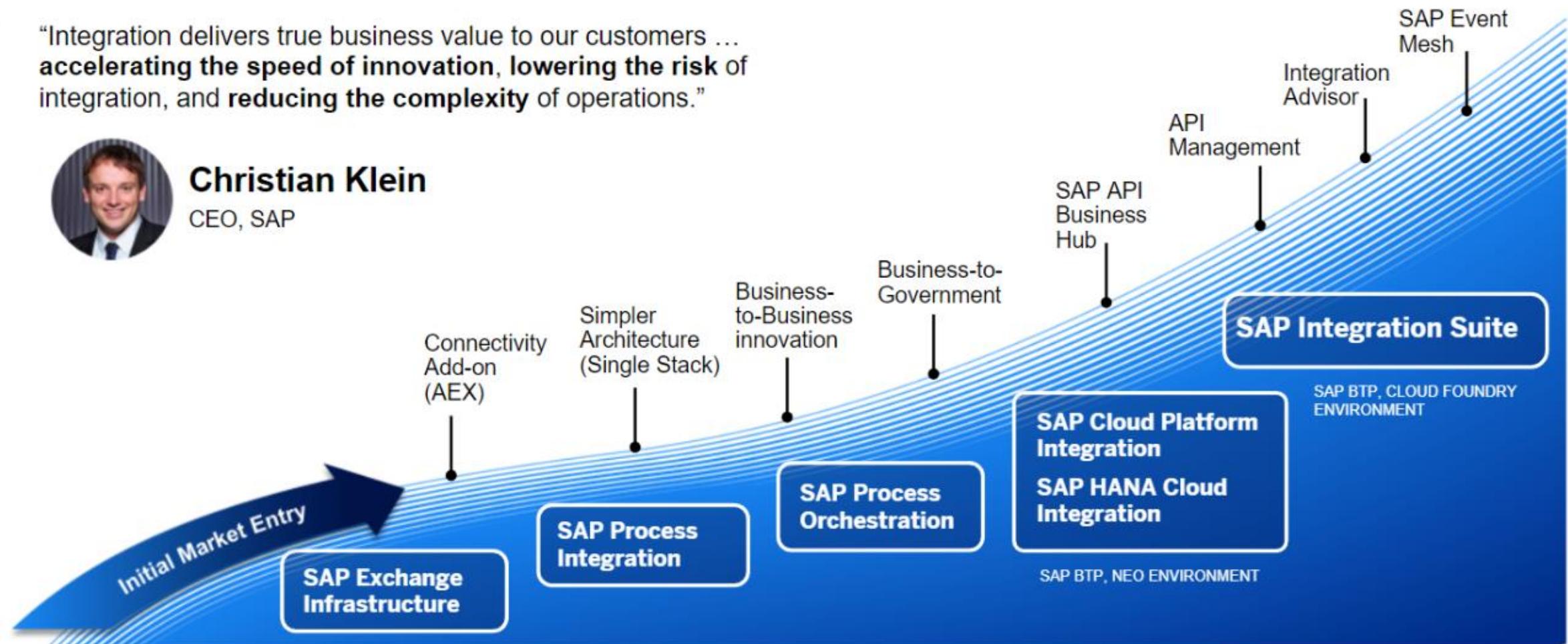
"Integration delivers true business value to our customers ... accelerating the speed of innovation, lowering the risk of integration, and reducing the complexity of operations."



Christian Klein

CEO, SAP

CUSTOMER VALUE

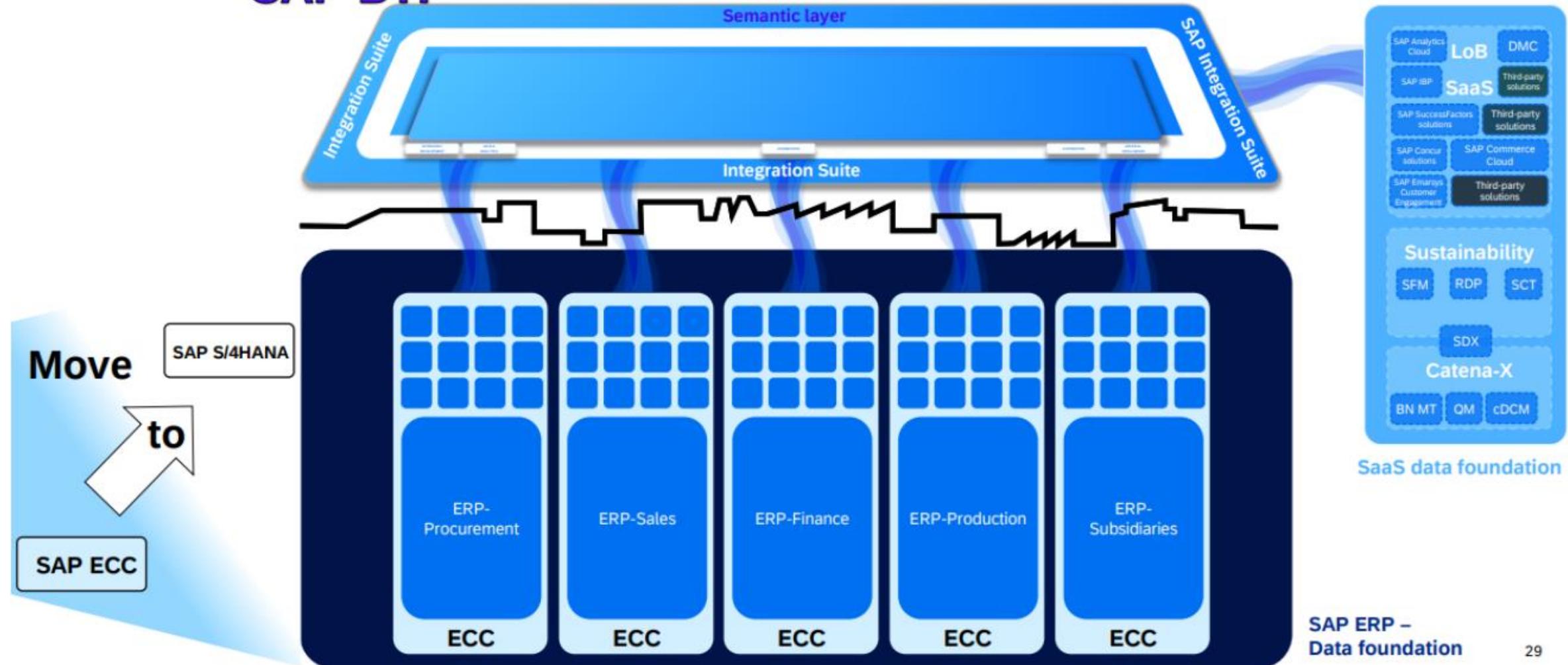


SAP's development strategy

The role of SAP Business Technology Platform

Back to
Standard

SAP BTP

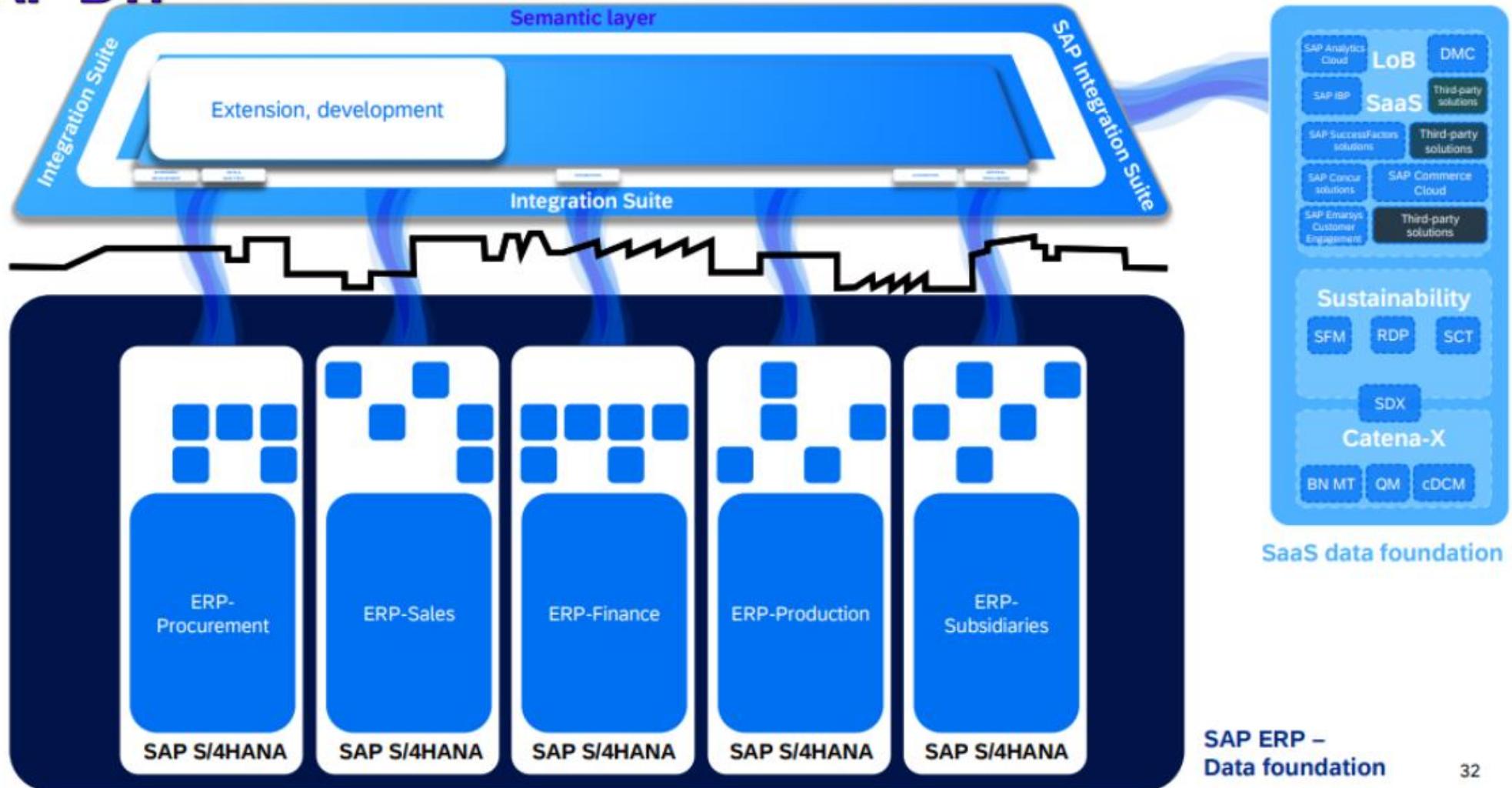


SAP's development strategy

The role of SAP Business Technology Platform

Keep the core clean!

SAP BTP



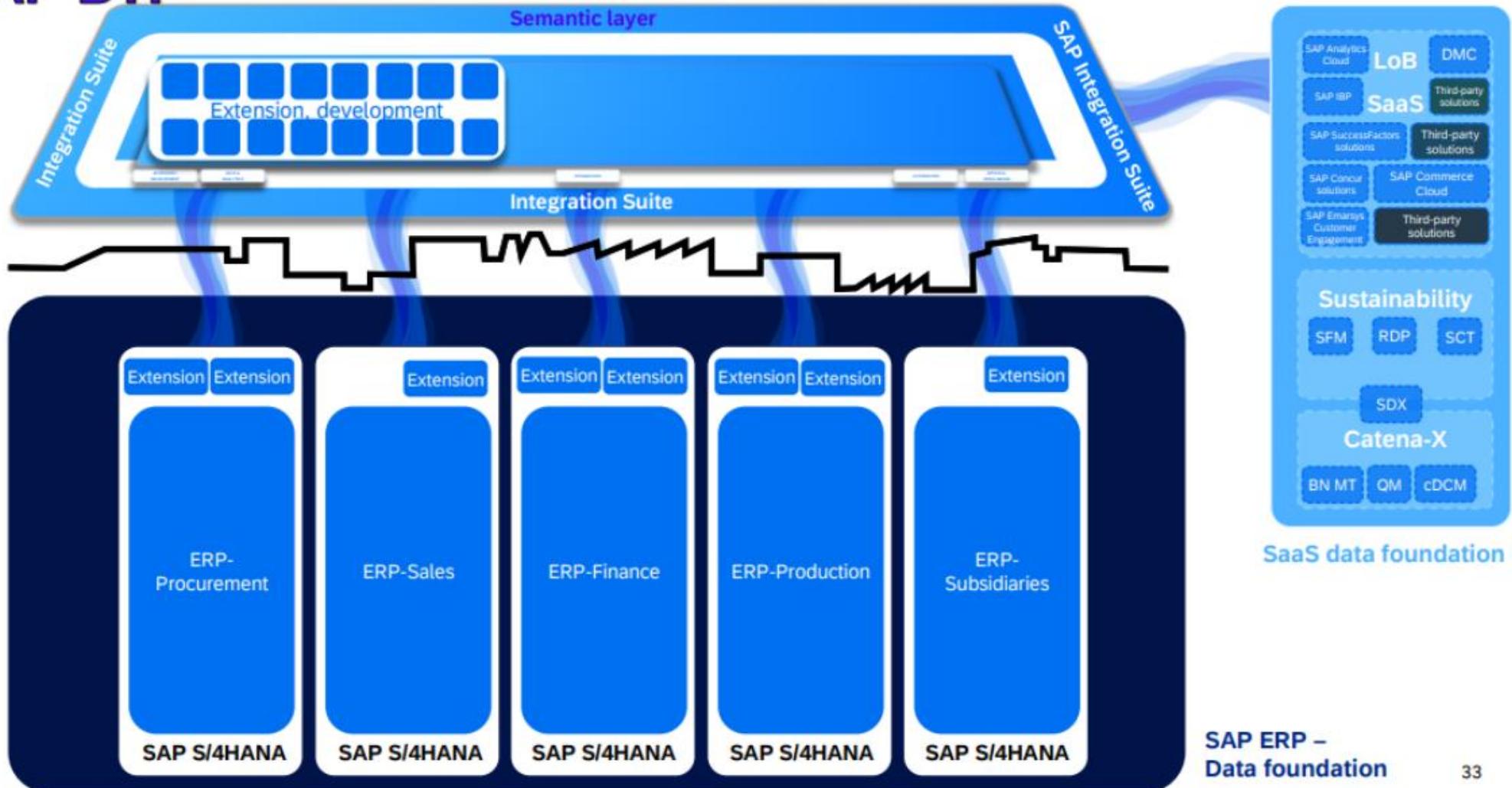
SAP ERP –
Data foundation

SAP's development strategy

The role of SAP Business Technology Platform

Keep the core clean!

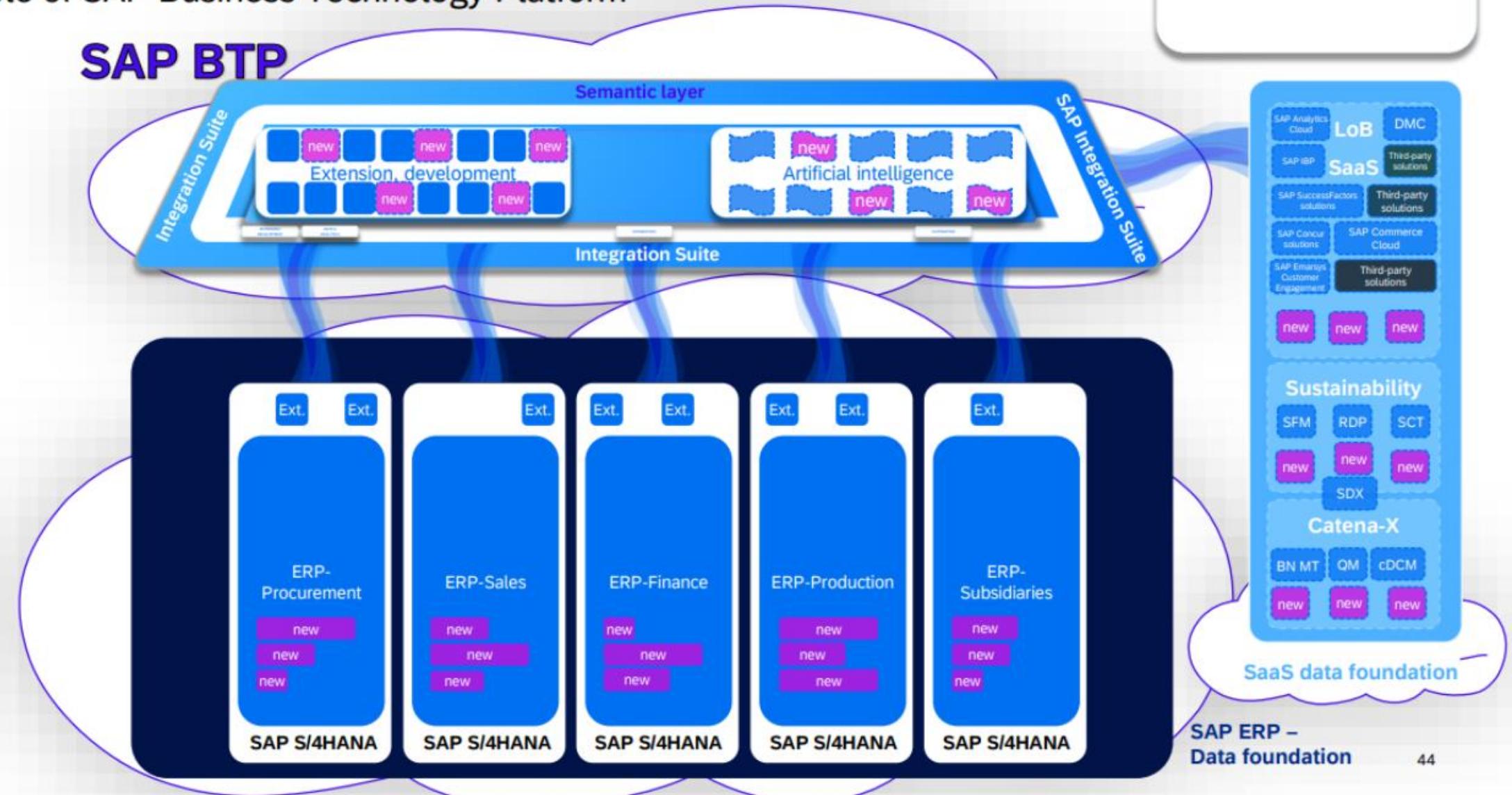
SAP BTP



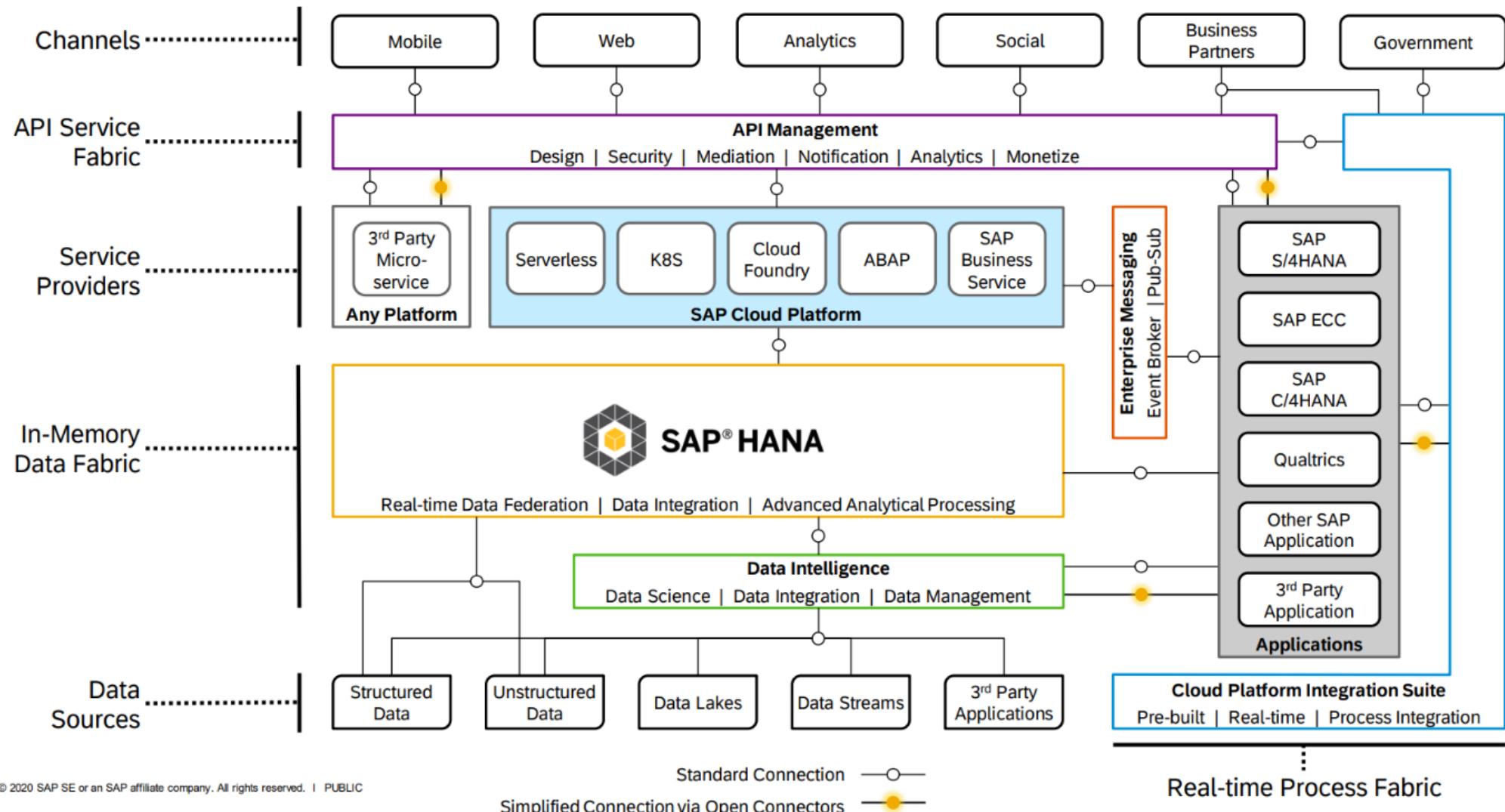
SAP's development strategy

The role of SAP Business Technology Platform

Cloud



Digital Integration Hub using SAP BTP



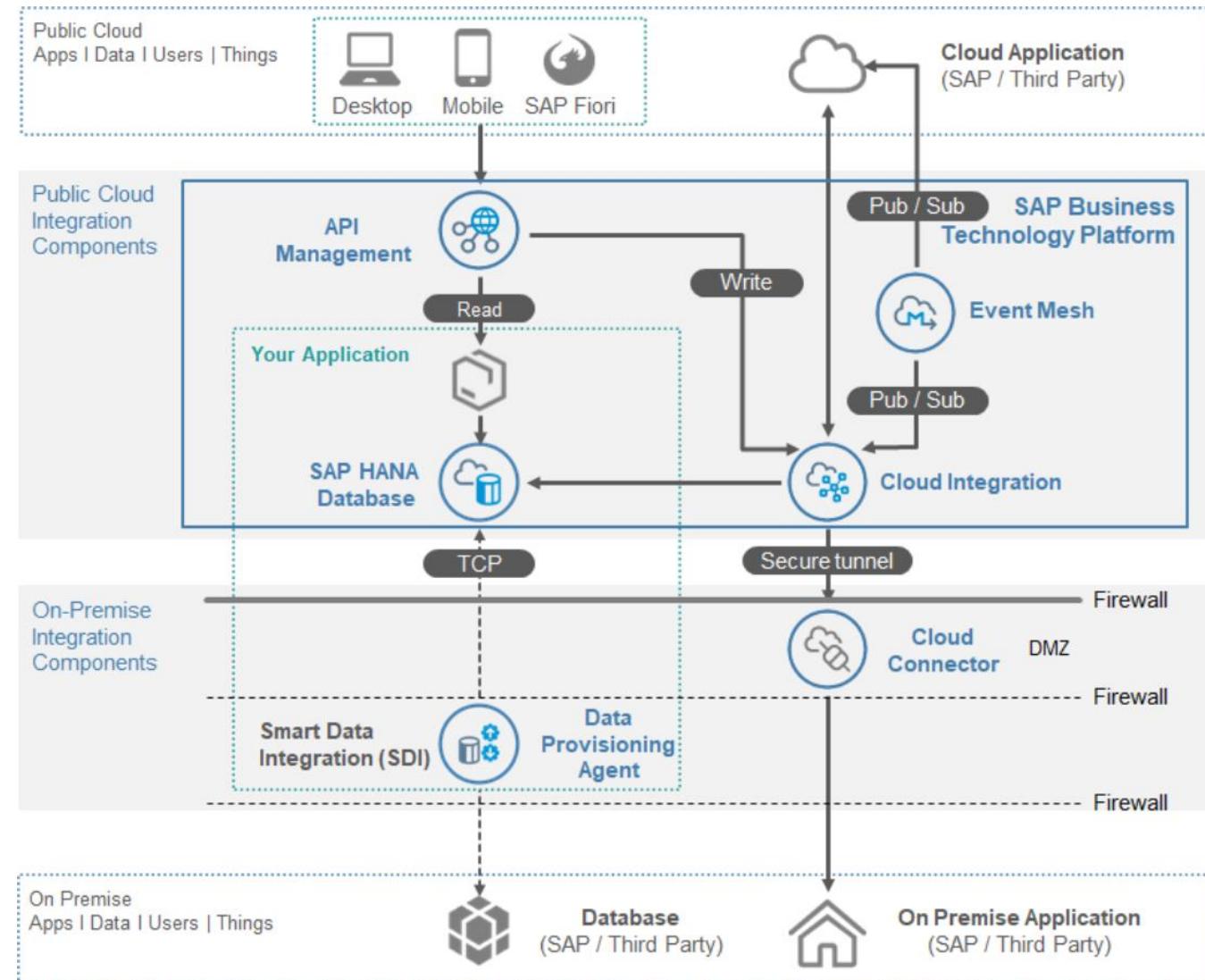
Digital Integration Hub: Cloud to On Premise and Cloud

Characteristics | Selection Criteria

- Need for a large-scale, high-throughput and low-latency front-end API services (e.g. for user interfaces)
- Need for responsive API access to data stored in business applications for large-scale/high performance scenarios
- For protecting back-end systems from excessive front-end APIs
- Decoupling of business application data sources from front-end API by introducing an in memory data store layer
- In memory layer aggregate and synchronises data with business applications by using event-based, request-based, and batch integration patterns

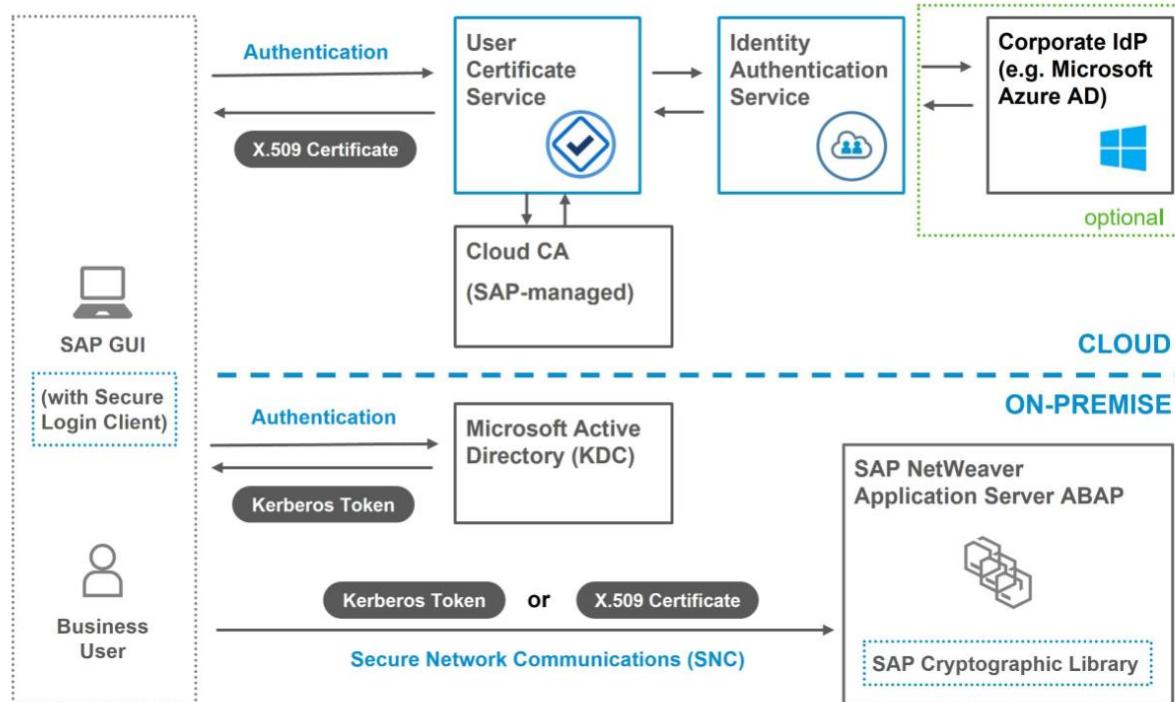
How to apply

- SAP HANA Database acts as a high-performance data store for caching the relevant subset of business data. Furthermore, it provides a single consolidated view of entities which is stored in one or multiple business applications (cloud / on premise) and databases.
- Cloud Integration integrates apps (SAP/third party, cloud/on premise) with SAP HANA database and keeps the data in sync.
- Open Connectors for simplified integration of third party cloud applications.
- SAP HANA Smart Data Integration is needed when integrating data from databases with the SAP HANA and to keep the data in sync.
- SAP Event Mesh acts as an event broker for a loosely coupled event based integration between business applications. These publish their events to Event Mesh. Cloud Integration capability is the subscriber of these events and sends the data to the SAP HANA database for update.
- API Management enables a low-latency frontend API service connecting to SAP HANA database for read queries. Update calls can be performed directly on the business applications.



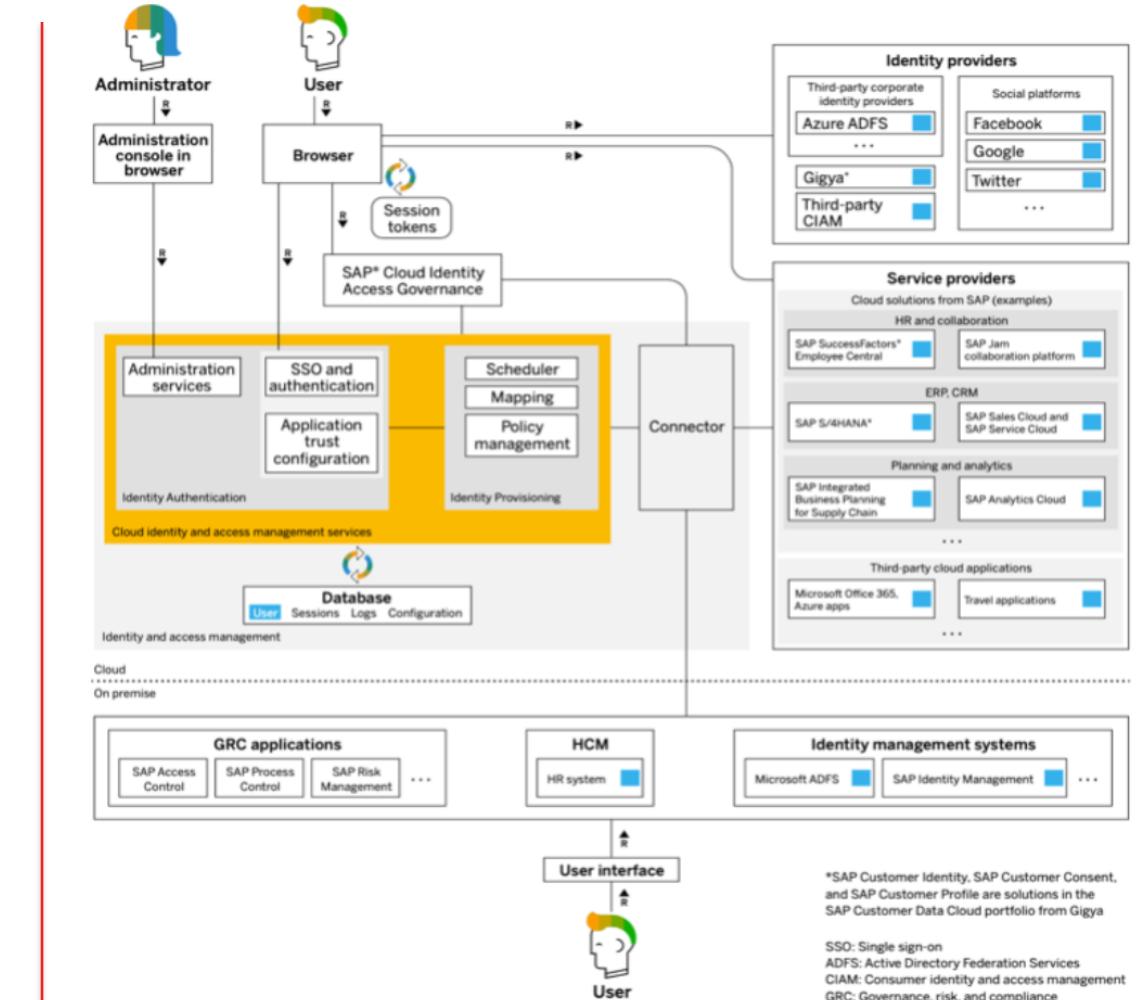
Reference Architecture of SAP Cloud Identity Services

SAP Secure Login Service for SAP GUI: Architecture overview



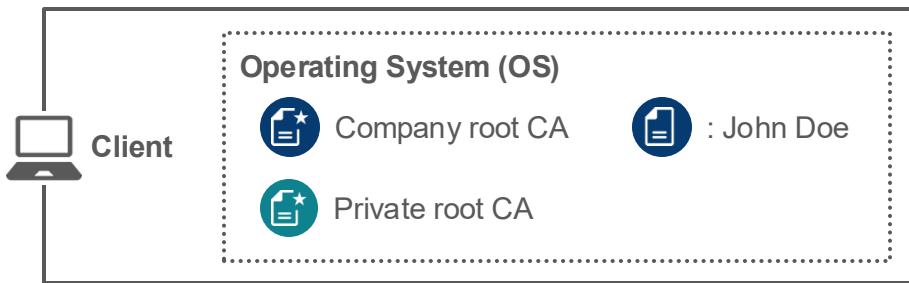
source: [SAP Secure Login Service for SAP GUI Now Available | SAP Blogs](#)

source: [Exploring SAP Secure Login Service for SAP GUI: A Comprehensive Review | SAP Blogs](#)

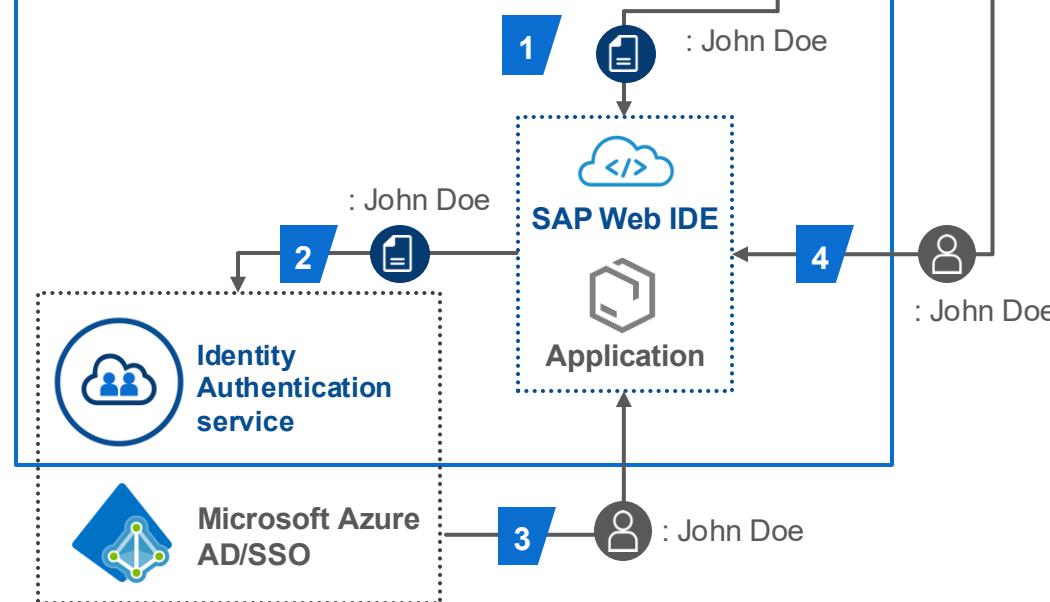


Principal Propagation on SAP Business Technology Platform

INTERNET

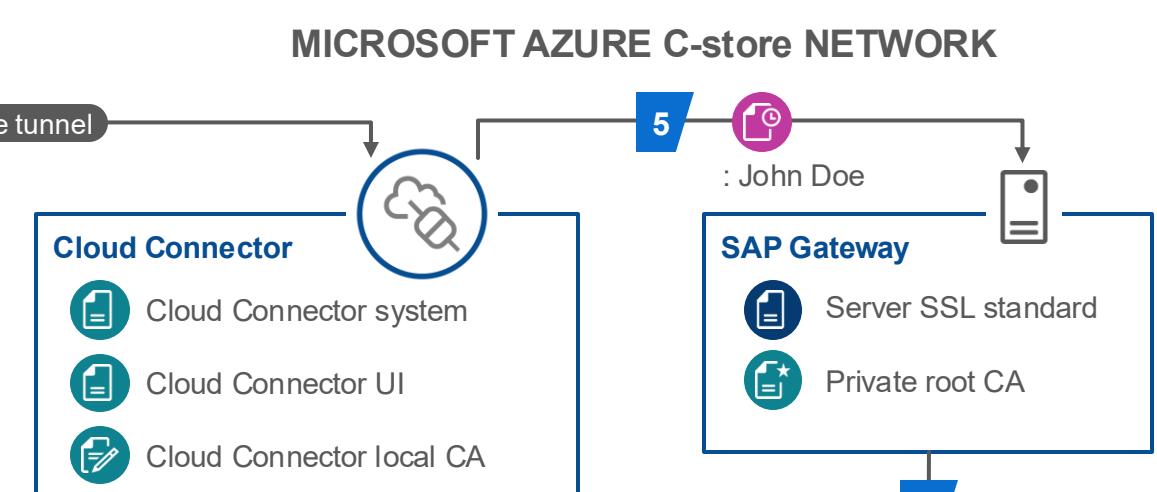


SAP Business Technology Platform



Firewall

MICROSOFT AZURE C-store NETWORK



Operating System (OS)

- Company Root CA
- Private Root CA

LEGEND

- Certificate signed by the Cloud Connector local CA*
- Certificate signed by the private root CA*
- Certificate signed by the company root CA*

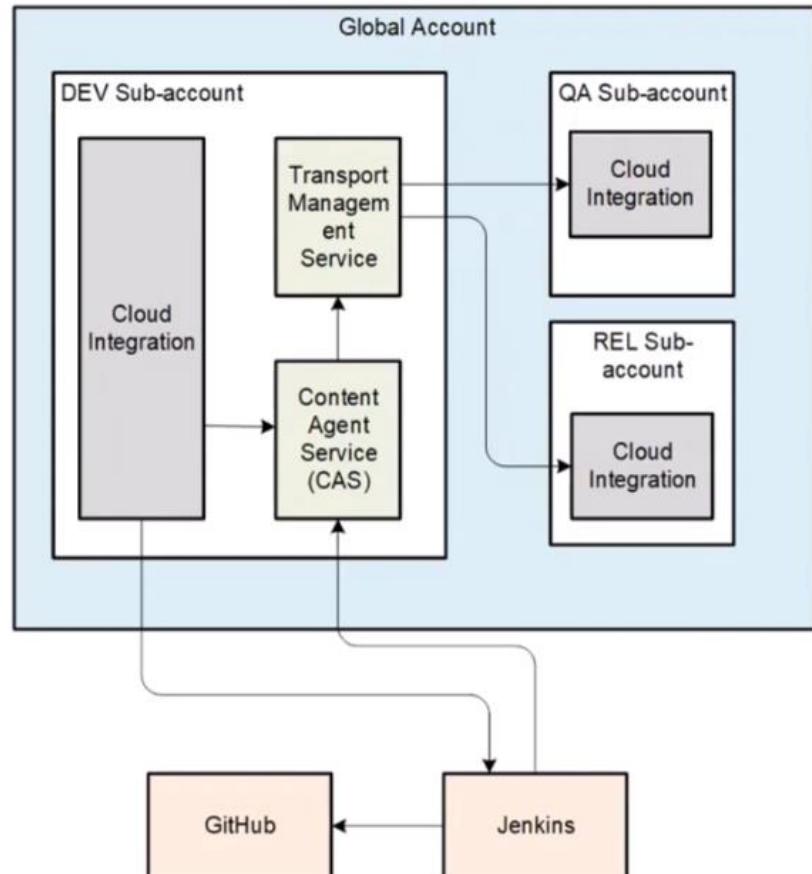
- Certificate
- Root certificate
- Intermediate or CA* certificate
- Short-lived certificate

- Identity from the Identity Provider
- Identity from the SAP system

*CA: certificate authority

SAP CI/CD Reference Architecture

SAP CI/CD for SAP Integration Suite (Project Piper)

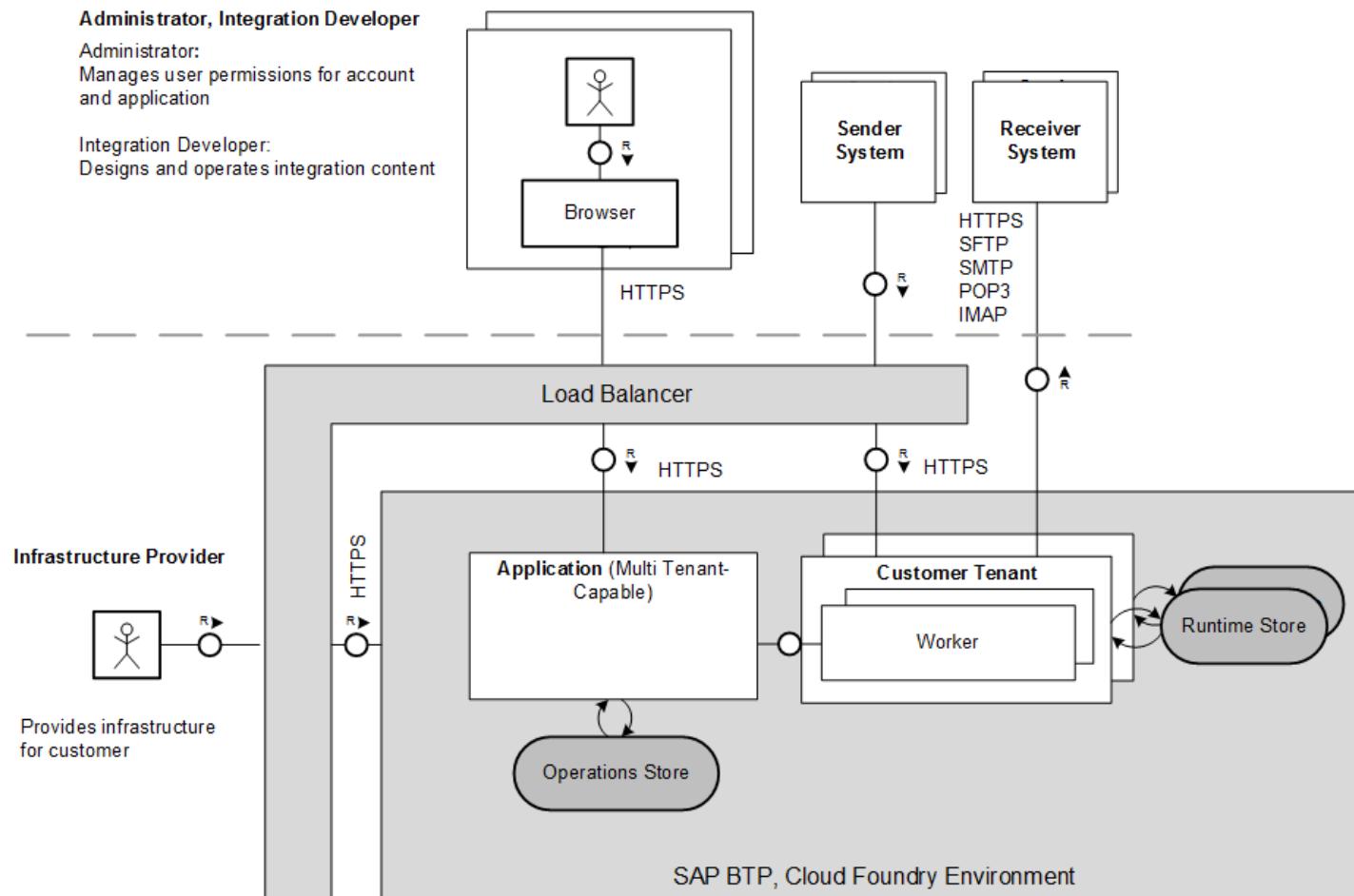


Process flow is the following:

1. Developer creates/modifies CI content
2. Before transport it to QA, a pull request in GitHub will be created
3. Code review and static code checks executed on GitHub
4. If approved, CI content will be transported to QA with TMS initiated by Jenkins for testing
5. Once development and testing are ready, content will be transported to REL to release for customers

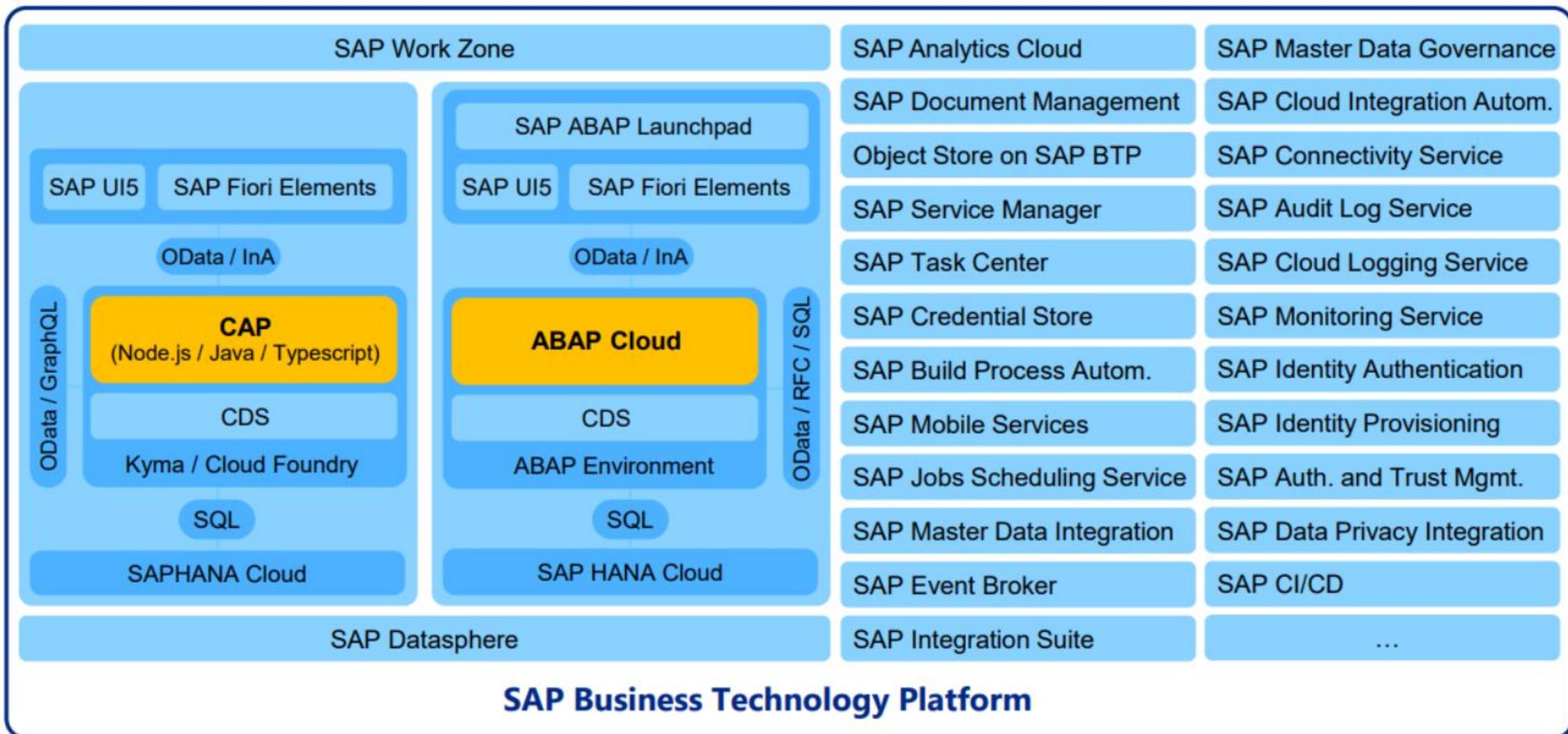
Cloud Integration Capability of SAP Integration Suite

Bird's eyes view on the technical architecture

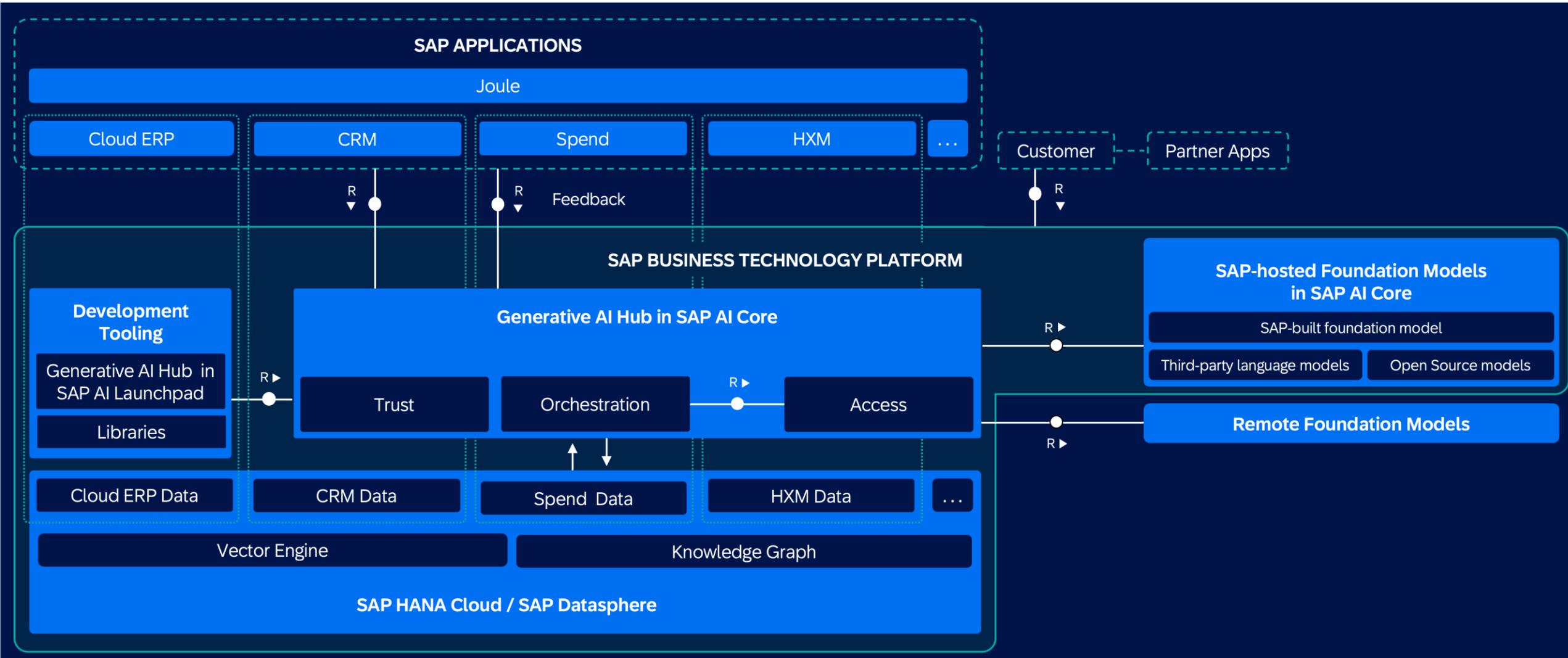


source: [Technical Landscape, Cloud Foundry Environment | SAP Help Portal](#)

SAP Business Technology Platform Services



SAP's Architecture for Generative AI



SAP Business Application Studio vs. SAP Web IDE

	SAP Business Application Studio	SAP Web IDE Full Stack
Available on	SAP BTP, Cloud Foundry environment	SAP BTP, Neo environment
Deployment target	SAP BTP, Cloud Foundry environment, on-premise ABAP, SAP HANA Cloud SAP BTP, ABAP environment, SAP S/4HANA Cloud	SAP BTP, Cloud Foundry environment, on-premise ABAP, SAP HANA Cloud SAP BTP Neo environment
Solution	Instantly spin-up pre-packaged isolated environments/Dev-spaces ("virtual machine on the cloud") with tools and runtimes, tailored per business scenario which provide more control over the environment . Create custom dev space for a team of developers*	Generic workspace that contains many tools. Some tools are not necessarily required for the target business scenario
Experience	Embraces VS Code experience , provides the ability to add custom extensions Desktop like experience in the cloud including local test, run & debug, terminal (CLI) access & superior code editors	SAP proprietary experience Browser based experience
Support for various personas	<ul style="list-style-type: none"> Better support for cloud & full stack developers with improved code editors for Java and Node.js Web/mobile developers Additional personas can be supported with a suited experience per persona 	<ul style="list-style-type: none"> Cloud and full stack developers – partial Web/mobile developers Similar experience for all personas
Open Source & standards	Based on open source & leading industry standards Provides possibility to quickly integrate capabilities and technologies that exist in the market	Uses open sources but majority is proprietary SAP proprietary framework with limited number of extensions

* Future Innovation This is the current state of planning and may be changed by SAP at any time.

SAP Data and Analytics Advisory Methodology

Technical Use Cases

Data Management

- Data Warehouse
- Data Fabric
- Data Mesh
- Data Lake

Data Governance

- Data (Product) Catalog
- Master Data Mgmt.
- Data Quality Mgmt.

Data Integration¹

Business Use Cases

Business Planning & Forecasting

- Strategic Planning
- Financial Planning (FPA)
- Ext. Planning & Analysis
- Workforce Planning
- Enterprise Planning
- Supply Chain Planning

Business Insight & Decision Support

- Dashboards
- Operational Perf. Mgmt
- Self-service reporting
- Analytical Apps
- Pixel-perfect report
- Cell-based Reporting

Predictive Analytics

- Simulation
- Automatic forecasting
- Bring Your Own ML Model
- Federated Machine Learning
- Predictive Maintenance
- ...

Data-driven Market Offerings

- Smart Services
- Smart Products
- Data Monetization
- ...

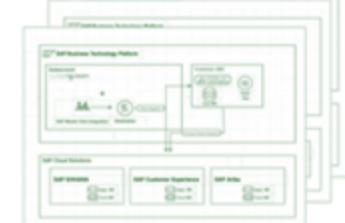
...

Legend:

- Use Case Categories
- Use case Patterns

1

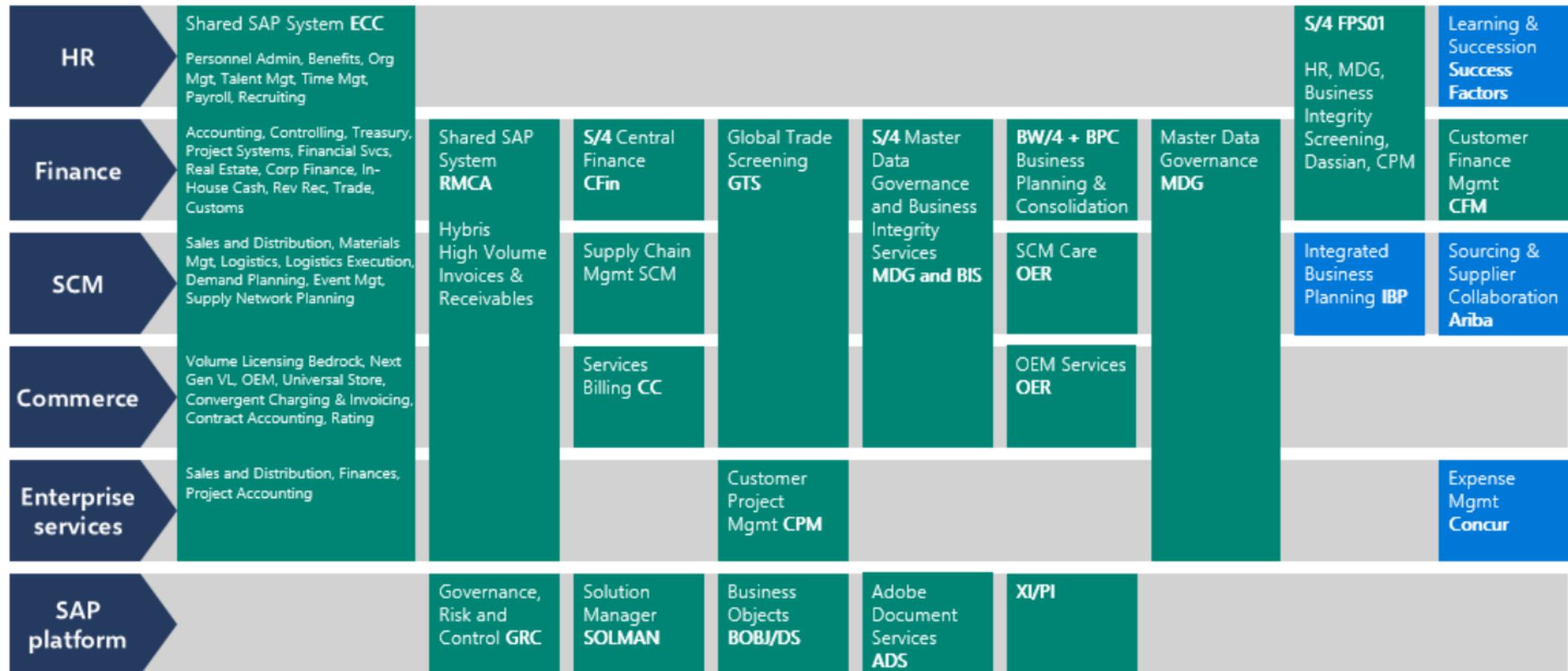
1..n



Reference Architectures

Microsoft's SAP Environment on Microsoft Azure

At Microsoft, we develop and host all new SAP infrastructure and systems on Microsoft Azure. We're using Azure-based cloud infrastructure and SAP-native software as a service (SaaS) solutions to increase our architecture's efficiency and to grow our environment with our business. The following graphic represents our SAP landscape on Azure.



source: [Monitoring Microsoft's SAP Workload with Microsoft Azure](#)

Azure

SAP SaaS

Integration Patterns

Peer-to-Peer
The Peer-to-Peer pattern involves direct communication between two components without the need for a central coordinator.

API Gateway
An API Gateway acts as a single entry point for all client requests to the backend services of an application.

Pub-Sub
The Pub-Sub pattern decouples the producers of messages (publishers) from the consumers of messages (subscribers) through a message broker.

Request-Response
This is one of the most fundamental integration patterns, where a client sends a request to a server and waits for a response.

Event Sourcing
Event Sourcing involves storing the state changes of an application as a sequence of events.

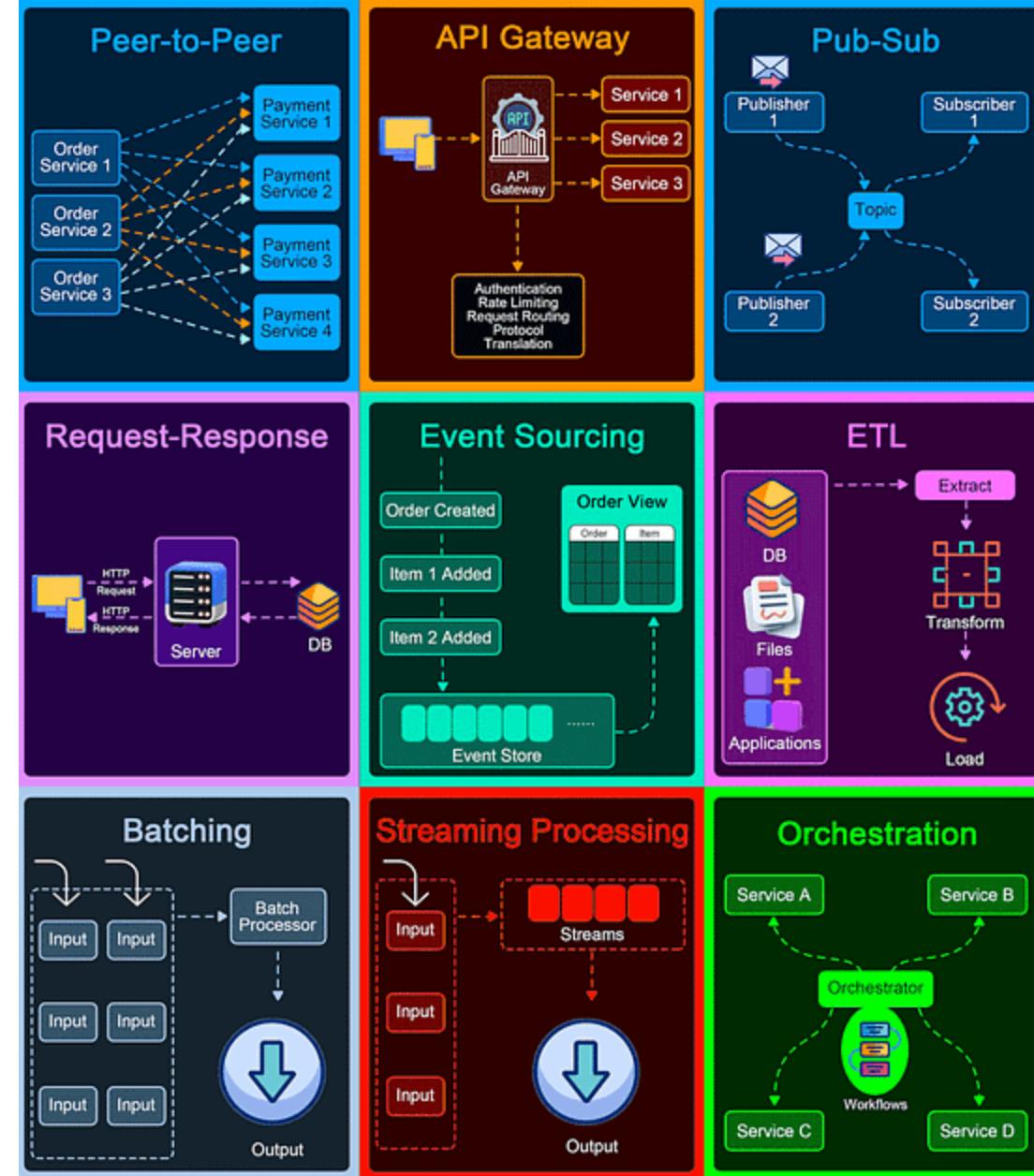
ETL
ETL is a data integration pattern used to gather data from multiple sources, transform it into a structured format, and load it into a destination database.

Batching
Batching involves accumulating data over a period or until a certain threshold is met before processing it as a single group.

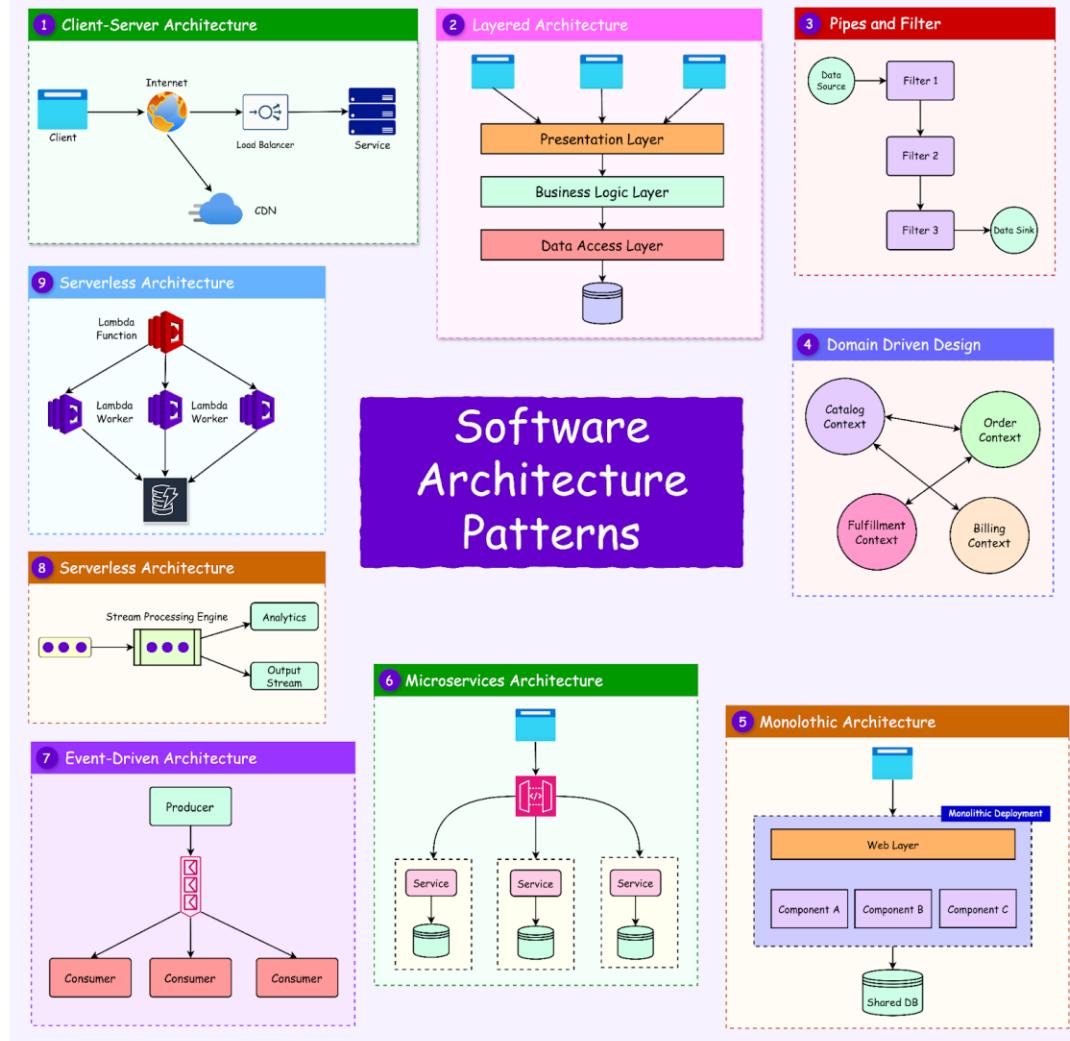
Streaming Processing
Streaming Processing allows for the continuous ingestion, processing, and analysis of data streams in real-time.

Orchestration
Orchestration involves a central coordinator (an orchestrator) managing the interactions between distributed components or services to achieve a workflow or business process.

Top 9 System Integrations



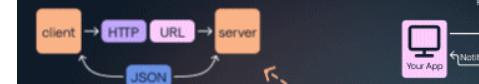
Architecture Patterns and API Protocols



API Protocols

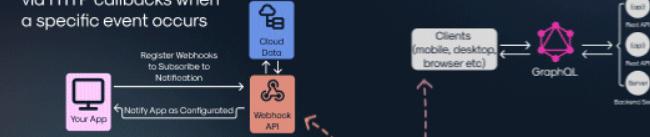
REST

REST is an architectural style for designing networked applications, using stateless communication and standard HTTP methods



Webhooks

A webhook is a mechanism for one system to notify another system in real-time via HTTP callbacks when a specific event occurs



GraphQL

GraphQL is a query language for APIs that allows clients to request only the data they need



SOAP

SOAP is a protocol for exchanging structured information using XML



WebSockets

WebSockets provide a full-duplex communication channel over a single, long-lived connection, allowing for real-time data exchange



REST

API TECNOLOGIES

Webhooks

GraphQL

SOAP

gRPC

WebSockets

SSE

MQTT

AMQP

IoT Data

EDA

Event-Driven Architecture (EDA) is a trending software architecture pattern nowadays



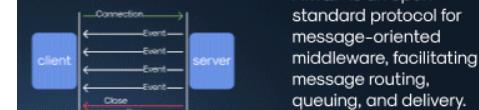
EDI

EDI (Electronic Data Interchange) is a set of standards for exchanging structured business data between organizations electronically without human intervention.



SSE

SSE (Server-Sent Events) is a simple and efficient standard for server-push notifications over an HTTP connection



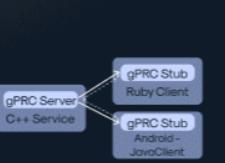
AMQP

AMQP is an open-standard protocol for message-oriented middleware, facilitating message routing, queuing, and delivery.



gRPC

gRPC is a high-performance, open-source framework for RPCs using Protocol Buffers



Cloud Azure Messaging Patterns

Asynchronous Request-Reply
This pattern aims at providing determinism for long-running backend tasks. It decouples backend processing from frontend clients.

In the diagram below, the client makes a synchronous call to the API, triggering a long-running operation on the backend. The API returns an HTTP 202 (Accepted) status code, acknowledging that the request has been received for processing.

Publisher-Subscriber

This pattern targets decoupling senders from consumers, and avoiding blocking the sender to wait for a response.

Claim Check
This pattern solves the transmission of large messages. It stores the whole message payload into a database and transmits only the reference to the message, which will be used later to retrieve the payload from the database.

Priority Queue

This pattern prioritizes requests sent to services so that requests with a higher priority are received and processed more quickly than those with a lower priority.

Saga
Saga is used to manage data consistency across multiple services in distributed systems, especially in microservices architectures where each service manages its own database. The saga pattern addresses the challenge of maintaining data consistency without relying on distributed transactions, which are difficult to scale and can negatively impact system performance.

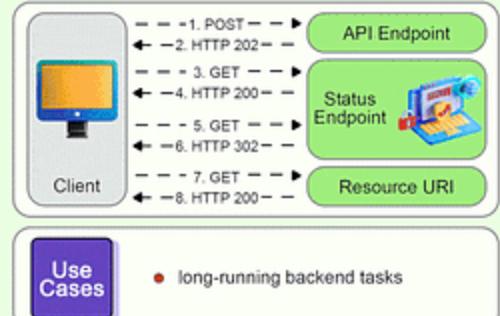
Competing Consumers

This pattern enables multiple concurrent consumers to process messages received on the same messaging channel. There is no need to configure complex coordination between the consumers. However, this pattern cannot guarantee message ordering.

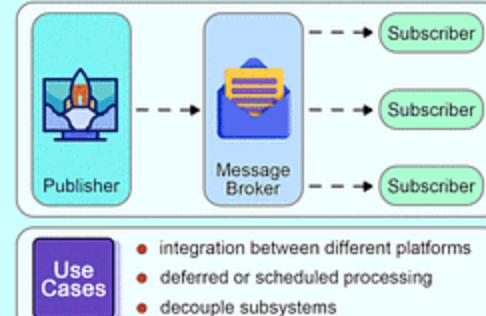
Top 6 Cloud Messaging Patterns



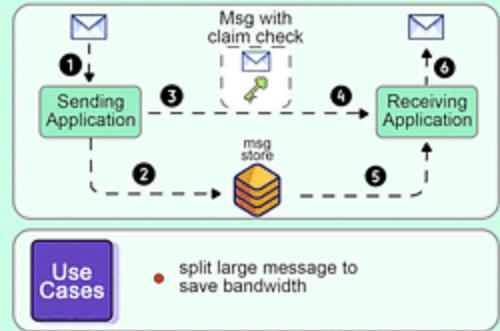
Async Request-Reply



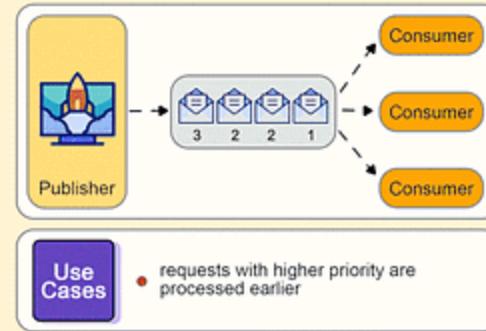
Publisher-Subscriber



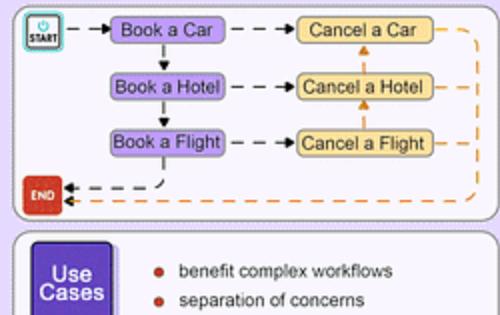
Claim Check



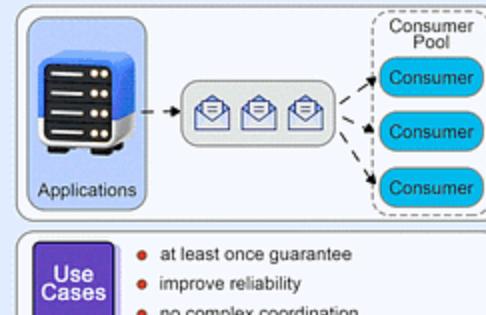
Priority Queue



Saga



Competing Consumers

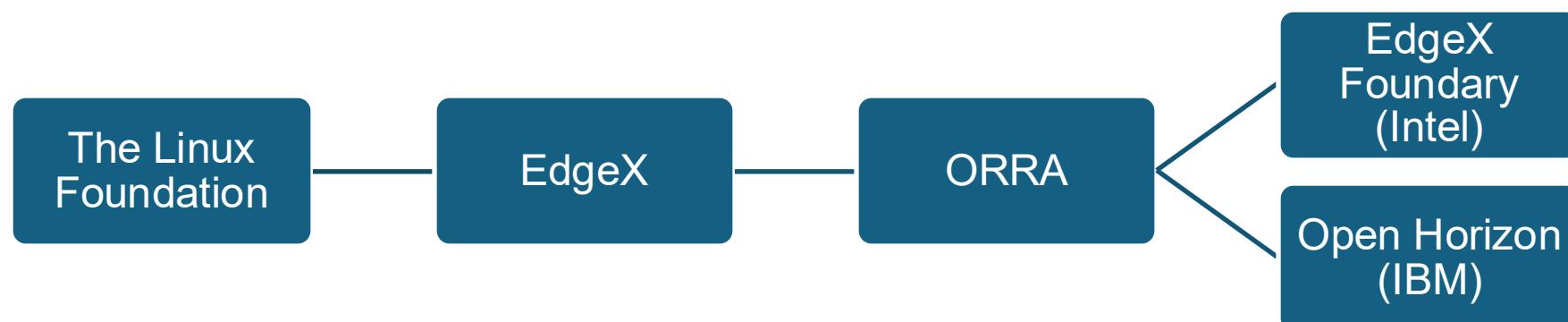


Open-Source Edge Platform

Digital transformation in the retail industry is accelerating. It's no longer enough for retailers to have an on-line presence. Retail's next wave is powering innovative in-store experiences. New ways of enabling store safety, facilities and equipment maintenance, custom and personalized services, inventory management and replenishment, digital signage and electronic pricing labels, and advanced forms of self- and automated-checkout all require increasing digital capabilities.

And, more often, these capabilities need to be created and performed in the store and at the edge. In-store AI, analytics, or process automation becomes increasingly important. Local processing is critical to ensure consistent and real-time interactions, reduce the overhead of transmitting large amounts of contextual data to the cloud, including removing potentially sensitive and private information from that data; and enable business continuity in the event of network outages. All these capabilities require in-store (and within device) compute resources to deliver a modern store experience. Whether powering POS terminals, information kiosks, digital signs, intelligent cameras and other sensors, automated refrigeration, stock handling, and even intelligent shopping carts, innovation will continue to grow in the years ahead.

These innovations reveal a critical gap in existing retail store infrastructure. What's needed is a platform for retail industry vendors to work together and deliver solutions with unique value that share a common infrastructure. To respect the limited footprint and cost constraints of a typical retail outlet, solutions must be easy to integrate, leverage common security practices, and offer a consistent approach to support and service. In short, the industry needs a framework that supports a collective and coherent ecosystem.

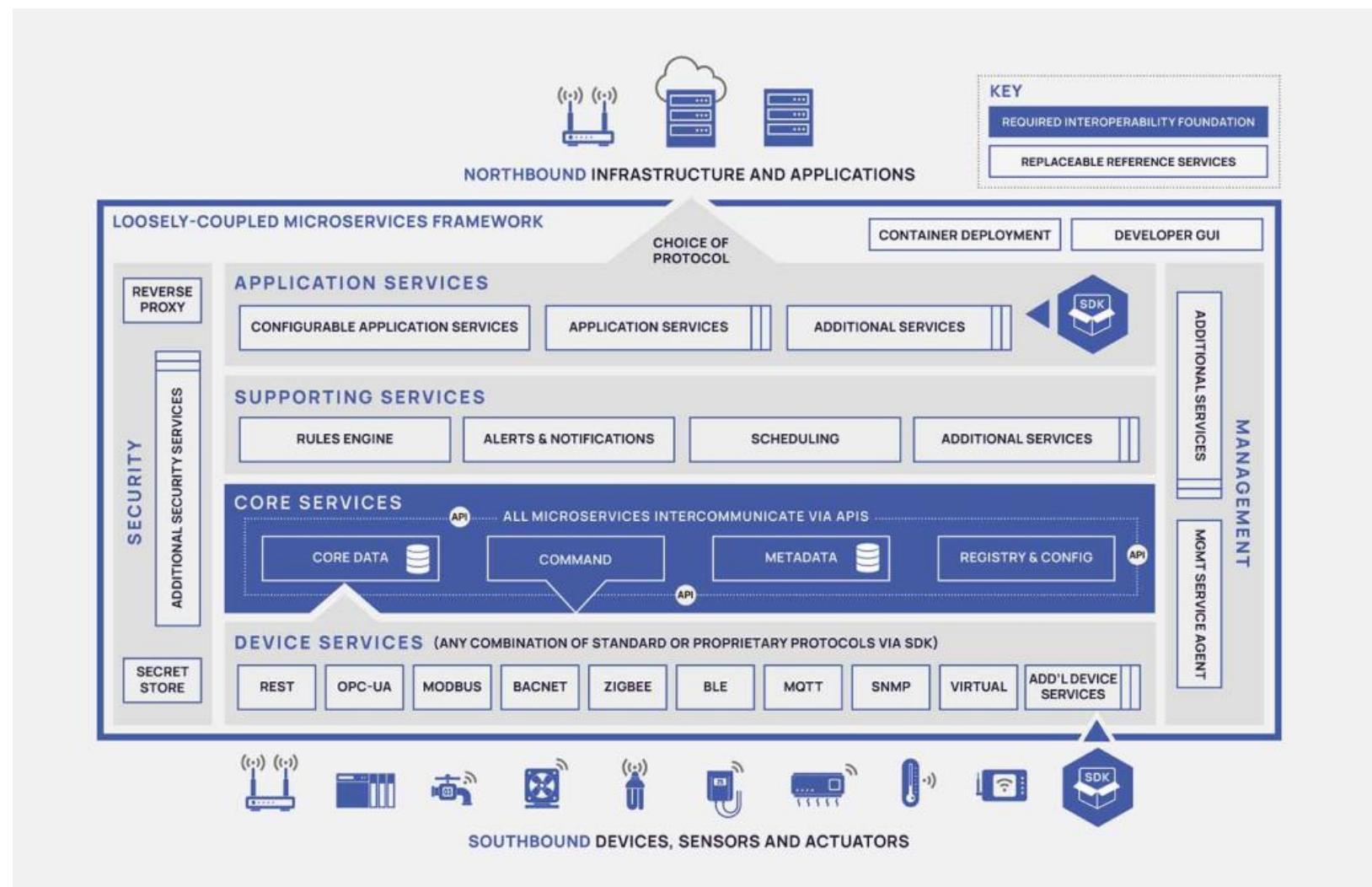


source: [EdgeX Foundry – LF EDGE: Building an Open Source Framework for the Edge..](#)

Open-Source Edge Platform

The layers and services of EdgeX Foundry provide a two-way transformation engine between edge devices/nodes and cloud/enterprise applications.

EdgeX translates and transforms the information coming from sensors and devices and delivers it to applications over network-based protocols in formats and structures that meet the needs of customers. It also takes data from applications and delivers it to the edge nodes/devices for updates, control and actuation. In this section you will find the main services available for the EdgeX loosely couple microservices architecture.



source: [EdgeX Foundry – LF EDGE: Building an Open Source Framework for the Edge](#).

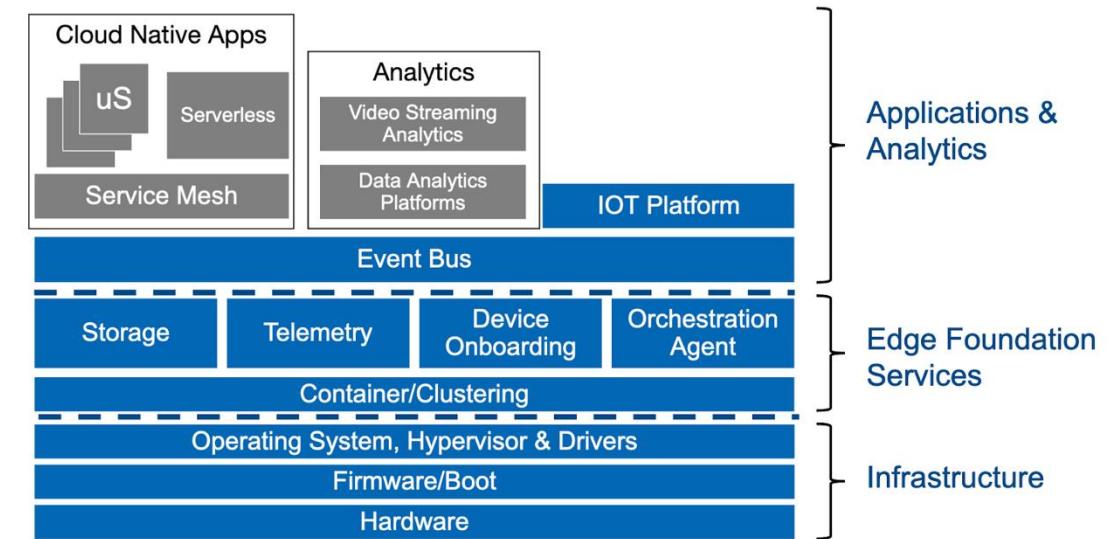
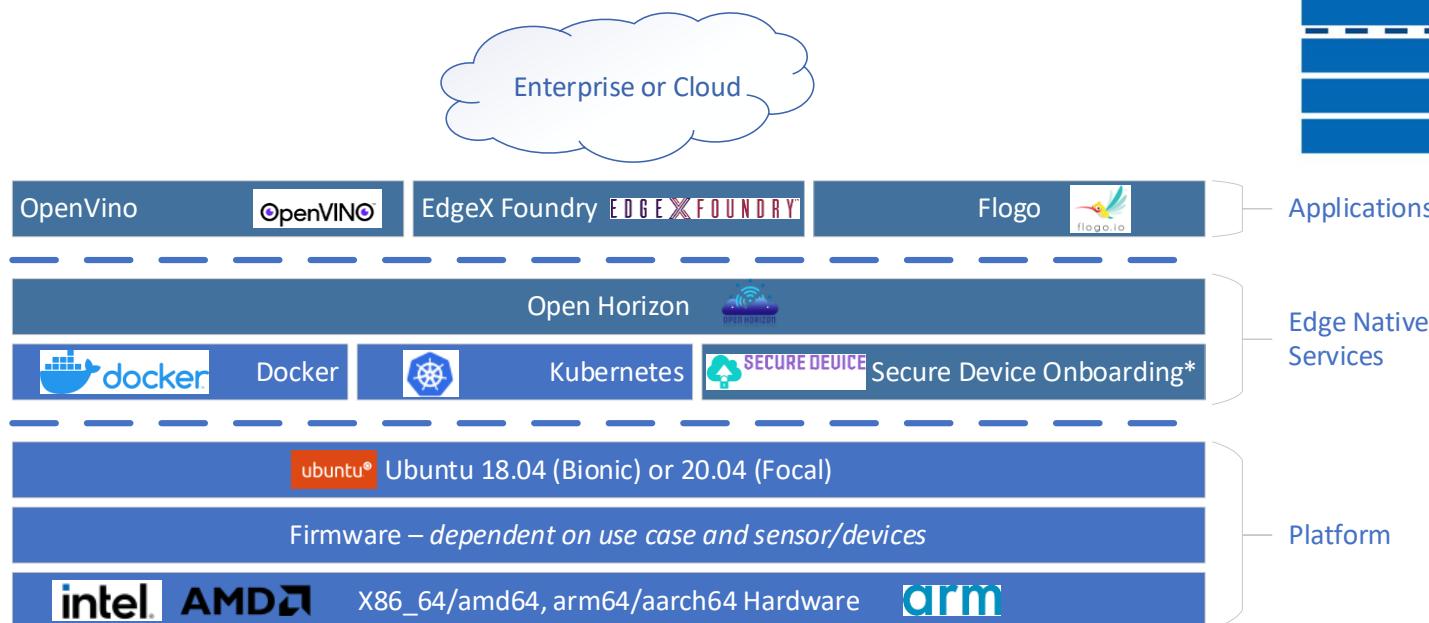
ORRA Overview - Retail Store Topology Architecture

Key Features

- Open Source technologies
- Microservices event-driven architecture
- Cloud agnostic
- Highly extensible
- Data pipelines to transport data
- Respond to IoT events in real time

Key Benefits

- Ownership of IoT data
- Scalability at the Edge - deploy as many services as needed
- Higher levels of automation
- Faster deployments
- Cost competitive
- Co-development support



Retail Edge Ecosystem Components (Server / Cluster / Gateway)

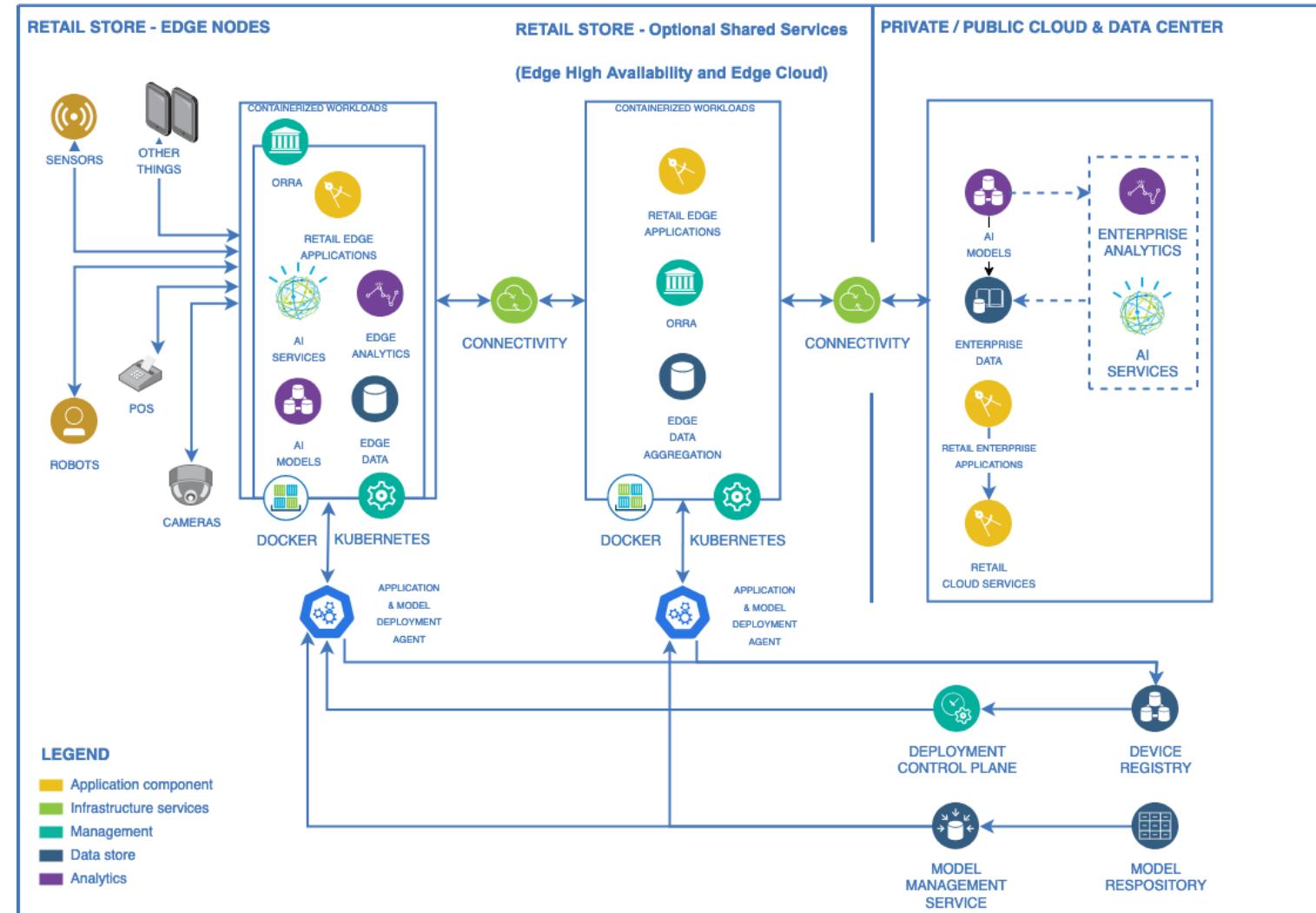
- Installation → Automated deployment of platform components and devices
- Configuration → Ability to configure edge services and merge and combine multiple pipelines
- ML Ops → edge analytics applications and inferencing of computer vision feeds

* Note: Secure Device Onboarding is now FIDO Device Onboarding specification

Open Retail Reference Architecture (ORRA)

"Definition of Done"

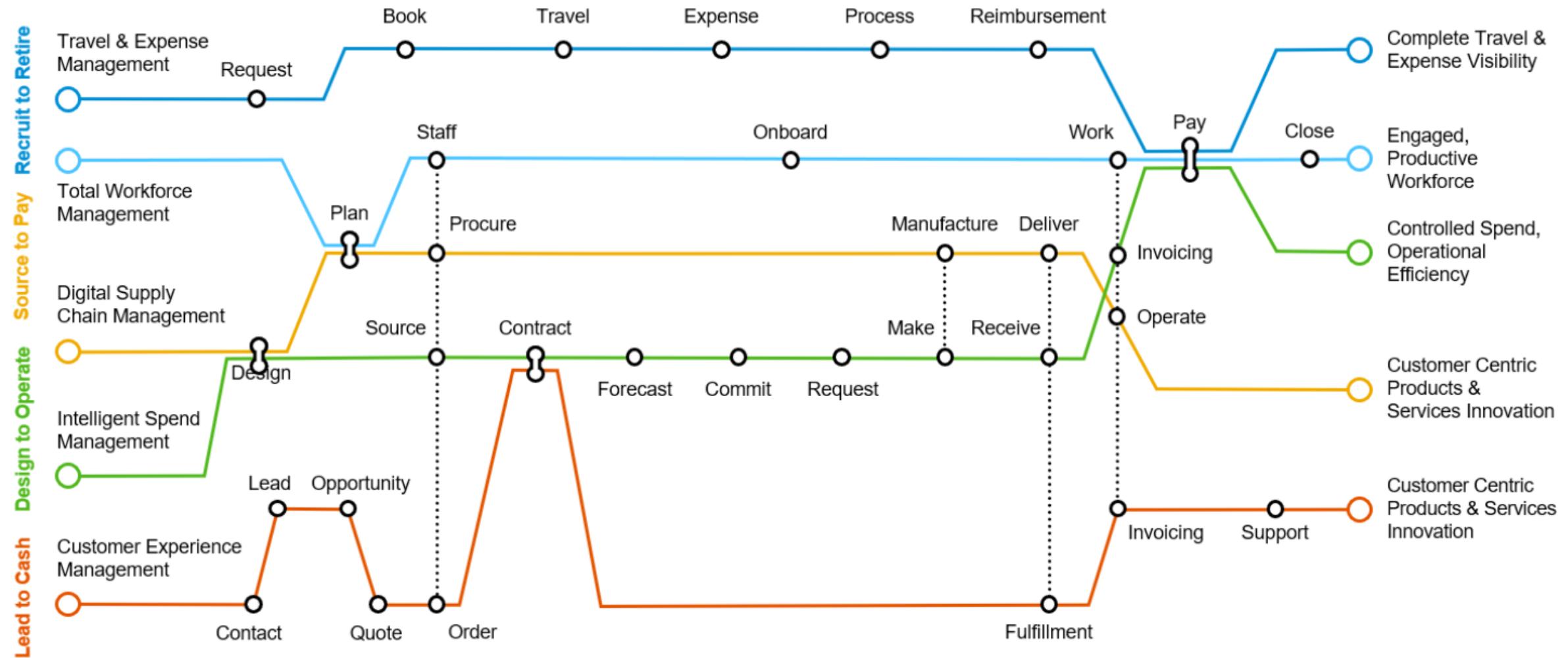
"Done" is based on whether the architecture can be built and booted, on a target system, based on the collaterals provided. Collaterals refer to the current and correct projects/versions, and any supporting scripts, test scaffolding, or other resources referred to in the architecture and build collaterals are present and functional. If a collateral requires software to be written, software is reviewed, checked in, and unit tests or validation plans have been updated.



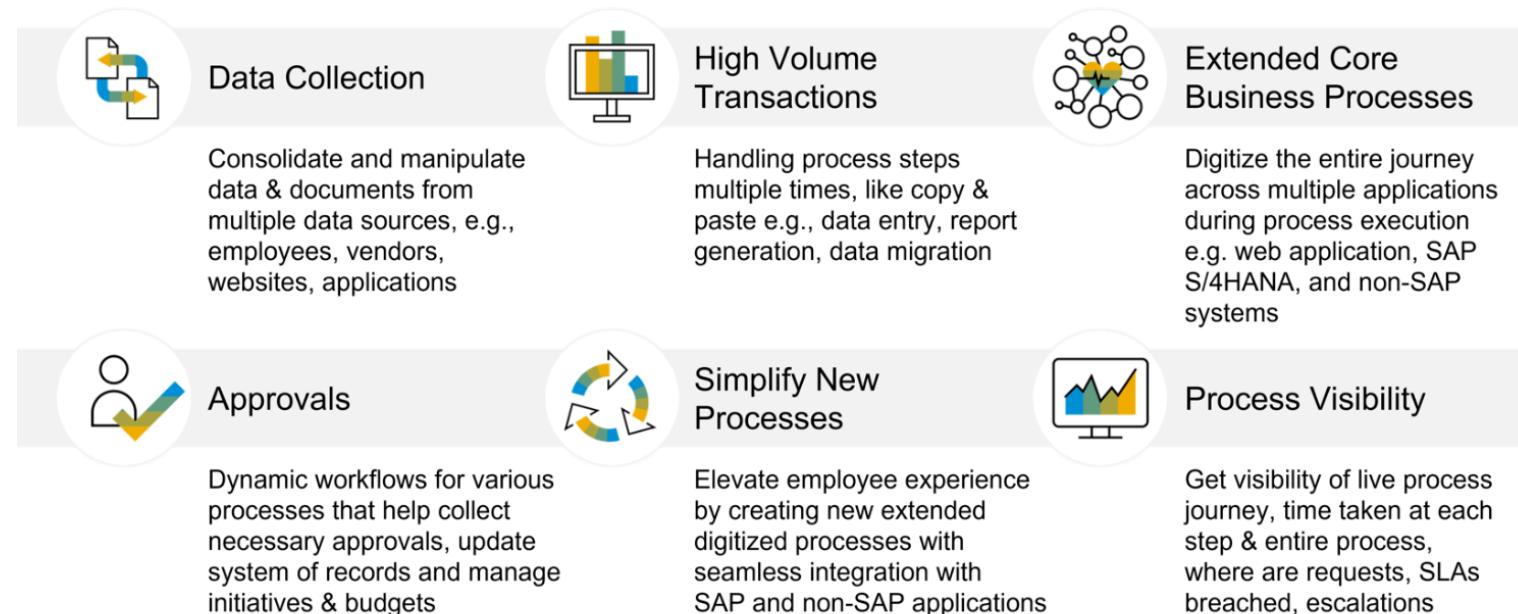
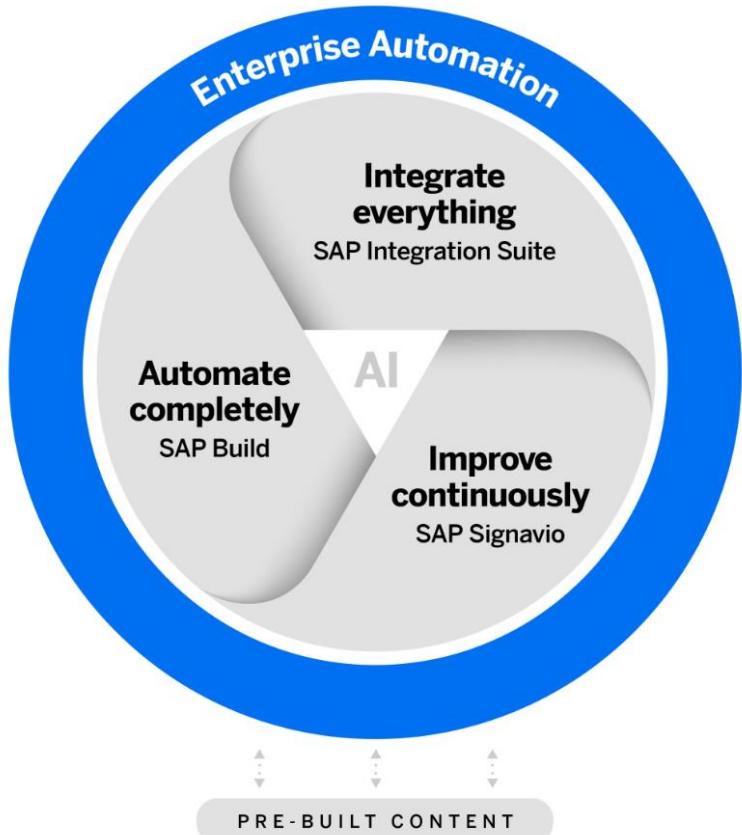
source: [Open Retail Reference Architecture - EdgeX Wiki - EdgeX Confluence \(edgexfoundry.org\)](https://edgexfoundry.org)

Enterprise Automation

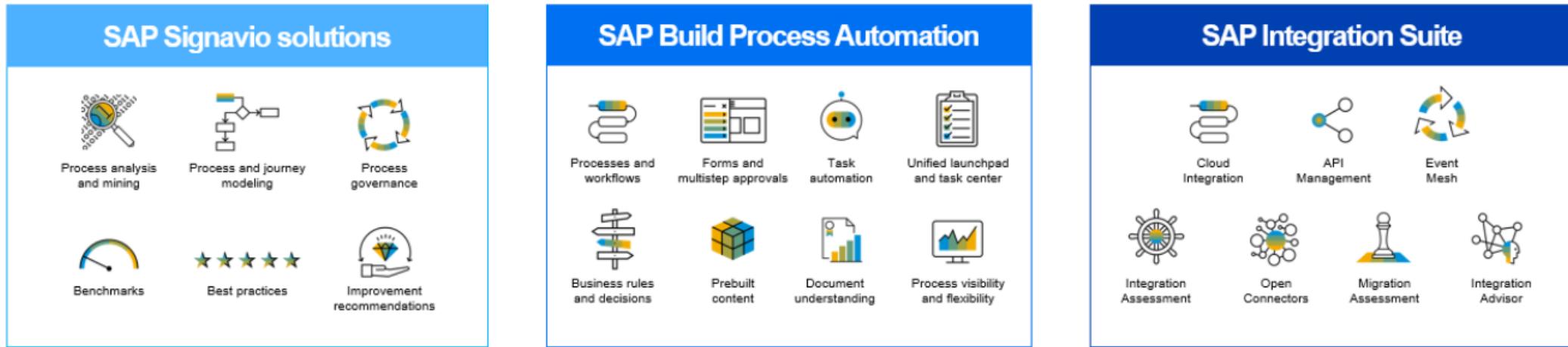
SAP Enterprise Automation



SAP Enterprise Automation



Delivering Enterprise Automation



- Understand areas with low automation rates
- Analyze processes and **recommend automations**
- **Automatically trigger automations** based on rules and thresholds

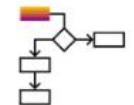
- Common business events can trigger automations
- **Easily package APIs** for use by business experts
- Automate between **legacy and modern systems**
- Leverage common integration scenarios in your workflows

SAP Enterprise Automation

SAP Signavio solutions



Process analysis and mining



Process and journey modeling



Process governance



Benchmarks



Best practices



Improvement recommendations

SAP Build Process Automation



Processes and workflows



Forms and multistep approvals



Task automation



Unified launchpad and task center



Business rules and decisions



Prebuilt content



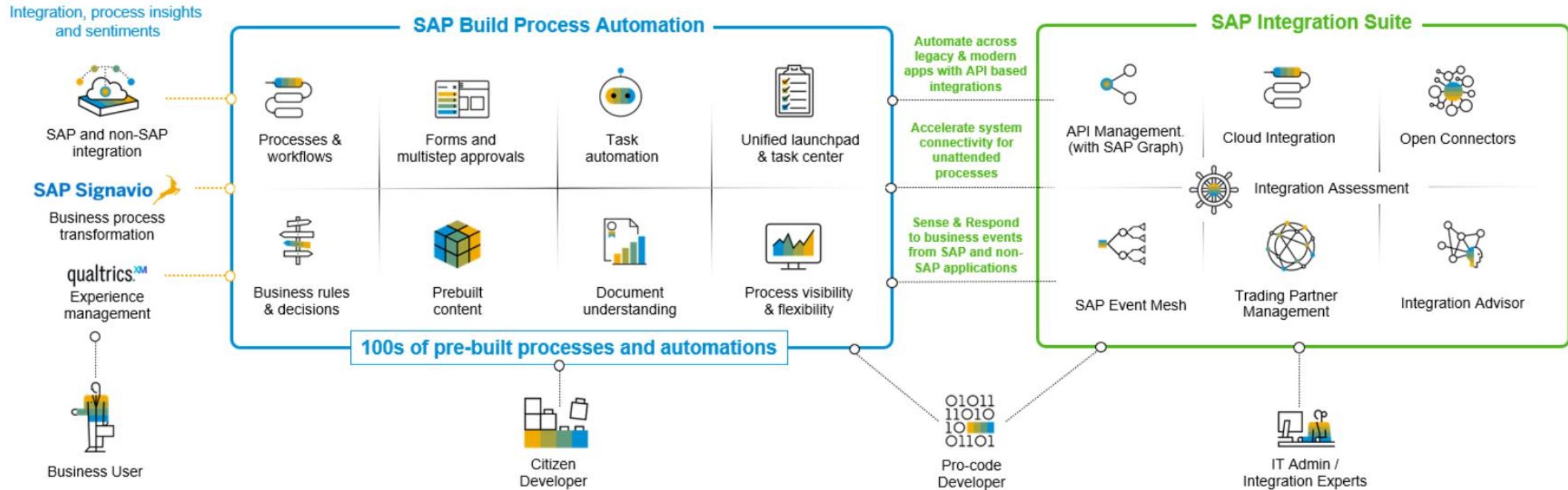
Document understanding



Process visibility and flexibility



SAP Enterprise Automation

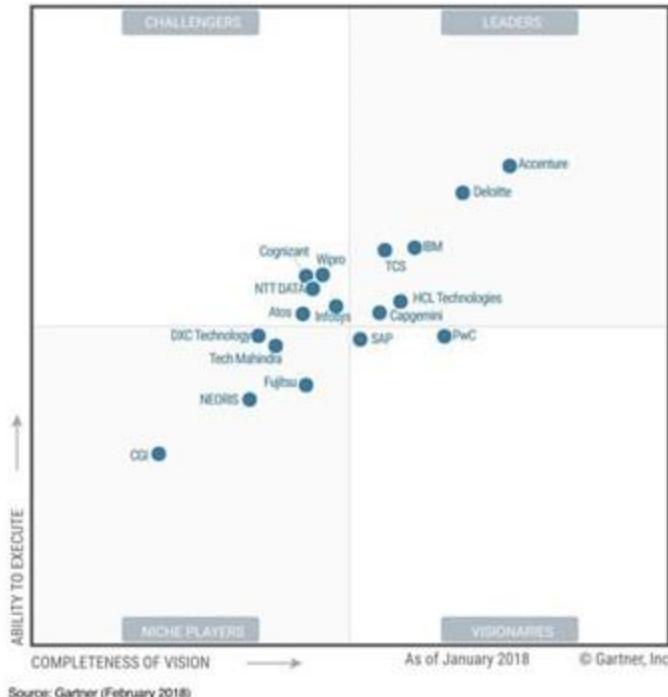


Appendix

Figure 1: Magic Quadrant for SAP S/4HANA Application Services, Worldwide

SAP Application Services

Figure 1. Magic Quadrant for SAP Application Services, Worldwide



source: [2022 Gartner® Magic Quadrant™ for SAP S/4HANA Application Services | Deloitte Global](#)

© Gartner, Inc

Event Storming



1. Admin decides which domain level events will be put into a timeline.
2. Add events by all: stacked it vertically to indicate that certain events can happen simultaneously.
3. Add activities flow by all: commands and activities added after events in a timeline.
4. Add entities or aggregates by admin: indicate how it is happening and who is doing it.
5. Add contexts by admin: indicate who is receiving the event and doing work with the event.

Events of
interest to
the
business

Actions |
What do we
want to have
happen

Questions |
Things to
do

Policy or
business
rule | Control
how actions
play out

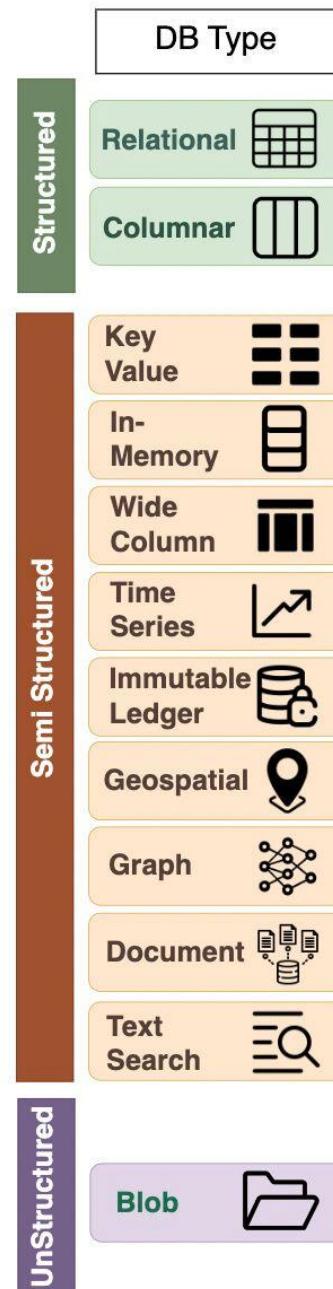
Manual
activities |
Event or
action with
human input

External
systems |
Occurred from
the outside
world

Actor or
UI
action

Cloud Database Cheat Sheet

 AWS	 Azure	 Google Cloud	 ORACLE CLOUD
 Elastic Compute Cloud (EC2)	 Virtual Machine	 Compute Engine	 Virtual Machine
 Elastic Kubernetes Service (EKS)	 Azure Kubernetes Service (AKS)	 Google Kubernetes Engine (GKE)	 Oracle Container Engine
 Lambda	 Azure Functions	 Cloud Functions	 OCI Functions
 Simple Storage Service (S3)	 Blob Storage	 Cloud Storage	 Object Storage
 Elastic Block Store	 Managed Disk	 Persistent Disk	 Persistent Volume
 Elastic File System	 File Storage	 File Store	 File Storage
 Virtual Private Cloud	 Virtual Network	 Virtual Private Cloud	 Virtual Cloud Network
 Route 53	 DNS	 Cloud DNS	 DNS
 Elastic Load Balancing	 Load Balancer	 Cloud Load Balancing	 Load Balancer
 Web Application Firewall	 Web Application Firewall	 Cloud Armor	 Web Application Firewall
 RDS	 SQL Database	 Cloud SQL	 ATP
 DynamoDB	 Cosmos DB	 Firebase Realtime Database	 NoSQL Database
 Redshift	 Synapse Analytics	 BigQuery	 Autonomous Data Warehouse
 Elastic MapReduce	 HDInsight	 Dataproc	 Big Data
 Kinesis	 Streaming Analytics	 Dataflow	 Streaming
 SageMaker	 Machine Learning	 Vertex AI	 Data Science
 Glue	 Data Factory	 Data Fusion	 Data Integration
 EventBridge	 Event Grid	 Eventarc	 Events
 Simple Queuing Service	 Storage Queues	 Pub/Sub	 Streaming
 Simple Notification Service	 Service Bus	 Firebase Cloud Messaging	 Notifications
 CloudWatch	 Monitor	 Cloud Monitoring	 Monitoring
 CloudFormation	 Resource Manager	 Deployment Manager	 Resource Manager
 IAM	 Active Directory	 Cloud Identity	 IAM
 KMS	 Key Vault	 Cloud KMS	 Vault



Thank you!

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