

How SAP C/4HANA and SAP Leonardo Machine Learning Enable the **Intelligent Enterprise**

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PUBLIC

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Agenda

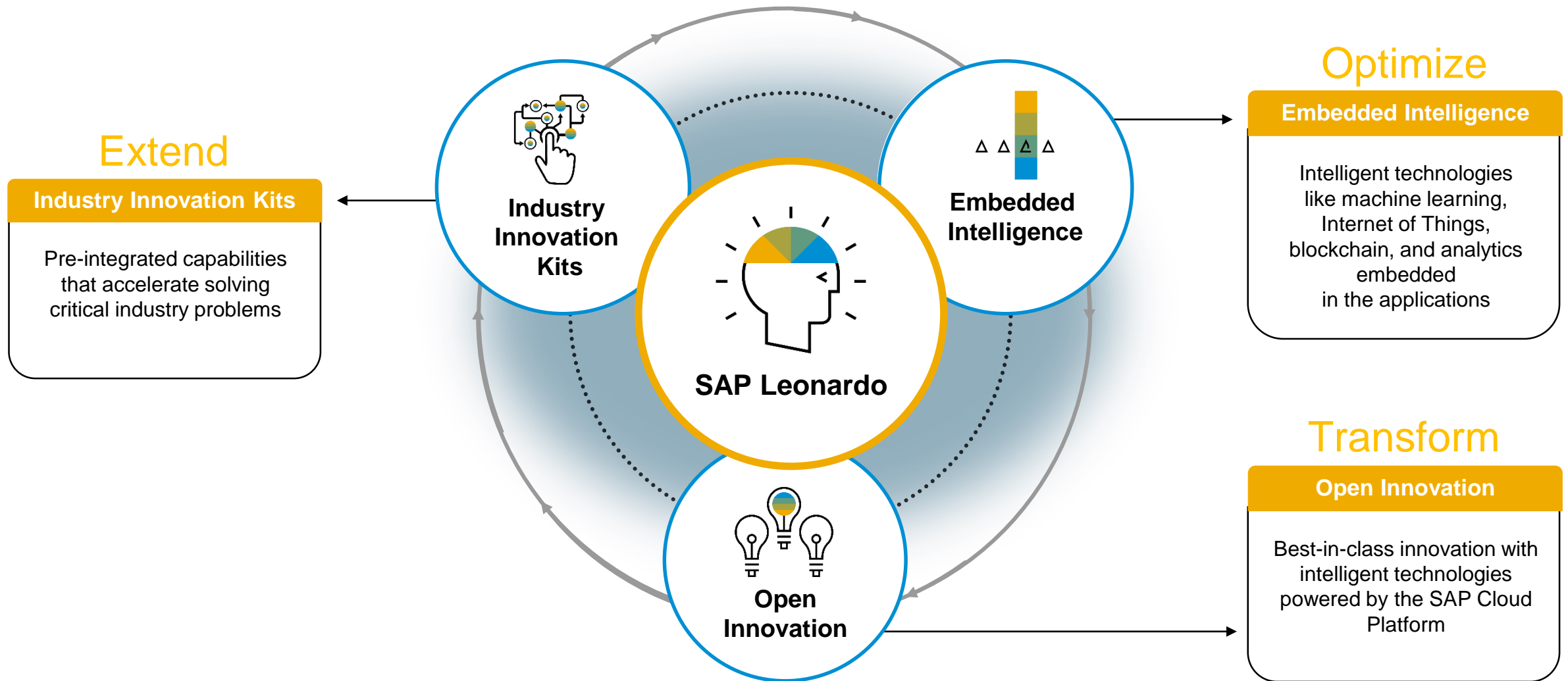
- Machine Learning by SAP Leonardo
- Why Machine Learning Impacts SAP C/4HANA Suite Architecture
- How SAP Leonardo Transforms Data Into Customer Value
- What Makes Customer Experience Intelligent

Machine Learning by SAP Leonardo

Many of us help to
train **Machine
Learning** models on
a daily basis without
knowing...



SAP Leonardo powers enterprises with *intelligent technologies* for every *business process*, to create better *outcomes*



Machine Learning will reinvent Businesses

• **60%**

Of human tasks will be automated by 2025

• **97%**

Image recognition accuracy today (better than human rate 95%)

• **95.1 %**

Speech recognition accuracy today (better than human rate 94.1%)

• **\$18B**

Enterprise Machine Learning Market by 2020

Process Automation

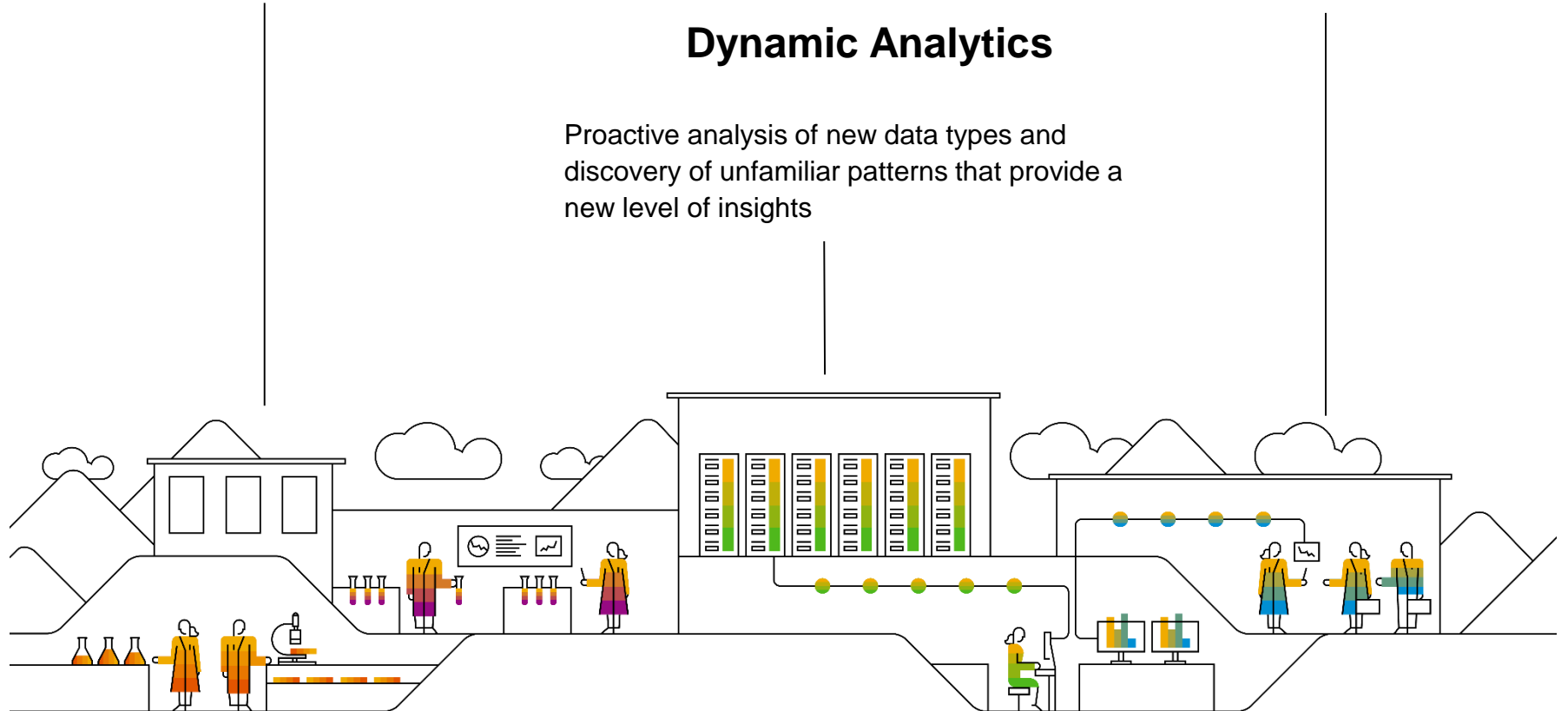
Full automation of business processes, from HR to payments processing, to workflow approvals for purchase orders and sales execution

Next-gen UX

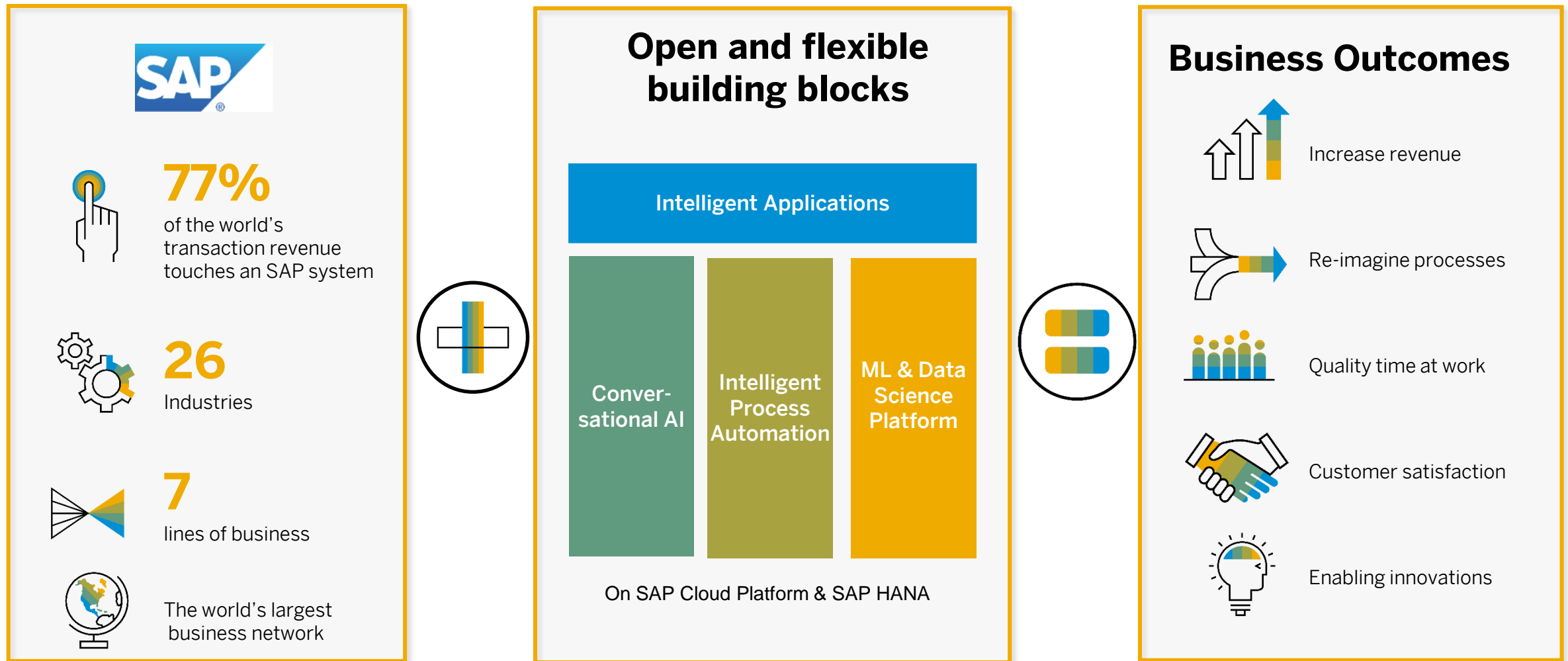
User experience based on voice, vision and messaging will replicate how people interact in real life and increase business productivity

Dynamic Analytics

Proactive analysis of new data types and discovery of unfamiliar patterns that provide a new level of insights

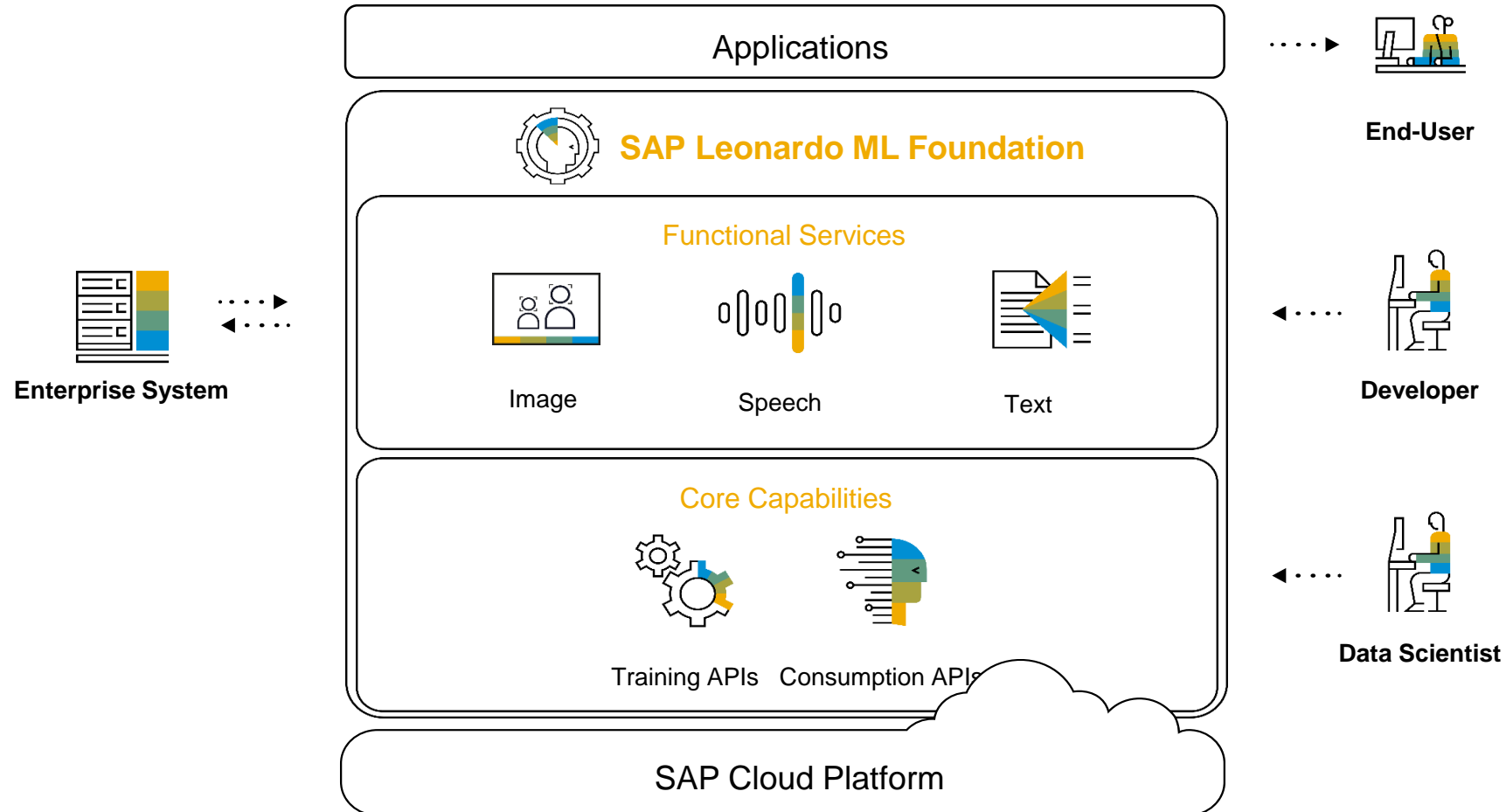


How SAP Leonardo ML helps to deliver the Intelligent Enterprise

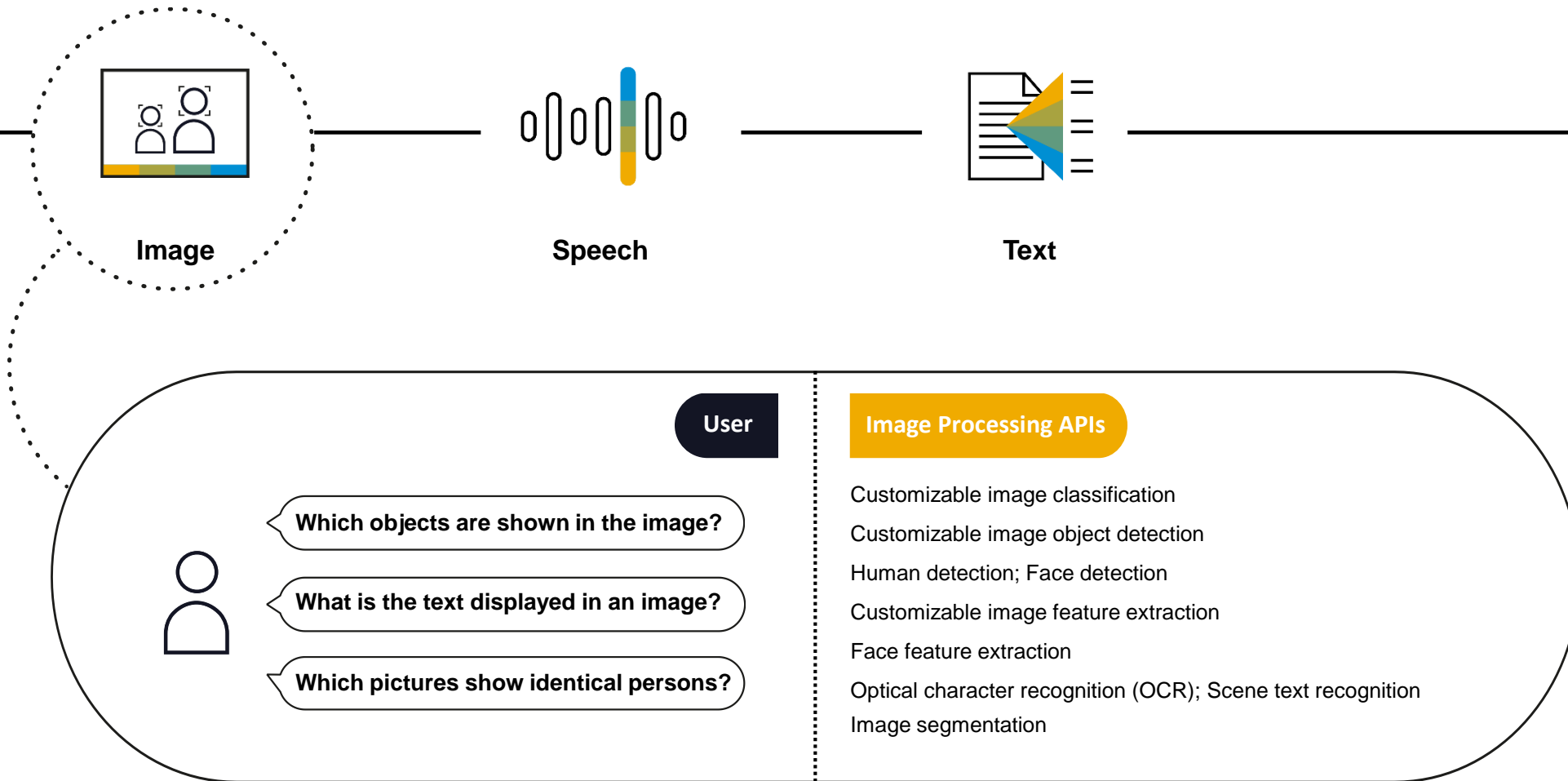


SAP Leonardo Machine Learning Foundation

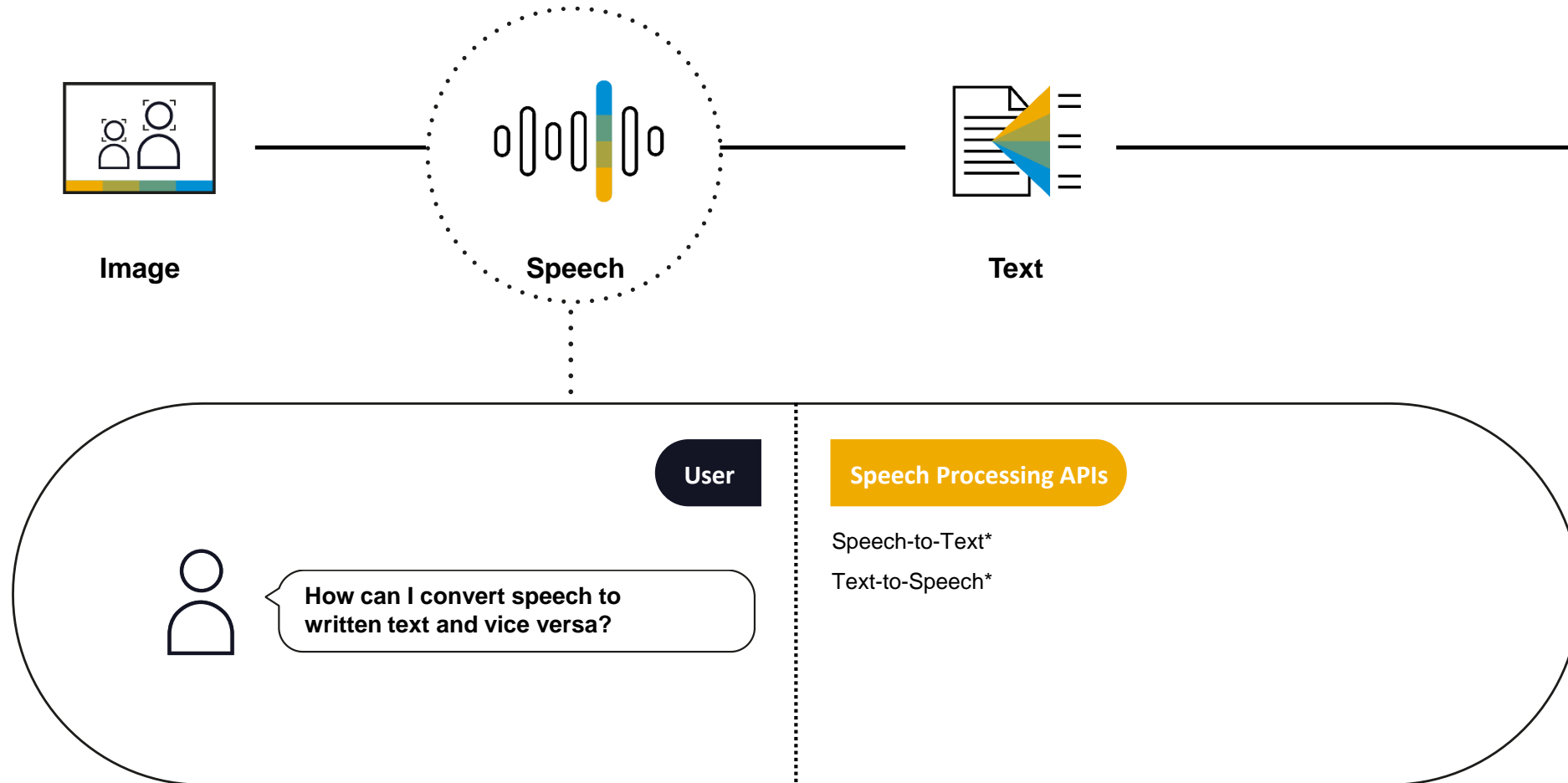
enabling customers and partners to build the intelligent enterprise



ML Services Portfolio



ML Services Portfolio



* Planned to be available in November 2018

ML Services Portfolio



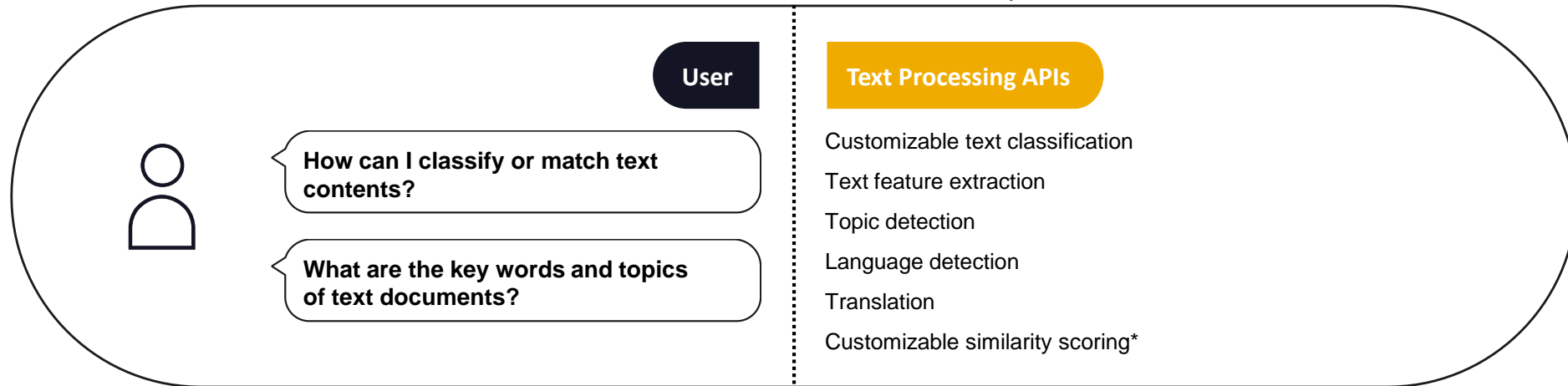
Image



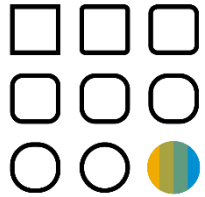
Speech



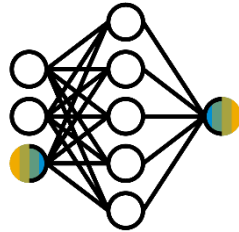
Text



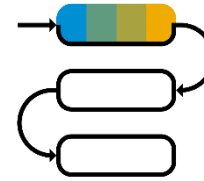
Planned innovations and roadmap for 2018



Data Scientist support for ML experimentation, including Jupyter notebooks



Create and run custom ML trainings (TensorFlow-based)



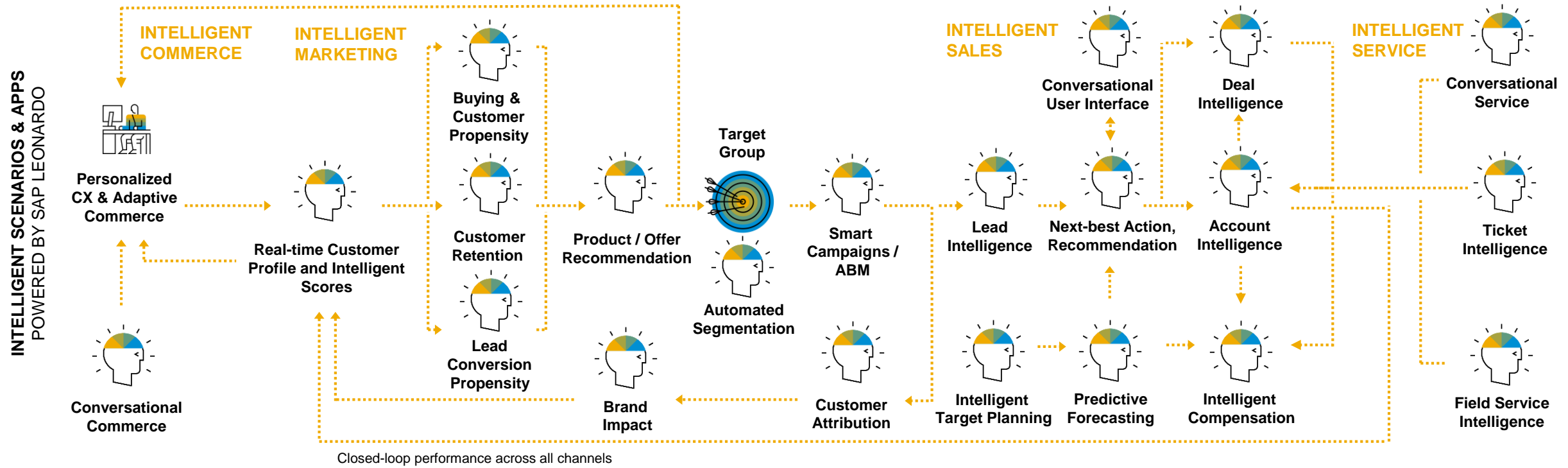
Leverage data pipelines to orchestrate ML services as well as data pre- and post-processing



Further data centers as deployment options

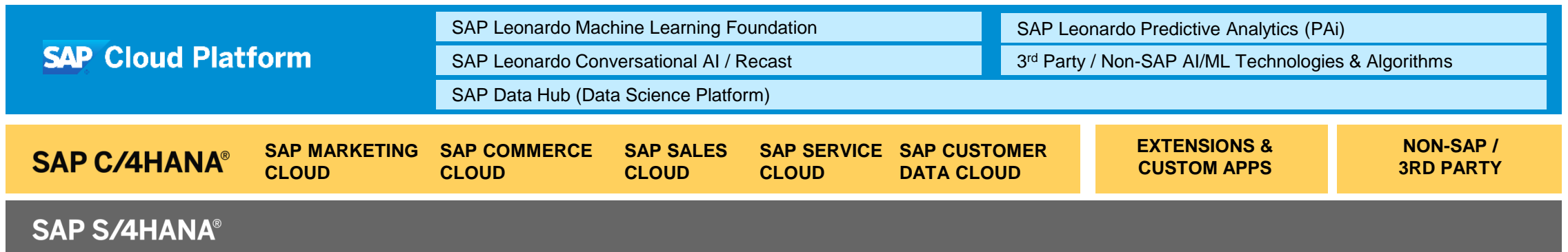
Why **Machine Learning Impacts SAP C/4HANA Suite Architecture**

SAP C/4HANA End-To-End Machine Learning Process Vision

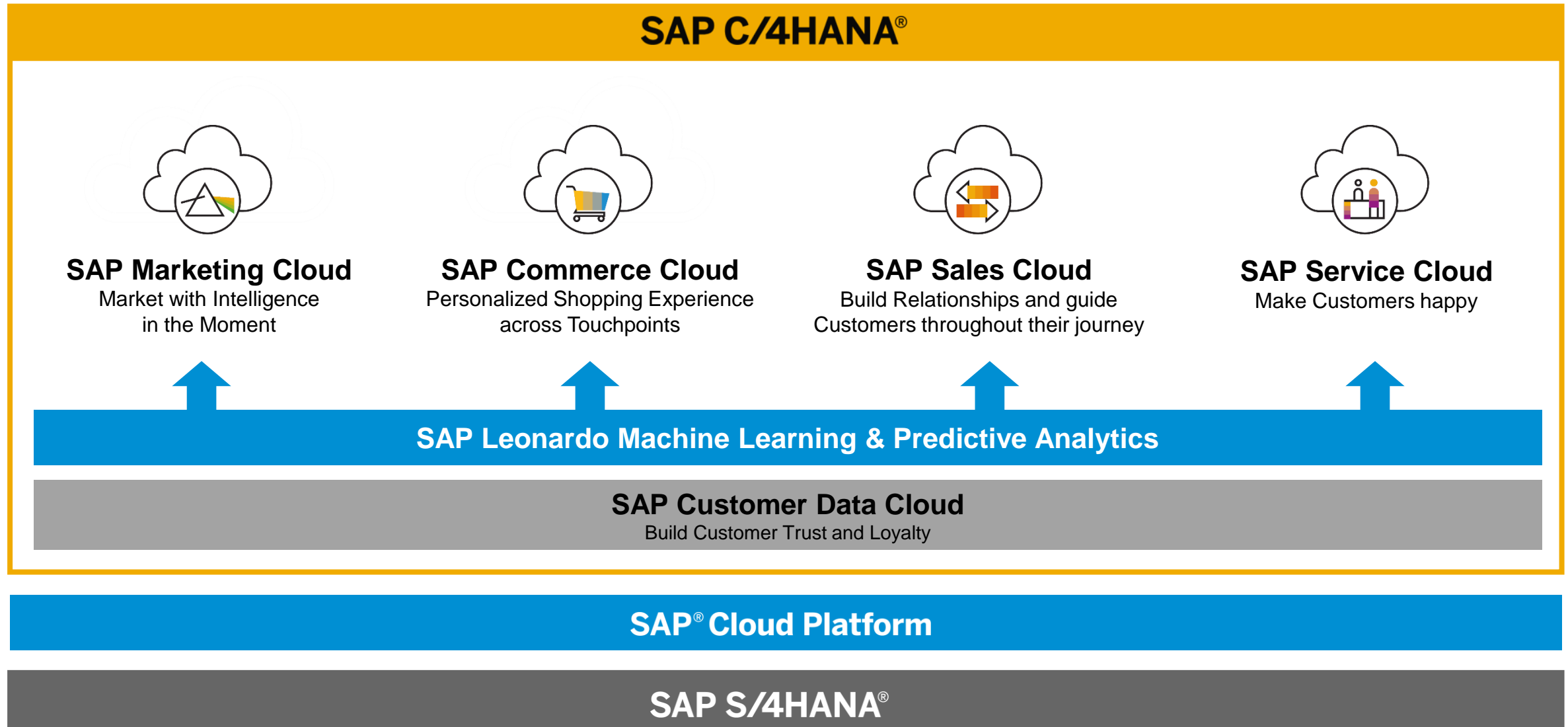


FRONT +
BACK OFFICE

AI/ML + DATA
PLATFORM



SAP C/4HANA Designed for New Customer Experience with SAP Leonardo



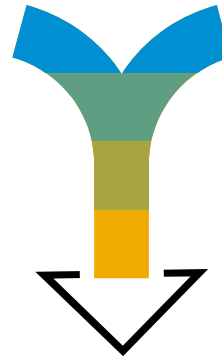
Success Factors of Enterprise Machine Learning Development

SCENARIOS

Strong use cases adding significant value to an exceptional customer experience.

DATA

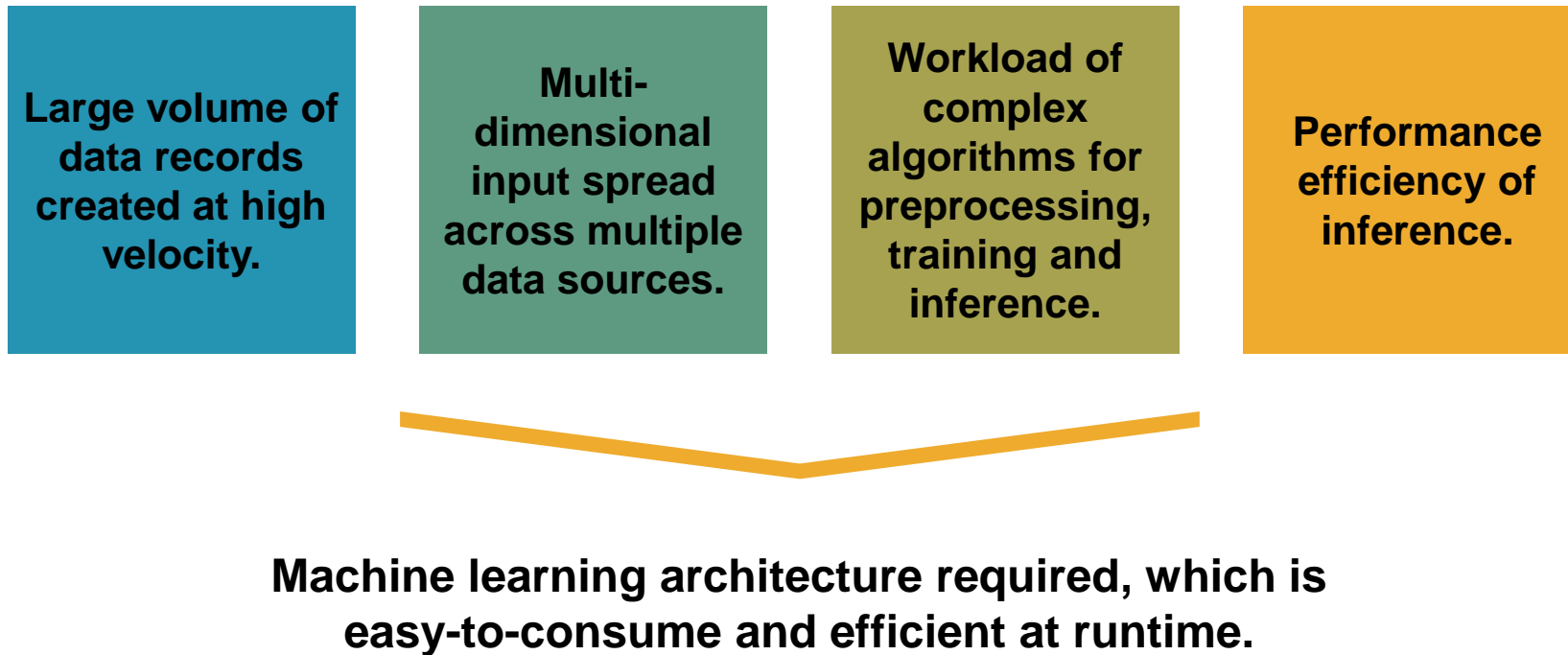
High-quality data across multiple domains Sales, Service, Marketing, Commerce



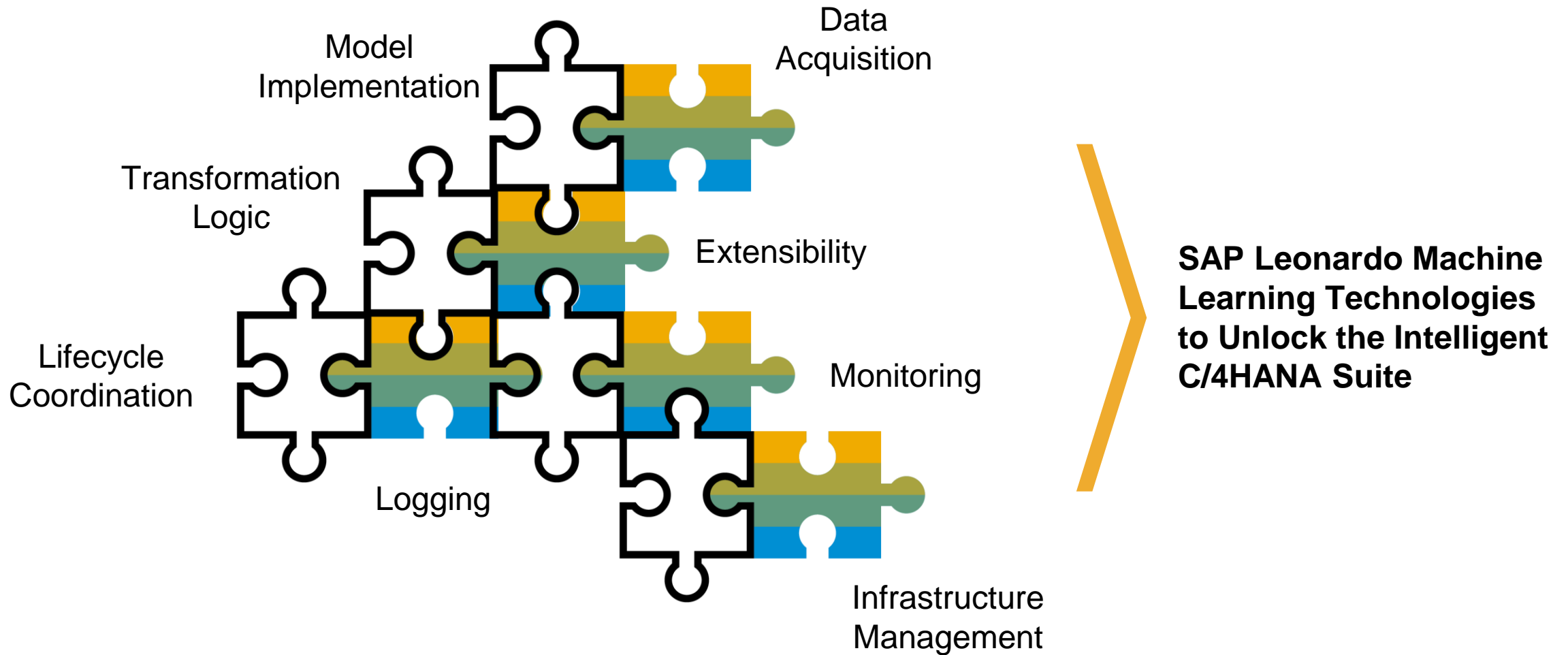
ARCHITECTURE

Sustainable architecture satisfying defined architecture qualities i.e. performance efficiency, reliability, portability, maintainability

Hidden Technological Complexity of Enterprise Machine Learning

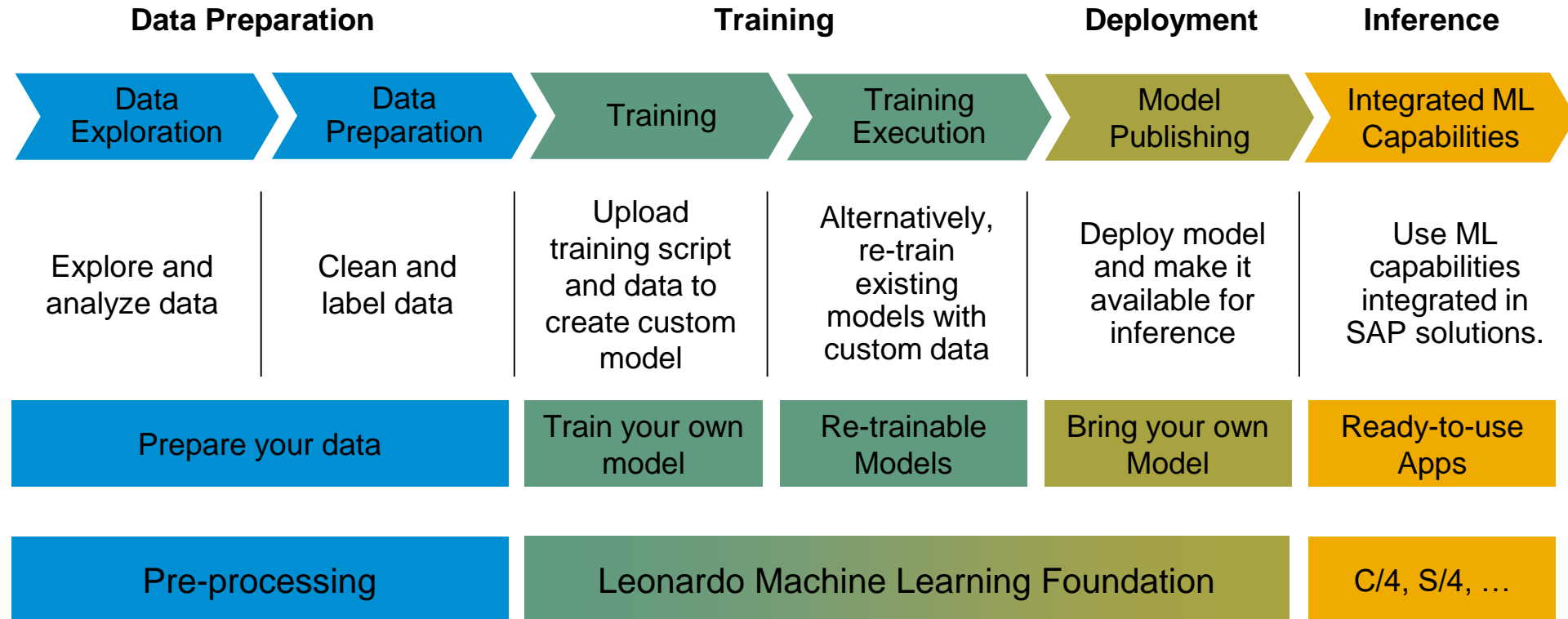


Productizing Machine Learning is More Than Data Science

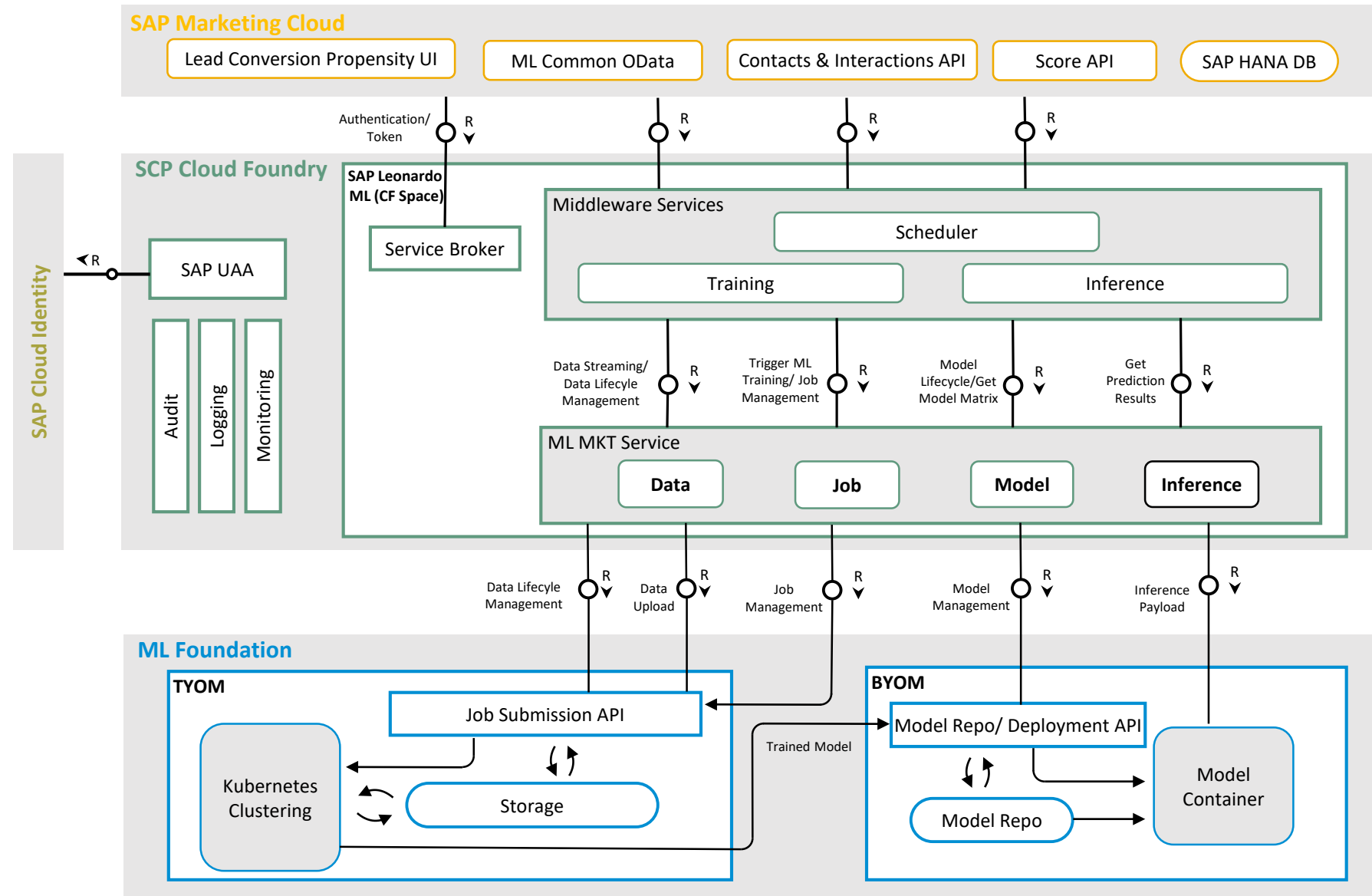


How **SAP Leonardo** Transforms Data Into Customer Value

Transforming Data into Customer Value with SAP Leonardo Machine Learning Foundation



Consuming Machine Learning Services on SAP Cloud Platform



Exposed Interfaces of SAP Leonardo Machine Learning Foundation

Submission API

GET Get Jobs

GET Get Job Status by Id

DELETE Delete Job by Id

POST Schedule Job

GET Get Job Log

GET Get Storage Endpoint

POST Create Initial Storage Endpoint

Model API

GET Get Models

GET Get Model Versions

POST Create Model Version

DELETE Delete Model Version by Id

GET Get Model Version by Id

PATCH Patch Model Version by Id

GET Get Model Version File

Deployment API

GET Get Model Runtimes

GET Find Model Servers

POST Create Model Server

DELETE Delete Model Server

GET Get Model Server

PATCH Patch Model Server

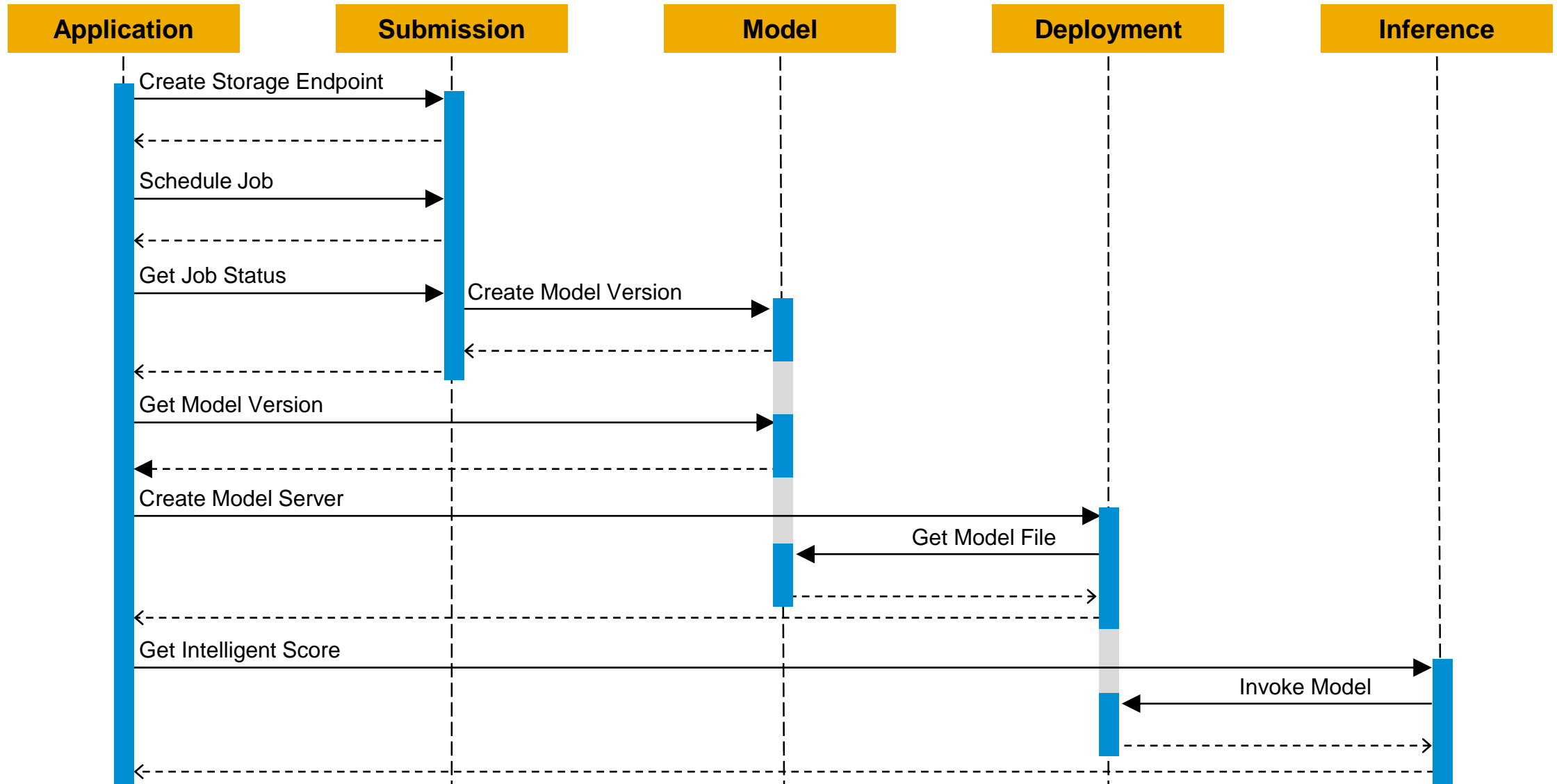
GET Return Available Resource Plans

GET Return Resource Plan

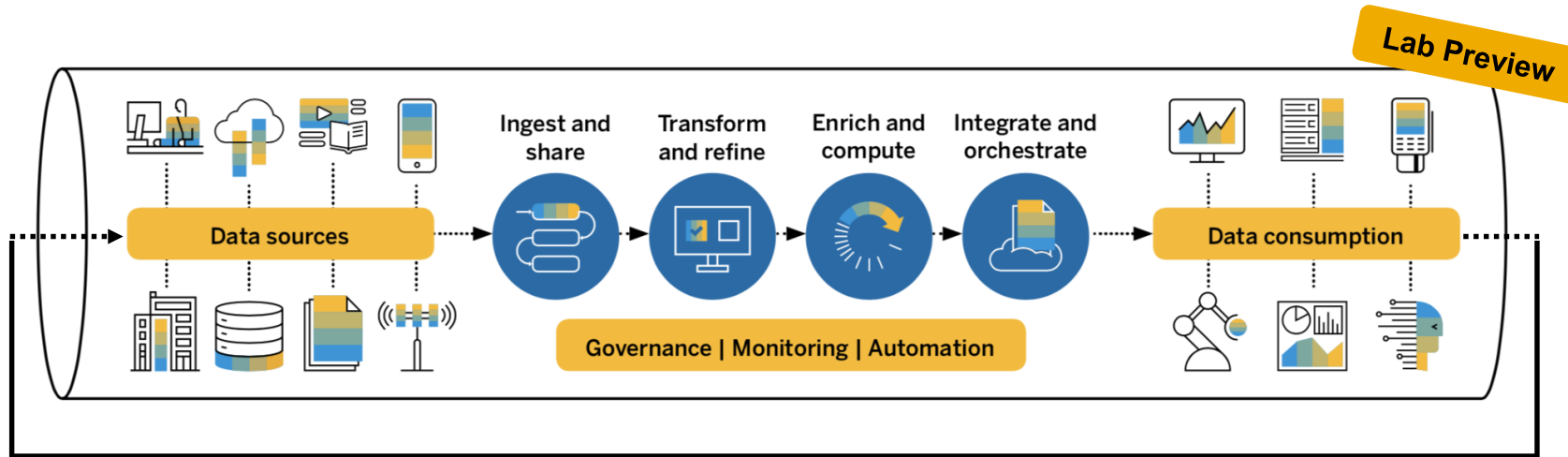
Version API

GET Get API Version

High-Level Sequence of Training and Inference based on SAP Machine Learning Foundation

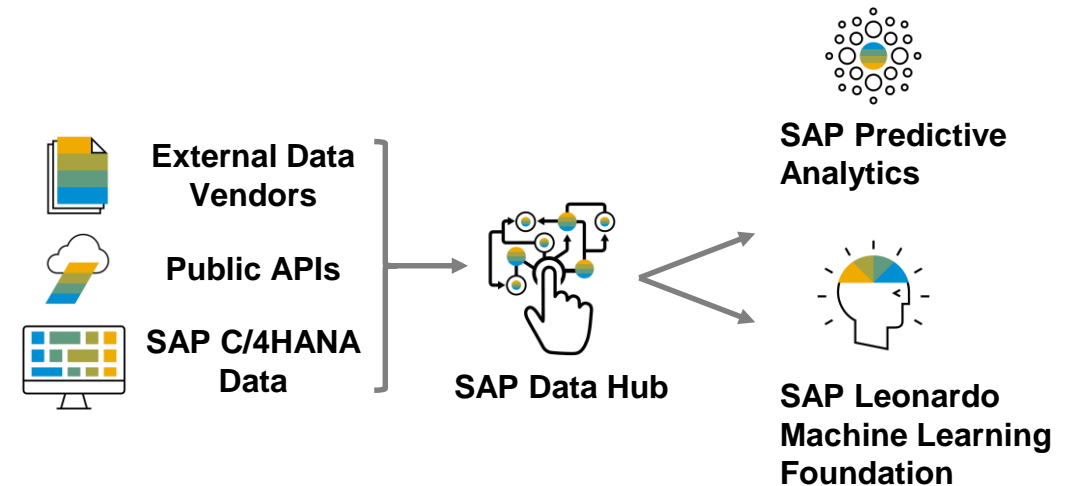


Ingest Data from Various Sources



SAP Data Hub Capabilities

- Apply machine learning and predictive algorithms to any data set combined from 1st party C/4HANA, 2nd party partner, and 3rd public data
- Operationalize machine learning intelligence rather than natively implement algorithms
- Distribute intelligent results to core business applications where value is added to business processes



Ingest Data from Various Source and Execute Intelligent Logic

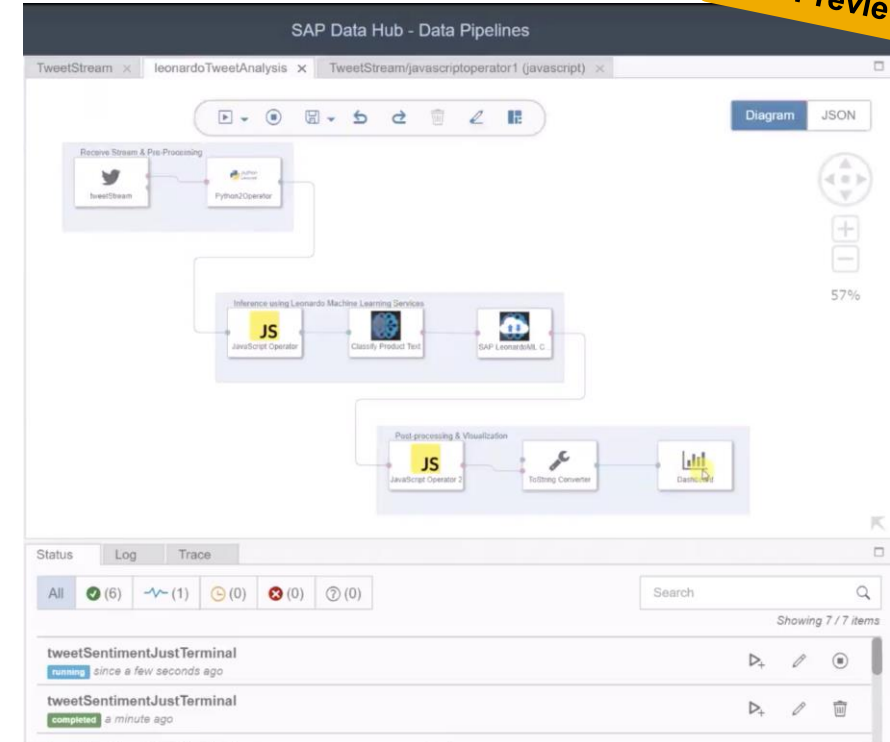
Create powerful data pipelines

- Fast and Flexible program definition and execution
- Use distributed processing in a cluster environment
- Take advantage of serverless computing paradigms for radical scale
- Incorporate powerful third-party libraries, such as TensorFlow

Build data streams to enable data-driven processes

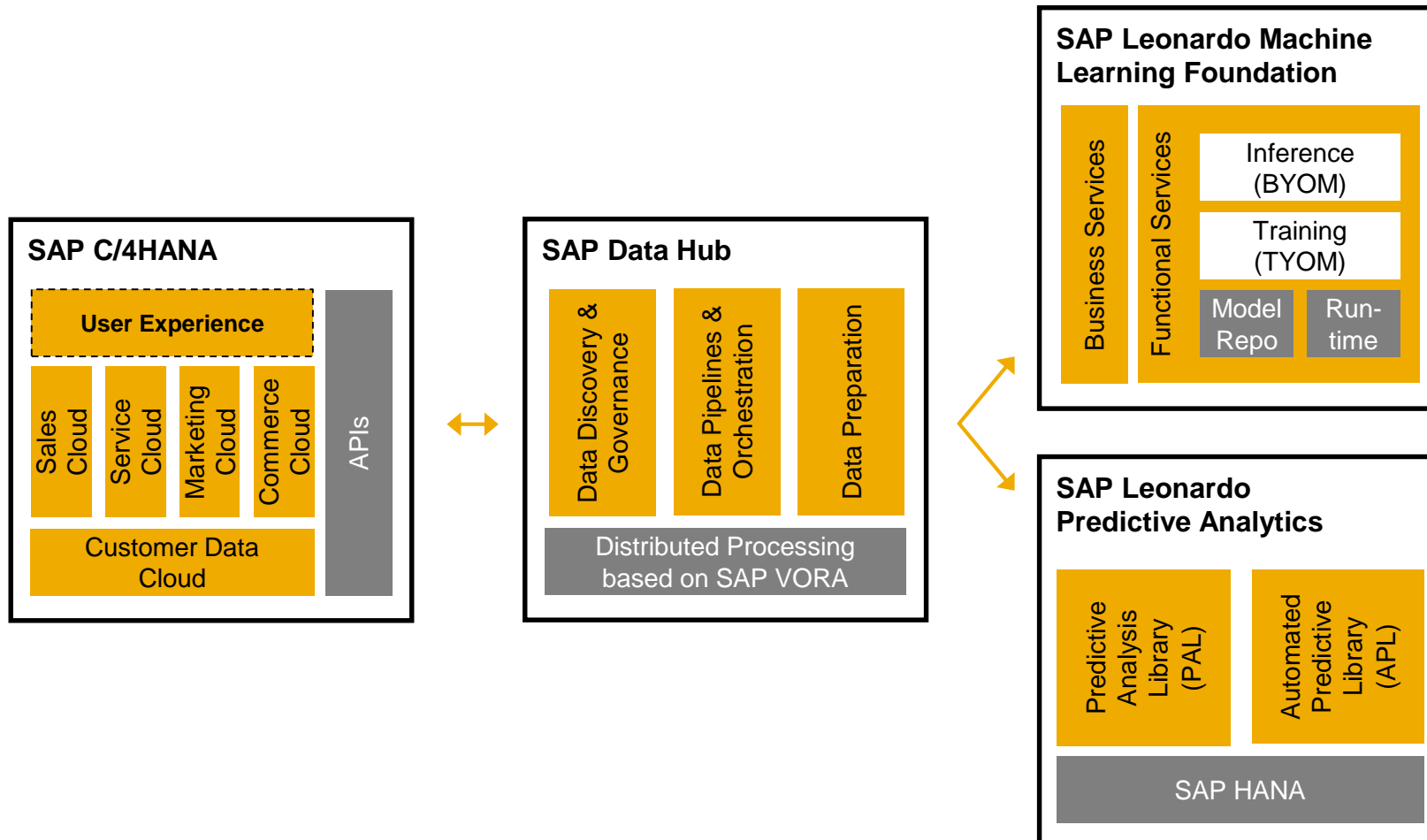
- Establish data streams to react to data changes instantly
- Embed complex algorithms into existing data flow by using any code or script
- Easy Reuse of existing coding and libraries
- Predefined machine learning operators
- Read and Store Data (File, HDFS, S3, SAP HANA, SAP Vora)

Lab Preview



Outlook Combining SAP Data Hub with SAP Leonardo

Lab Preview



Towards a unified ML & Data Science Platform

Components



SAP Data Hub

Data sharing, pipelining, and orchestration.
Including data preparation and cleaning.



SAP Predictive Analytics

Operationalization and automation



SAP Leonardo ML Foundation

Deep Learning (text, image, video, audio)



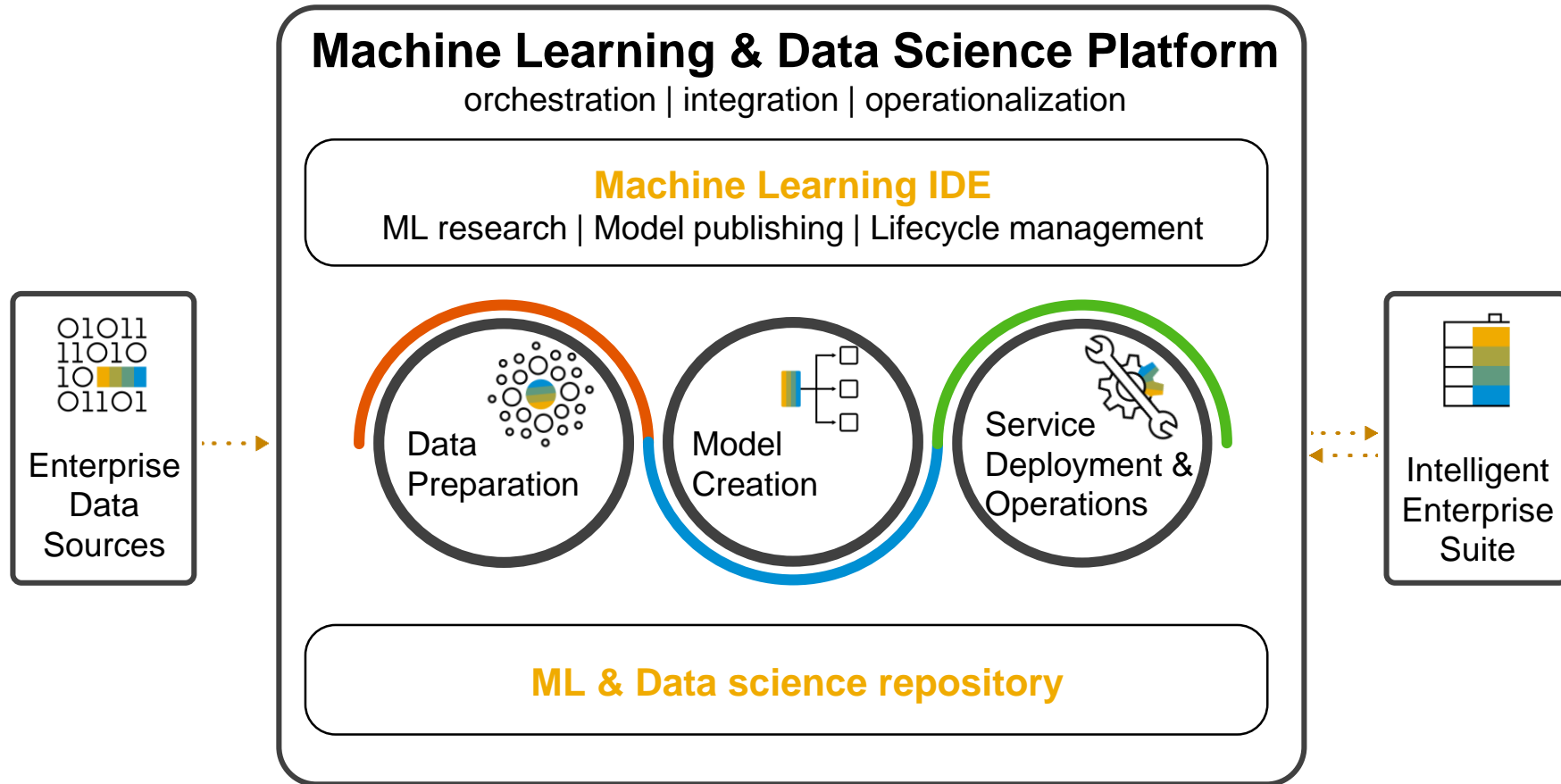
SAP HANA ML

In-database Machine Learning

Solution

One integrated offering
One data science front end
Full lifecycle management
Integrated with SAP

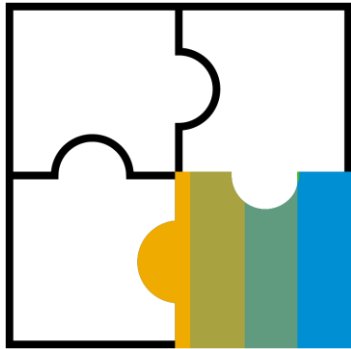
ML & Data Science Platform Overview



The foundation of the intelligent enterprise.

- Supporting the entire lifecycle of self-learning software.
- Enabling data Scientists and developers to tightly integrate with SAP data and processes
- All Machine Learning technologies.
- Scalable and secure cloud-based platform.

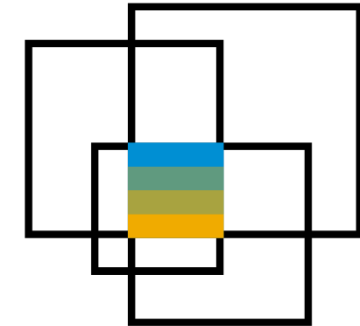
Overview of Integration Scenarios



REST: Invoke
Machine Learning
via APIs

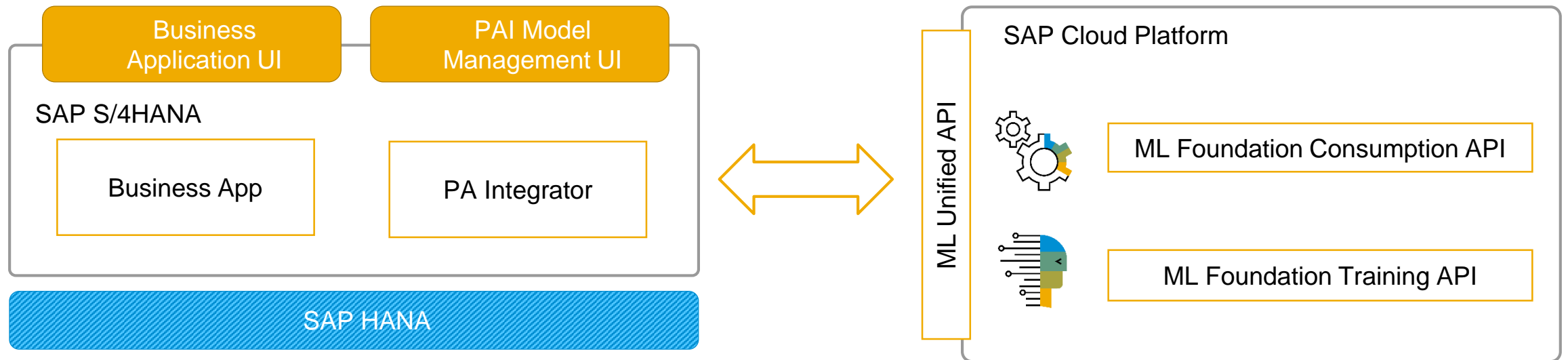


SAP Predictive
Analytics Integrator:
Native Consumption
out of ABAP*

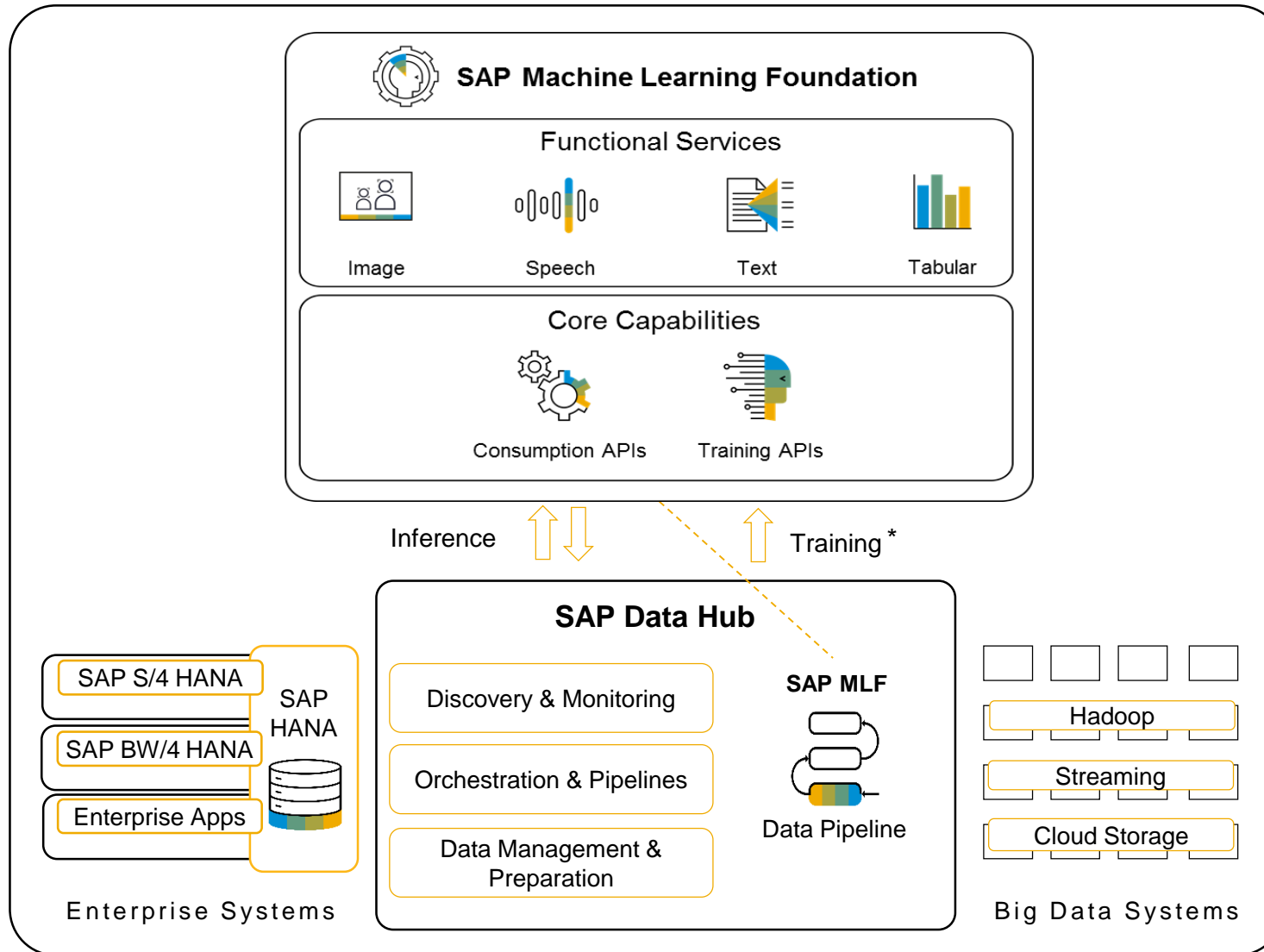


SAP Data Hub:
Combining different
systems and data
sources

Predictive Analytics Integrator to invoke Machine Learning APIs



Powerful combination of SAP ML Foundation & SAP Data Hub



- Leverage deep learning out of the box by invoking SAP MLF services in SAP Data Hub pipelines
- Utilize heterogenous data managed by SAP Data Hub
- Orchestrate enterprise data with big data to feed ML models

What Makes Customer Experience Intelligent

SAP C/4HANA Service: Ticket Intelligence Automates the Classification and Routing of Customer Requests

Uses deep learning convolution neural networks for ticket category classification and ticket prioritization

Dear Sir/Madam,

Last Monday we were expecting your service engineers to arrive at our home between 8am and 12pm.

No one came until 2pm and after calling your service desk, we were told that there are no more service appointment slots possible for us this week.

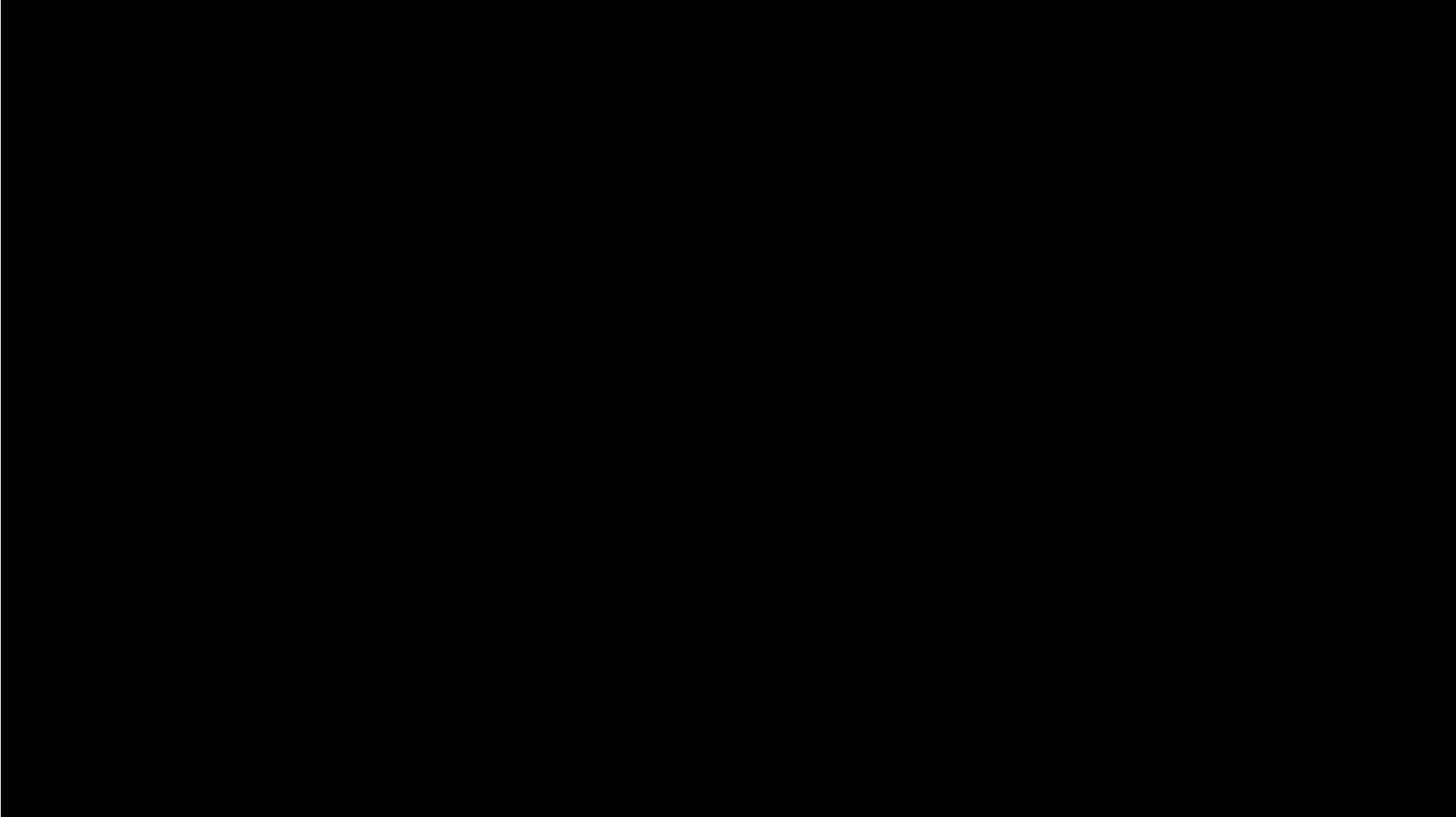
We are very disappointed as this would mean a whole week with no fridge for our family.

Regards,

Taylor Jones

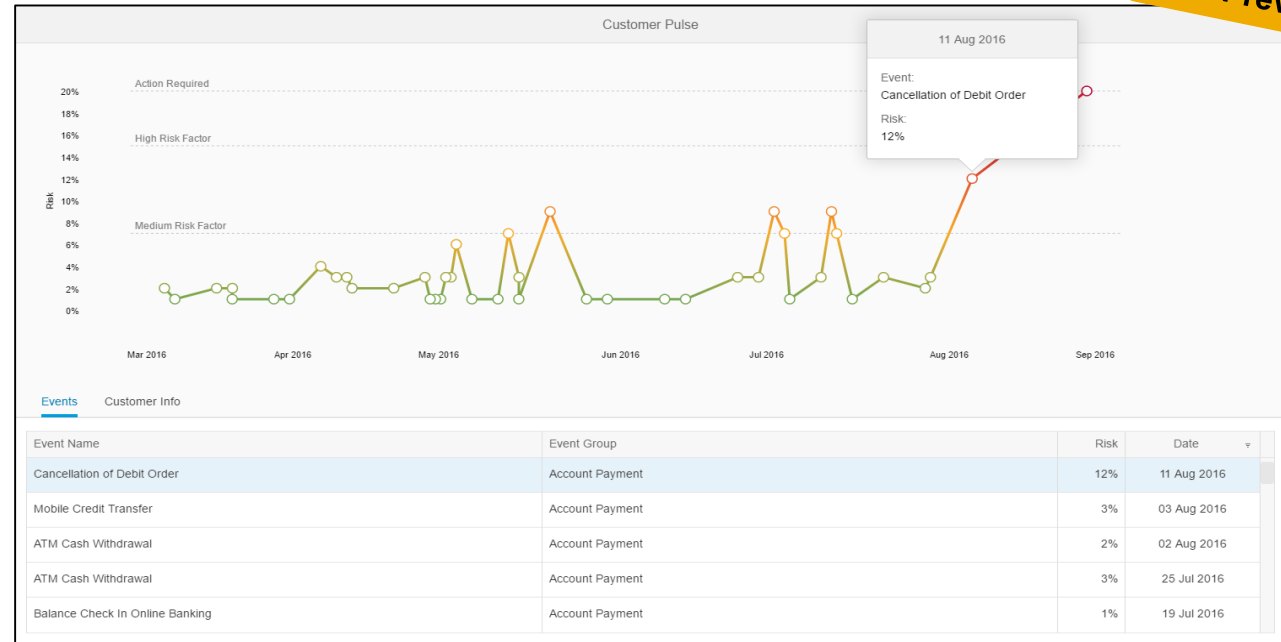
The screenshot displays the SAP C/4HANA Service Ticket Intelligence interface. At the top, there's a header bar with 'Tickets' and 'Ticket' tabs, and a specific ticket identifier '6797 - Missed appointment...'. Below this, a navigation bar includes tabs for OVERVIEW, INTERACTIONS, EMAILS (BETA), SOLUTION FINDER, SURVEYS, ACTIVITIES, ATTACHMENTS, NOTES, and IT. The main content area shows ticket details: Priority Normal, Escalation Status Not Escalated, Status Open, and a red-bordered box containing 'Service and Support Team Level 2 Escalation Support Queue'. Below this, a section titled 'CUSTOMER' and 'CATEGORY' is visible. The 'CUSTOMER' section lists 'Customer Taylor Jones', 'E-Mail taylor.jonesh@gmail.com', 'Contact -', and 'Phone +1 9168889696'. The 'CATEGORY' section has a red-bordered box containing 'Service Category Complaint'.

Demo: Service Ticket Intelligence



SAP C/4HANA Marketing: Customer Retention

Continuously monitor the churn risk of customers. React on time for higher customer retention



Lab Preview

Mine customer touchpoint data from various sources, identify unknown churn related behavioral patterns or events, and predict list of customers at risk of churning and estimate the time before they churn.

Take action on high risk customers by creating target lists automatically with follow-up campaigns.

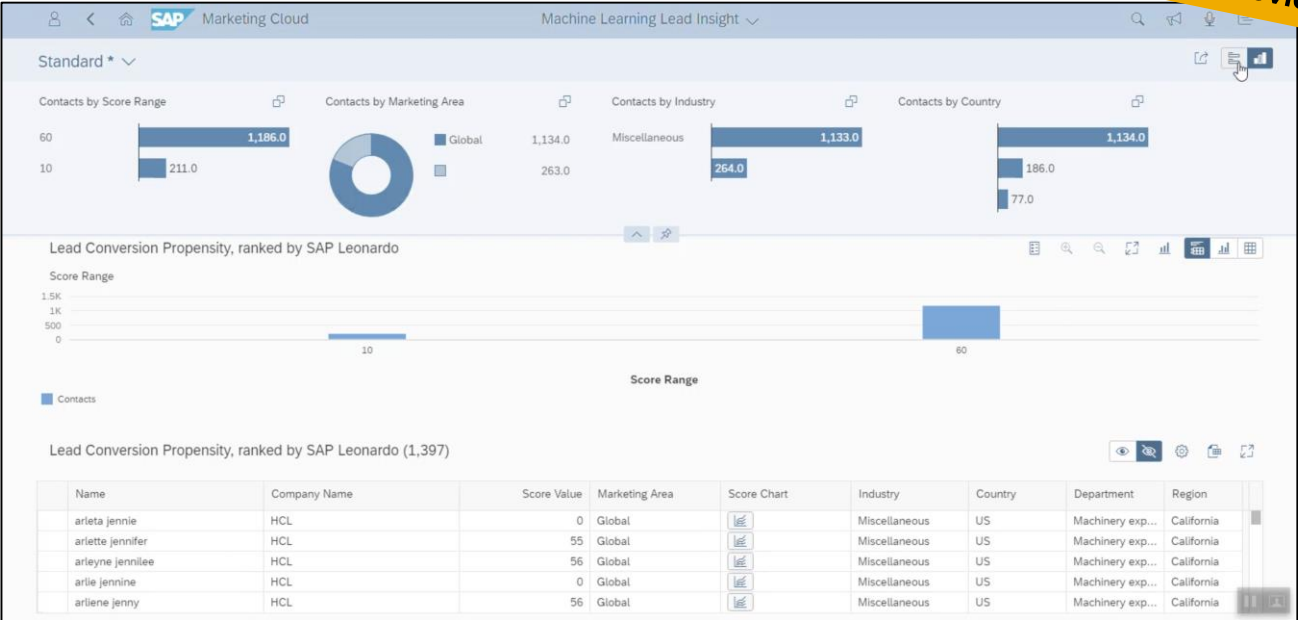
Visualize all customer touch points/events to better understand a customer's journey and experience.

SAP C/4HANA Marketing: Lead Conversion

Propensity Identifies Most Promising Customers

Use SAP Leonardo and customer behavior data to detect “hidden” behavior patterns and determine lead conversion

Lab Preview



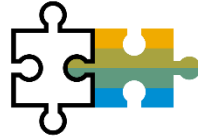
- The majority of all B2B generated leads are not sales ready. Time, costs and resources is optimized.
- Identify leads with a high chance of conversion with the help of deep learning powered by SAP Leonardo.
- Achieve campaign optimization and automation as well as focused customer engagement by addressing the right audience.
- Increase conversion rates, revenue, and customer satisfaction while reducing marketing cost.

Leonardo Machine Learning Foundation in a nutshell

Enterprise-grade platform to augment business processes with **Machine Learning**



Easy-to-consume ML
content targeted at non-ML
experts



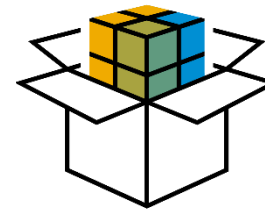
Tight integration with
SAP's software



Scalable and secure cloud-
based platform



Supporting the entire
lifecycle of self-learning
software



Being open towards
various Machine Learning
technologies

SAP Leonardo Machine Learning Discovery Service



Service Description

Machine learning technology provides new solutions to existing and new business opportunities. **We conduct an onsite workshop with you to define an approach for your business to benefit from the capabilities of machine learning.** SAP machine learning experts provide guidance about the benefits of machine learning and intelligent application – for potential uses cases and line of businesses.

Delivery Approach



Business Benefits

- Understand the business benefits of machine learning and intelligent applications
- Define a vision and value proposition for machine learning based on SAP Leonardo
- Validate a high level action plan to maximize business benefits

Applications

- SAP Leonardo Machine Learning Foundation
- S/4HANA and other backend systems

Key Deliverables

- Initial customer vision to machine learning
- Value proposition based on SAP Leonardo machine learning
- High level action plan

Variants & Duration

- **Standard variant:** 1 day onsite (3 person days effort based on T&M)
- **Variant with extended prototyping:** 2 days onsite (6 person days effort based on T&M)

Get Started

→ Developer website: sap.com/developer/topics/machine-learning.html



Get Started

1. [Select your Machine Learning technology](#)
2. [Get your SAP Cloud Platform developer account](#)
3. [Build your first app](#)

Machine Learning for SAP



Machine learning enables computers to learn from large amounts of data without being explicitly programmed. With machine learning, you can now build intelligent business apps that can augment and automate repetitive tasks, optimize business operations and be easily integrated and consumed across your organization.

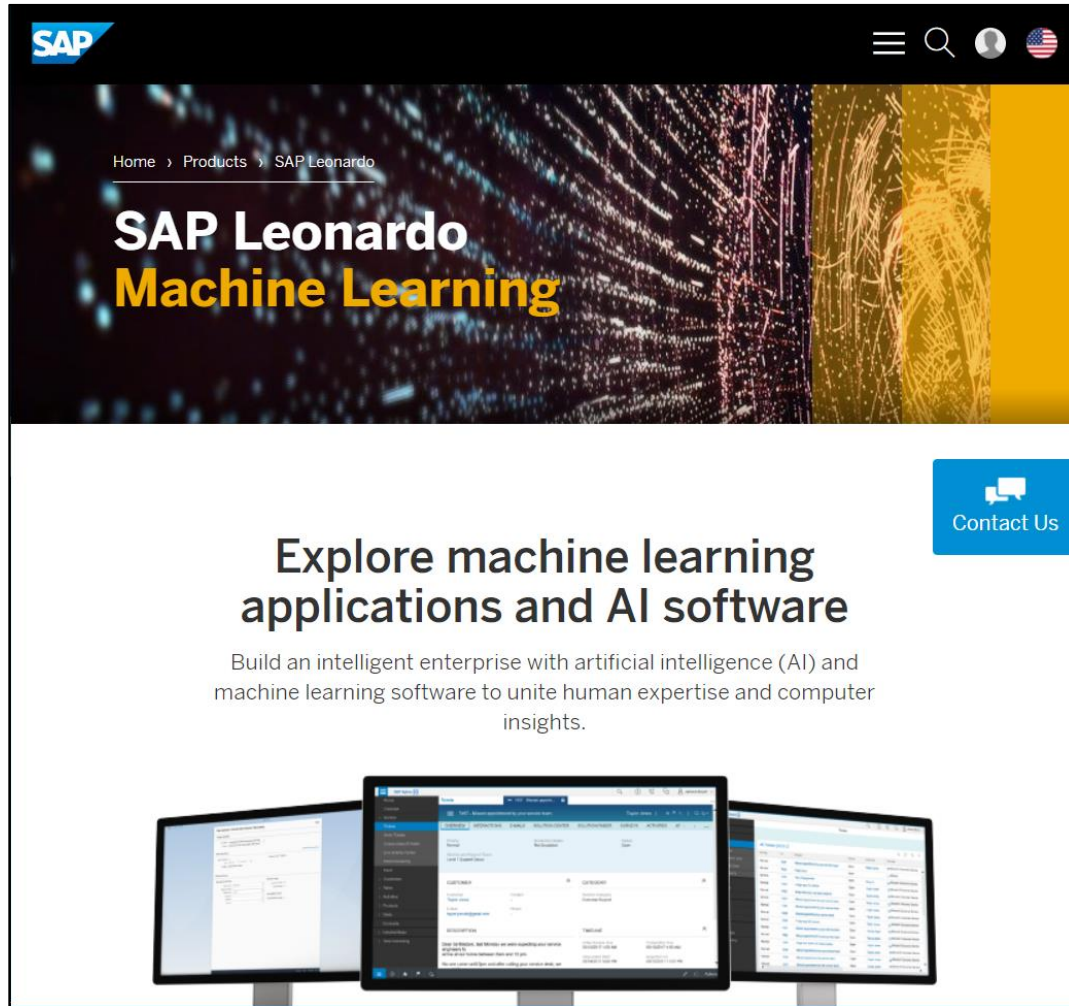
Machine Learning
Capabilities

[Machine Learning Tutorials](#)

[Community](#)

[Machine Learning
Resources](#)

Learn More



Websites

- ML overview website: sap.com/ML
- Product website: sap.com/products/machine-learning-foundation.html

Online Courses

- SAP Leonardo Machine Learning Foundation – An Introduction <https://open.sap.com/courses/leo5>
 - Enterprise ML in a Nutshell <https://open.sap.com/courses/ml1>
 - Enterprise Deep Learning with TensorFlow <https://open.sap.com/courses/ml2/>
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Thank you.

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