

SAP Leonardo **Machine Learning** - turning insight into action, for truly live business

SAP Leonardo Machine Learning
May 2017

CUSTOMER

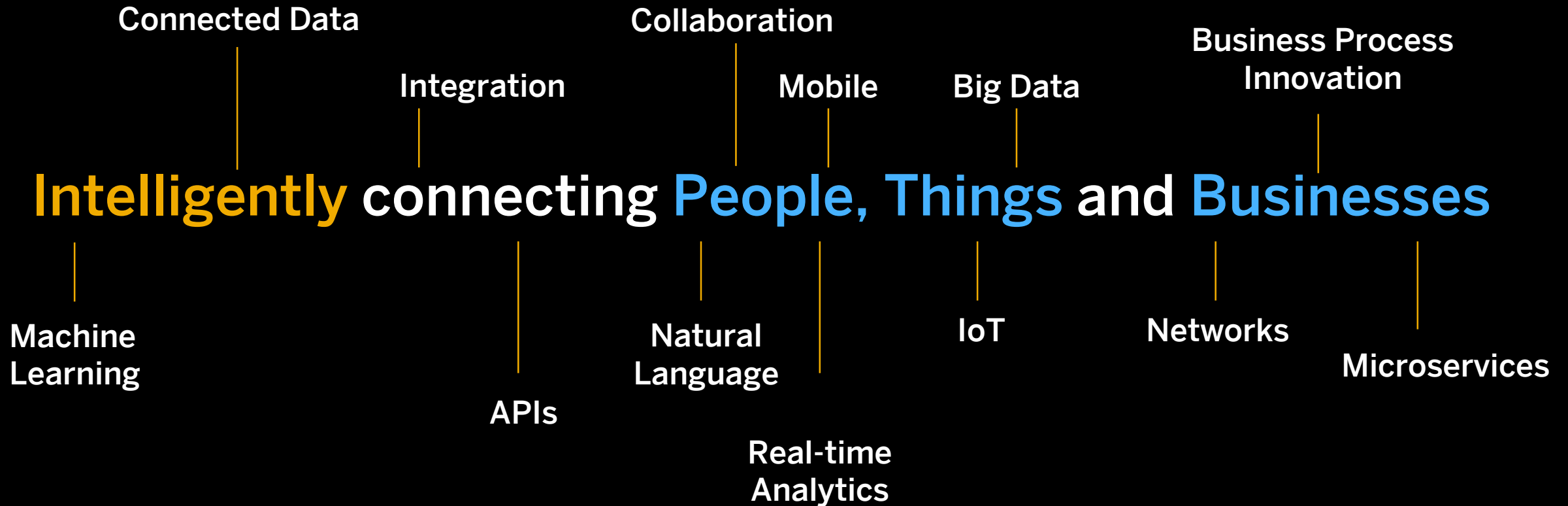
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Digitization

Every company to become a software-driven company by



The logo features the word "SAP" in a bold, white, sans-serif font with a registered trademark symbol (®) to its right. To the right of "SAP" is the word "Leonardo" in a larger, white, sans-serif font. The entire logo is centered within a dark blue, rounded rectangular shape that has a subtle glow effect.

SAP Leonardo

*The **digital innovation system** that enables you to **innovate at scale** to confidently redefine your business.*

SAP Leonardo Digital Innovation System

SAP Leonardo Digital Innovation System

Design Thinking Services

SAP Leonardo
Technologies



SAP Cloud Platform

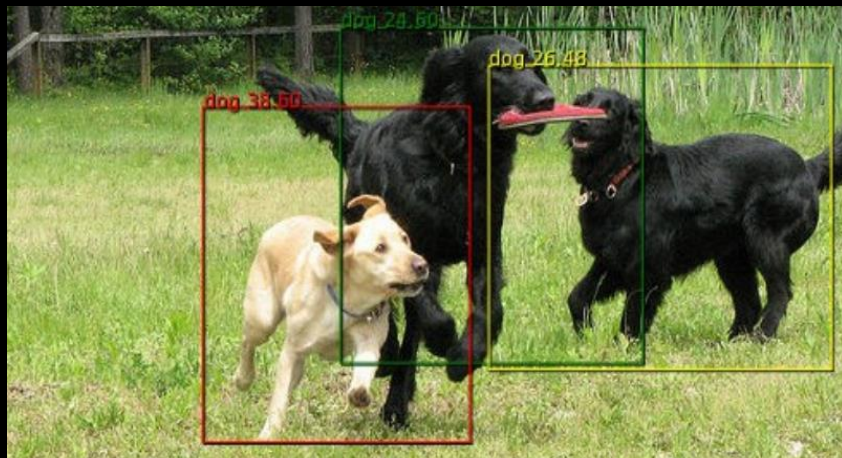
Microservices | Open APIs | Flexible Runtimes | Integration

Technology trends: Computer vision

Computer vision is surpassing human abilities



Water
Travel
No person
Sea
Landscape



A skier is jumping
over snow
covered hill

Sources: LeCun: The unreasonable effectiveness of deep learning, Zeiler: Visualizing and Understanding Convolutional Networks, <http://www.clarifai.com/>, <http://imageannotator.cs.tau.ac.il/>

Example:

Computer vision is surpassing human abilities

Automated captioning

ImageNet performance



A dog with ball in its mouth



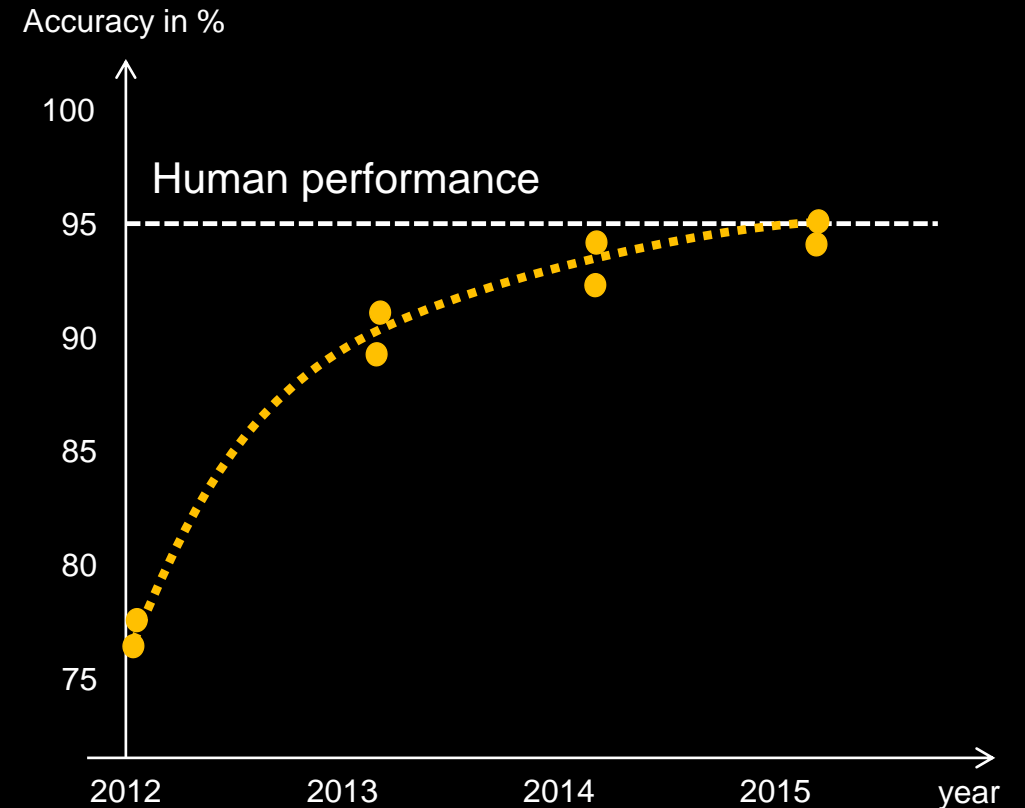
Group of seven people



Late 19th-century architecture



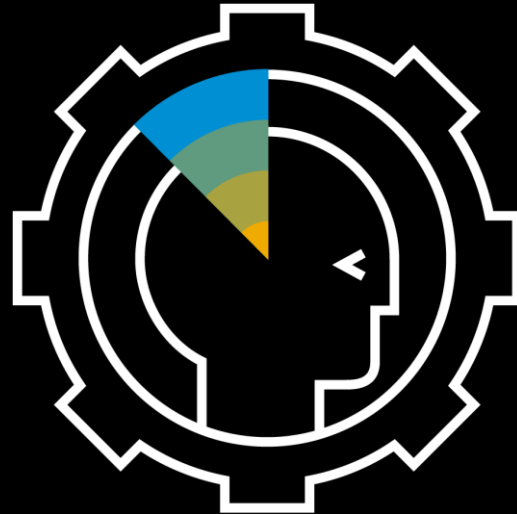
A skier is jumping over snow covered hill



Machine learning is the reality behind artificial intelligence

What is machine learning?

- Computers learn from data without being explicitly programmed.
- Machines can see, read, listen, understand, and interact.

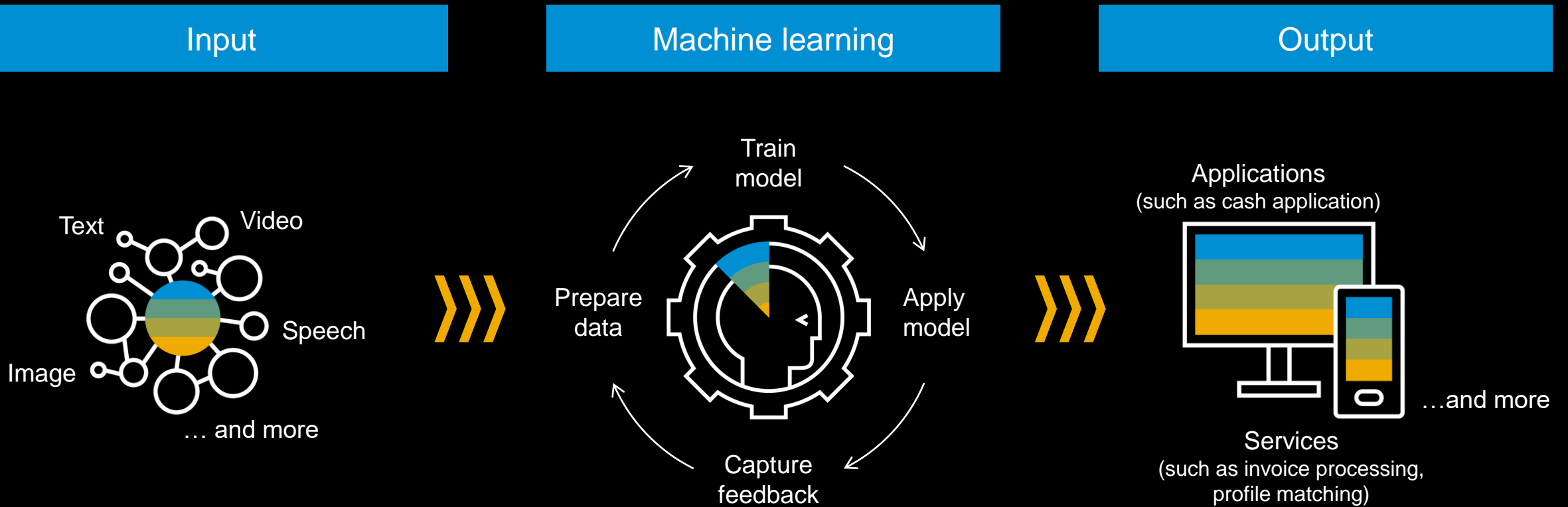


Why now?

- Big Data (for example, business networks, cloud applications, the Internet of Things, and SAP S/4HANA)
- Massive improvements in hardware (graphics processing unit [GPU] and multicore)
- Deep learning algorithms

How enterprise data is transformed into business value

From data to insights



SAP Leonardo Machine Learning has great traction

Successful customer deployments. Recognized industry leadership.

Industry recognition

Forrester: Leader

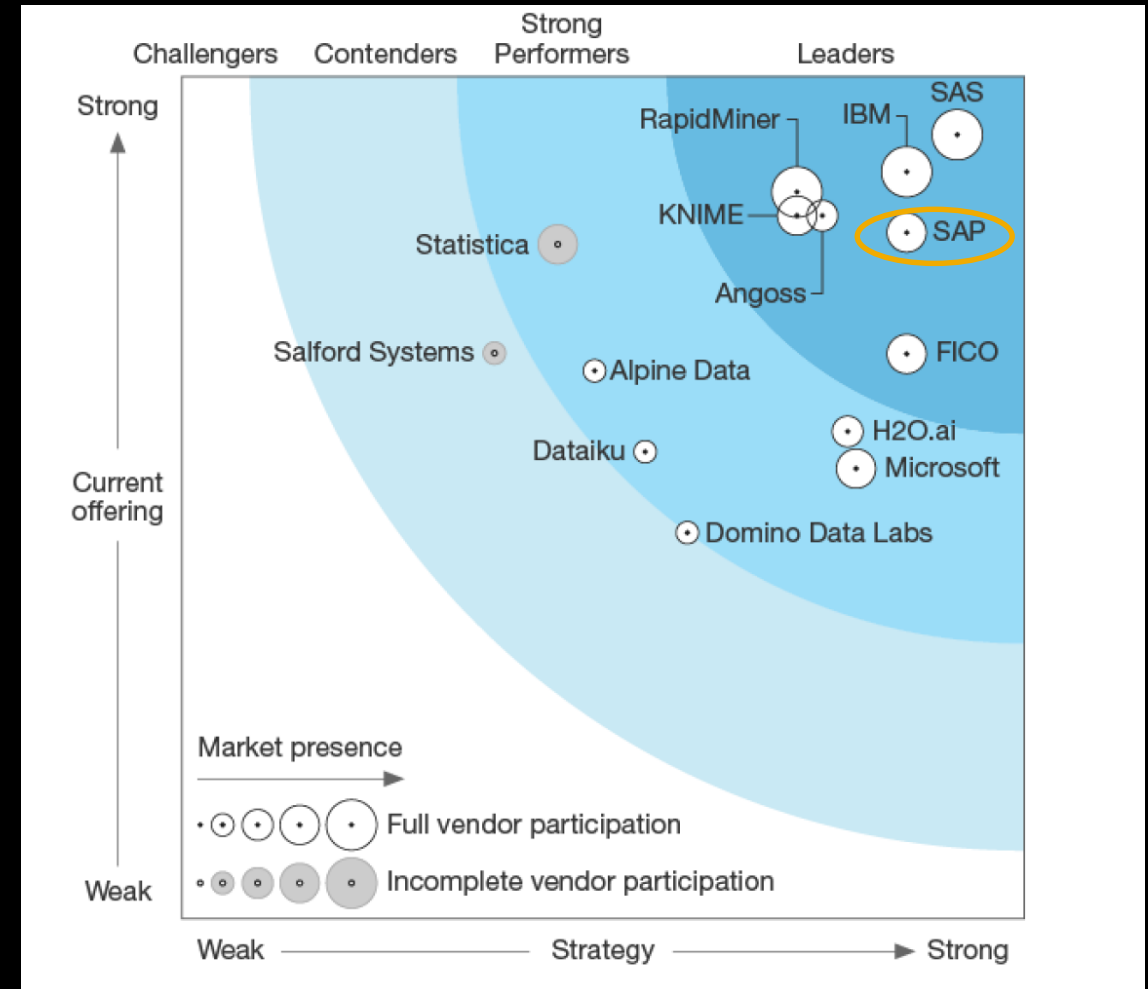
“SAP draws a straight line from predictive models to business applications.”

Hurwitz: Victor

“Fast time to value and ability to support very large data sets.”

Dresner: Top vendor

“The top vendors for advanced and predictive analytics include SAP.”



SAP Leonardo Machine Learning enables the intelligent enterprise



76% of the world's transaction revenue

25 industries

12 lines of business

The world's largest business network



SAP Leonardo Machine Learning

Applications

Business services

Functional services

Lifecycle management

SAP Cloud Platform and SAP HANA



Business Outcomes



Increase revenue with superior sales targeting and execution



Re-imagine business processes with digital intelligence



Improving quality time at work for employees



Increased customer satisfaction with superior service



Enabling product, process & business model innovations

SAP's vision for enterprise machine learning

SAP Leonardo Machine Learning

Create your own intelligent infrastructure

Automate Knowledge Work



- Transformational **HR** services



- Lights out **finance** operations

SAP S/4HANA



- Self-driving customer **service**
- Conversational **sales** bots
- Customer **retention** insights

Do the Impossible



- Image-based Ariba **commerce**
- Contextual Concur **travel** concierge



- Video-aware **marketing**
- Visual **store execution**



- Drone and satellite-based **asset management**



- Vision-enabled **manufacturing**
- Contextual **logistics**

SAP S/4HANA

SAP Cloud Platform and SAP HANA

Machine Learning is embedded across the SAP portfolio

	Available now	Wave 2	Wave 3	
Finance	Cash Application	Accounts Payable	Predictive Accounting	...
Marketing	Brand Impact		Customer Behavior Segmentation	...
Sales	Customer Retention	Sales Forecasting	Profile Completeness	...
Service	CoPilot	Service Ticketing	Solution Recommender	...
Human Resources	Resume Matching	Learning Recommender	openSAP Translation	...
Procurement		Financial Advising	Goods & Services Classifier	...
Supply Chain		Forecasting (IBP)	Stock in Transit	...
Platform	Machine Learning Foundation		Model Training Infrastructure	...

SAP Cash Application

Next-generation intelligent invoice matching powered by machine learning



SAP Cash Application intelligently learns matching criteria from your history and automatically clears payments.



Improves days of sales outstanding



Integrated with SAP S/4HANA for reduced TCO and time to value



Allows shared services to scale as the business grows



Empowers finance to focus on strategic tasks and service quality

SAP Brand Impact

Reimagine marketing and sponsorship engagements



SAP Brand Impact automatically analyzes brand exposure in video and images by leveraging advanced computer vision techniques. It helps media agencies, production companies, and brands to gain accurate, timely insights into sponsoring and advertising ROI.



Fast: Near real-time



Transparent
Interactive interface



Accurate and scalable
to millions of hours




Time-annotated
impact indicator API
for combining data
with CRM, ERP,
Web site stats

SAP Service Ticketing


Accelerate customer service in an omnichannel front office




SAP Service Ticketing automatically processes customer enquiries to deliver best-in-class customer service.



Improve service response times with automated processing



Integrated with SAP Hybris Service Cloud for reduced time to value



Allows customer service to scale with increased digital interactions

SAP Customer Retention

Build customer loyalty through proactive retention



SAP Customer Retention identifies leading indicators based on transactional interactions to anticipate customer behavior, such as product cancellations or renewals



Automatically classifies
and finds patterns



Detects at-risk
customers



Provides understanding
of root causes and
timely predictions to act

SAP Resume Matching

Find the best talent faster with intelligent candidate matching



SAP Resume Matching automates the screening process by identifying the candidates with the best skills and education match with reduced bias



Fast-track the screening process to save time and effort



Identifies the best candidates and reduce false positives



Reduces possibility of missing potential candidate



Mitigates the recruiter's personal bias in screening candidates

SAP Job Standardization

Find the best fit job category faster with intelligent job description matching



SAP Job Standardization classifies job descriptions against job standards (such as the Occupational Information Network, O*NET)



Time Saving in
searching for job
category



Creates common
language and improves
consistency



Better targeted
recruiting efforts lead to
better job transparency

SAP Fraud Management

Identify fraud behavior



SAP Fraud Management increases accuracy of fraud alerts with predictive algorithms that identify potential cases based on historical data.



Ability to focus on cases with highest likelihood of fraud and ROI



Integrated with SAP HANA for reduced TCO and time to value



Models update as patterns of fraud evolve



Custom and 3rd-party algorithms to optimize for customer's business

We are building the next set of use cases

Examples of Q2/Q3 2017 road map



Remittance advice scanning automatically extracts payment information from unstructured data for further processing.



SAP Accounts Payable is an expanding suite of services that automate the accounts payable processes.

SAP Accounts Payable

Automate the accounts payable processes



SAP Accounts Payable is an ever-expanding suite of machine learning services that automate accounts payable processes. Based on deep learning it processes incoming invoices and extracts important information. For a high level of compliance it also supports matching invoice vendors to your master database.



Automates and speed up the process from minutes to seconds



Reduces number of errors and effort when posting invoice data to record with higher accuracy



Increases quality and compliance, number of matches in a shorter amount of time and potential throughput of invoices

SAP Leonardo Machine Learning solution portfolio

Including the first wave of intelligent applications

SAP Leonardo Machine Learning

Applications

- N** SAP Service Ticketing
- N** SAP Customer Retention
- N** SAP Brand Impact
- N** SAP Resume Matching
- N** SAP Cash Application
- N** SAP CoPilot
 - SAP Fraud Management

SAP Cloud Platform

SAP Analytics Cloud

- N** Business services
- N** Functional services

SAP HANA Platform / (DBaaS)

On-Premise

SAP Predictive Analytics

SAP HANA Platform



Users



Analysts



Developers



Developers

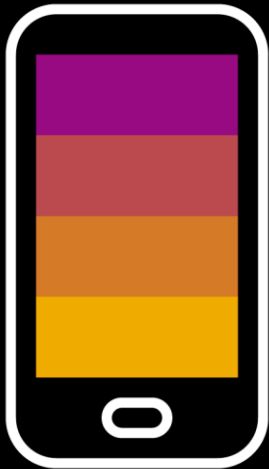


Analysts

N New intelligent application

SAP CoPilot

The digital assistant for the live enterprise



SAP CoPilot - One digital assistant
with one personality across all
products and solutions, industries
and lines of business



Business context awareness

Understanding the business context, and pro-actively suggesting solutions using predictive functionality



Conversational (multi-modal) UI

Conversational UI using Natural Language Processing functionality with a focus on the next-gen UX to create a human-like experience



Cross Applications

Allows seamless transition across platforms; start a task on a mobile device and continue later, on a desktop or vice versa



Self Learning

Using machine learning functionality to gain knowledge based on historic data, experience, and take action in response to new or unforeseen events

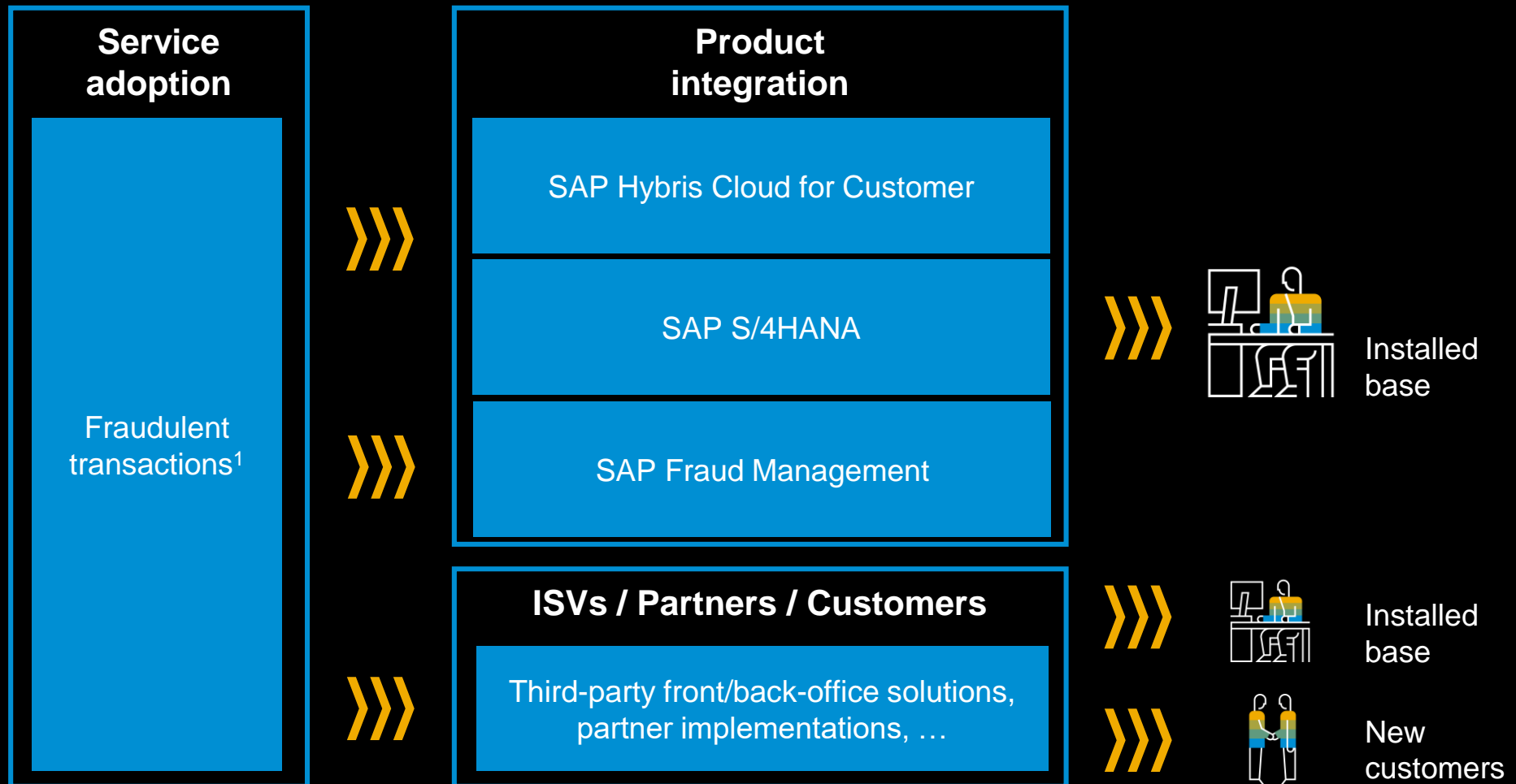


Simple Access to Enterprise AI Platform

Integration to SAP and Non-SAP Solutions
Simple access to Natural Language Processing and Machine Learning functionality via APIs

The versatility of SAP Leonardo ML Foundation - Business Services





Embedded in SAP standard solutions and available for building your own applications



1) Depending of services integration will be via API or SAP BusinessObjects Predictive Analytics integrator

SAP Leonardo Machine Learning Foundation services portfolio

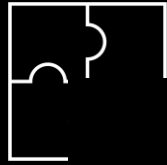
NOW AVAILABLE on the [SAP API Business Hub](#): SAP Leonardo ML - Functional Services

	 Tabular	 Image	 Text	 Audio/ Video
General availability*	<ul style="list-style-type: none"> Time series change point detection Time series forecasting (AA algorithm) Clustering Key influencer analysis Outlier detection Recommendation What-if analysis 	<ul style="list-style-type: none"> Image classification Image feature extraction Earth observation analysis 	<ul style="list-style-type: none"> Topic detection/keyword extraction 	
Alpha	<ul style="list-style-type: none"> Time series forecasting (R algorithms) Similarity scoring 	<ul style="list-style-type: none"> Product image classification 	<ul style="list-style-type: none"> Machine translation Document feature extraction Language detection Product text classification 	
Road map	<ul style="list-style-type: none"> Time-to-failure forecasting Association rule learning 	<ul style="list-style-type: none"> Image segmentation Face detection Document optical character recognition Image text extraction Image NER/extraction Apparel detection 	<ul style="list-style-type: none"> Sentiment analysis Named entity recognition Text classification Hate speech detection File-to-text conversion 	<ul style="list-style-type: none"> Speech-to-text Text-to-speech Voice recognition (speaker identification) Video object segmentation Video classification Video human action recognition

* Prioritized for SAPPHIRE NOW delivery

SAP Leonardo ML Foundation - Functional Services Use Case Sample

Broken Product Similarity Search



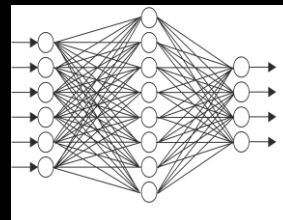
Service Ticket, e-mail incl.
image of broken product



Image Feature Extraction
Similarity Scoring



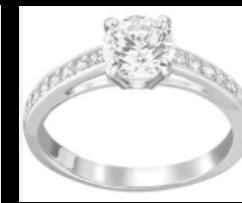
Product Identification and
automatic classification



1% Necklace
2% Bracelet
96% Ring
1% Other



92% Model A



75 % Model B



60% Model C

SAP Leonardo Machine Learning automatically classifies product images and enables faster customer interaction with precise information on potential product repair cost or item substitution.

SAP Leonardo ML Foundation - Functional Services Use Case Sample

Trend Color Prediction powered by functional services



Social Media Data
Influencers Fashion Data
WGSN Fashion Data
Sales Data
Weather Data
Other Sources



Apparel type detection
Color detection
Gender detection
Age detection



Color Trend Prediction
In-Store Manufacturing
Micro Season Forecast

SAP Leonardo Machine Learning analyzes and predicts color trends to better understand current, past fashion trends in market and consider that for apparel production forecast

SAP Leonardo Machine Learning road map intelligent features

Many new features planned for 2017

	Available	Shipping (Q2 2017)	Building (Q2/Q3 2017)
Applications	<ul style="list-style-type: none"> SAP Fraud Management SAP Cash Application (SAP S/4HANA) <p>(Partial list)</p>	<ul style="list-style-type: none"> SAP Resume Matching (SAP Fieldglass solutions) SAP Service Ticketing (business service, SAP Hybris Cloud for Customer) SAP Brand Impact (new product) SAP Customer Retention (new product) SAP S/4HANA Sourcing and Procurement – predict contract consumption 	<ul style="list-style-type: none"> SAP Accounts Payable (business service, Concur solutions) Remittance advices (SAP S/4HANA) Goods and services classifier (SAP Ariba solution) Supply chain finance capability Concur Triplt classifier SAP S/4HANA Finance – predictive close Sales forecasting capability for SAP S/4HANA Produce stock in transit capability for SAP S/4HANA Situation handling capability for SAP S/4HANA – payment block/ cash discount at risk Master data governance capability for SAP S/4HANA – predictive workload
Platform	<ul style="list-style-type: none"> SAP Leonardo Machine Learning embedded in SAP HANA SAP Predictive Analytics SAP Analytics Cloud SAP Cloud Platform predictive services 	<ul style="list-style-type: none"> SAP Leonardo Machine Learning Foundation for internal usage Predictive analytics integrator SAP S/4HANA on demand 	<ul style="list-style-type: none"> SAP Leonardo Machine Learning Foundation release to customer SAP Leonardo ML Foundation - Functional Services SAP Leonardo ML Foundation training environment SAP S/4HANA

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)

Links and further information



Official Website

→ For updates and more information check our sap.com/ml

Education

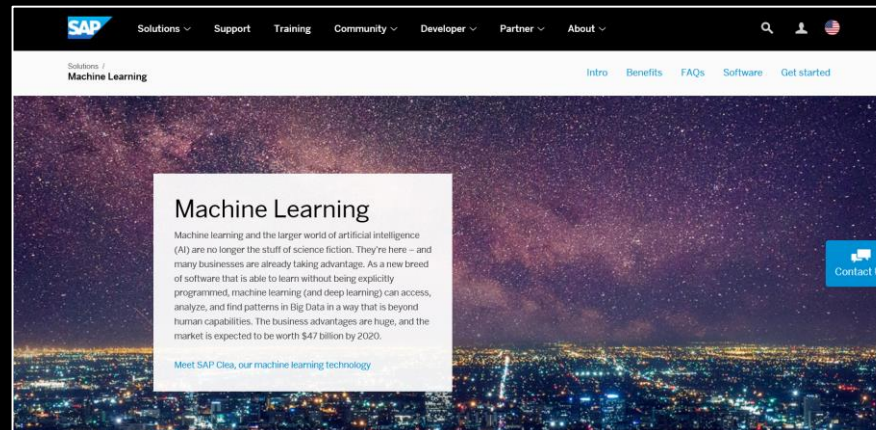
→ Participate in the openSAP course **Enterprise Machine Learning in a Nutshell** (overview course)

SAPPHIRE NOW

→ Include SAP Leonardo Machine Learning in your SAPPHIRE NOW plans (visit us at **Booth DP 507**) and reach out to your account teams to plan dedicated experience tour

Early adoption and co-innovation

→ Be an early adopter and co-innovate with us for next-wave cases



Thank you.

SAP Leonardo Machine Learning

May 2017

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