



SAP Leonardo Big Data **and the Digital Platform for the Intelligent Enterprise**

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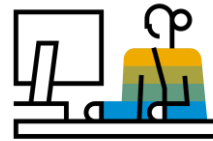
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The Digital Era is evolving into The Intelligence Era



Mainframe & PCs
1960s – 1980s



Client Server & Internet
1990s - 2000s



Cloud, Mobile & Big Data
2000s - 2010s



Intelligent Technologies
2010s - 2020s

ENABLING TECHNOLOGIES

- Transistors & silicon revolution
- Large scale Mainframe Computing adoption
- Emergence of PC's
- Plant floor automation

- Widespread PC adoption
- Broadband Internet
- ERP and business process technologies

- Mobile & Smartphone ubiquity
- Cloud Computing
- Social Networks
- Big Data

- Machine learning (ML) and artificial intelligence (AI)
- Internet of things (IoT) and distributed computing
- Blockchain

CUSTOMER VALUE CREATION

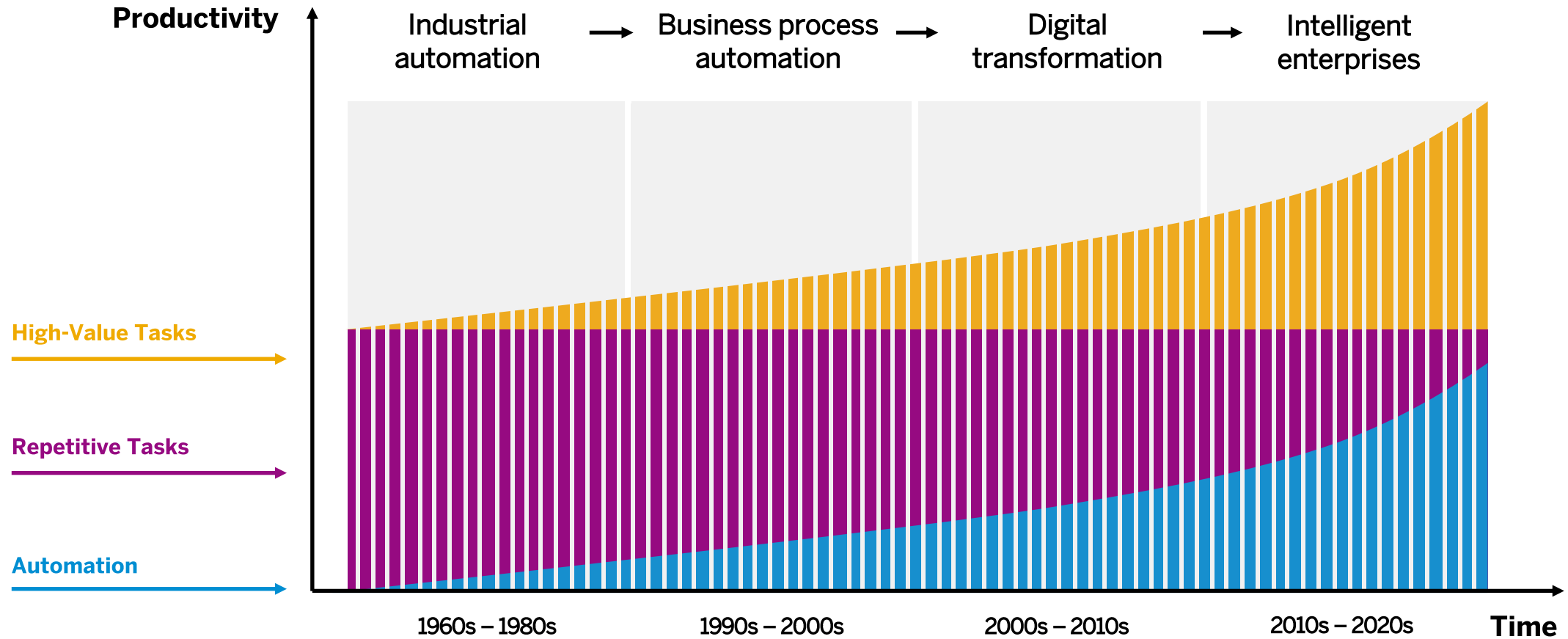
**Industrial
Automation**

**Business Process
Automation**

**Digital
Transformation**

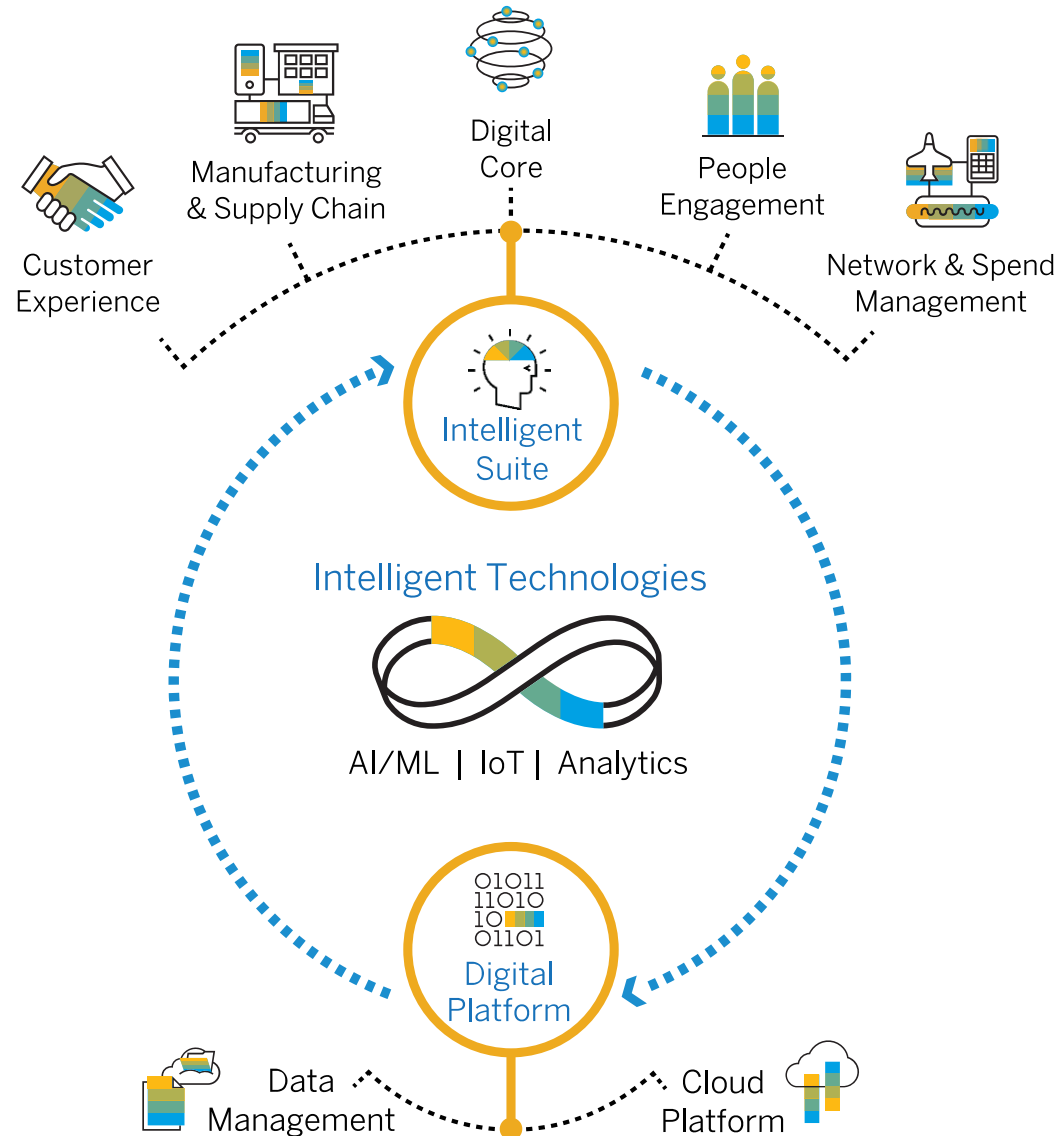
**Intelligent
Enterprise**

Intelligent enterprises elevate employees to focus on higher-value tasks



SAP Strategy – Deliver the Intelligent Enterprise

THE INTELLIGENT ENTERPRISE features **3 KEY COMPONENTS**:



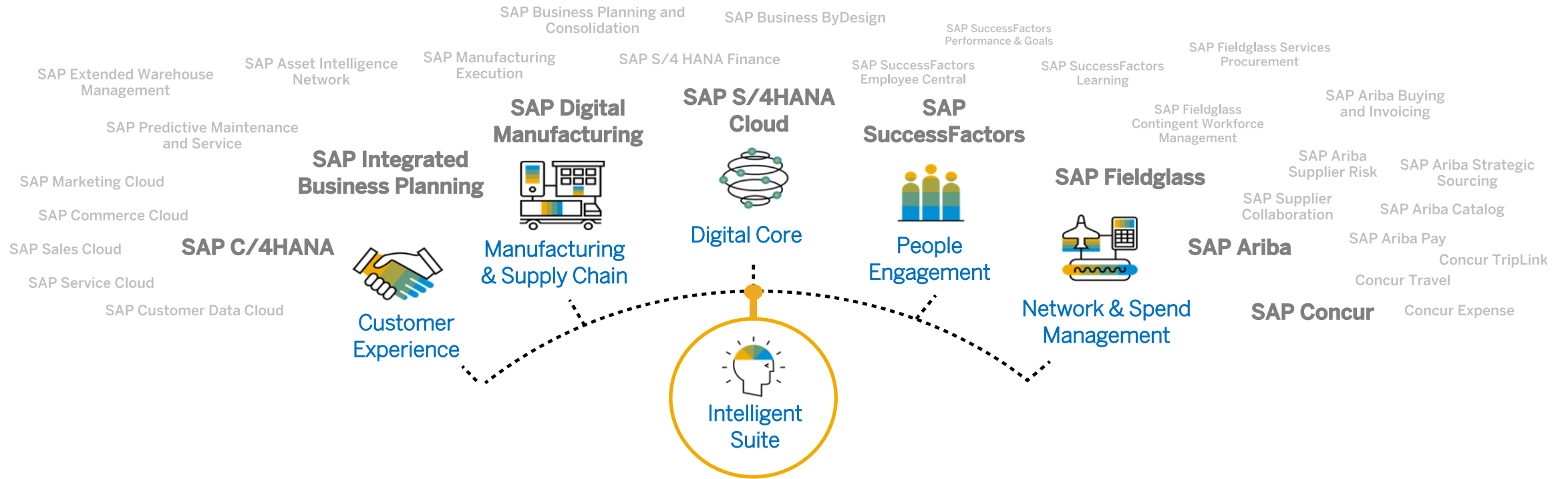
1 Intelligent Suite

2 Digital Platform

3 Intelligent Technologies

Intelligent Suite: Deliver intelligence across value chains

Intelligent applications for every line of business



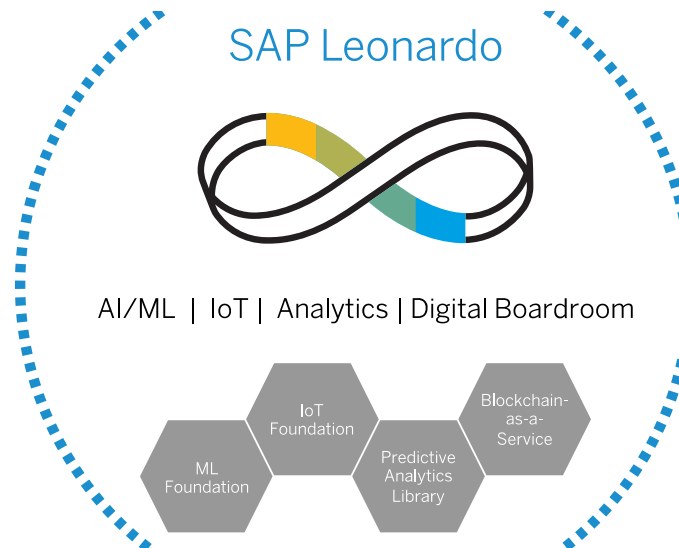
Integration | Business Objects | Master Data | Orchestration
 25 Industries | 180+ Countries

Intelligent Technologies: SAP Leonardo everywhere

Core Applications

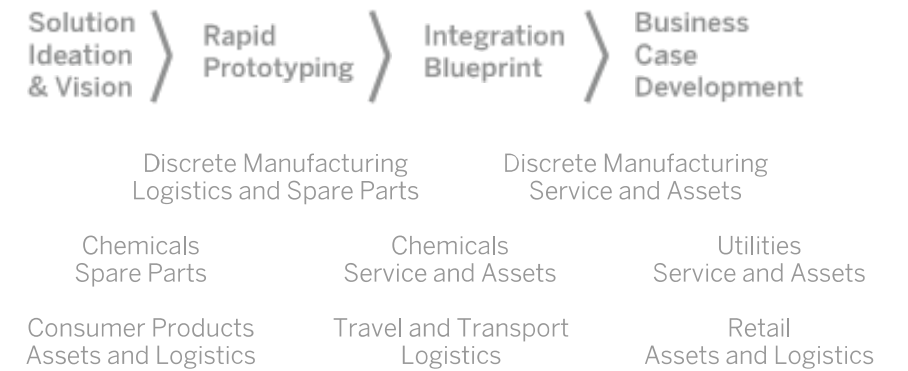
SAP Leonardo embedded

SAP Intelligent Cash Management	SAP Service Ticket Intelligence	SAP Brand Intelligence
	SAP Customer Retention	SAP Resume Matching
SAP Global Track and Trace	SAP Predictive Engineering Insights	
SAP Vehicle Insights	SAP Manufacturing Execution	SAP Asset Intelligence Network
SAP Predictive Maintenance and Service		



Industry Innovation Kits

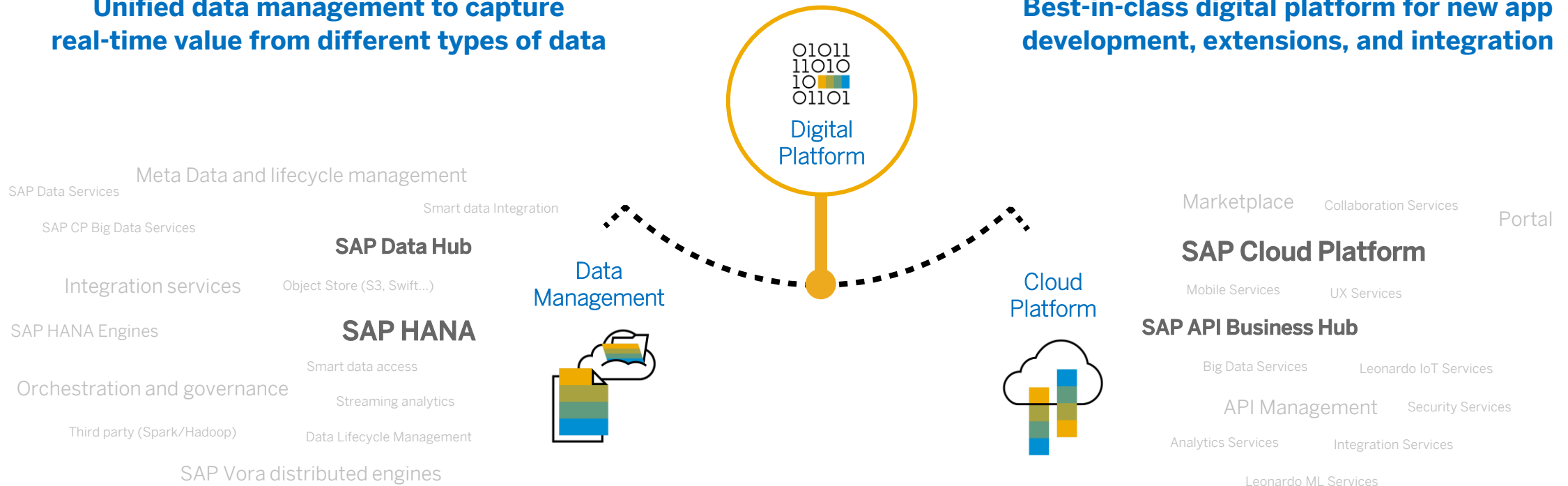
Industry-led SAP Design Thinking Methodology



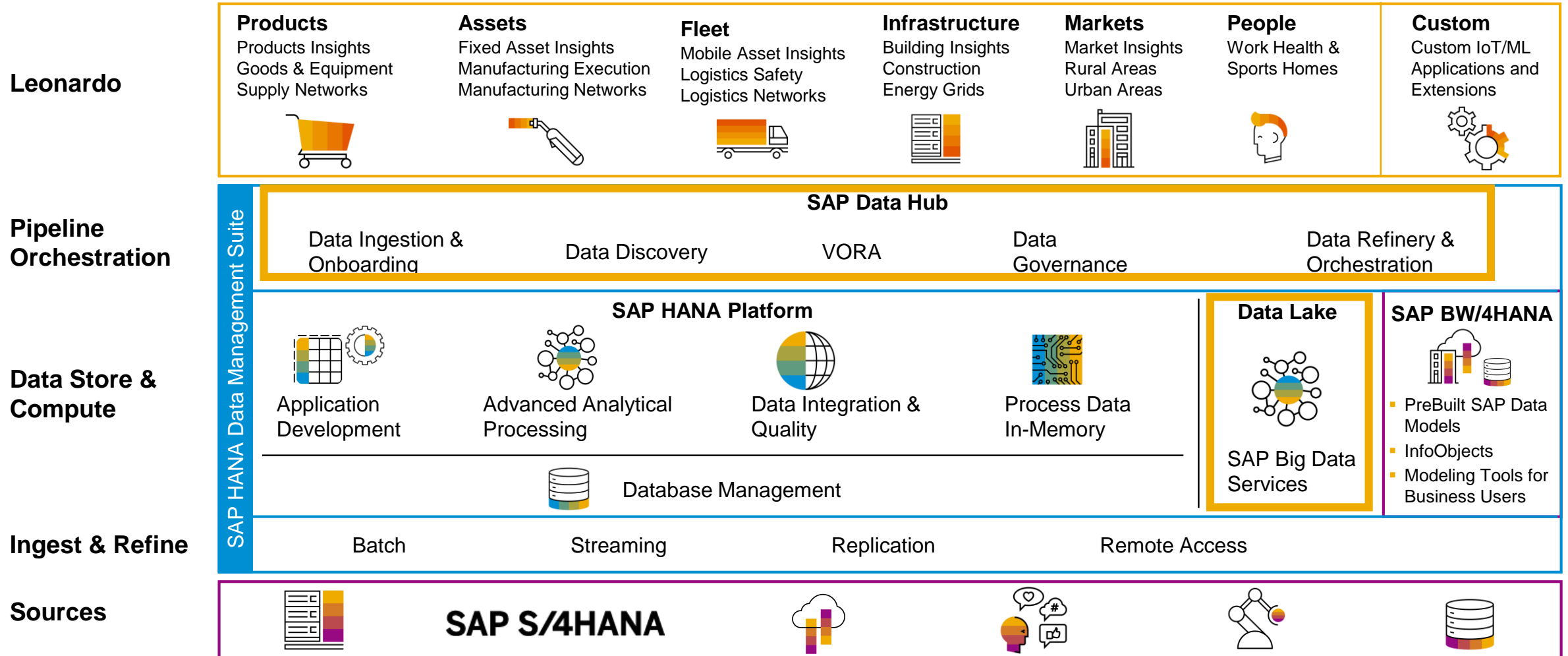
Digital Platform: Unlock data-driven intelligence and innovation

Unified data management to capture real-time value from different types of data

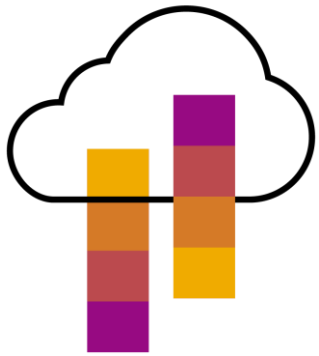
Best-in-class digital platform for new app development, extensions, and integration



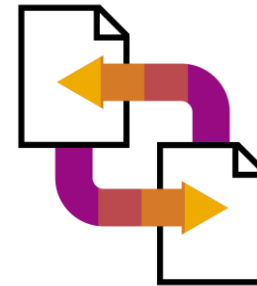
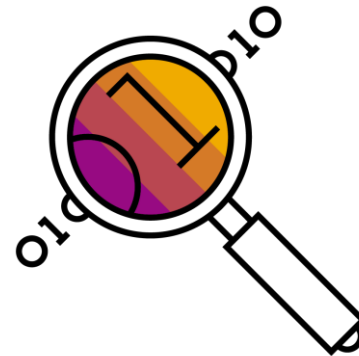
SAP HANA Data Management Suite empowering SAP Leonardo



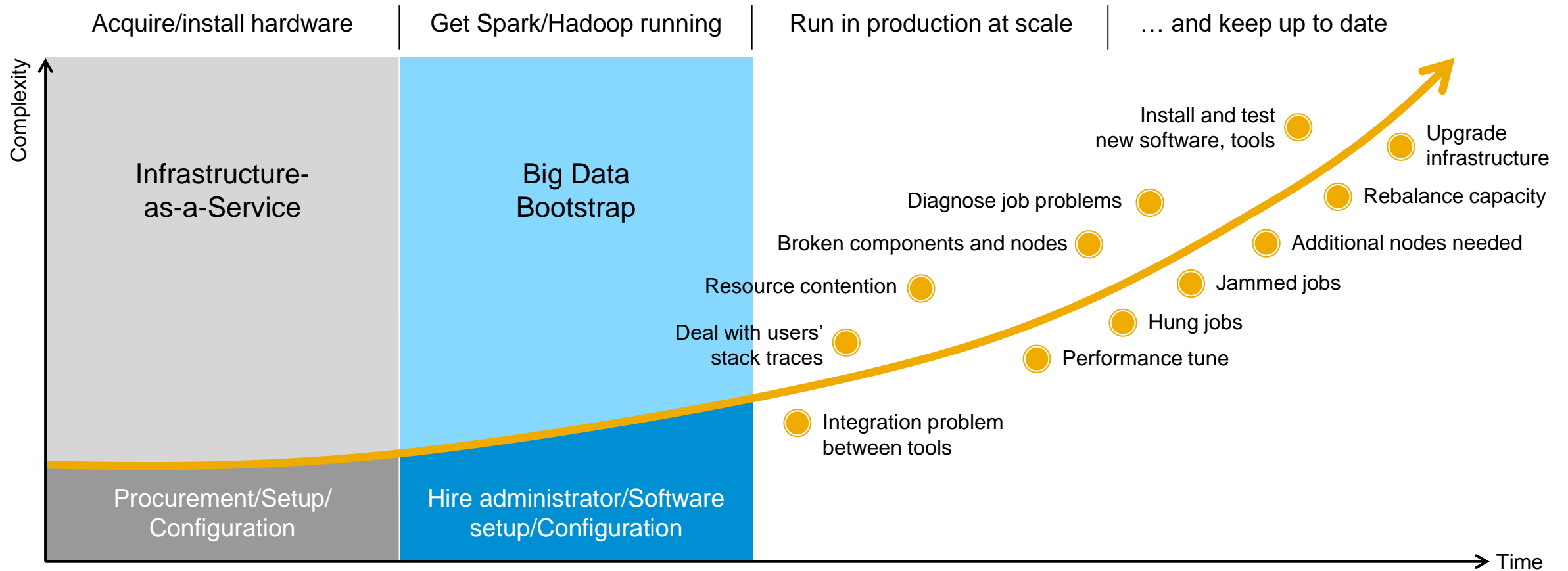
SAP BIG DATA SERVICES



01011
11010
10
01101



Big Data Is Complex, It Gets More Complex As You Scale



SAP Big Data Services : Big Data that just works

Enterprise-ready Hadoop and Spark fully managed by SAP



Fast time to value
days not months



Easier, faster scalability
with elastic scaling



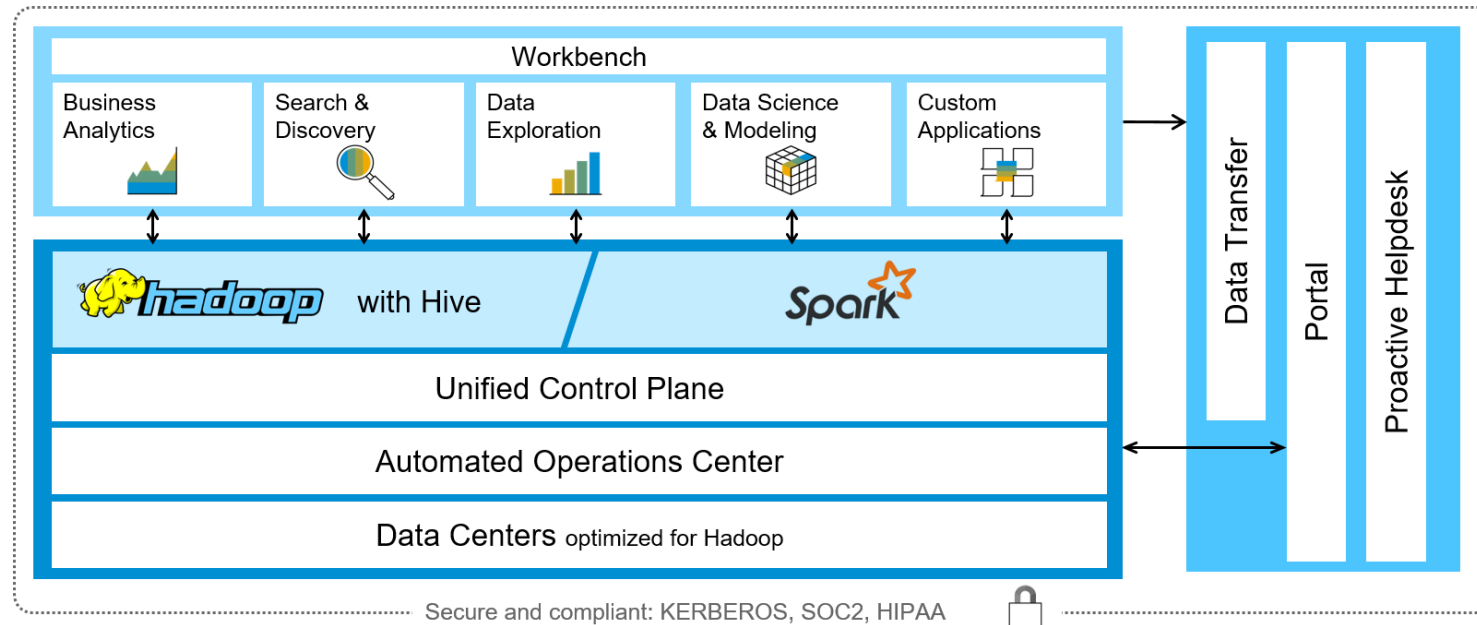
Operations support
so your jobs get done



Lower TCO
for fast investment payback



Enterprise ready
for business-critical applications



“White-glove service for Hadoop at a self-service price” – Forrester

Customer Use Case - 1

Marketing Analytics

Neustar MarketShare DecisionCloud

- Attribution analysis: measure, predict, and improve the impact of marketing on revenue
- Customers include retail, finance, hospitality, pharma, auto, and tech companies
- Massive, rapidly changing advertising data stored and analyzed in Hadoop

~2.5 PB of data provisioned on SAP Cloud Platform Big Data Services



Customer Use Case - 1

Marketing Analytics

Challenges due to inefficiencies of previous platform

- Job processing taking too long
- Poor service reliability
- Product development hampered
- Service costs driven up
- Number of customers limited

50%

Lower Cost



SAP Cloud Platform Big Data Services Benefits

- Greater client satisfaction due to higher performance and reliability
- More time to focus on analytics instead of Hadoop operations
- More effective resource allocation and cost management
- Increased solution competitiveness

10x

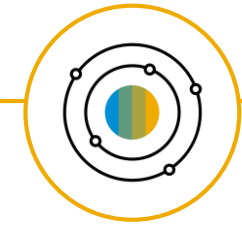
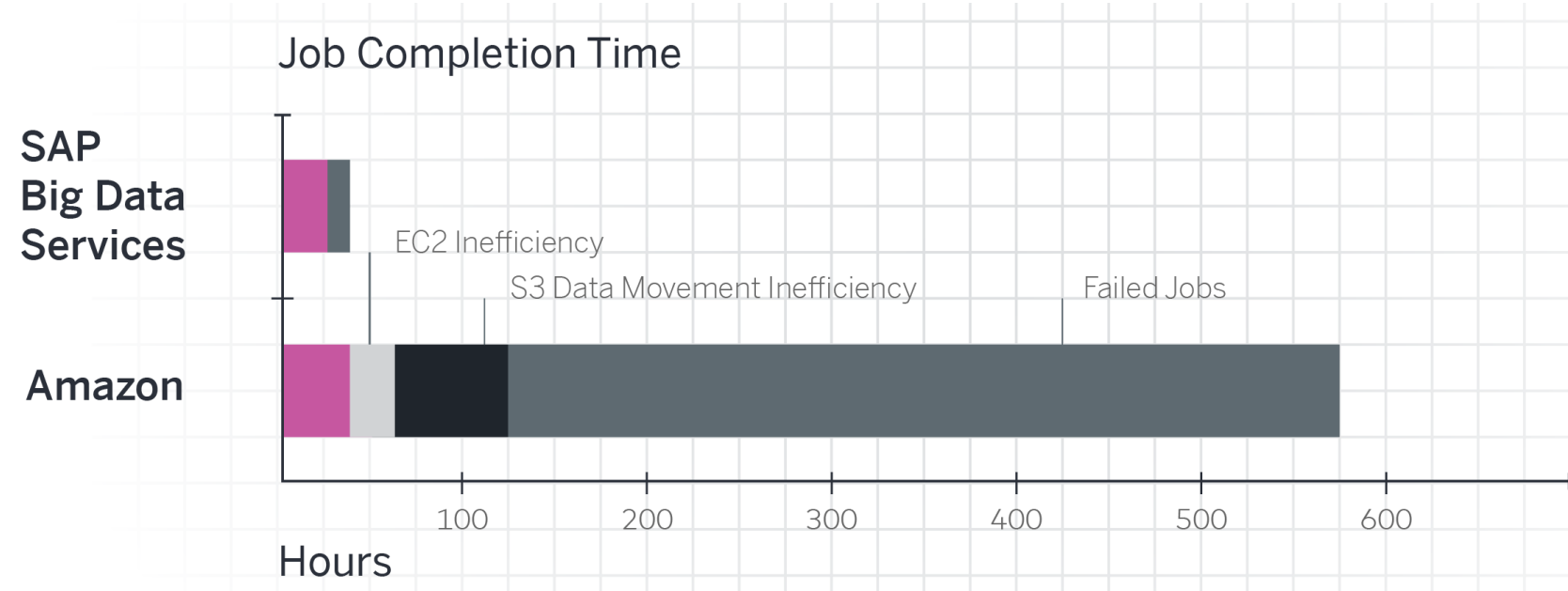
Performance



Customer Use Case - 1

Built for Performance

Superior reliability and efficiency drive performance



Big Data-optimized infrastructure

- HDFS, not object storage
- Data locality
- No virtualization overhead
- Transparently elastic

Customer Use Case - 2

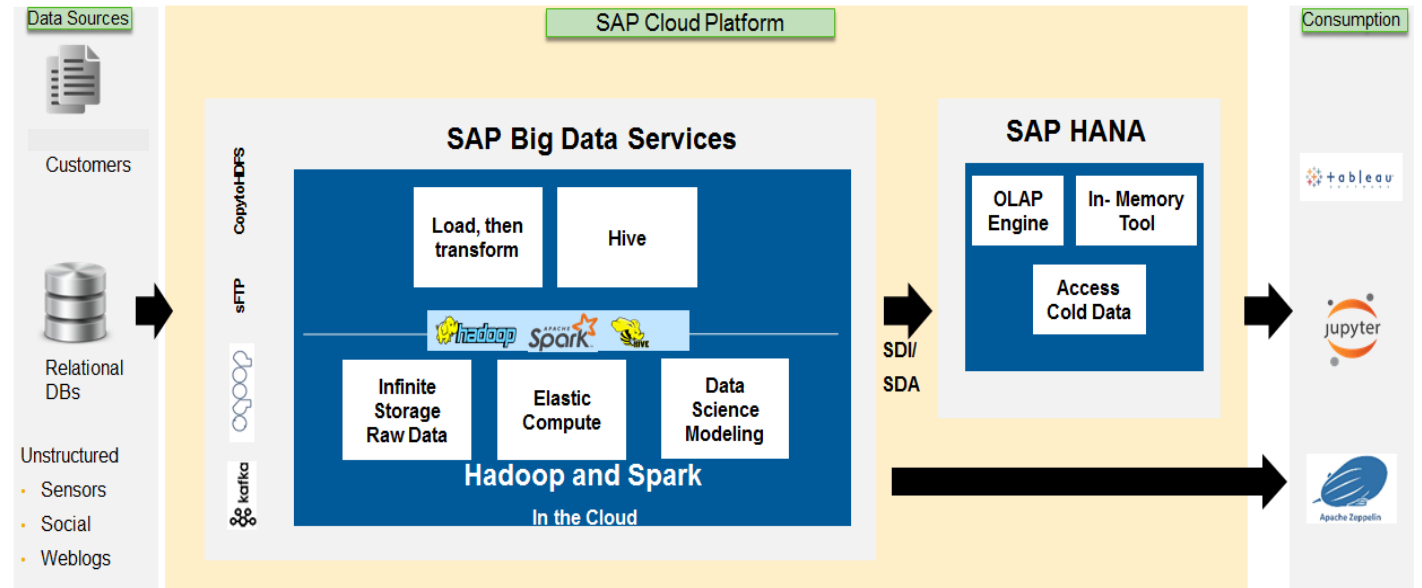
Big Data Warehouse with HANA and BDS

Enabling transparency between Retailers and Vendors

- Provides technology and expertise for retailers, suppliers and distributors to improve collaboration through data, payments, and analytics.
- Customer network includes over 30,000 retail outlets and over 3,000 distributors

Challenges due to inefficiencies of previous platform

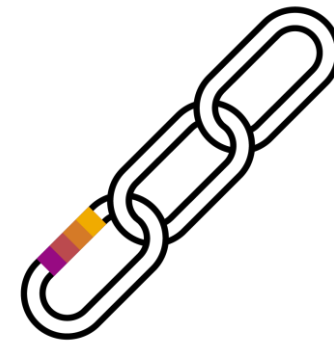
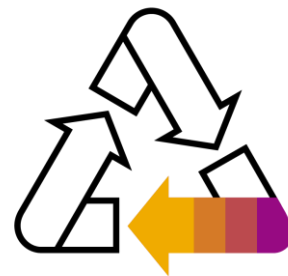
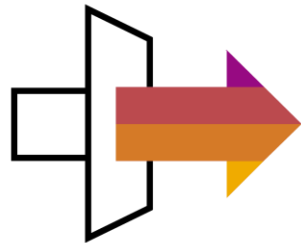
- Poor service reliability – User applications running slow or timing out due to concurrency issues
- Data Velocity – Long nightly daily batch window. Often completed during business hours.
- Business units not having access to the most accurate and up-to-date information about their customers
- Rising Maintenance costs



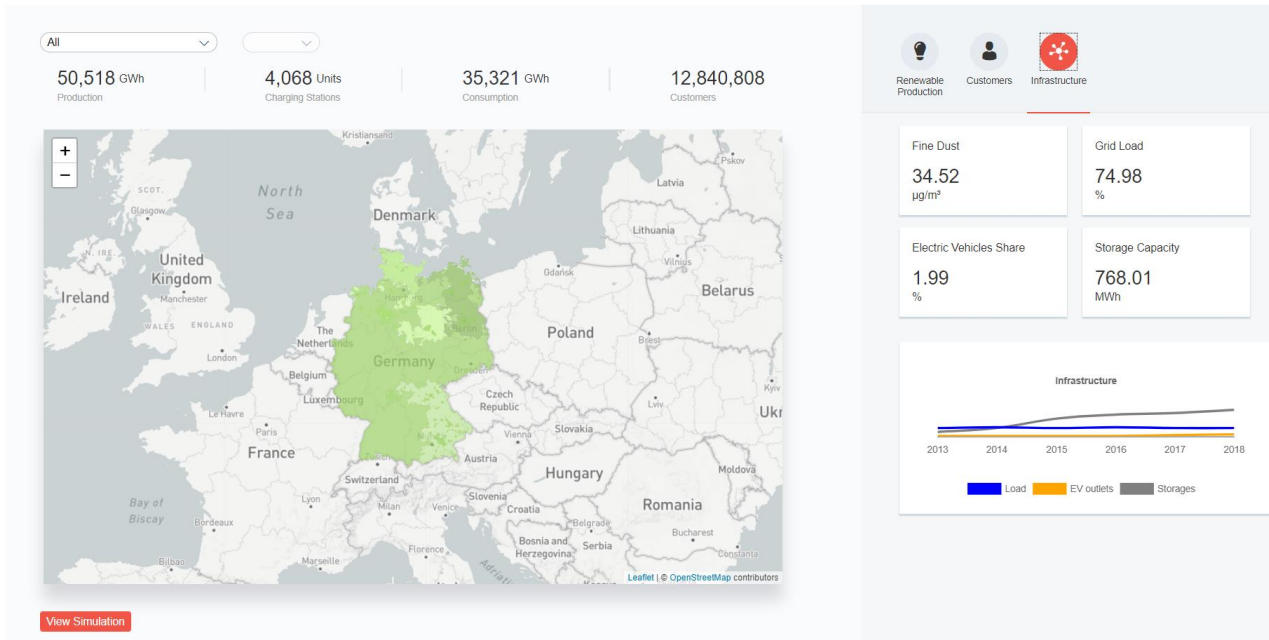
Why SAP ?

- Cost effective but also highly performant landscape : Use HANA for high performance reporting requirements for customers & use SAP BDS to collect and store high volume of data from 30.000 retail outlets
- Using Spark for the production pipeline will reduce the nightly batch window, thus business will be able perform analysis on the most recent data

SAP DATA HUB



How to accelerate Smart Infrastructure Development ?



Business Challenge

- Municipalities need to create a more “green” environment but don’t necessarily have visibility to the most effective investment options and the infrastructure required
- Grid Operators “know” energy production and consumption patterns & can recommend where and what to invest on renewable energy
- Create new revenue streams by providing advisory services to Municipalities on enabling “Green Cities”

Solution

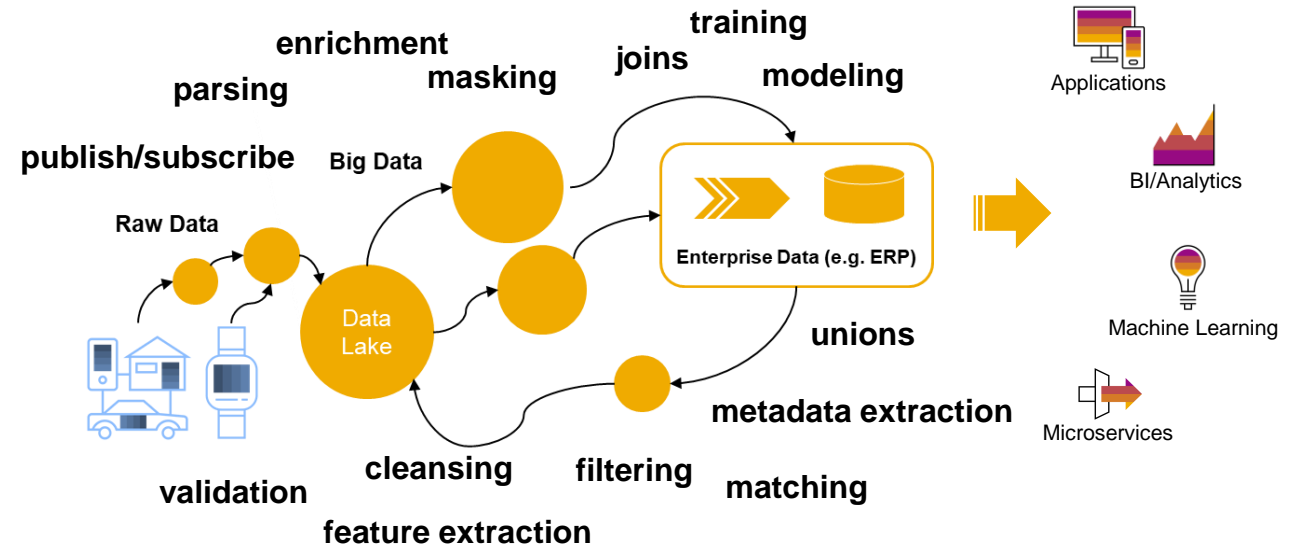
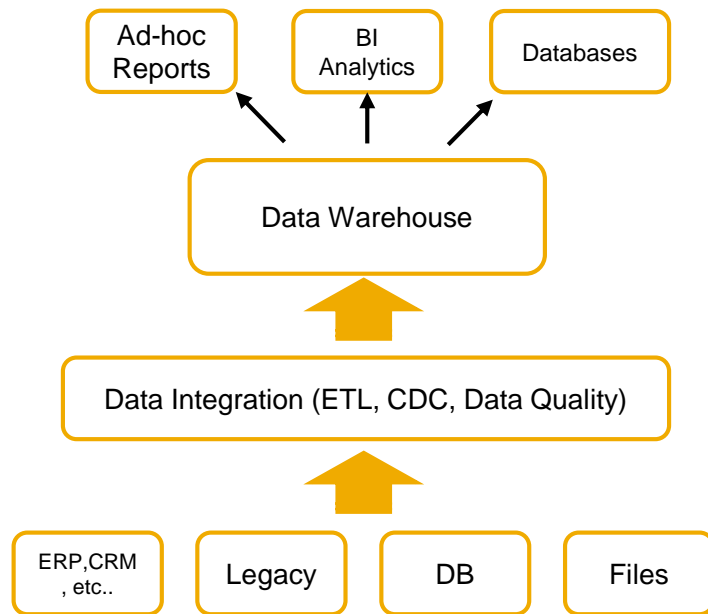
- Create a unified view of all customers, assets, energy consumption & production values, grid load, energy price data and other related datasets across the country
- Simulation capability on different renewable energy investment options using Machine Learning

How to...

- Easily combine datasets from multiple different systems :
 - Customer & Energy Consumption (SAP Utilities)
 - Assets and Capacity (SAP ERP and non-SAP CRM)
 - Grid Load (Historian/Scada systems)
 - Energy Pricing, Weather, Finedust data (online - opensources)
- Predict Future Grid Load by running a Machine Learning algorithm on the combined data set
- Provide E2E monitoring on the overall process, quickly identify errors

Modern Landscapes

How Big Data is Transforming Landscapes



- Handling large volumes of data is not the main concern
 - Enable early insights on all levels of data
 - Ensure integrated analytics across the enterprise
 - Not just on-premise but distributed

- ETL or DWH are not the answer
 - Data formats, granularity, streams & flexible structures
 - Apply logic to the data, not data to the logic
 - Not just batch but also real-time

SAP Data Hub

Why is it Unique ?

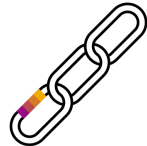
SAP Data Hub enables agile management of data in a diverse landscape across the organization.

This enterprise-ready solution provides **governance and orchestration** for **data refinement and enrichment**, using **pipelining of many complex data processing operations**, like machine learning (ML).



Visibility

Centralized View
of all data sources



Orchestration

Seamless,
Flexible, Agile
Data Movement



Management

Scheduling,
Monitoring, Lifecycle
Management



Governance

Data Lineage,
Metadata Catalog



Security

Authorization, Policy
Enforcement



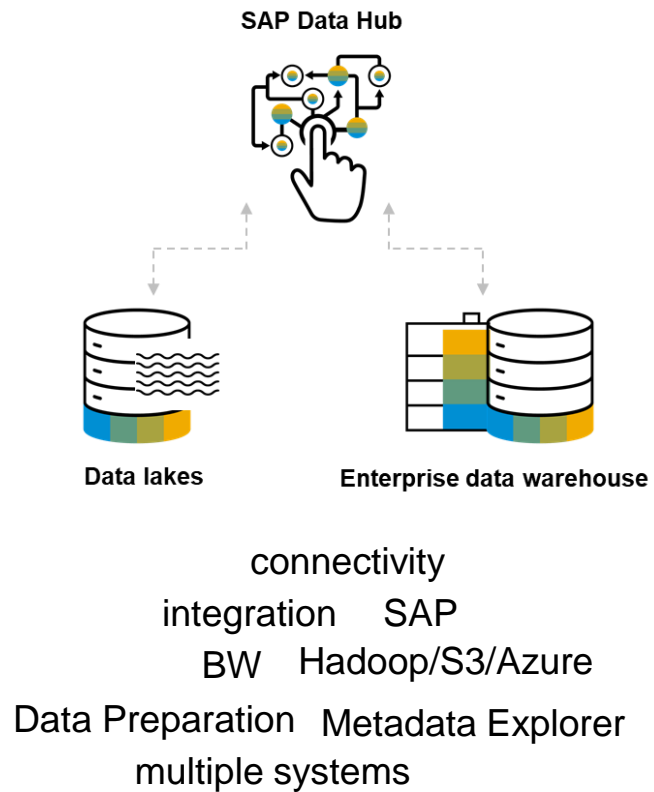
Scalability

Deployment
flexibility, cloud
scalability

SAP Data Hub

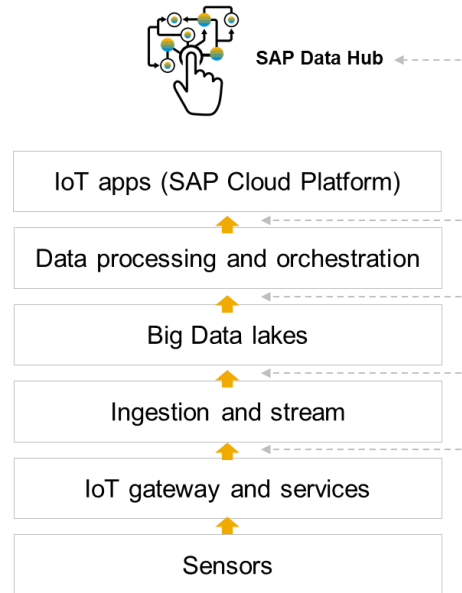
Use Cases

Big Data Warehousing



Scalability, Monitoring, Scheduling

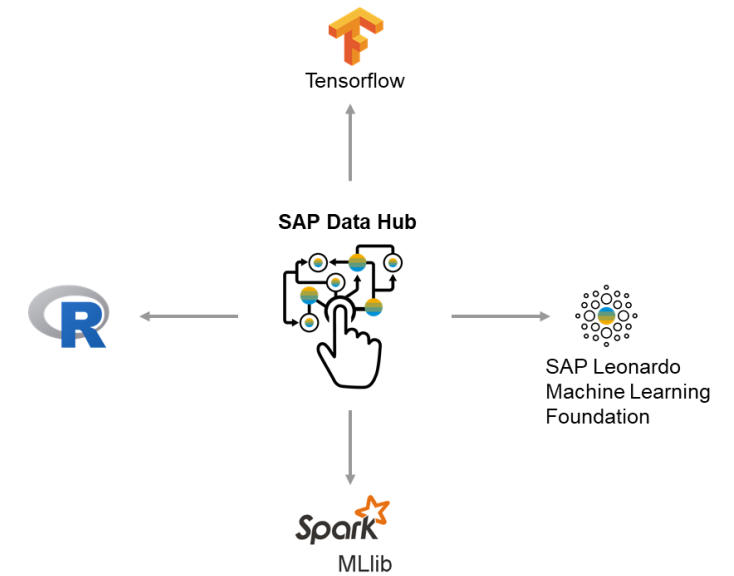
Internet of Things



streaming SCP IT/OT
kafka events
cloud IoT sensors

Scalability, Monitoring, Scheduling

Data Science

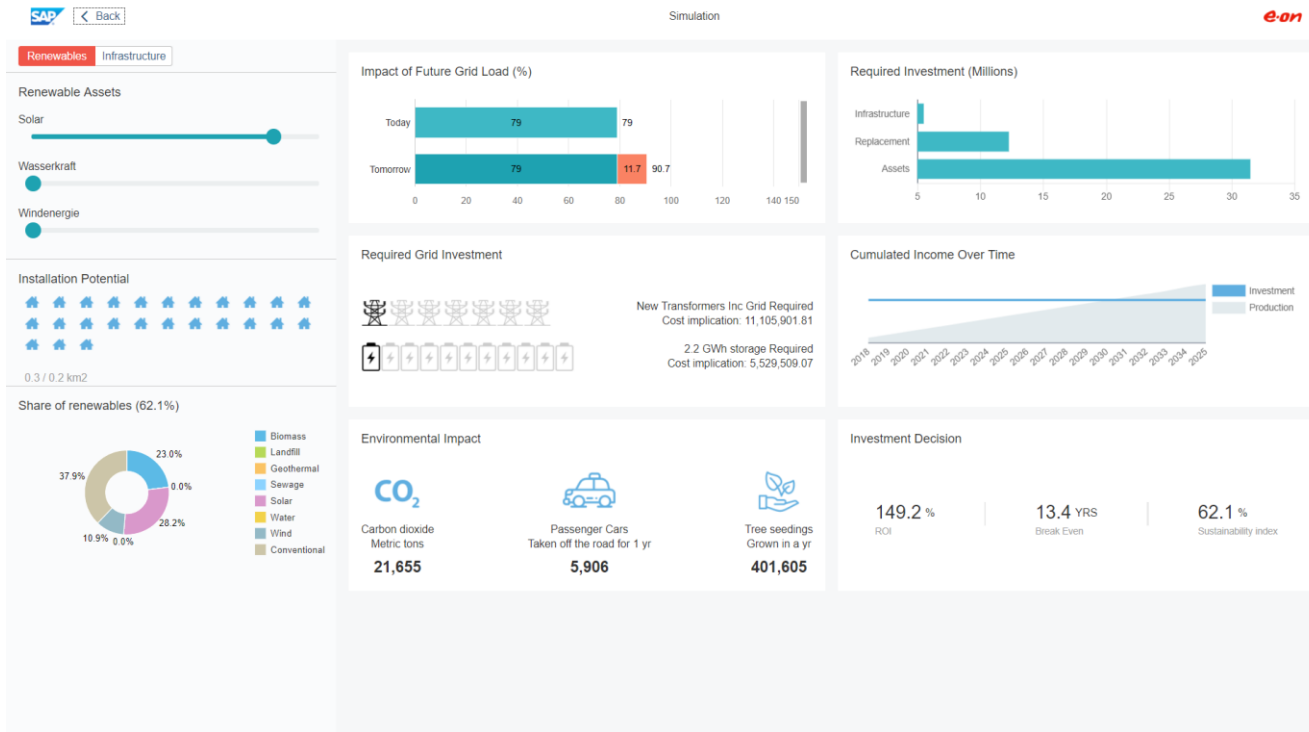


Python R
Machine Learning
CI / CD Script Automation
Tensorflow

Scalability, Monitoring, Scheduling

Customer Use Case - 1

Value Added Advisory Services for Grid Operators



Business Challenge

- Municipalities need to create a more “green” environment but don’t necessarily have visibility to the most effective investment options and the infrastructure required
- Grid Operators “know” energy production and consumption patterns & can recommend where and what to invest on renewable energy
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Solution

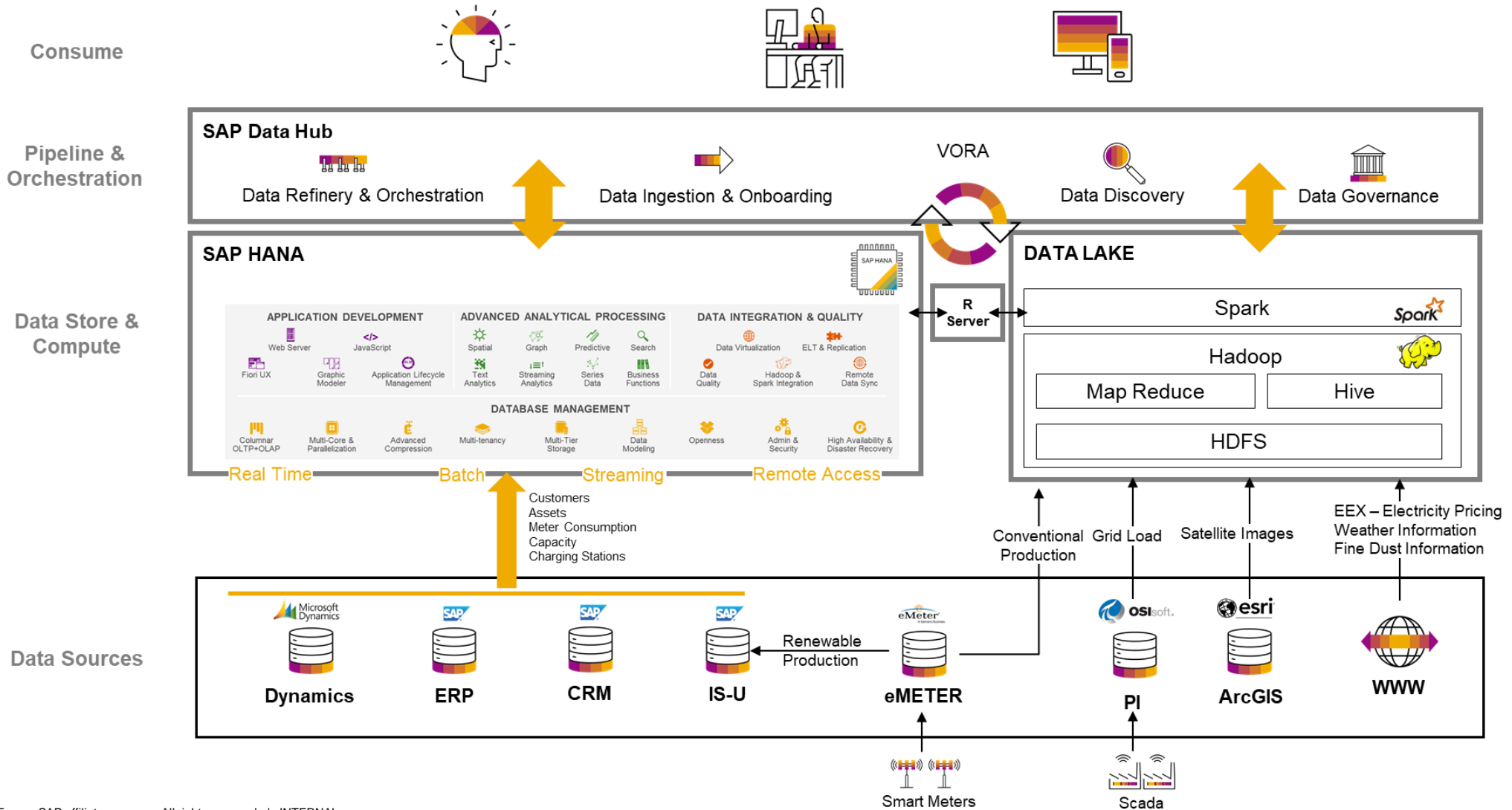
- Create a unified view of all customers, assets, energy consumption & production values, grid load, energy price data and other related datasets across the country
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Why Data Hub ?

- Using data pipelines; easily combine datasets from multiple different systems :
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 - Assets and Capacity (SAP ERP and non-SAP CRM)
 - Grid Load (Historian/Scada systems)
 - Energy Pricing, Weather, Finedust data (online - opensources)
- Predict Future Data Load by running a Python script on the combined data set
- Provide E2E monitoring on the overall process, quickly identify errors

Customer Use Case - 1

High Level Solution Landscape



Customer Use Case - 1

SAP Data Hub Models

Task Workflow: Combine Energy Production, Customer, Location, Grid Load information and Predict Future Grid Load

HANA_EON_GridAnalysis

Destinations (4)

Data Sets (10)

Tasks (5)

● EnrichCustomerProduction

● EnrichGridLoad

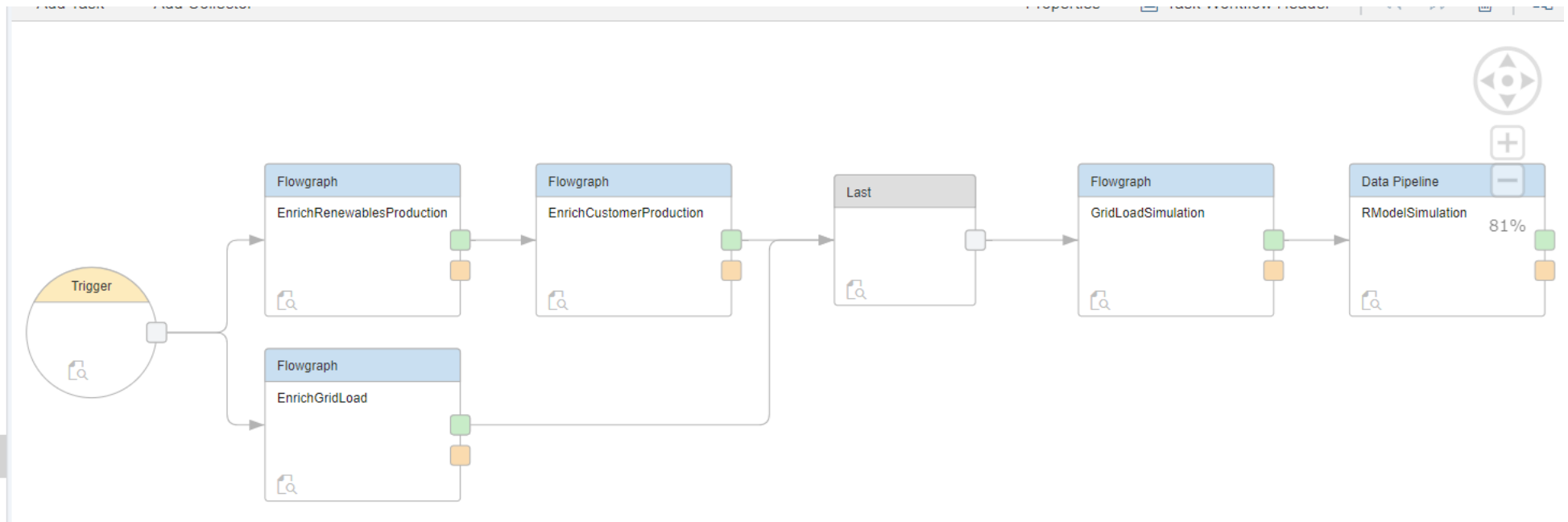
● EnrichRenewablesProduction

● GridLoadSimulation

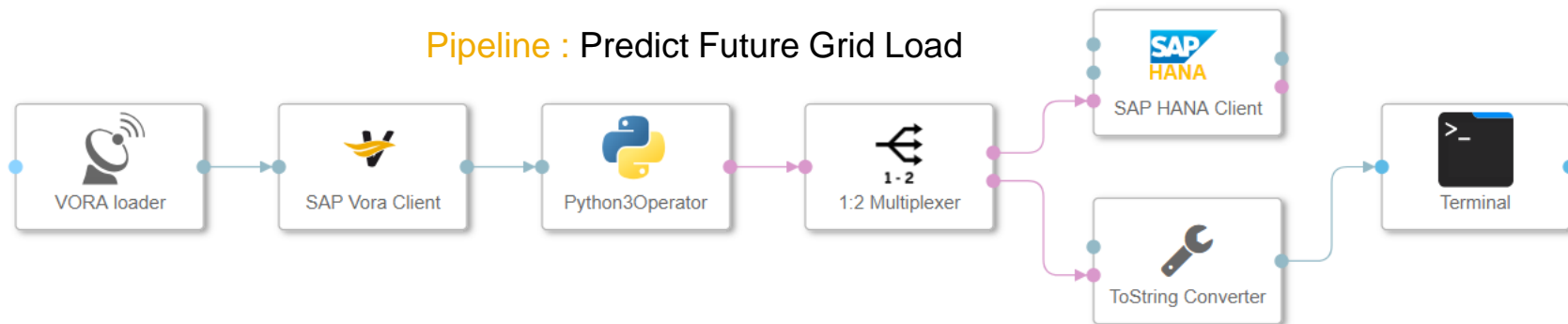
● RModelSimulation

Task Workflows (1)

● CalcProductionByDistrict

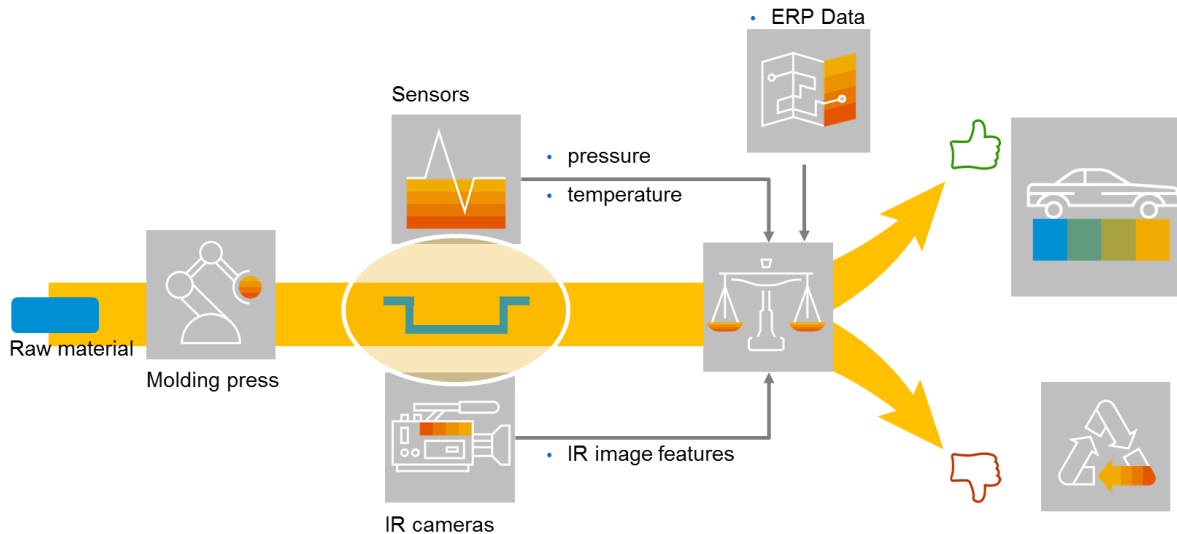


Pipeline : Predict Future Grid Load



Customer Use Case - 2

Detect Quality Deviations in Manufacturing Moulding Process using ML



Business Challenge

- Proactively identify faults in manufacturing moulding process to reduce cost related to waste and re-work

Solution

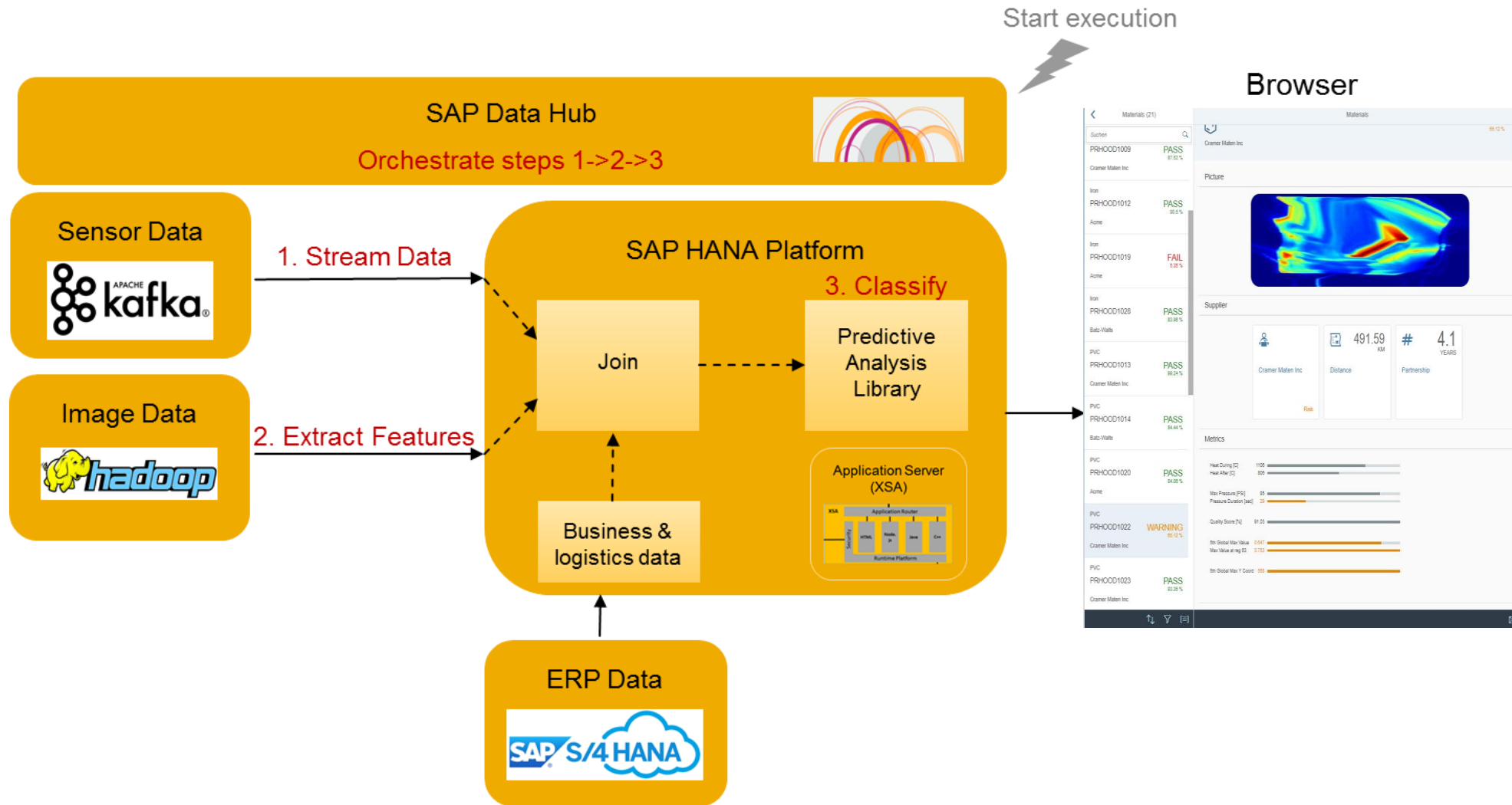
- Use Machine Learning to detect quality deviations in end products
- 3 different data sets are used for the predictive model :
 - Pressure and Temperature values before and after moulding
 - IR Images before and after moulding
 - Logistics data from SAP ERP on suppliers

Why Data Hub ?

- Using data pipelines; easily combine datasets from 3 different systems :
 - Pressure and Temperature sensors (Kafka)
 - IR Images (Hadoop)
 - Logistics data from SAP ERP (HANA)
- Predict if the pressed material is faulty or not by feeding the combined dataset into a HANA Predictive Analytics Library procedure
- Provide E2E monitoring on the overall process , quickly identify errors

Customer Use Case - 2

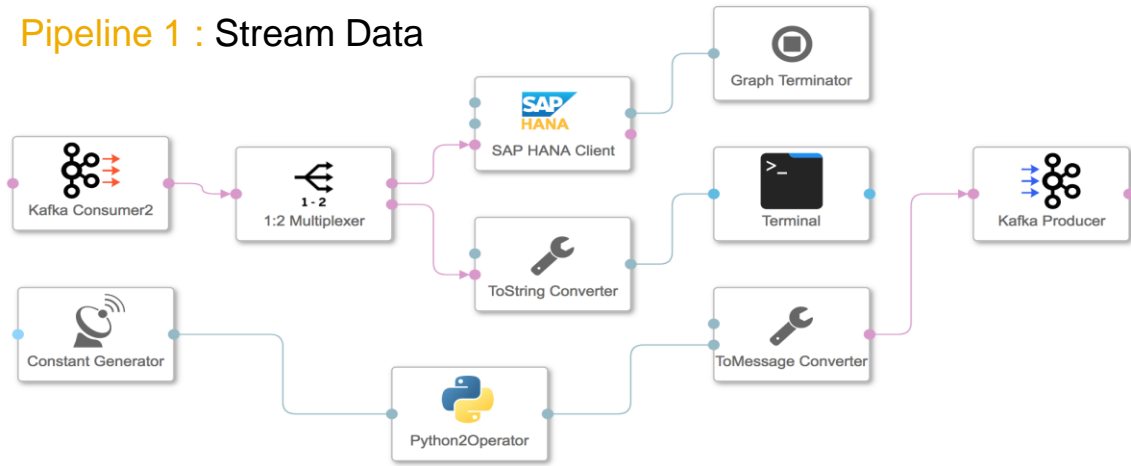
Data Flows



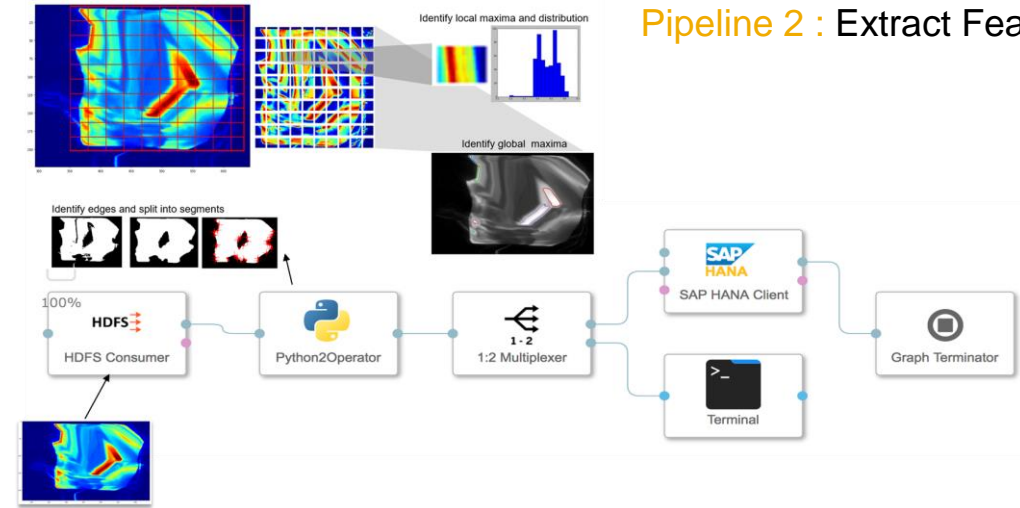
Customer Use Case - 2

SAP Data Hub Models

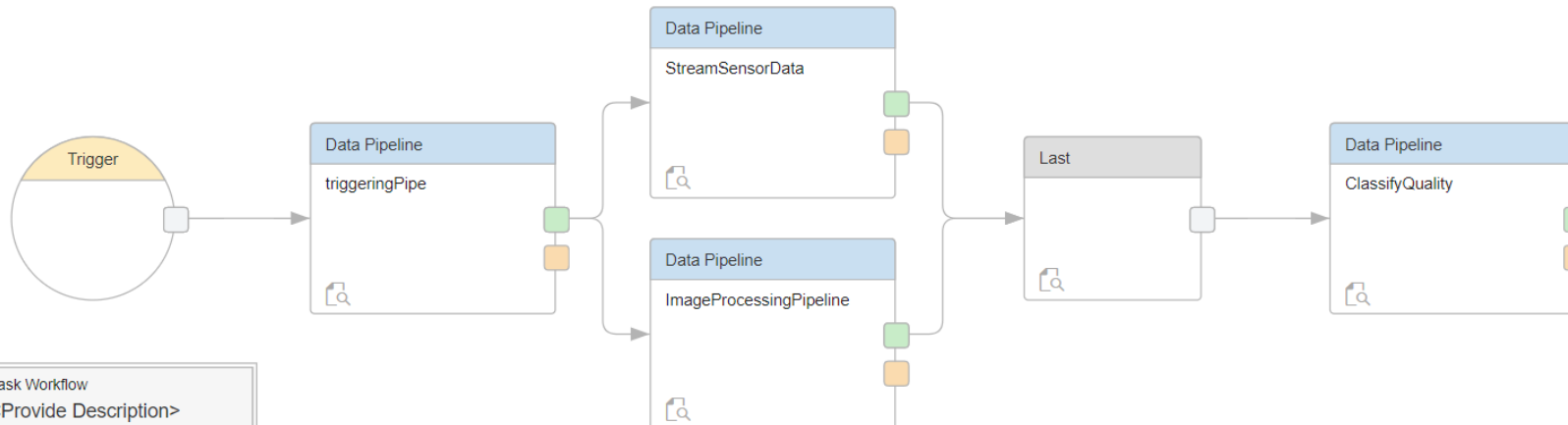
Pipeline 1 : Stream Data



Pipeline 2 : Extract Features

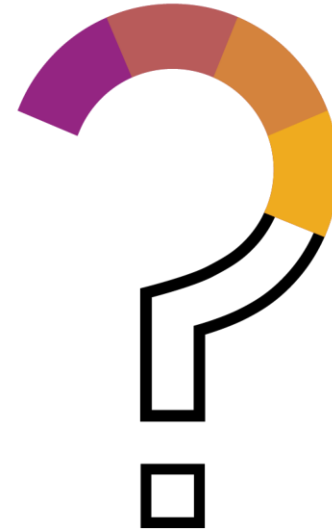


Task Workflow: Combine Datasets and Run ML



Task Workflow
<Provide Description>

QUESTIONS



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Useful Links

- [SAP Intelligent Enterprise](#)
- [SAP Leonardo Technologies](#)
- [SAP HANA Data Management Suite](#)
- [SAP Big Data Services](#)
- [SAP Data Hub](#)

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