

SAP Asset Performance Management

Dirk Kempf, SAP SE
Chief Customer Officer – SAP IAM

March 8th 2023

INTERNAL – SAP and Customers Only



Disclaimer

The information in this presentation is confidential and proprietary to SAP and may not be disclosed without the permission of SAP. Except for your obligation to protect confidential information, this presentation is not subject to your license agreement or any other service or subscription agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or any related document, or to develop or release any functionality mentioned therein.

This presentation, or any related document and SAP's strategy and possible future developments, products and or platforms directions and functionality are all subject to change and may be changed by SAP at any time for any reason without notice. The information in this presentation is not a commitment, promise or legal obligation to deliver any material, code or functionality. This presentation is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. This presentation is for informational purposes and may not be incorporated into a contract. SAP assumes no responsibility for errors or omissions in this presentation, except if such damages were caused by SAP's intentional or gross negligence.

All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

Agenda

1

Intelligent Asset Management

Capabilities and Solutions and closing the Loop from Strategy to Execution

2

Live Demo SAP Asset Performance Management

3

Roadmap, Questions&Answers

Intelligent Asset Management: Capabilities & Solutions



Maintenance Management (aka "PM") Service Management (aka "CS")

Plan, schedule and safely execute maintenance and service activities to ensure optimal operations



Asset Health Prediction and Optimization

Bring together information from operational and business systems using IoT to predict and simulate asset failure



Asset Strategy and Performance

Drive smarter decisions, improve reliability, and optimize maintenance strategies



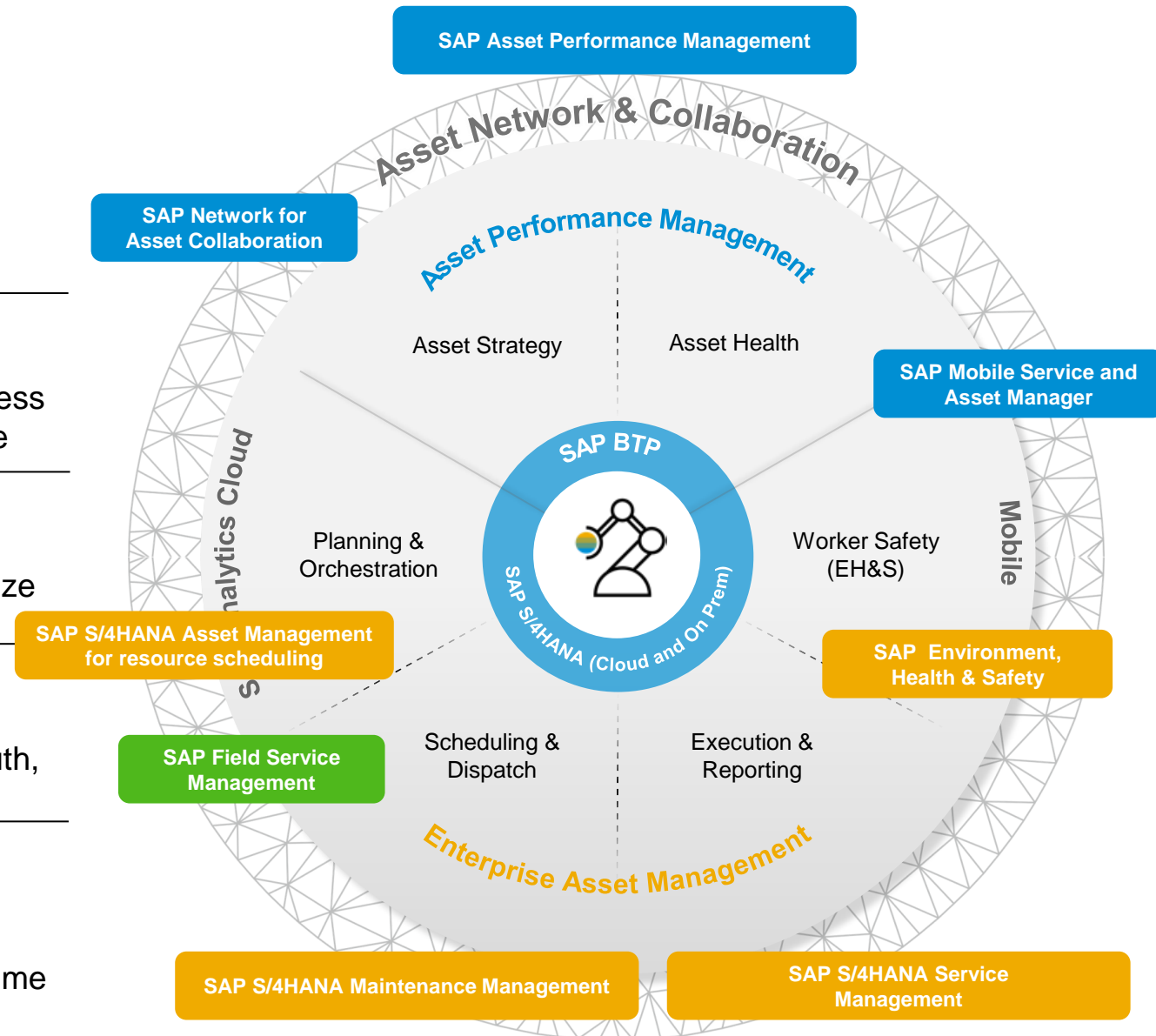
Asset Network and Collaboration

Share asset information, access one version of the truth, and collaborate on a cloud-based business network



Mobile Asset Management

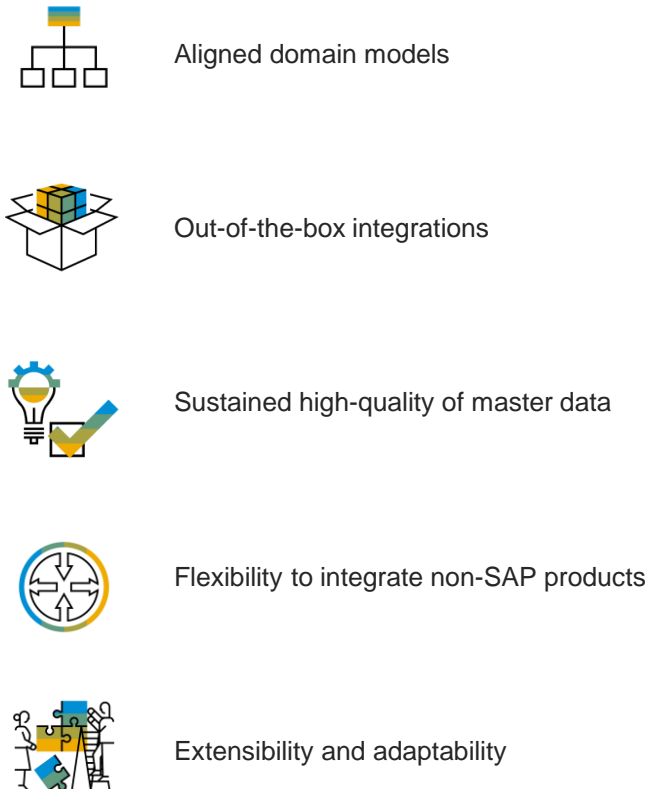
Leverage mobile technologies to enable new asset management business processes anywhere and anytime



The New Way: Intelligent Asset Management

How to realize the end-to-end closed loop story?

What SAP's customers are demanding!



SAP's Strategic Direction

Establishing One Domain Model (ODM) for communication across SAP applications

Motivation

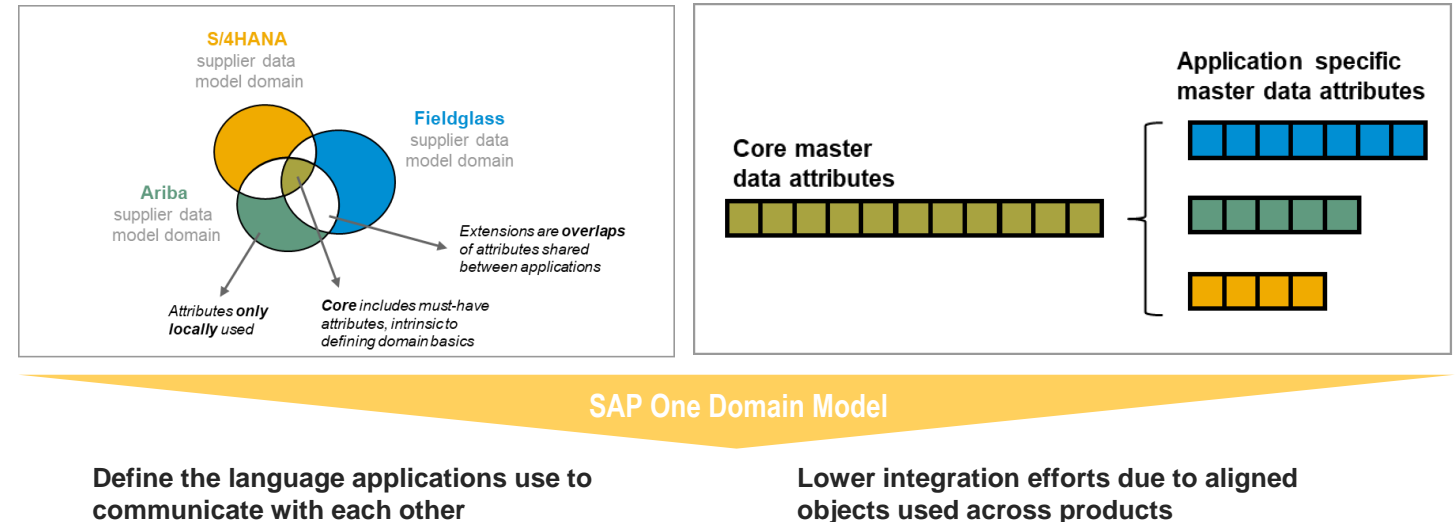
Aligned domain models are an enabler for consistent APIs and reduced dependency on middleware to translate data structures and values

Vision

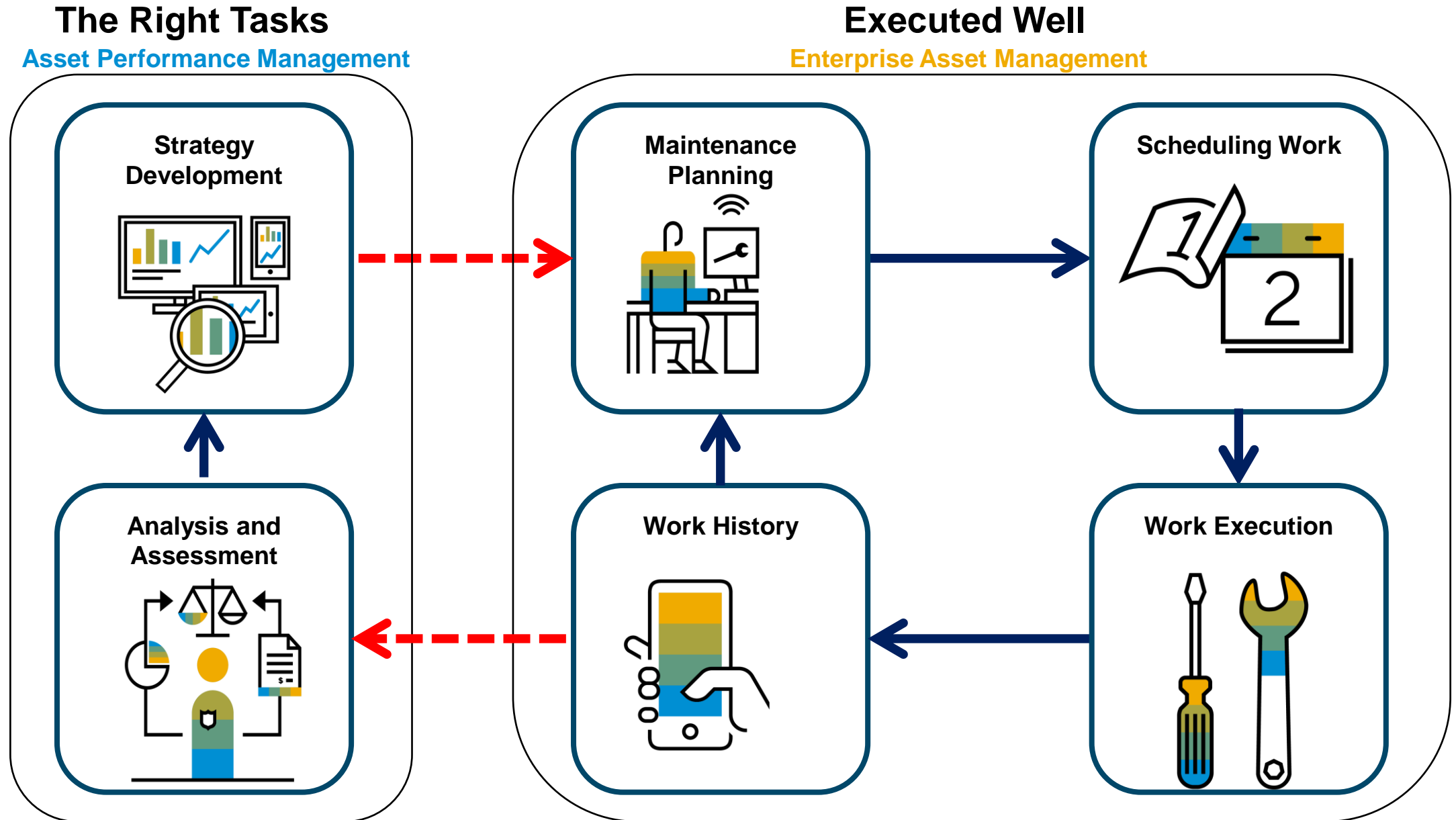
Creation of aligned data models for all key domains throughout most of the SAP applications and processes

User Story

Users will find support on Domain Model Alignment (DMA) and initiate the alignment of data objects that are relevant in an integration scenario



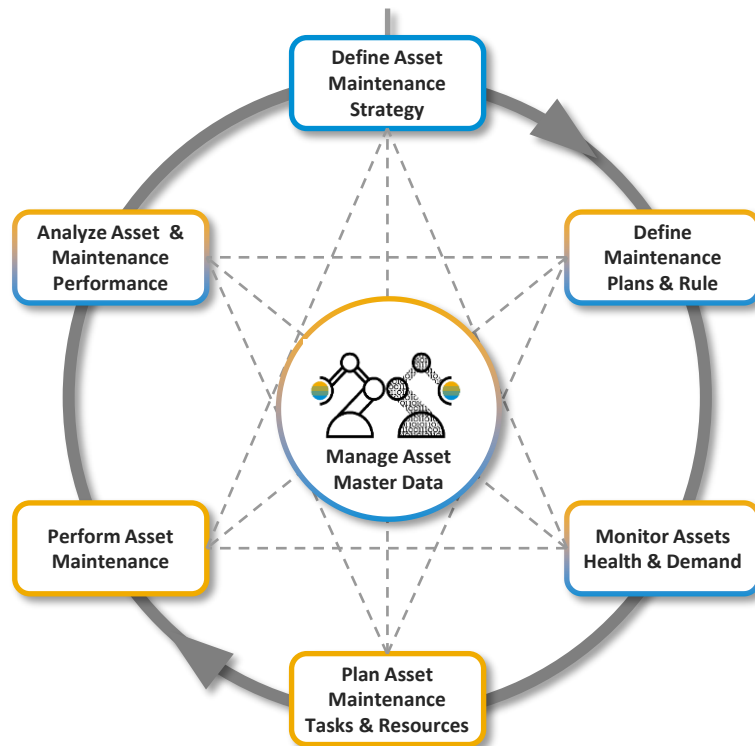
Apply Strategies , monitor the effectiveness and optimize continuously



Drive Business Outcome by Converging Strategy & Execution

Our Vision

Seamlessly extend **Enterprise Asset Management** with **Asset Performance Management** along end-to-end processes to close the loop between maintenance strategy and execution to **define, implement, execute and monitor the optimal asset maintenance**.



1

Define Asset Maintenance Strategy

- Define risk and criticality for assets
- Develop maintenance strategies

2

Define Maintenance Plan & Rule

- Define time- and usage-based maintenance
- Define condition-, predictive/prescriptive-, risk-based Maintenance

3

Monitor Asset Health and Maintenance Demand

- Manage asset alerts
- Initiate / screen maintenance demand

4

Plan Asset Maintenance, Tasks & Resources

- Order planning, incl. all needed resources
- Order scheduling

5

Perform Asset Maintenance

- Order execution (also mobile)
- Order/notification close-out

6

Analyze Asset & Maintenance Performance

- Analyze maintenance strategy versus execution in efficiency and effectiveness

0

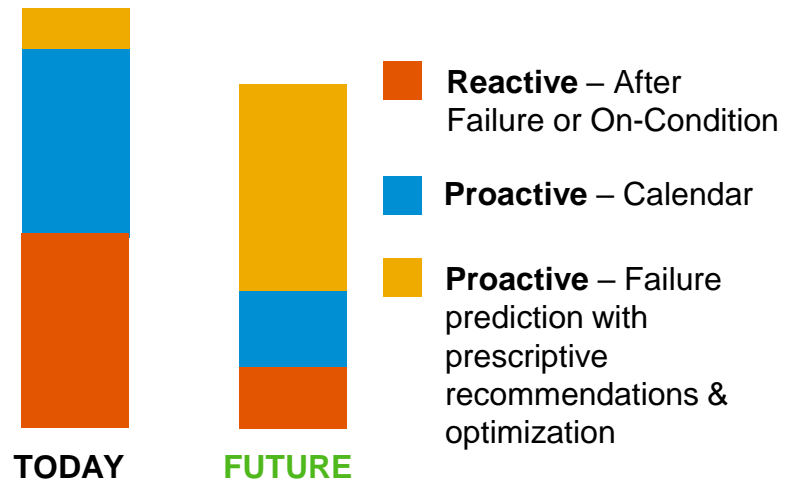
Manage Asset Master Data

- Manage asset and asset related master data semantically aligned for both disciplines to provide a 360° view in form of a Digital Twin

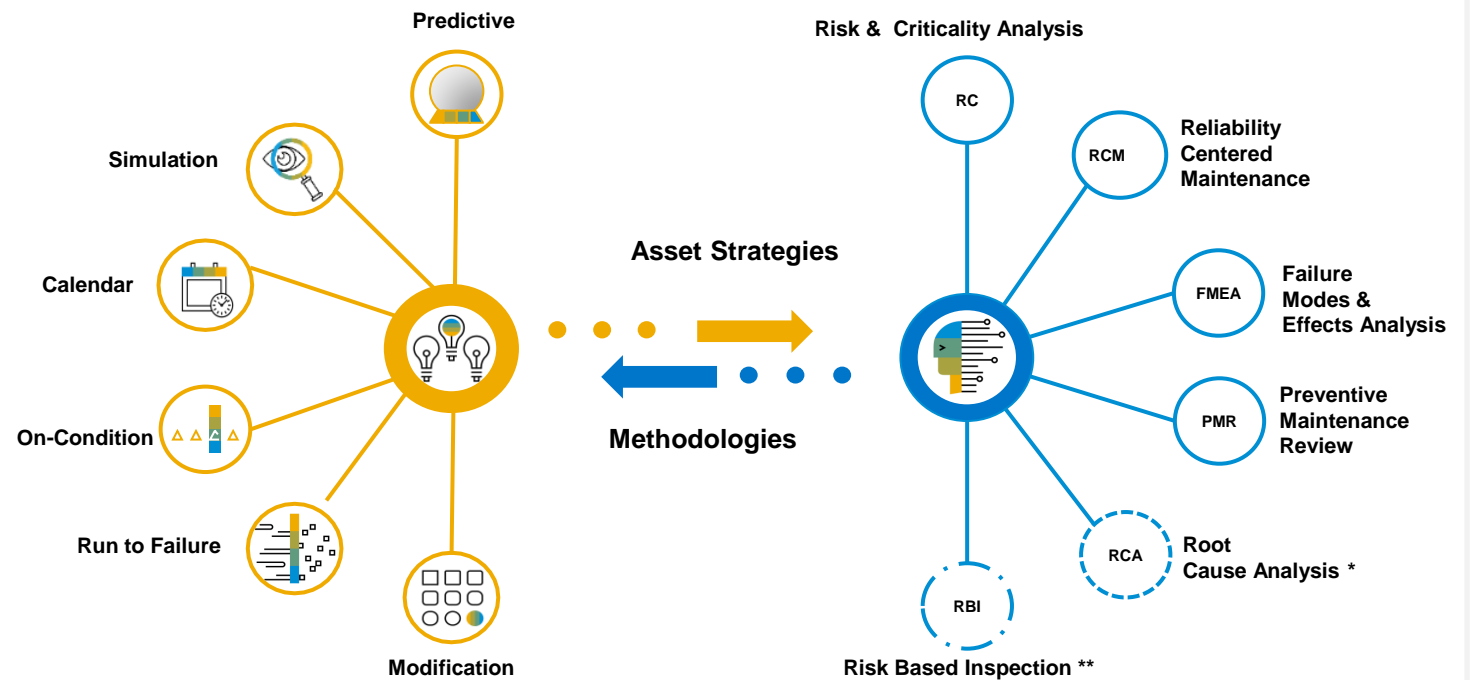
Evolve from reactive to reliability-centered & prescriptive maintenance

Calendar-based maintenance results in **over-maintaining** assets at higher costs / less availability

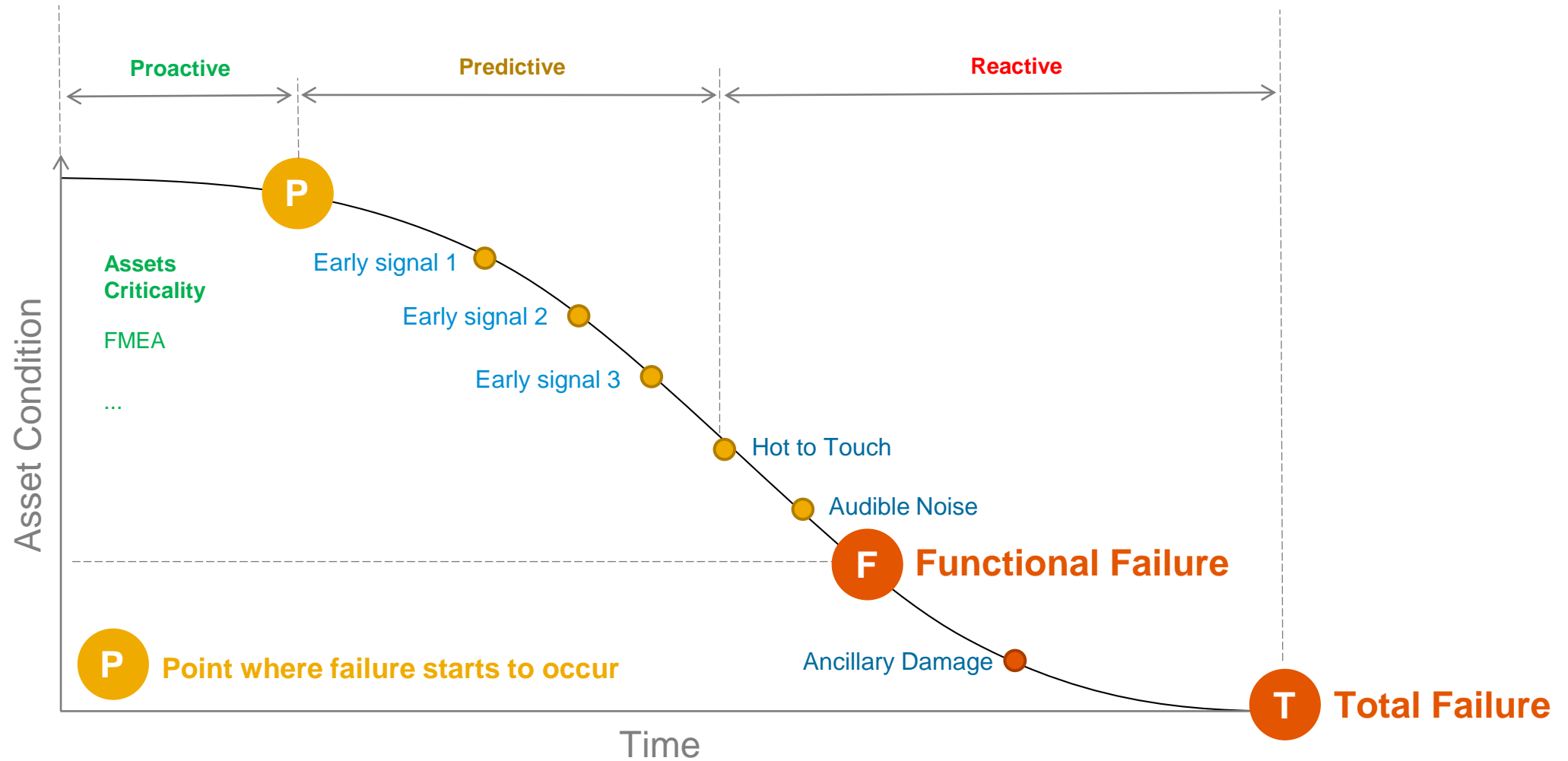
Reactive-based maintenance is too late for efficient planning and optimization



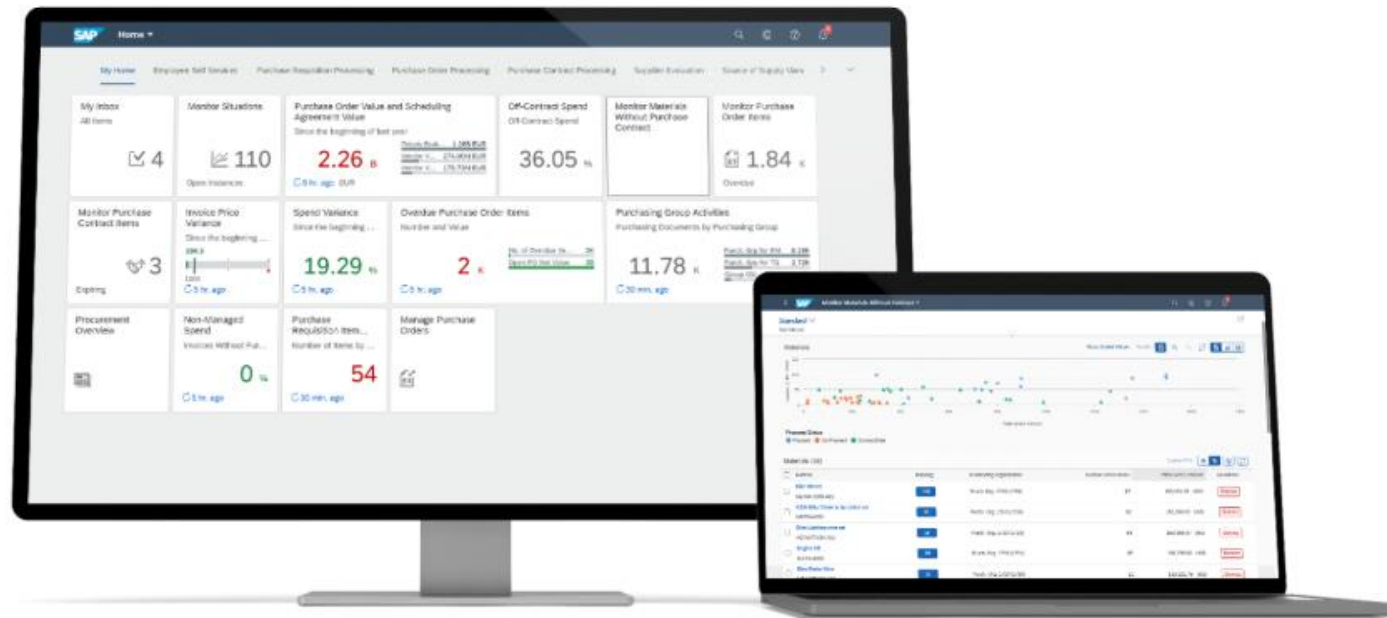
Intelligent Asset Management supports **data-driven proactive** strategies with execution and optimization based on reliability & other goals. This achieves the delicate balance of **profitability, asset health** and **availability**



PF Curve as a starting point towards Proactive Maintenance



Deliver an exceptional User Experience with SAP Fiori



Role-based



Delightful



Coherent



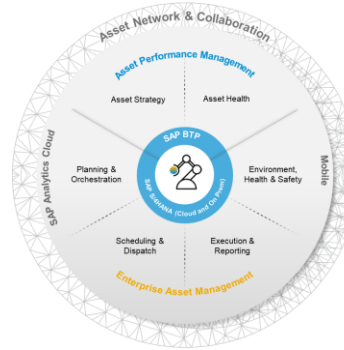
Simple



Adaptive

Intelligent Asset Management: Business Benefits

Asset Performance Management



Enterprise Asset Management

End-2-End Business Processes

- Deploy APM capabilities, such as strategy management (e.g. RCM) or condition-based, prescriptive maintenance, seamlessly integrated with maintenance & service planning and execution in the ERP system
- Enable a true, end-2-end “failure mode centric”, Intelligent Asset & Service Management by converging strategy and execution while shifting from time- & usage-based maintenance to condition-based, predictive/prescriptive maintenance

Better Decision Making

- Aligned data models between APM and Asset & Service Management to enable unified views on asset and maintenance & service performance for better decision making along process steps
- Enable a holistic Asset & Service Management to continuously assess asset performance and improve maintenance & service effectiveness for higher asset reliability at lower risk and lower cost

Improved User Experience

- Provide consistent information to the end user on asset and maintenance/service performance for higher user productivity

Easy Adoption of APM Solution

- Customers with S/4HANA (or ECC) can quickly deploy APM capabilities, fully integrated with planning and execution in the ERP system, based on aligned data model (One Domain Model)
- Reduce overall deployment complexities and initial application set-up time

Improve Reliability/ Reduce Failure Rate of:

- Pressure vessels, pipelines
- Rotating equipment
- Safety instrument systems

Manage Compliance to:

- Environmental Regulations
- Safety Laws

Increase Production Throughput:

Increased production throughput from improved availability

Improve Productivity from:

Reduction in Labor/ Services Costs:

- Less travel time, information searching, parts searching

Reduction in Parts Costs:

- Optimized spare parts, tools policies

Agenda

1

Intelligent Asset Management

Capabilities and Solutions and closing the Loop from Strategy to Execution

2

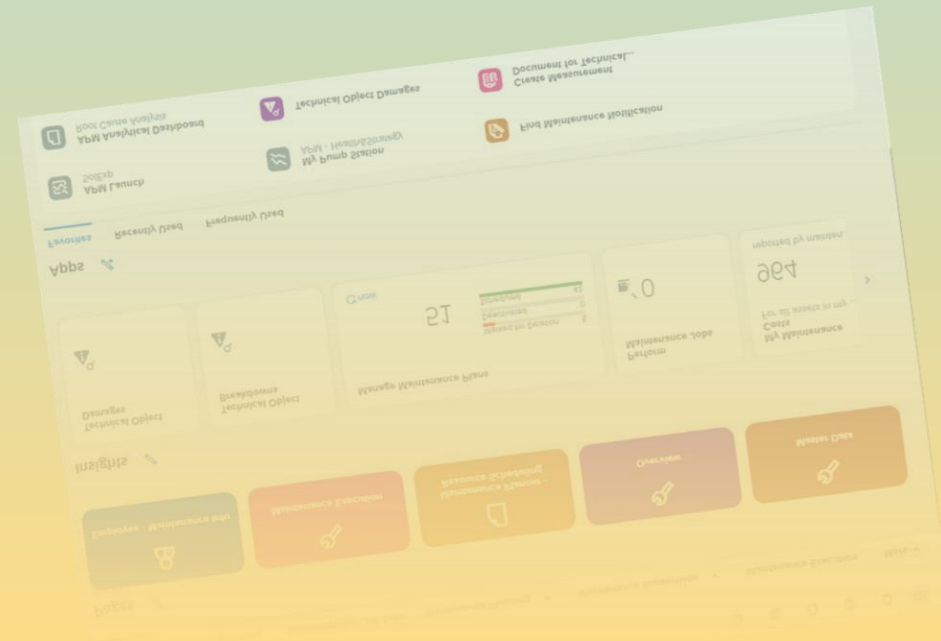
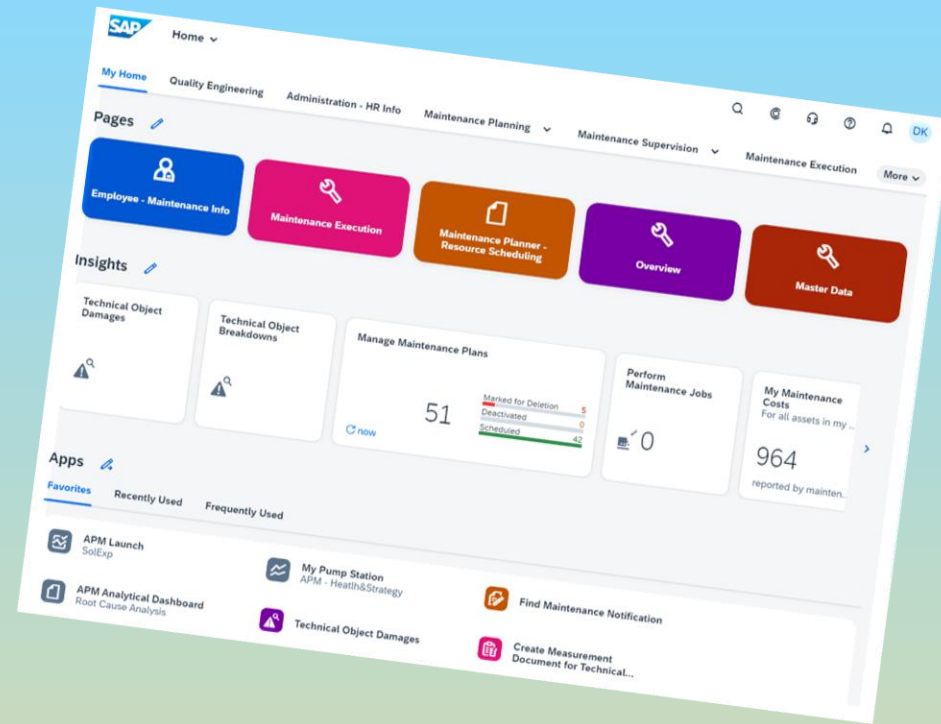
Live Demo SAP Asset Performance Management

3

Roadmap, Questions & Answers

Live Demo -

How does SAP Asset Performance Management look like ?



Agenda

1

Intelligent Asset Management

Capabilities and Solutions and closing the Loop from Strategy to Execution

2

Live Demo SAP Asset Performance Management

3

Roadmap, Questions&Answers

Roadmap



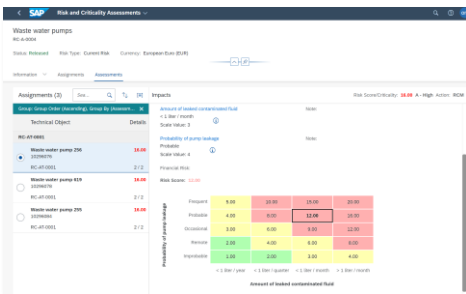
SAP Asset Performance Management 2202 – 2211

Define Asset Maintenance Strategies



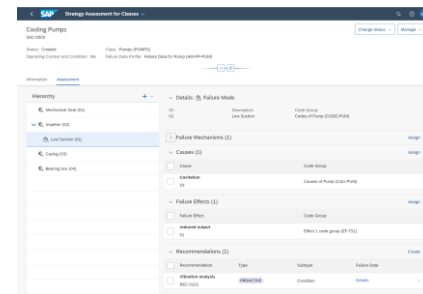
Risk & Criticality Assessment

- Assess risk & criticality for technical objects
- Assess risk & criticality for multiple objects using Microsoft Excel
- Use criticality to update the ABC indicator of technical objects



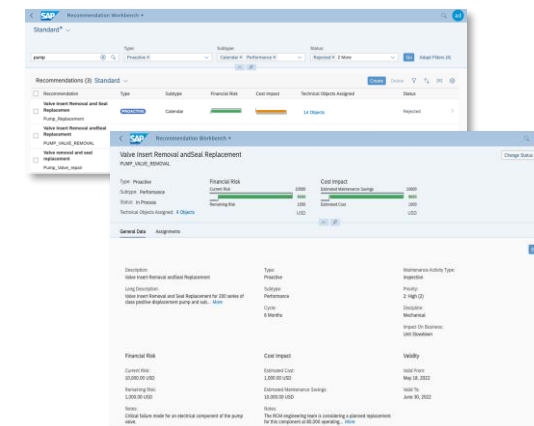
Maintenance & Service Strategy Development by Assessment

- Perform strategy assessments at asset class level
- Apply strategy assessment for classes to technical objects



Strategy and Recommendation Management

- Review strategy recommendations and manage recommendation status
- Create recommendations without an assessment



SAP Asset Performance Management Roadmap

Define Asset Maintenance Strategies



Risk & Criticality Assessment

- Trigger follow-up tasks from risk and criticality assessments (Q2/23)



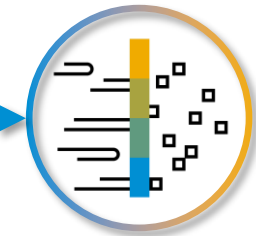
Maintenance & Service Strategy Development by Assessment

- Perform **RCM assessments** on individual technical objects (Q1/23)
- Perform **FMEA assessments** on individual technical objects (Q2/23)
- Copy strategy assessment for classes (Q3/23)
- Perform **root cause analyses** for technical objects (Q4/23)
- Manage the reliability backlog (Q4/23)



Strategy and Recommendation Management

- Manage task lists in recommendations (Q2/23)
- Manage failure modes in recommendations without assessments (Q3/23)
- Manage maintenance plans with task lists in recommendations (Q3/23)

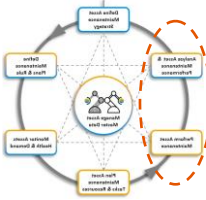


Maintenance & Service Recommendation Implementation

- **Implement recommendations** for condition-based maintenance (Q3/23)
- **Implement recommendations** for reactive maintenance (Q4/23)
- **Implement recommendations** for preventive maintenance (Q4/23)

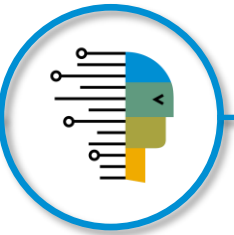
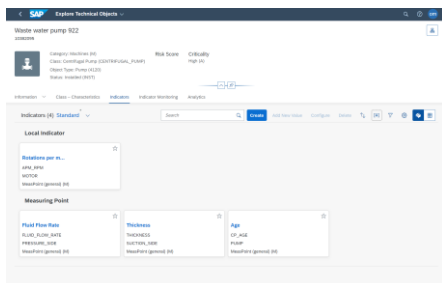
SAP Asset Performance Management 2202 – 2211

Monitor Asset Health



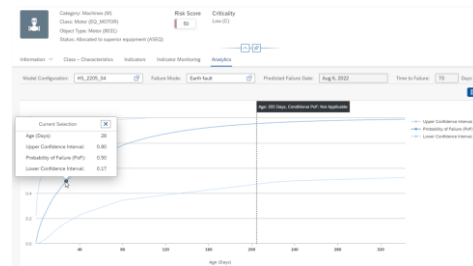
IoT Data Management

- Configuration of indicators for condition-based maintenance
- Synchronization of technical objects to IoT technology for health monitoring
- Use S/4 measurement documents for condition monitoring



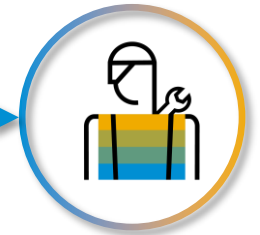
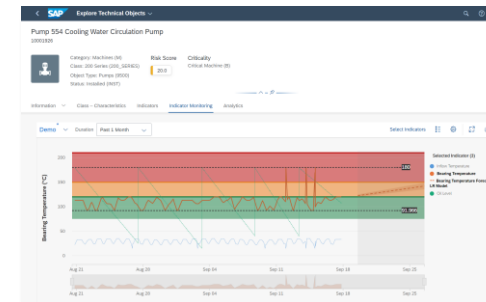
Asset Health Modeling

- Manage scheduled and streaming rules
- Calculate derived and aggregated indicators
- Calculate and view failure curves



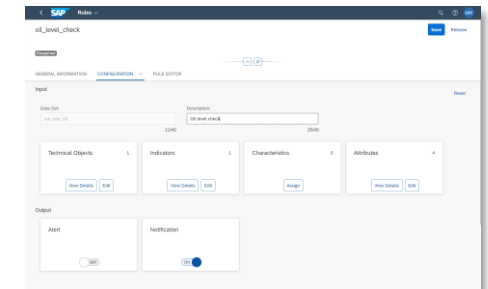
Asset Health Monitoring

- Monitor rule-based alerts
- View indicator trends of a technical object
- Forecast indicator trends
- Embed custom analytical dashboards to overview asset health



Maintenance Demand Creation

- Create notifications with task list from rules



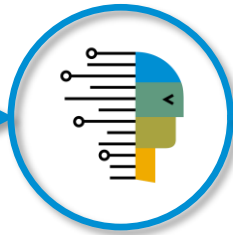
SAP Asset Performance Management Roadmap

Monitor Asset Health



IoT Data Management

- Use templates to configure technical objects for condition monitoring (Q2/24)



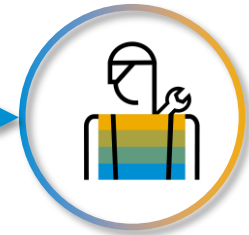
Asset Health Modeling

- Use custom AI algorithms to assess asset health (Q2/23)
- Use time-aggregated indicators and indicator thresholds in rule conditions (Q3/23)
- Configure custom rule-output actions (Q2/24)



Asset Health Monitoring

- Monitor alerts from machine events and alarms (Q2/23)
- Detect and understand **anomalies** of assets (Q2/23)
- View alerts and custom data sheets for a fleet of technical objects (Q3/23)
- Send customized e-mails as output of a rule (Q3/23)
- **Configure health overview pages from technical object data cards** (Q3/23)



Maintenance Demand Creation

- Manually create maintenance notifications from alerts (Q1/23)
- Use IoT-based counters for counter-based maintenance (Q1/24)
- Manually **create work orders from alerts** (Q3/23)

Aktuelle Informationen finden Sie jederzeit im SAP Road Map Explorer

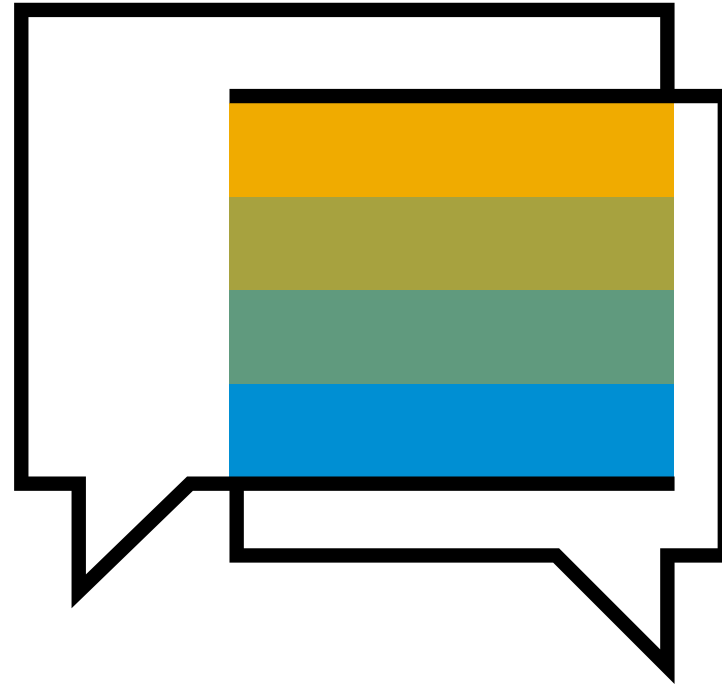
The screenshot displays the SAP Road Map Explorer interface. At the top, there is a navigation bar with the SAP logo, the title 'Road Map Explorer', and tabs for 'Products', 'Processes', 'Industries', and 'My Road Maps'. A search bar on the right shows 'SAP Asset Perfo...' and '60 Road Map Items'. Below the navigation bar, there are filters for 'Products', 'Industries', 'Focus Topics', and 'Suite Qualities'. A 'Current - Latest' button and a 'Save' button are also visible.

The main content area is divided into five columns, each representing a different time period or release phase:

- Q1 2023** (15 Road Map Items): Labeled 'Future Release'. Items include 'Ability to perform an RCM assessment on individual technical...', 'Ability to propose recommendations for RCM assessment on individual...', 'API for recommendations (CRUD)', 'API for risk and criticality assessment (CRUD)', 'API for strategy assessment for classes (CRUD)', 'Automatic closure of alerts for processed notifications', 'Configurable analysis tool for displaying the health of assets', 'Consequence evaluation with RCM assessment', and 'Enhancements to indicators: ability to display a timeline, add commen...'. Each item is associated with 'SAP Asset Performance Management'.
- Q2 2023** (11 Road Map Items): Labeled 'Future Release'. Items include 'Ability to perform FMEA assessments on individual technic...', 'Anomaly detection with explanation of contributing indicators', 'Condition-based recommendation enhancement with common...', 'Incremental improvements to rules – force execution or pause execu...', 'Management of task lists in recommendations', 'Measurement document replication from releases of SAP ERP and low...', 'Measuring point replication from releases of SAP ERP and from low...', 'Recommendation of follow-up tasks from risk and criticality assessments', and 'Support the assignment of existing recommendations within a RCM...'. Each item is associated with 'SAP Asset Performance Management'.
- Q3 2023** (14 Road Map Items): Labeled 'Future Release'. Items include 'Ability to configure the long text of business objects created by rules', 'Ability to create a task to initiate a risk and criticality assessment for...', 'Creation of recommendations without assessments for leading...', 'Enrichment of counter-based maintenance information with IoT...', 'Implementation of recommendations as condition-monitoring rules', 'Management of maintenance plans with task lists in recommendations', 'Overview page of technical object data cards', 'Selection of rule data sets from indicator templates', and 'Sending e-mails as rule outputs'. Each item is associated with 'SAP Asset Performance Management'.
- 2023** (7 Road Map Items): Labeled 'Product Vision'. Items include '360 degree asset health overview and details', 'Ability to compare indicator trends across assets of similar types', 'Ability to write rule conditions as decision tables', 'Implementation of recommendations as maintenance plans with task lists...', 'Implementation of recommendations as task lists for reactive maintenance', 'Management of maintenance recommendations', and 'Task management for creating additional types of assessments'. Each item is associated with 'SAP Asset Performance Management'.
- 2024** (9 Road Map Items): Labeled 'Product Vision'. Items include 'Ability to assign failure modes to notifications using their long text', 'Ability to define rule-output actions for multiple technical objects', 'Ability to determine the leading indicators and their values most...', 'Ability to predict the probability of future failures', 'Centrally configured rule output actions', 'Configuration of custom rule-output actions', 'Reassessment of the risk and criticality of technical objects', 'Use of APIs to create and update rules', and 'Use of data from multiple technical objects in one rule'. Each item is associated with 'SAP Asset Performance Management'.

At the bottom left, there is a small disclaimer: 'SAP does not warrant the accuracy of the information provided. SAP is not responsible for any material, code, or functionality. This document is provided without a warranty of any kind. Read more.'

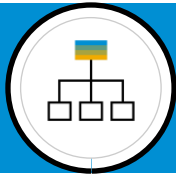
“Q&A”



Appendix

Harmonized Asset Data

Asset Performance Management and Enterprise Asset Management



Use an aligned data model and an out of the box integration between SAP S/4HANA Maintenance and Service Management and SAP Asset Performance Management to support end to end processes.

- Run Asset Performance Management processes on technical objects like Equipment and Functional location from S/4HANA Maintenance and Service Management
- Leverage filter and sorting criteria to find and select technical objects that are aligned with S/4HANA Maintenance and Service Management like classification data, organizational data etc.
- Integration of Measuring Points and Documents as well as classification data that allows an extension of business processes from SAP S/4HANA and enables assessments and rule definition for classes
- Run assessments and develop maintenance and service strategies on an aligned failure data model between SAP Asset Performance Management and SAP S/4HANA Maintenance and Service Management

The screenshot shows the SAP 'Explore Technical Objects' interface. It includes a search bar and several filter fields: Technical Object Type, Category, Object Type, Maintenance Plant (set to 'Plant 0001 (0001)'), Planner Group (set to 'EAMS (EAM)'), Criticality, Cost Center, Main Work Center (set to 'SAMS (ABM, EAMS)'), Company Code (set to 'SAP SE (0001)'), Class, and Status. A 'Go' button and 'Adapt Filters (4)' link are present. Below the filters, a table displays 1,070 technical objects. The table columns are: Technical Object, Category, Object Type, Model Number, Manufacturer, Superior Functional Location, and Criticality. The table lists various equipment and functional locations, including MPN Plant 1977, ABCD Company 1977, CHP Track Hoppera1, Reaction Turbine - Kaplan #03, Compressor Main Unit #01, Compressor Casing, Rotor with Impeller - Stage #1, Rotor with Impeller - Stage #2, Rotor - Interstage, Reaction Turbine - Kaplan #02, Sub Unit #01, Test for Planning Plant, and IOCL - O&G Upstream.

Technical Object	Category	Object Type	Model Number	Manufacturer	Superior Functional Location	Criticality
MPN Plant 1977.MPN	Technical system - standard (M)	Object type 7000 (7000)	ABC1000	ABC Ltd	ABCD Company (1977)	High (A)
ABCD Company 1977	Technical system - standard (M)	Object type 7000 (7000)	ABC1000	ABC Ltd		High (A)
CHP Track Hoppera1 0001-CHP-TRHP	Technical system - standard (M)	Conveyor (8008)	73223	Fichtner GmbH & Co.	Coal Handling Plant (0001-CHP)	Low (C)
Reaction Turbine - Kaplan #03 10163515	Machines (M)	Reaction Turbine (HYDTUR_REA)	ABC1XXX232222	ABC Ltd		
Compressor Main Unit #01 10163487	Machines (M)	Centrifugal CO (001COCENTR)	ABC1XXX23456	ABC Ltd	IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Compressor Casing. 10163492	Machines (M)				IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Rotor with Impeller - Stage #1 10163493	Machines (M)				IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Rotor with Impeller - Stage #2 10163494	Machines (M)				IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Rotor - Interstage 10163495	Machines (M)				IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Reaction Turbine - Kaplan #02 10163512	Machines (M)	Reaction Turbine (HYDTUR_REA)	AB786543222	ABC Ltd		High (A)
Sub Unit #01. 10210296	Machines (M)				IOCL - DB01- GC - Compressor Main Unit (1800.AOL.DB.DB01.GP.GC.COMP)	High (A)
Test for Planning Plant 10124343	Machines (M)					
IOCL - O&G Upstream 1800	Technical system - standard (M)	Object type 7000 (7000)	ABC1000	ABC Ltd		High (A)

Figure: Technical Object Explorer in SAP Asset Performance Management

Risk & Criticality Assessment

SAP Asset Performance Management: Define Asset Maintenance Strategies



Segment your Assets based on Risk & Criticality to focus on what matters most!

- Out of the box re-use of **aligned master data** and their classification from SAP EAM
- **Classify the risk** of assets by developing a risk and criticality scores calculated based on standard formulars (min, max, average) for different risk impact categories
- Use **alphanumeric risk** matrix to derive the risk score of assets
- Perform assessments on **single** or **multiple** assets
- **Derive actions** and maintenance strategies based on the risk and criticality scores
- Use **custom templates** and criticality thresholds to standardize the risk and criticality calculation

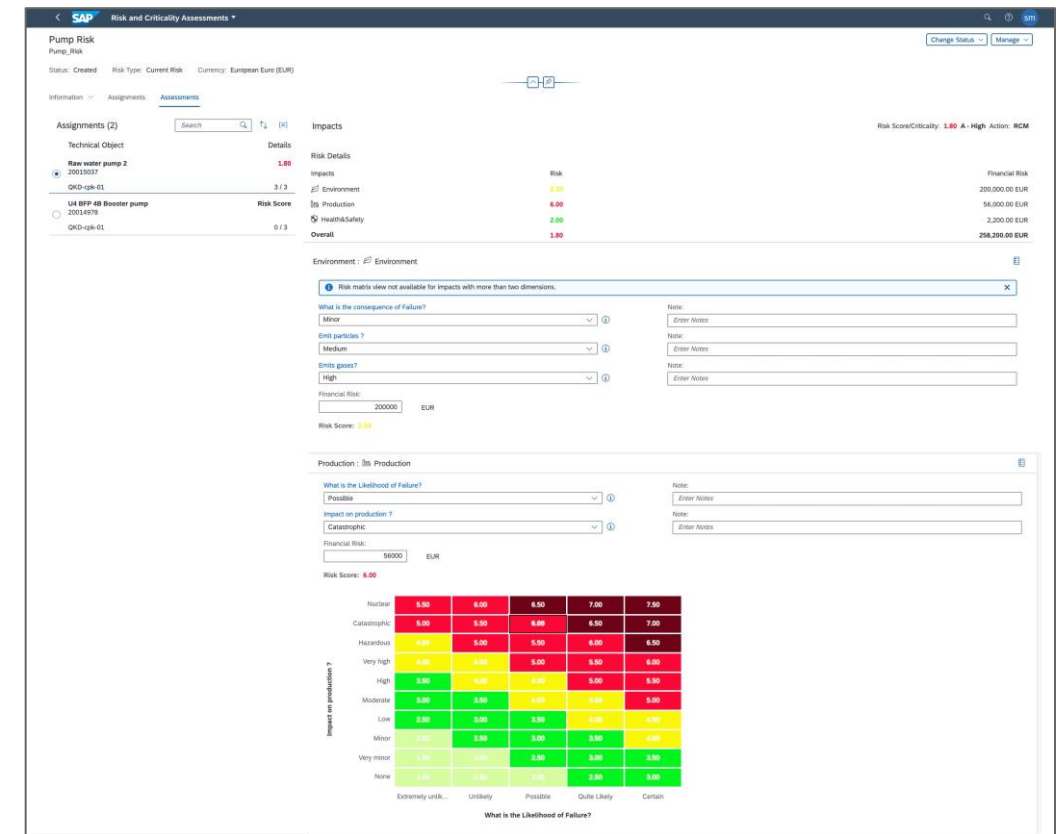


Figure: Risk & Criticality Assessment

Maintenance Strategy Development by Assessments

SAP Asset Performance Management: Define Asset Maintenance Strategies



Analyze potential failure and their impact for your assets to develop the right maintenance & service strategy to mitigate the likelihood of happening, or to restore function if acceptable

- Develop leading **failure data** and maintenance & service recommendations for **asset classes** to **standardize** and **optimize** maintenance & service programs for similar assets
- Use standard **reliability methods** such as RCM, FMEA, or FMECA to develop the best maintenance & service strategy for your critical assets
- Leverage an **aligned** and **harmonized failure data** model between SAP APM and SAP EAM
- Use **maintenance & service history** and patterns as input and guidance for assessments
- Derive and create **maintenance recommendations** to mitigate the likelihood of failures using **task lists** for reactive, proactive or improvement actions

The screenshot shows the SAP Strategy Assessment for Classes interface for a Centrifugal Pump. The main title is "ASM for Centrifugal Pump" with the identifier "ASM_CENTRIFUGAL_PUMP". The status is "Created", the system ID is "S4Cloud-CC8", and the failure data profile is "Rotating Pump (IS-RO-PU)". The operating context is "Yes" and the class is "Centrifugal Pump (CENTRIFUGAL_PUMP)".

The interface is divided into two main sections: "Hierarchy" and "Cause (2)".

Hierarchy:

- Operating_Environment
 - Support (0001)
 - Fail to start on demand (FTS)

Cause (2):

Cause	Code Group
No Lubrication 01	Causes of Pump (CAU-PUM)
Overload 02	Causes of Pump (CAU-PUM)

Effect (2):

Effect	Code Group
Reduced Output 01	Effects of Pump (CO-EF-PU)
No Output 02	Effects of Pump (CO-EF-PU)

Figure: Development of failure data

Strategy And Recommendation Management

SAP Asset Performance Management: Define Asset Maintenance Strategies



Manage developed maintenance & service recommendations to have the right measure defined for review, approval and release for implementation

- Make use of a **recommendation workbench** to manage developed recommendations **centrally**
- **Review, compare and consolidate** recommendations to derive the best set of recommendations
- Manage the status of recommendations and **approve** and **release** recommendations **for implementation**
- **Create** recommendations independently of assessments and **assign failure data** to be addressed if desired
- **Copy** or **apply** existing recommendations to other technical objects
- Analyze **implemented recommendations** to reveal potential misalignment between recommendation and implemented measure*

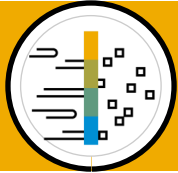
The screenshot shows the SAP Recommendation creation interface. The title bar indicates 'SAP Recommendation'. The main content area is titled 'Valve Insert Removal & Seal Replacement' with ID '123456789'. It shows 'Type: Proactive', 'Subtype: Performance', and 'Status: In Process'. Below this is a tabbed interface with 'Information' selected. The 'Recommendation Details' section includes a 'Description' field with the text 'Valve Insert Removal & Seal Replacement' (39/40 characters), a 'Long Description' field with a detailed text about a 200 series of class positive displacement pump (151/5000 characters), and a 'Cycle' field. To the right, there are dropdown menus for 'Type' (Proactive), 'Subtype' (Performance), and 'Cycle'. Further right, there are input fields for 'Maintenance Activity Type', 'Priority', 'Discipline', and 'Impact on Business'. At the bottom, there are three tabs: 'Financial Risk', 'Maintenance Savings', and 'Validity'. A 'Save' button and a 'Cancel' button are located at the top right of the details section.

Figure: Recommendation creation

*Future planning

Recommendation Implementation

SAP Asset Performance Management: Define Asset Maintenance Strategies



Put developed recommendations into action with the right implementation: from reactive and time-/usage based maintenance and service to more condition-based, predictive/prescriptive maintenance and service

- **Analyze** and **review** the promoted recommendations to take the **right actions**
- Leverage the **recommendations and their specifics** to transfer them into the relevant **planning objects**** for execution
- Keep track on implemented recommendations by having **connections established between recommendations and planning objects****
- Use **harmonized master data** to **ease the handover** of maintenance & service recommendations into planning objects for execution

The screenshot shows the SAP Recommendation Workbench interface. At the top, there are search and filter fields for Recommendation, Type, Subtype, Technical Object, Status, Source, Assessment, Impact on Business, Maintenance Activity Type, Class, and Characteristic Value. Below these fields is a 'Go' button and an 'Adapt Filters' link. The main area displays a table of recommendations, with a header row and several data rows. Each row includes a checkbox, recommendation ID, type (PROACTIVE or REACTIVE), subtype, financial risk, maintenance savings, technical objects assigned, and status.

Recommendation	Type	Subtype	Financial Risk	Maintenance Savings	Technical Objects Assigned	Status
<input type="checkbox"/> Valve Insert Removal and Seal Re... 123456789	PROACTIVE 2	Performance	<div></div>	<div></div>	Kaplan Turbine 101 (10145678) and 7 more	In Process
<input type="checkbox"/> Recommendation 1 and more info 87438792	PROACTIVE 3	Calendar	<div></div>	<div></div>	Battery pack (VIN87438792) and 10 more	Review
<input type="checkbox"/> Recommendation 2 and more info 100001041	PROACTIVE 4	Condition	<div></div>	<div></div>	Wiper System (100001041) and 70 more	In Process
<input type="checkbox"/> Recommendation 3 and more info 217100901	REACTIVE 5		<div></div>	<div></div>	Kaplan Turbine 101 (1045678) details	On Hold
<input type="checkbox"/> Recommendation 4 and more info 10001569	REACTIVE 6		<div></div>	<div></div>	Schneider Lift (10001569) and 5 more	Consolidated

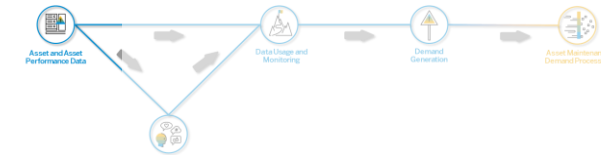
Figure: Recommendation Workbench

*Future planning

**e.g. Task list, Inspection Template, Maintenance Plan, Maintenance Rule

Asset and Asset Performance Data

Monitor Asset Health and Maintenance Demand



Use asset master data or transactional data and set up a connectivity to SAP IoT to receive time series data, or events for health monitoring and demand generation

- Out of the box re-use of **aligned asset master data** including measuring points, counters and characteristics between APM and EAM
- Set up **indicators for your assets** and configure thresholds and value ranges
- Establish a **connection with SAP IoT to receive time series data** for your assets
- Incorporate transactional data like **historic maintenance/service notifications from maintenance/service management** or **machine alerts from SAP IoT**

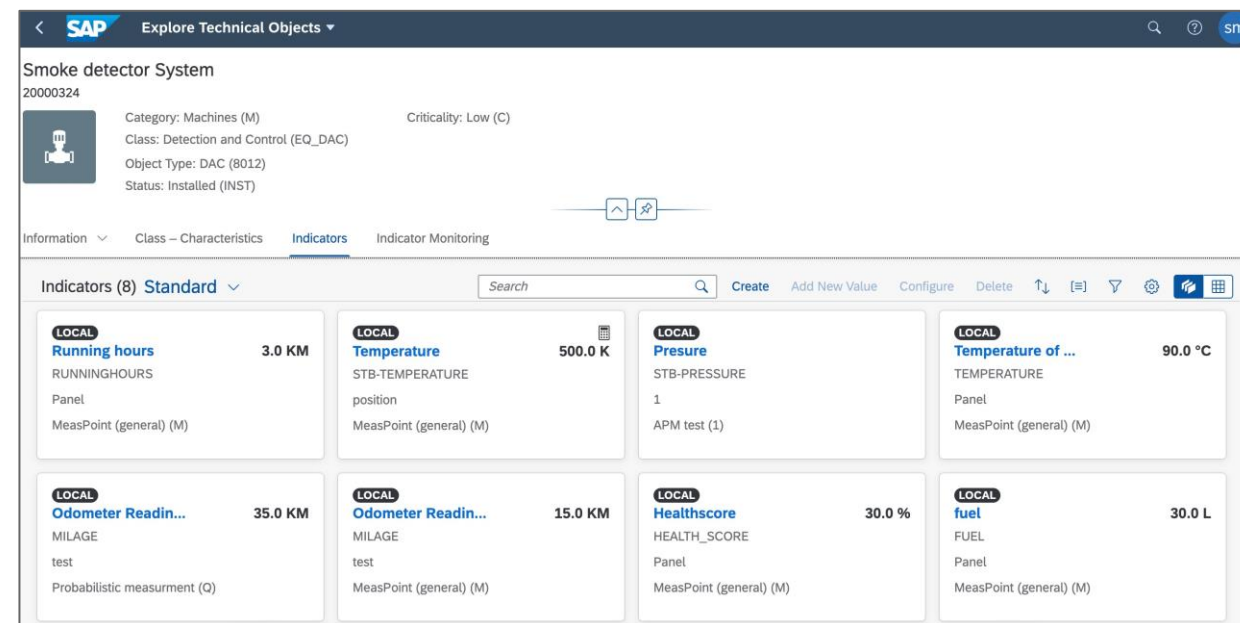


Figure: Indicator Overview

AI Models to Derive Data

Monitor Asset Health and Maintenance Demand



Leverage AI models to process data and gain further insights based on time series data, events, transactional or master data

- Use **out of the box models like anomaly detection or Weibull algorithm** to process raw data
- Derive data like **anomaly score or probability of failure**
- Determine **leading indicators** that contribute the most to **an asset health or failure**
- Calculate an **indicator forecast to show trends** of indicator values
- Store derived data against the asset indicators to gain and provide deeper insights into the asset health



Figure: Technical Object Page → Analytics → Failure Curve

Data Usage and Monitoring

Monitor Asset Health and Maintenance Demand



Set up rules to automate creation of maintenance demand or use the data to examine and analyze the health of your asset or fleet

- Create rules of **different types** (calculated rules, scheduled rules, hierarchical aggregation rules, triggered rules, streaming rules) using **operators** for a set or individual technical objects
- Leverage different rule outputs like calculated indicators, creation of notification with assigned task lists or alerts and emails
- Monitor the **health status** or the **condition** of assets or fleets
- Use **analytics, charts and dashboards** to manage and monitor key data for single **technical objects** or an entire **fleet**
- **Compare** indicator **trends** across assets

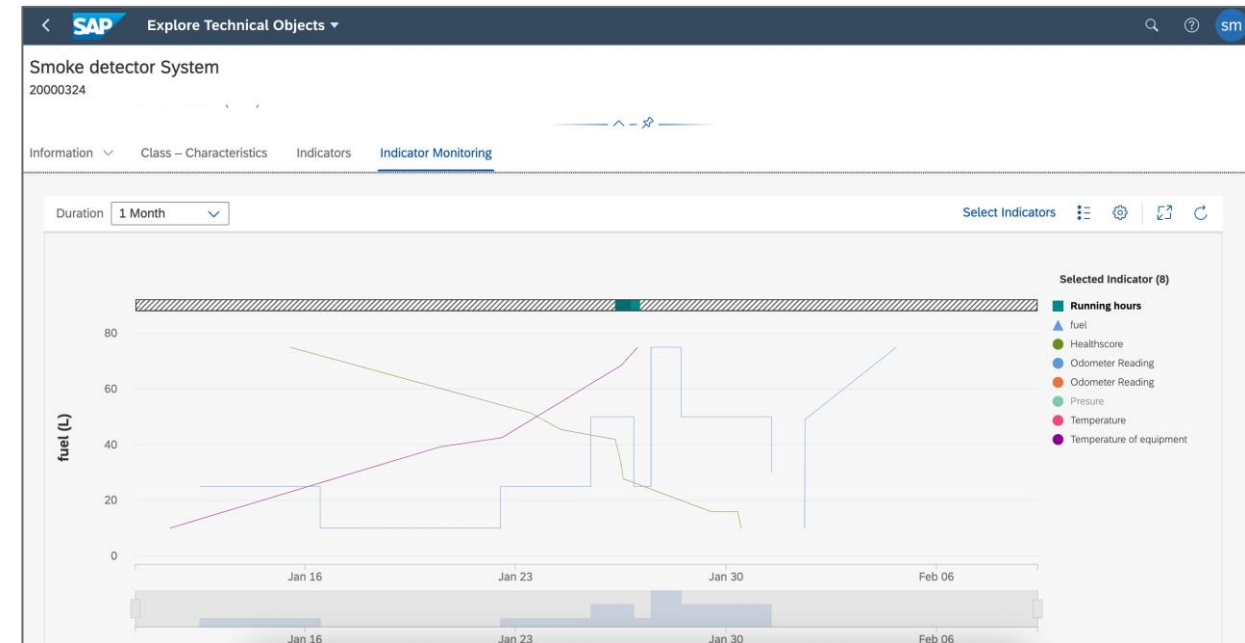
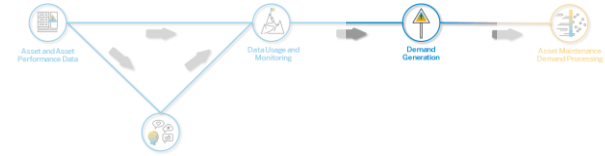


Figure: Indicator Chart

Demand Generation

Monitor Asset Health and Maintenance Demand



Create maintenance/service demand by converting generated alerts into notifications (subsequent work orders) in S/4HANA Maintenance Management

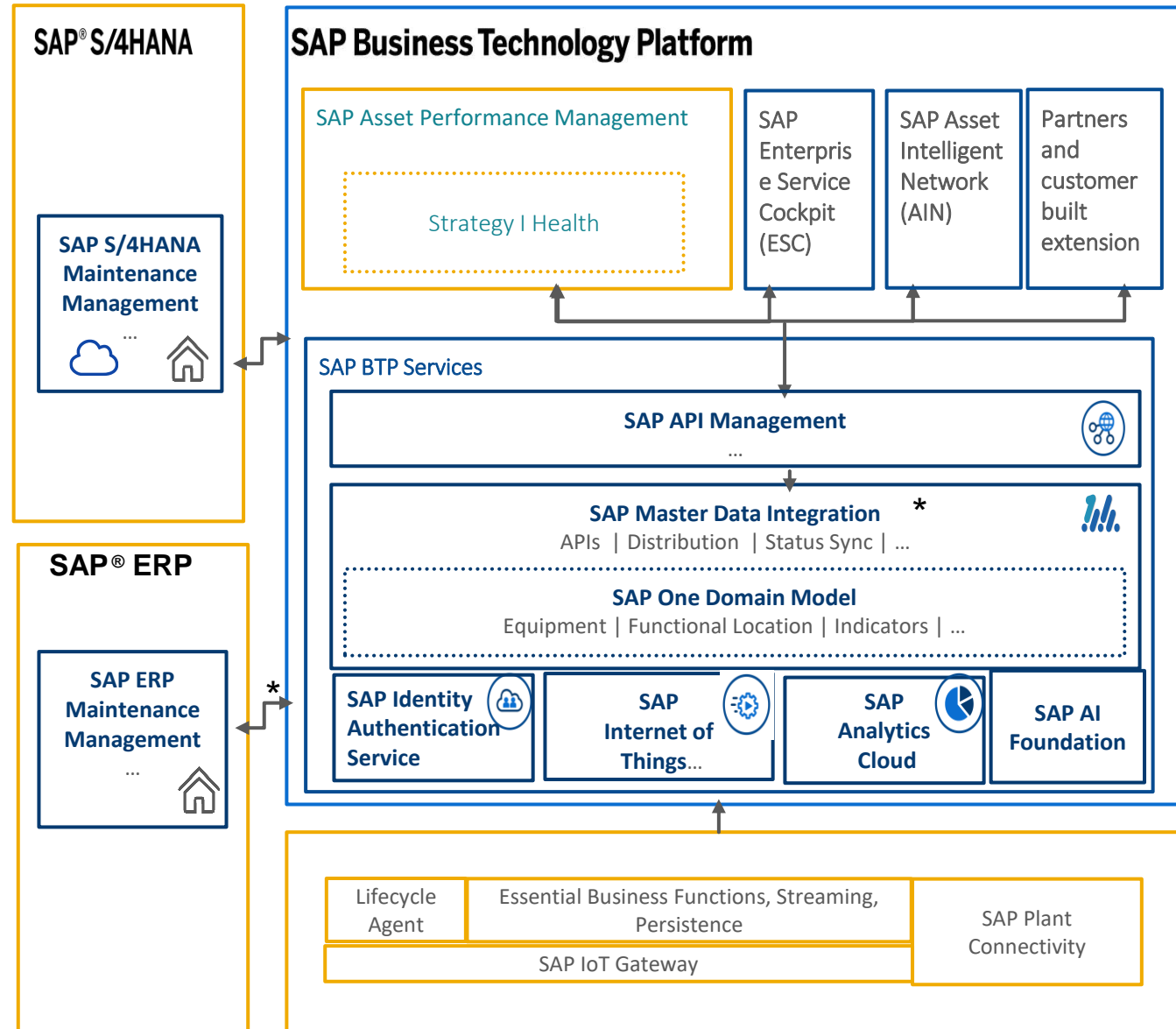
- **Review** created **alerts** and create **maintenance/service notifications** for the same
- **Monitor and review** context information or maintenance history associated with the generated **alerts** and failures for technical objects or fleets to qualify alerts
- **Use rules** with asset health and condition to auto-generate **notification** or **work order**** creation
- Out of the box re-use of aligned master data and **configuration** for notification types, priorities
- Use rules with **pre-defined task lists** to further **specify and qualify the maintenance/service demand** (notification)

Alerts								
Alerts (3) Alerts - Core Attributes								
<input type="checkbox"/>	Description	Triggered On	Severity	Equipment	Indicator	Status	Processor	Source
<input type="checkbox"/>	Bearing Overheating	Feb 23, 2022, 4:01:16 PM	Information	PUMP 00554	Bearing_Temperature	New		Rule
<input type="checkbox"/>	Bearing Overheating	Feb 22, 2022, 4:52:16 PM	Information	PUMP 00554	Bearing_Temperature	New		Rule
<input type="checkbox"/>	Bearing Overheating	Feb 20, 2022, 2:07:16 PM	Information	PUMP 00554	Bearing_Temperature	New		Rule

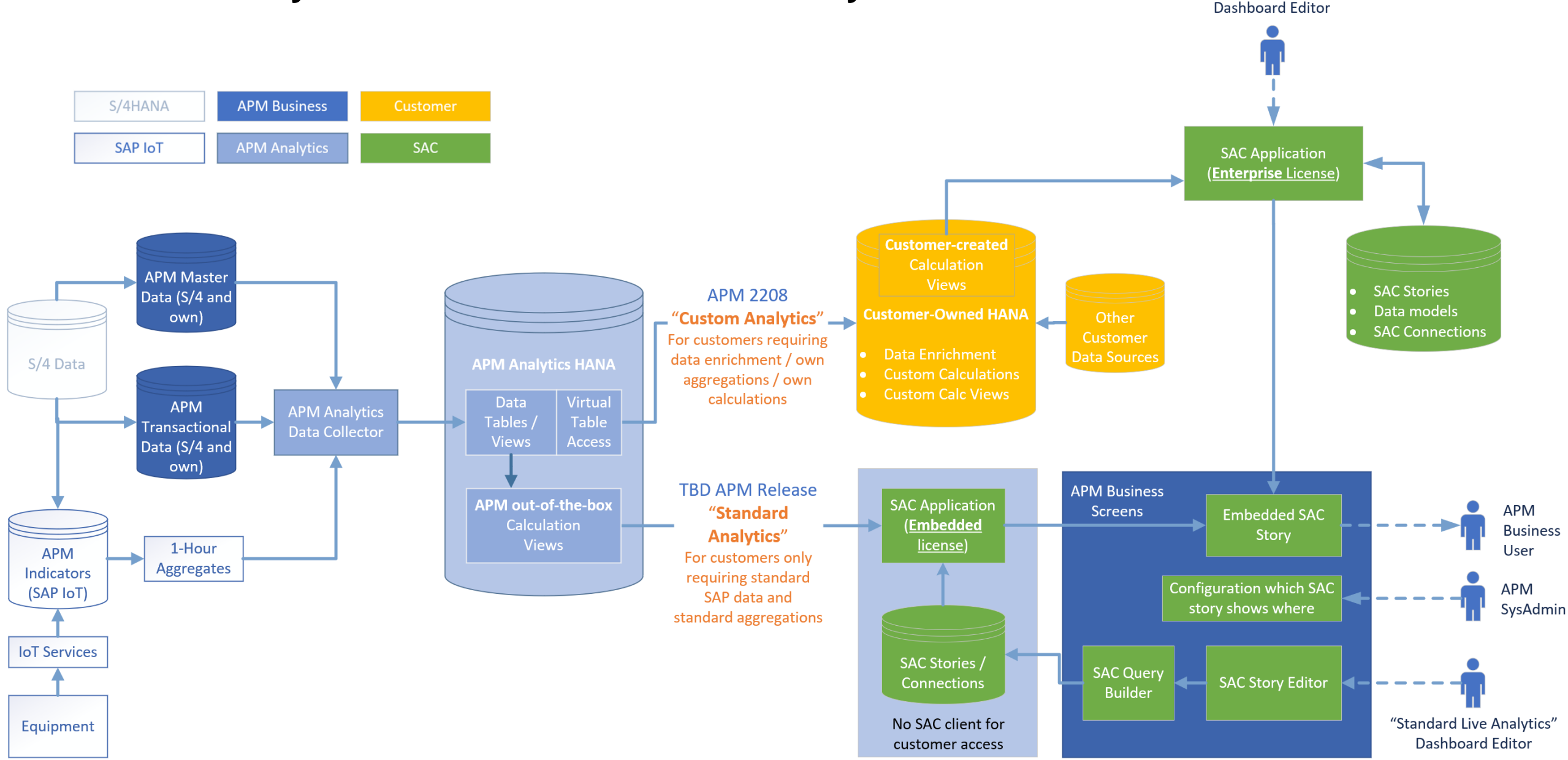
Roadmap Link: <https://roadmaps.sap.com/board?range=CURRENT-LAST&BC=000D3AAADBCE1EDC98B2F7ECE8D6FBF1#Q4%202022>

Asset Performance Management Technical Architecture

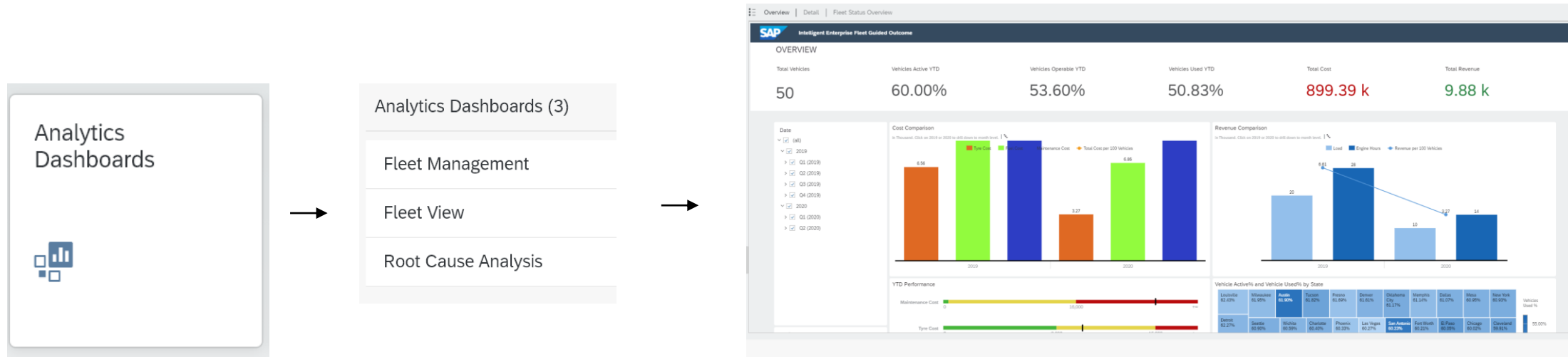
- Offered as a SaaS application with monthly releases and self service features like automated onboarding, tenant provisioning, user management, etc.
- Domain model alignment to achieve Closed-loop e2e processes, using technologies like One domain model (ODM)
- OData, Events and MDI based integration to achieve seamless integration between applications S/4HANA Maintenance Management (OP and Cloud), SAP ERP, APM, SAP IoT and other applications.
- Microservices and BTP based cloud solution to manage industrial scale assets. A true multitenant solution which isolates tenant resources including storage.
- Optimal granular APIs for integration with SAP and non SAP products. Side-by-side extensibility
- Security: Highly secure application following SAP's secure software development lifecycle (SDLC) . ISO27001 certification underway, SOC certification on roadmap



Custom Analytics Architecture with SAP Analytics Cloud

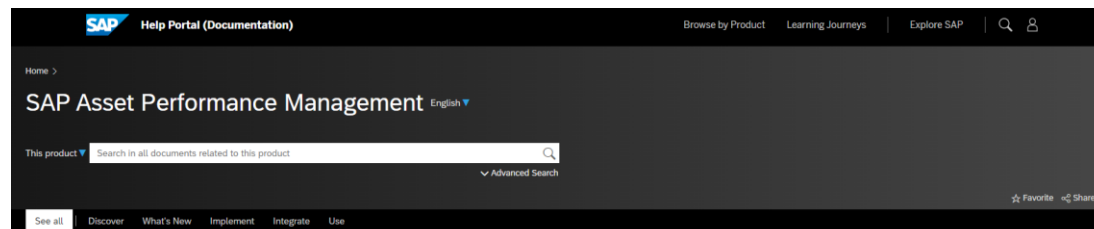


SAP Analytics Cloud - Embedded Analytics Use Cases

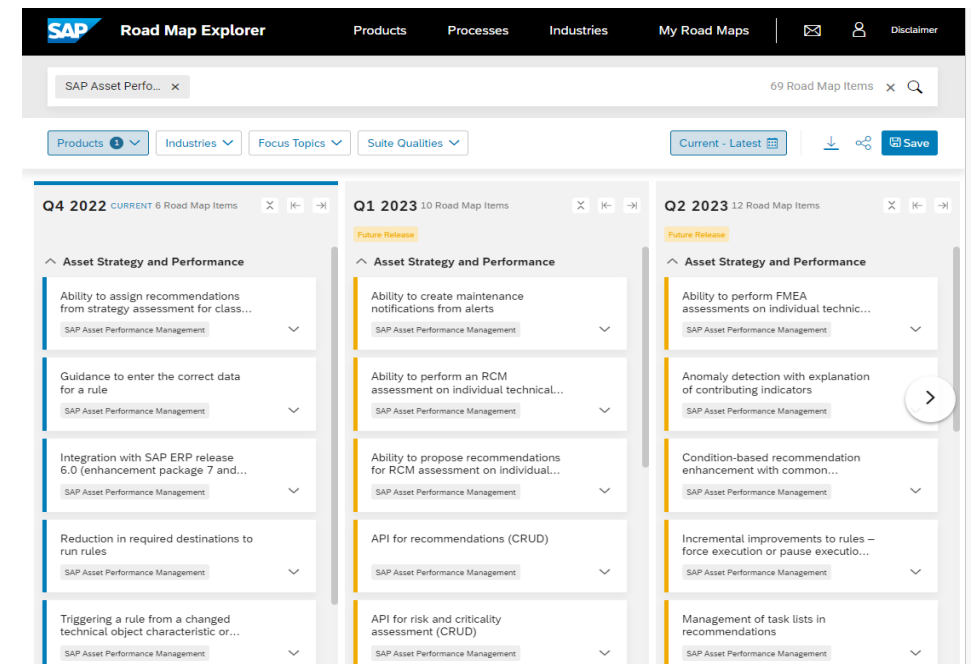


- **Standard data sources as part of APM integration**
 - Technical Objects, Positions, Categories, Alert Types, Alerts, Indicators, Indicator Thresholds, Indicator time series aggregates (count, sum, avg, min, max)
- **Requires customer Owned HANA instance**
 - Supports live connections
 - Support custom calculations

For more information:



https://help.sap.com/docs/SAP_APM



[Roadmap](#)

Thank you.

Contact information:

Dirk Kempf
dirk.kempf@sap.com

