

KDD005 - Managing Asset Performance for Maintenance

Status	Approved
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Issue

This Key Decision Document (KDD) serves as a comprehensive guide outlining critical decisions, considerations, and recommendations essential to the implementation and management of Asset Performance. It aims to clarify the rationale behind exploring and evaluating whether to extend advanced and data-driven approach to asset maintenance across Syensqo plants based on selected assets in comparison to standard SAP preventative maintenance process.

Asset Performance refers to the comprehensive management and optimization of physical assets throughout their lifecycle using advanced tools and technologies.

Key areas covered in this document include:

- Benefits and drawbacks of each solution, including factors such as efficiency, accuracy, safety, and compliance.
- Overview & Background
- Design Options
- Evaluation
- Recommendation
- Business & Project Impacts

Overall, the purpose and structure of the KDD ensure clarity, transparency, and accountability throughout the process of adopting and utilising Asset Performance Management functionalities within Syensqo.

Recommendation

Based on the comprehensive evaluation using the provided decision matrix, extending **S/4HANA Asset Performance Management (APM)** across Syensqo plants for selected assets as part of the ERP rebuild is the recommended approach. This decision is driven by the substantial long-term benefits of increased operational efficiency, improved asset performance, and the ability to leverage both real-time and historical data.

Implementing APM will future-proof Syensqo by enhancing asset performance and maintenance management. As real-time data integration matures within the business, the capabilities of APM will expand, offering even greater benefits over time.

The StarTek solution will continue to be used as a data source for APM. StarTek will also continue to be available for condition-based maintenance functionality where this is sufficient and the more advanced APM functionality is not needed.

Background & Context

Syensqo currently employs preventive maintenance for a diverse range of assets across all their plants, including those critical to safety and production operations. However, asset management is handled individually at each plant, lacking a standardized approach. This leads to inconsistencies in how similar assets are proactively maintained, resulting in potential inefficiencies and varying maintenance standards.

Currently, only one plant utilizes advanced maintenance functionalities such as predictive maintenance and real-time asset monitoring. These advanced features allow for data-driven decision-making and proactive issue resolution. In contrast, the rest of the organization relies on standard SAP preventive maintenance, which focuses on scheduled tasks and routine inspections without leveraging advanced analytics or real-time data. This disparity in maintenance practices highlights the need for a cohesive and standardized approach across all plants to ensure consistent asset management and optimization throughout the organization.

As-Is Summary

At present, only the Tavaux plant leverages the advanced functionalities of asset performance management, which encompass predictive maintenance, real-time monitoring, and comprehensive asset performance insights. The rest of the organization relies on standard SAP preventive maintenance, which focuses primarily on scheduled maintenance tasks without advanced analytics and predictive capabilities.

Opportunities

There is an opportunity to standardize and improve maintenance practices organization-wide, potentially closing the gap between strategy and execution.

Introducing strategies such as predictive maintenance, asset health monitoring, and risk-based maintenance, integrated with a program like SAP APM, can significantly enhance asset reliability, minimize downtime, and increase efficiency.

Assumptions

Data Availability: Not all plants will have sensors and real-time data available to integrate with APM. In cases where real-time data is not available, historical data will be used to feed S/4HANA APM with the necessary information to operate effectively.

Asset Types: The specific types of assets to be managed under the APM solution will be determined during the detailed design phase. This determination will influence the implementation approach and data requirements.

MES Aveva PI (StarTek): Startek is currently operational in 35 Syensqo plants, with plans for continued deployment to additional plants.

Real-Time Monitoring: Real time data from operational sensors will continue to be passed through the IoT Hub and routed to local MES and/or StarTek (AWS-hosted central data lake based on OSIsoft PI).

Constraints

Data Infrastructure: Variability in data infrastructure across plants may pose challenges for consistent data integration and utilization.

Asset Types Determination: The detailed design phase will need to identify and categorize the types of assets to be managed, which may impact the implementation timeline and complexity.

Impacts

Implementing S/4HANA Asset Performance Management (APM) as part of the ERP Rebuild Project will have various business and project impacts

Operational Efficiency: Enhanced maintenance strategies can lead to improved operational efficiency and reduced downtime.

Automation: Implementation of APM can automate routine maintenance tasks, reducing manual intervention

Licensing: APM - Asset Performance Management requires a separate license, based on number of objects (Equipment). A separate SAP IoT subscription to work with SAP Asset Performance Management is not required, as the SAP APM has an inbuilt subscription for SAP IoT with the service plan "OneProduct".

Data

- **Integration:** Need for seamless data integration across all plants.
- **Cleansing:** Significant effort may be required to cleanse existing data to ensure it is accurate and compatible with the new APM system.
- **Migration:** Migrating historical data to the new APM system can be complex and requires careful planning to ensure data integrity and continuity.

Languages: Multilingual will be required to accommodate users in different regions with diverse language preferences.

User Training: Extensive training will be required for users to adapt to new systems and business processes. This training will need to cover several key areas to ensure a smooth transition and effective utilization of the new APM system:

- **System Navigation:** Users will need to become familiar with navigating the new S/4HANA APM system. This includes utilizing different functionalities specific to asset types. Training to include how to switch between these applications to efficiently manage and monitor different asset types without confusion or errors.
- **Process Changes:** The implementation of APM will introduce new business processes. Users must understand these changes, including how to perform their daily tasks within the new system and how these tasks integrate with the overall asset management strategy.
- **Performance Monitoring:** Utilization of APM tools for monitoring and analysing asset performance.

System Complexity: Increased complexity in managing and integrating APM with existing systems and processes.

Business Rules

Data Utilization:

- When real-time data from sensors is available, the data should be integrated into the APM system (this includes data through a third-party application) to enable predictive maintenance and real-time monitoring.
- In the absence of real-time data, historical maintenance and performance data should be used to populate the APM system, ensuring all plants benefit from the system's capabilities.

Maintenance Scheduling: Predictive maintenance schedules to be generated based on data analytics from APM.

Options considered

Option A: S/4HANA - APM (Asset Performance Management)

This option involves extending the implementation of S/4HANA APM across the organization for selected assets, example Rotating Assets (Assets to be determined during Detail Design), whilst continuing to use standard SAP preventative maintenance in parallel. APM is a comprehensive solution designed to optimize asset reliability and performance through advanced analytics and strategic maintenance practices. It facilitates a holistic view of asset health, enabling organizations to implement effective maintenance strategies. Key functionalities include:

- **Predictive Maintenance:** Uses data and analytics to predict potential failures before they occur.
- **Risk-Based Maintenance:** Prioritizes maintenance activities based on asset criticality and risk assessments.
- **Reliability-Centered Maintenance:** Determines the most effective maintenance strategies to ensure asset reliability.
- **Data Integration:** Combines historical maintenance records, manual condition assessments, and real-time IoT data to provide actionable insights.
- **Failure Mode and Effects Analysis (FMEA):** Identifies potential failure modes, their causes, and effects for proactive maintenance planning.
- **Lifecycle Cost Management:** Tracks and manages the total cost of ownership of assets.
- **Compliance Reporting:** Facilitates compliance with regulatory requirements through better documentation and reporting of maintenance activities.
- **Enhanced Collaboration:** Improves collaboration between maintenance teams and other departments.
- **Performance Benchmarking and KPIs:** Defines and monitors key performance indicators (KPIs) and benchmarks for asset performance.

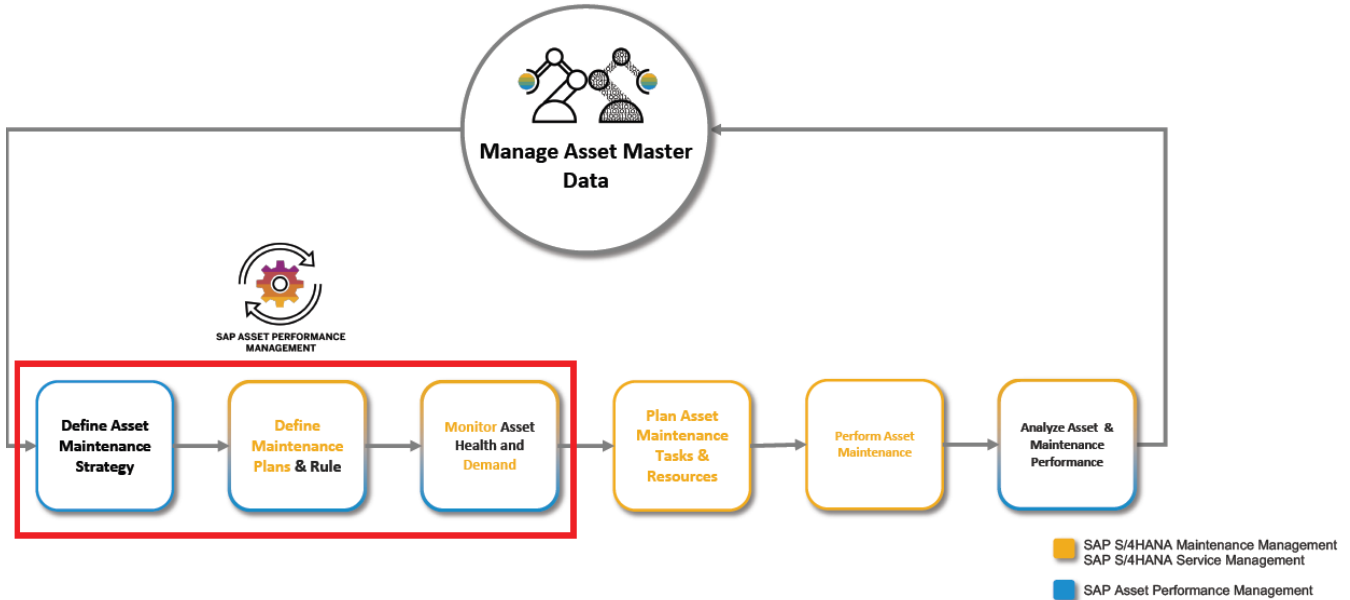
By improving collaboration among maintenance teams and offering tools for performance benchmarking, APM helps organizations minimize downtime, reduce maintenance costs, and extend the lifespan of their assets.

From a user experience perspective, SAP APM offers intuitive dashboards and detailed analytics that empower maintenance teams and decision-makers with actionable insights.

Currently, 35 Syensqo plants use sensors, actuators, and other IoT devices to collect operational real-time data. These devices work together within IoT ecosystems to provide comprehensive data collection, which is then collated in MES Aveva PI (StarTek). This established architectural structure across the organization will serve as the foundation for supplying real-time data to APM via integration.

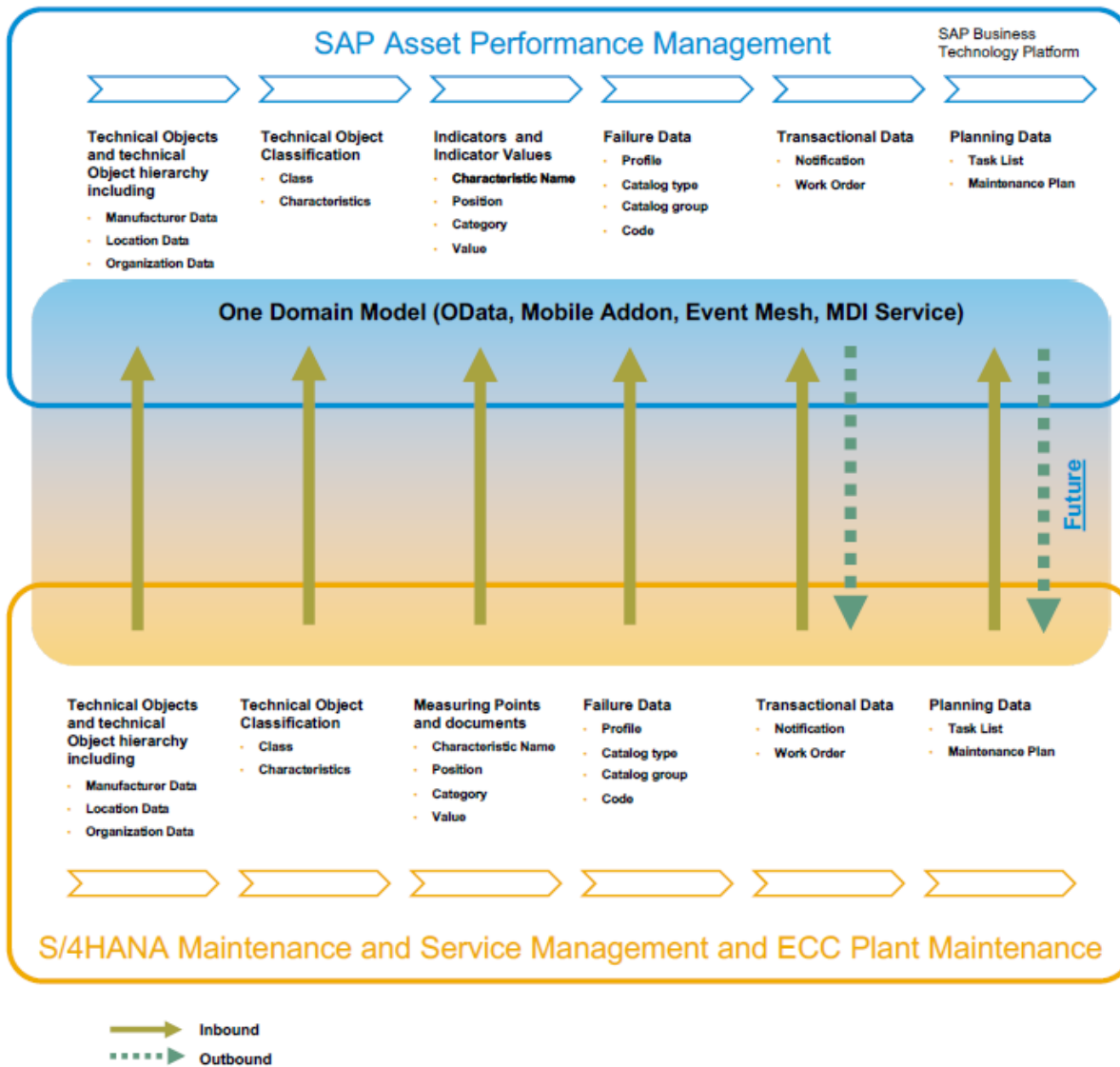
It is important to note that while time series data significantly enhances the predictive capabilities of S/4HANA APM, the module still offers numerous benefits that can improve overall asset management, maintenance strategies, and operational efficiency. This allows Syensqo to build over time to introduce time series data as maturity increases.

High Level Capability Process



Data - As shown in the below flow diagram, data is not required to be maintained separately in 2 applications. Master data held within S/4HANA is the primary source of truth and then replicated into APM through integration.

Data Flow Diagram



Option B: Standard S/4HANA Preventative Maintenance

This option involves continuing with the standard SAP preventative maintenance approach currently used by most plants. Preventative maintenance focuses on scheduled maintenance tasks without incorporating advanced analytics or real-time monitoring capabilities. It operates on a schedule, using time-based or usage-based intervals to trigger maintenance activities. This approach ensures that assets are regularly checked and maintained to prevent unexpected breakdowns, thus enhancing asset reliability and operational efficiency.

The existing preventative maintenance approach is well understood by the maintenance teams, ensuring that they can operate efficiently and effectively. This familiarity can lead to higher compliance and better execution of maintenance tasks, further supporting asset reliability and performance.

Comparison Table

	S/4HANA Asset Performance Management (APM)	Standard S/4HANA Preventive Maintenance
Proactive vs. Reactive	Proactive: Uses advanced analytics on historical data to predict and prevent failures. Also has the functionality of Predictive analytics and real-time monitoring when time series data is introduced	Reactive: Relies on scheduled maintenance tasks to prevent equipment failure.
Cost & Licenses	Higher costs: due to the implementation of advanced analytics and sensors.	Lower costs: as it relies on scheduled tasks without additional technology investments.

Implementation Complexity	High: Involves significant changes to current systems, integration of IoT, and advanced analytics capabilities. Moderate: Involves changes to current systems and integration of historical data for advanced analytics.	Low: Easier to implement as it builds on existing maintenance schedules and practices.
Data Utilization	Advanced: Leverages historical data and real-time data for predictive insights.	Basic: Utilizes historical data for scheduling routine maintenance.
Maintenance Accuracy	High: Provides precise maintenance schedules based on asset conditions and usage patterns.	Moderate: Maintenance schedules are based on fixed intervals, which may not account for actual asset conditions.
Resource Optimization	Efficient: Optimizes resource allocation by performing maintenance only when needed.	Less Efficient: May lead to over-maintenance or under-maintenance due to fixed schedules.
Asset Longevity	Increased: Predictive maintenance can extend asset life by addressing issues before they cause significant damage.	Standard: Maintains asset life by preventing failures through regular, scheduled maintenance.
Compliance and Reporting	Enhanced: Offers detailed reporting and compliance tracking based on predictive analytics.	Basic: Provides standard reporting based on scheduled maintenance activities.
Scalability	Scalable: Can be scaled with additional historical data and predictive model. Also, with the addition of additional sensors as needed.	Limited: Scaling involves adding more scheduled tasks, which can become complex and resource intensive.
Change Management	High: Requires extensive training for maintenance teams to understand and utilize new technologies effectively.	Low: Minimal training required as it builds on existing maintenance knowledge and practices.
Decision-Making	Data-driven: Enables informed decision-making through advanced analytics and real-time data.	Scheduled-based: Decisions are made based on predefined schedules and historical data.
Risk Management	Reduced risk of unexpected failures through early detection and proactive maintenance both using historical data and real time data.	Moderate risk management: Relies on scheduled checks, which may not detect all potential failures early.

Evaluation

The decision matrix provided below offers a structured approach to evaluating and comparing the options for Asset Performance Management (APM) and Standard Preventive Maintenance.

Despite the higher costs and implementation complexity, the benefits of APM in proactive maintenance, data utilization, resource optimization, and risk management make it a more advantageous option overall. Implementing APM will future-proof Syensqo, enhancing how asset performance and maintenance are managed.

Even without real-time data, APM offers more proactive and optimized maintenance through the use of historical data and predictive models. As real-time data is introduced, the capabilities will grow even further, providing greater benefits over time.

**The evaluation scoring system ranges from Low to Very High. In this system, a low score indicates a negative attribute, such as high costs.*

Criteria	Weight	Option 1	Option 2
		S/4HANA APM	S/4HANA Standard PM
Proactive vs. Reactive	H	Very High	Medium
Cost & Licenses	H	Low	Very High
Implementation Complexity	M	Low	High
Data Utilization	M	Very High	Medium
Maintenance Accuracy	M	High	Medium
Resource Optimization	M	High	Medium
Asset Longevity	M	High	Medium
Compliance and Reporting	L	Very High	Medium
Scalability	L	High	Medium
Change Management	L	Medium	Very High

Decision-Making	L	High	Medium
Risk Management	L	High	Medium
Overall		High	Medium

See also

The following section describes relevant documentation:

Document Name	Description
SAP Asset Performance Management Overview	S/4HANA APM - Asset Performance Management Overview
S/4HANA APM Road Map	S/4HANA APM - Future Road Map
Meeting Minutes - KDD005_Managing Asset Performance for Maintenance Business walkthrough.docx	Business Walkthrough Meeting Minutes

Business Definitions (Glossary)

Acronym / Term	Definition
APM	Asset Performance Management
FMEA	Failure Mode and Effects Analysis
KPI	Key Performance Indicators
IoT	Internet of Things
ERP	Enterprise Resource Planning
EAM	Enterprise Asset Management

Change log

Version	Published	Changed By	Comment
CURRENT (v. 37)	Jul 23, 2024 10:31	LEIGHTON-ext, Dean	
v. 36	Jul 21, 2024 05:12	LEIGHTON-ext, Dean	
v. 35	Jul 18, 2024 12:11	LEIGHTON-ext, Dean	
v. 34	Jul 17, 2024 12:12	WENNINGER-ext, Sascha	
v. 33	Jul 17, 2024 12:08	WENNINGER-ext, Sascha	
v. 32	Jul 17, 2024 11:51	LEIGHTON-ext, Dean	
v. 31	Jul 17, 2024 11:39	WENNINGER-ext, Sascha	
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v. 29	Jul 15, 2024 12:38	LEIGHTON-ext, Dean	
v. 28	Jul 10, 2024 12:37	LEIGHTON-ext, Dean	

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Jul 24, 2024	Actor	Type	Activity	Version
Approved	 FALL-ext, Cheikh	State	changed state to Approved at 3:10 pm	v37
Pending SteerCo Review	 FALL-ext, Cheikh	State	gave <i>Final Approval</i> approval at 3:10 pm	
		State	changed expiry date to '07 Aug, 2024 03:10 pm' at 3:10 pm	
		State	changed state to Pending SteerCo Review at 3:10 pm	v37
Pending Stakeholder Review	 FALL-ext, Cheikh	State	gave <i>Stakeholder Review</i> approval at 3:10 pm	
Jul 23, 2024				
	WENNINGER-ext, Sascha	State	changed expiry date to '30 Jul, 2024 12:07 pm' at 12:07 pm	
		State	changed state to Pending Stakeholder Review at 12:07 pm	v37
Edited following DA Endorsement	WENNINGER-ext, Sascha	State	gave <i>Minor change</i> approval at 12:07 pm	