Asset Information Management
Along the Complete Asset Lifecycle
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Key Trends Driving Asset Information Management

The future of asset management in the digital age begins now. As organizations like yours move toward the age of digitalization and the Internet of Things (IoT), a solid master data foundation becomes imperative. The growing ubiquity of IoT-connected assets and mobile-connected workers is creating unprecedented demands for quality in the underlying master data.

Asset operators want to minimize capital investments and risks with low maintenance costs, while original equipment manufacturers (OEMs) want to tap growth opportunities with bundled products and services.

Organizations like yours increasingly want to predict asset performance better, which in turn needs better-networked operators and OEMs. A tipping point can occur when a combination of business drivers – cost, risk, performance – and technological developments – networks, automation, real-time diagnostics, connected assets, and integration – come together to change and enhance maintenance operation processes.
Sustainable operations
- Management of structured and unstructured information in a seamless process
- Advanced level of process maturity, moving from reactive to proactive maintenance
- Collaboration with OEMs to optimize maintenance processes and asset improvement programs
- Lifecycle cost management and maintenance services

New business models
- OEMs moving to a full lifecycle of sell and service processes
- Emergence of pay per use, such as “asset operation by the hour” models
- Closer collaboration of OEMs, engineering procurement contractors (EPCs), service providers, and operators

Technological innovation
- Industry moving slowly from a document-centric to a data-centric approach
- Single cloud-based engineering system owned by operators
- “Jump to data/do not replicate” such as engineering data in an engineering system accessed by a “jump” from SAP® and other applications
- Cloud-based network approach for information exchange and collaboration
The Importance of Managing Asset Information

Comprehensive, accurate asset master data has become a cornerstone for safe and efficient operations in asset-intensive industries. However, maintaining a detailed understanding of your organization’s as-built assets is complicated for numerous reasons, including:

- **Multiple systems of record:** Various aspects of as-built asset records are “owned” by multiple organizations including engineering, maintenance, and operations. Thus, multiple systems of record share this key information.

- **Technical asset information:** This information is required during the entire lifecycle of an asset. Depending on the type of plant or asset, lifecycles can range between 30 to 50 years.

- **Continuously changing assets:** Operational assets change continuously. Changes occur due to daily maintenance, engineering changes, shutdowns, “debtotlenecking,” and capital projects. As a result, your organization must keep asset data current to reflect the as-built assets.

- **Multiple data formats:** Critical asset master data resides in a variety of data-centric (structured) and document-centric (unstructured) formats. Thus, maintaining accurate as-built asset records entails synchronization of both structured and unstructured asset master data.

Even with all these possible complications, asset information tends to flow from engineering to operations and maintenance.
The following figure shows this typical flow of information.

Figure 1: Typical Flow of Information from Engineering to Operations and Maintenance
Why SAP Solutions?

SAP solutions provide capabilities to address these complications. Your organization can deploy one or more of the solutions to address a specific issue, such as identifying data quality issues. Or the software can act as a holistic, end-to-end solution set to help you manage the full lifecycle of asset information. Figure 2 depicts this holistic approach for managing asset information.

Detailed descriptions and “when to use which solution” are provided in the product directory that follows.
Figure 2: SAP Solutions for Managing Asset Information

Consolidated processing of structured and unstructured information

- SAP Data Services
  - SAP Master Data Governance, enterprise asset management extension by Utopia

- SAP Extended Enterprise Content Management by OpenText

- SAP Information Steward
  - SAP 3D Visual Enterprise

EAM Workbench (planned)

SAP Management of Change
Referencing Figure 2, which shows SAP’s approach, a typical flow of information follows:

- An engineering transmittal for asset master data is managed in a “project” workspace in the **SAP Extended Enterprise Content Management application (SAP Extended ECM)** by OpenText. The workspace links to the transmittal package.
- **SAP Extended ECM** initiates a change request in the **SAP Master Data Governance** application and passes extracted “tags” and master data to create master data in the SAP Enterprise Asset Management (SAP EAM) solution.
- **SAP Extended ECM** also provides asset models, diagrams, and data for maintenance aid development using **SAP 3D Visual Enterprise** applications.
- **SAP Master Data Governance** creates a change request to initiate creation of asset master data objects, such as functional locations and equipment.
- **SAP Extended ECM** builds “early” workspaces for each corresponding object and links to objects in **SAP Master Data Governance**. SAP Extended ECM moves documents to staging workspaces.
- Cloud-based **SAP Asset Intelligence Network** provides enriched content using data from manufacturers, suppliers, and user communities.
- Approval of the change request in **SAP Master Data Governance** invokes the loading of master data to **SAP EAM**.
- SAP is planning to provide a workbench tool to further enhance the usability of managing asset information.
The Business Case for Asset Information Management

You can gain the following benefits from using integrated asset information management solutions available from SAP. Check these business case details in Figure 3.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Sample magnitude</th>
<th>Potential benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital project and turnaround delays</td>
<td>$1 million per day per billion in asset value</td>
<td>1.5% of capital cost</td>
</tr>
<tr>
<td>Information foundation creation</td>
<td>1%–3% of capital project budget</td>
<td>Reduce by 10%–20%</td>
</tr>
<tr>
<td>Safety and environmental</td>
<td>$1–$100 million</td>
<td>Reduce incident risk</td>
</tr>
<tr>
<td>Plant availability</td>
<td>North American refining capacity less than 90%</td>
<td>1% increase in availability</td>
</tr>
<tr>
<td>Shop-floor productivity</td>
<td>Wrench time averages of 35% (world-class 60%)</td>
<td>Improve by 50%</td>
</tr>
<tr>
<td>Aging and mobile workforce</td>
<td>Up to 50% of the skilled shop-floor workforce retired before 2020</td>
<td>Increase knowledge capture Absorb attrition</td>
</tr>
<tr>
<td>Maintenance, repair, and overhaul (MRO) supply chain disconnected from shop floor</td>
<td>Less than 50% of MRO materials in equipment bills of materials</td>
<td>Reduce obsolete items (3%) Reduce parts consumption (2%) Reduce returns (30%)</td>
</tr>
<tr>
<td>Low adoption of MRO systems</td>
<td>Low adoption rates for 60% of workforce (operators and craftsmen)</td>
<td>Reduce training costs</td>
</tr>
</tbody>
</table>

Figure 3: Potential Benefits Using Integrated Asset Information Management Solutions
The pages that follow contain detailed descriptions of each of the SAP solutions summarized in Figure 4.

<table>
<thead>
<tr>
<th>Software component</th>
<th>What it does</th>
<th>When to use it</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP® Data Services</td>
<td>Delivers a single enterprise-class solution for data integration, data quality, data profiling, and text data processing to integrate, transform, improve, and deliver trusted data to critical business processes</td>
<td>Migrate data from external applications, such as a legacy computerized maintenance management system for plant maintenance software</td>
</tr>
<tr>
<td>SAP Information Steward</td>
<td>Provides a single environment to discover, assess, define, monitor, and improve the quality of your enterprise data assets</td>
<td>Identify data quality issues based on business rules</td>
</tr>
<tr>
<td>SAP Master Data Governance</td>
<td>Extends business processes running in SAP Business Suite applications, providing domain-specific master data governance to centrally create, change, and distribute master data</td>
<td>Validate and enrich master data before replicating it in the SAP ERP application or other systems</td>
</tr>
<tr>
<td>SAP Extended Enterprise Content Management by OpenText</td>
<td>Provides workspaces for EAM objects to capture, manage, store, and control enterprise-wide content, including documents, images, e-mails, instant messages, and videos</td>
<td>Manage content in workspaces</td>
</tr>
<tr>
<td>SAP 3D Visual Enterprise</td>
<td>Enables visually enhanced processes through the product and asset lifecycle</td>
<td>Visualize spare parts lists and job and safety instructions relating to two- and three-dimensional visualization of equipment and components</td>
</tr>
<tr>
<td>SAP Asset Intelligence Network</td>
<td>Provides a cloud-based global registry of industrial equipment that facilitates data exchange between suppliers and manufacturers</td>
<td>Collaborate between manufacturers and operators of industrial equipment</td>
</tr>
<tr>
<td>SAP Management of Change</td>
<td>Provides a highly flexible and fully auditable tool for monitoring, implementing, and reporting changes, such as for products, procedures, processes, and equipment</td>
<td>Manage all changes in an enterprise using a central tool</td>
</tr>
</tbody>
</table>

Figure 4: SAP Solutions for Asset Information Management (Details Follow)
SAP Data Services

INTEGRATE, TRANSFORM, AND IMPROVE ENTERPRISE DATA

Data integration and replication helps access, move, and load all data sources, including structured or unstructured data and Big Data sources, on premise or in the cloud with rapid data migration to SAP S/4HANA®.

SAP Data Services software provides:
• Single, easy-to-use user interface to build, test, and deploy projects
• Connection, transformation, and information available from virtually any source, structured and unstructured
• Comprehensive data quality solution for cleansing and enriching all types of data
• Scalable solution for high data volumes with high-batch and real-time throughput
<table>
<thead>
<tr>
<th>Solution Capabilities</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Continuously assess the trustworthiness of information</td>
<td>• Improve collaboration to drive data governance excellence</td>
</tr>
<tr>
<td>• Analyze how data quality affects enterprise processes and performance</td>
<td>• Gain full data quality transparency for confidence in data accuracy and trustworthiness</td>
</tr>
<tr>
<td>• Identify opportunities to save money on data cleanup</td>
<td>• Identify and quantify savings opportunities to secure funding for data quality initiatives</td>
</tr>
</tbody>
</table>
EVALUATE AND ENFORCE DATA ACCURACY AND INTEGRITY

SAP Information Steward software provides key metrics to help your stakeholders understand the quality of data. For example, using a simple visual overview of data benchmarks such as integrity, uniqueness, conformity, completeness, and accuracy, business users and IT staff can better understand how data quality levels impact day-to-day business operations.

Business users can define rules and standards that are most appropriate for their data and processes, as well as
maintain them over time. Once rules are created, SAP Information Steward enforces them automatically and alerts the appropriate data steward when they fall out of compliance.

For example, a requirement may specify populating a field according to predefined rules such as valid values or a certain structure that supports a business process, reporting, or legal or compliance requirement. If the field populates with an item that violates the business rule, the software can reject or accept the input and send an alert to the designated data steward.

SAP Information Steward also has a rapid-deployment solution.
<table>
<thead>
<tr>
<th><strong>Solution Capabilities</strong></th>
<th><strong>Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reporting tools to continuously assess the trustworthiness of data</td>
<td>• Improve collaboration to drive data governance excellence</td>
</tr>
<tr>
<td>• Preconfigured key metrics to measure business impacts of poor data and discover where to focus data quality efforts</td>
<td>• Gain full data quality transparency for confidence in data accuracy and trustworthiness</td>
</tr>
<tr>
<td>• Analytics for running what-if scenarios on proposed data quality initiatives</td>
<td>• Identify and quantify savings opportunities to secure funding for data quality initiatives</td>
</tr>
<tr>
<td>• Tools to define business rules and manage data governance</td>
<td></td>
</tr>
</tbody>
</table>
SAP Master Data Governance

ENABLE DATA GOVERNANCE, COMPLIANCE, AND TRANSPARENCY

SAP Master Data Governance, a natural extension of business processes running in SAP Business Suite applications, provides ready-to-go, domain-specific master data governance to centrally create, change, and distribute master data for your full enterprise system landscape.

The enterprise asset management extension by Utopia for the SAP Master Data Governance application can help you centrally manage master data related to your plant and equipment assets.

Get more information about SAP Master Data Governance.
Solution Capabilities

• Governance, compliance, and transparency through integrated staging, approval, and central audit trail
• Consistent definition, authorization, and replication of key master data entities for SAP
• Elimination of error-prone manual maintenance processes for master data in multiple systems
• Master data governance for your own master data
• Integration with SAP Data Services and SAP Information Steward for quality, enrichment, and data remediation

Benefits

• Keep the data “clean”
• Integrate natively with SAP Business Suite
• Reuse the SAP data model, existing business logic, and configuration for creation and validation
CONNECT STRUCTURED AND UNSTRUCTURED INFORMATION

The SAP Extended Enterprise Content Management application by OpenText can help you overcome the disconnect between structured processes and unstructured information.

SAP Extended ECM enables users of SAP EAM to attach unstructured documents and entire ECM workspaces to transactions in SAP applications, without needing to log in to multiple applications to find information. ECM workspaces represent objects in SAP EAM such as functional locations and equipment.
Solution Capabilities

- 360-degree view of plant information
- Collaborative workspace for project members, partners, and customers
- Access to content from inside and outside of SAP applications
- Efficient handover of documents
- Content workspaces for asset-related projects and maintenance work

Benefits

- Increase process efficiency by making unstructured content easily accessible within the context of business processes
- Enable EAM workspaces for collaboration and consistent delivery
- Integrate structured and unstructured data to ensure traceable and transparent documentation of projects
- File and find relevant documents related to a project
SAP 3D Visual Enterprise

COMBINE VISUAL INFORMATION WITH RELEVANT BUSINESS DATA

SAP 3D Visual Enterprise applications combine visual product and plant information with business content from SAP Business Suite applications. Gain an unprecedented combination of traditional business information with fully interactive 2D and 3D visuals.

Maintenance technicians can use these visuals as aids to select spare parts through visual bills of materials (BOMs) or show visual job or safety instructions.
Solution Capabilities

• Interaction with simple-to-use and cost-effective authored and published content with the SAP 3D Visual Enterprise Viewer application
• Creation of animated procedures, 3D embedded documents, and high-definition imagery with the SAP 3D Visual Enterprise Author application
• Simple-to-use tool for visually restructuring BOMs with SAP 3D Visual Enterprise structure manager
• Use of the SAP Visual Enterprise Generator application to do the following:
  – Automate publishing of 3D CAD files into a lightweight format
  – Integrate with external data sources and destinations; consume and combine graphical data with textual information
  – Publish graphics, videos, and documents with optional storage in a data management system (DMS)

Benefits

• Enable better and faster decision making
• Improve productivity and process efficiency by providing visual navigation and query of product information and graphical animation of procedures
SAP Asset Intelligence Network

REGISTER INDUSTRIAL EQUIPMENT GLOBALLY

SAP Asset Intelligence Network provides a global registry of industrial equipment; built and shared among multiple business partners including OEMs, asset operators, regulators, and service providers, and used across the industry by stakeholders. Extensive use enables new collaborative business models, resulting in true operational excellence.

A cloud-based network hosted by SAP, SAP Asset Intelligence Network runs on SAP HANA Cloud Platform.

Get more information about SAP Asset Intelligence Network.
Solution Capabilities

• Installation of a digital twin in SAP EAM to represent each physical machine
• Standardized equipment management through asset master data and spare-parts information available for update from the network
• Streamlined maintenance through access to the latest task lists and service bulletins on maintenance strategies
• Collaborative design and execution for complex installation or maintenance procedures
• Collaborative network services for managing equipment, collecting asset performance analysis and feedback, and fostering usage-based design enhancement

Benefits

• Improve asset data quality and transparency across manufacturers
• Reduce capital expenditure and maintenance costs
• Improve asset reliability and employee productivity
• Simplify collaboration by storing common metadata on the network
• Shorten issue response times and enrich decision making
• Share information quickly with a publish-and-subscribe paradigm
SAP Management of Change

PERFORM SYSTEMATIC REVIEWS, RISK MITIGATION, AND APPROVALS

Management of change (MoC) process capabilities in the SAP Management of Change application helps you record, monitor, process, and evaluate change processes in the following ways:
- Manage and streamline changes to products, procedures, processes, and equipment.
- Motivate employees to communicate change requests using the intuitive user interface.
- Monitor and organize reviews, approvals, and other actions necessary to implement the change (for example, update documentation, training materials, or master data).
• Use customized templates to decrease implementation and adoption costs.
• Help ensure that employees follow company and industry-specific change procedures for safety compliance to reduce incidents.

MoC process capabilities help integrate data from non-SAP software or SAP ERP in the SAP Management of Change application.
**Solution Capabilities**

- Integration with objects in SAP S/4HANA (functional location, equipment, material, documents, maintenance order, maintenance notification) and environmental health and safety risk assessment
- SAP Business Workflow tool, including e-mail notifications
- Digital signature – customizable for each status change
- Business rules framework to support flexible customer-specific business processes
- Change management across the enterprise
- Intuitive method to create MoC notifications
- Offline submission option
- Streamlined integration with other SAP software
- Easy way to track and report MoC notifications
- Safety and regulatory requirements
- Ability to fit the business processes

**Benefits**

- Change process consistent across the organization
- Central functions with full visibility and progress monitoring
- Timely monitoring of follow-up tasks
- Reduced report preparation time

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For additional information, contact us online.