Transform Asset Management with SAP S/4HANA

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• Context

• EAM in S/4HANA

• User Interface

• Strategies and Processes in Asset Management

• Integration aspects

• Summary and Q&A
Context **Trends in Asset Management**
SAP Line of Business Asset Management

Trends in Asset Management

- **ISO 55001, ISO 14001, ISO 45001,...**
- Optimizing **cost, risk, and performance**
- Balancing **OPEX** with **CAPEX**
- Meeting **stakeholder expectations**
- Empowerment of **practitioners**
- **Collaboration** between EPCs, OEMs, service providers, and operators

**Business Driver**

**Technology Enablers**

- Internet of Things (IoT) to scale connectivity
- **Big Data** for getting insight from IT and OT
- **Analytics** for prediction and simulation
- Machine Learning to improve on business decisions
- **Enterprise Mobility** to empower employees
- **Cloud** for collaboration

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Context Logical Architecture
# SAP Line of Business Asset Management

Supporting Asset Management processes end-to-end

## Portfolio and Project Management
- Idea Management
- Portfolio Management
- Project Management
- Resource Management
- Project Connectivity

## Asset Operations and Maintenance
- Asset Information Governance
- Maintenance Planning and Scheduling
- Maintenance Execution
- Mobile Asset Management

## Environment, Health, and Safety
- Incident Management
- Health and Safety Management
- Environment Management
- Management of Change
- Maintenance Safety and Permit to Work

## Asset Performance and Intelligence
- Asset Strategy and Performance
- Asset Network and Collaboration
- Asset Prediction and Optimization
Solution EAM in SAP S/4HANA
SAP's vision for Asset Management

Provide best-in-class user experience seamlessly on all devices.

- UI harmonization
- Roadmap for mobile apps
- EAM and EH&S in S4/HANA
- Geospatial Enablement Framework
- Multiresource Scheduling
- Customer Connection

Help ensure accuracy of master data and allow for sharing master data alongside the value chain.

- Data Services and Information Steward
- Master Data Governance EAM extension
- Visual Enterprise
- EAM workbench in development

Establish a business network for OEMs, service providers, operators, and other contributors.

- Asset Intelligence Network

Make operational data available for comprehensive analytics and insight-to-action, leveraging the IoT.

- Predictive Maintenance and Service on-premise and in the cloud
User Interface
SAP User Interfaces
Evolution
SAP S/4HANA: what does it look like?

Single entry point
- The SAP Fiori launchpad will be the single entry point to access all apps
- KPIs driven business with realtime insights

Domain specific insights and actions
- Users quickly get an overview of what needs their attention with
  - Overview Pages, List Reports, and Work Lists.
  - Trigger quick actions or drill down to the next level of detail

Enter details and explore in depth
- Key and differentiating use cases will be re-imagined
- “Classic” transactions will have the SAP Fiori visual theme

Use Search, Links, Collaboration & Adaptability
- For intuitive navigation and individualization if needed
- Use CoPilot for Collaboration with Quick Actions & Embedded Objects

Access the relevant Maintenance apps from the FIORI Launchpad
Users will quickly get an overview of what needs their attention with Work Lists and can trigger quick actions
All related App’s have been visual harmonized supporting end to end process in an visual harmonized UI
Overview about the different objects via search, list and navigation capabilities
Launchpad features:
- Tiles based on role(s) that can be adapted
- List views
- Maintenance request
- Information centers
- Favorites
- Comprehensive list of EAM transactions available
Strategies for Asset Maintenance
Strategy: run-to-failure = (corrective) breakdown maintenance

Operations / Asset → Call / create notification

Supervisor / Planner → Create order

Technician / Backoffice → Fix problem

Technician → Confirm and complete order

Maintenance workcenter
Strategy: Preventive maintenance

**WHEN?**
Time-/counter-based strategies

**WHAT?**
Task lists

**WHERE?**
Objects

**Maintenance Planning**

**Schedule plan**
- Single cycle
- Strategy
- Multiple counters

**Order**
0010 Inspect pumps
0020 Replace seals

**Confirm and complete order**

**Technician / Backoffice**

**Execute job**

**Technician**

**Maintenance workcenter**
Strategy: Condition Based Maintenance

Inspections/rounds
Countervalue / Thresholds
Machine integration
- PCo
- MII
- IoT Conn.

Maintenance plan
- Single cycle
- Strategy
- Multiple counters

Create work order

Order
0010 Inspect pumps
0020 Replace seals

Confirm and complete order
Technician / Backoffice

Execute job
Technician

Maintenance workcenter
Strategy: Predictive Maintenance

Real time Information
Manually inspected information
System Specification and Characteristics
Preventive and Corrective maintenance

Operational Inputs
Physical system of asset

Operational Outputs

Operational forecasts
Failure pattern
Next maintenance activity

Order
0010 Inspect pumps
0020 Replace seals

Confirm and complete order

Technician / Backoffice

Execute job

Technician

Maintenance workcenter
Maintenance Journey & Asset Optimization
Organizations are maturing their maintenance strategies

Wait until a machine fails and then undertake maintenance.

Perform maintenance activities based on regular intervals (time or counter based)

Continuously observe the status of assets and react to predefined conditions and events.

Apply advanced analytics of operational and business data to help determine the condition of specific equipment and predict when to perform maintenance.

Companies are moving from a reactive to a proactive approach, leveraging machine data for better insights.
Technology is changing our approach to maintenance

*Use of Maintenance Strategy – **Today**

- Run to Failure
- Preventive
- On-Condition
- Predictive

*Use of Maintenance Strategy – **Future**

- Run to Failure
- Preventive
- On-Condition
- Predictive

Although still relevant, **preventive** maintenance typically results in over-maintaining assets and high cost.

The Internet of Things is leading to increased use of **on-condition** and **predictive** maintenance strategies.

The goal is to increase the use of advanced maintenance strategies and reduce reactive maintenance events.

*Proportion of maintenance strategies are for illustration purposes only and will vary based on many factors
Processes in Asset Management
The maintenance process

Initiate

Plan

Schedule

Execute

Close & analyze
Initiate

How is Maintenance Work Generated?

Maintenance Notification
- Manual order creation

Direct Order Creation
- Inspection/Rounds

Scheduled PM
- Time/Counter Strategy

Condition Based
- Inspection/Rounds
- Machine Integration
- Real Time

Predictive
- Forecasts and Failure Patterns
Technical Object: 10000000 (Centrifugal Pump)

Type: M1 (Maintenance Request)

Description: Issue with Pump

Use Template

Long Text: Please describe the problem. Add details here.
When did the problem start? Today.
What did you do after identifying the problem?

Location: 9.3501336, 48.6616037

Map: 9.3501336, 48.6616037
Malfunction Report

*Technical Object: 10071536

Details  Current Notifications (28)

*Description: Break Down

Long Text: Describe the problem in more detail

Failure Mode: broken (82)

Effect: Production breakdown (3)

Current Location: Describe the current location of the technical object

Reported On: 06/08/2017  07:10:16

*Reported By: MAINTENANCE_TECHNICIAN

Assign To: 50000387

Attachments (1)

prairie-pumpjack-slide3.jpg

Uploaded By: Maintenance_Technici John  ·  Uploaded On: 08-06-2017 23:10:43 · File Size: 313.5 KB

Project Status: Draft  ·  Source: DMS
**Order data**

**Description:**

Basic start date: 06/09/2017 / 00:00:00

**Work:**

0.0 / HR

**Main WorkCtrl:** MECH01 / 1000

**Personnel no.:** 00000000

**Planning plant:** 1000

**Functional loc.:** AU-L

**Equipment:** AU-1000-N001

**Business Area:** 9900

**Basic finish date:** 06/09/2017 / 24:00:00

**Complete Technically:**

**Activity Type:**

**MaintActivType:** 102
Plan

How can we proactively manage work packages?

• Comprehensively manage master data for technical objects

• Build preventive maintenance plans, review past execution, and account for the requirements of the work package

• Gain real-time visibility into current performance of assets
### Order and Notification List

<table>
<thead>
<tr>
<th>Order</th>
<th>Order Type</th>
<th>Description</th>
<th>Priority Descr.</th>
<th>Total act. costs</th>
<th>TotalPlndCosts</th>
<th>Tech. Object</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM01</td>
<td>Order</td>
<td>Test WJ 2</td>
<td>High</td>
<td>0.00</td>
<td>0.00</td>
<td>P-1000-N001</td>
<td>04/03/2017</td>
<td>04/07/2017</td>
</tr>
<tr>
<td>PM01</td>
<td>Order</td>
<td>PM Order</td>
<td>Medium</td>
<td>0.00</td>
<td>703.52</td>
<td>AU-1000-N001</td>
<td>04/20/2017</td>
<td>05/11/2017</td>
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<tr>
<td>PM01</td>
<td>Break</td>
<td>CM Break</td>
<td>Medium</td>
<td>299.72</td>
<td>343.29</td>
<td>AU-1000-N001</td>
<td>04/20/2017</td>
<td>04/20/2017</td>
</tr>
<tr>
<td>PM01</td>
<td>Order</td>
<td>PM Order</td>
<td>Medium</td>
<td>0.00</td>
<td>2,414.55</td>
<td>AU-1000-N001</td>
<td>04/20/2017</td>
<td>04/20/2017</td>
</tr>
<tr>
<td>PM01</td>
<td>Condition</td>
<td>Condition Alert Detected +/- 8% Idle</td>
<td>Very high</td>
<td>0.00</td>
<td>0.00</td>
<td>AU-1000-N001</td>
<td>05/31/2017</td>
<td>06/01/2017</td>
</tr>
<tr>
<td>PM01</td>
<td>Order</td>
<td>0010 - Leaking Oil</td>
<td>Very high</td>
<td>135.98</td>
<td>2,924.15</td>
<td>AU-1000-N001</td>
<td>06/01/2017</td>
<td>06/02/2017</td>
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<tr>
<td>PM01</td>
<td>Order</td>
<td>PM 10,000 Hrs Maintenance</td>
<td>High</td>
<td>0.00</td>
<td>0.00</td>
<td>AU-1000-N001</td>
<td>05/31/2017</td>
<td>06/02/2017</td>
</tr>
<tr>
<td>PM01</td>
<td>Order</td>
<td>Condition Alert Detected +/- 8% Idle</td>
<td>Very high</td>
<td>0.00</td>
<td>0.00</td>
<td>AU-1000-N001</td>
<td>05/31/2017</td>
<td>06/02/2017</td>
</tr>
</tbody>
</table>

#### Details for order 822264

**General Data**

- **Description**: 0010 - Leaking Oil
- **Priority**: Very high

**Location Data**

**Organization Data**

- Mobile status set to RECEIVED by user l808035 on 2017-06-01 16:17:37
- Mobile status set to STARTED by user l808035 on 2017-06-01 18:30:28
Technical Object Structure:

- **K1**: Clarification plant
- **K1-ZPW**: Inlet pump plant
- **K1-M**: Mechanical purification
- **K1-B**: Biological cleaning
- **K1-B01**: Pump station
  - **K1-B01-1**: Pump test Codelco
  - **P-1000-DF01**: Electric pump 001
  - **P-1000-DF02**: Electric pump 001
  - **P-1000-DF03**: Electric pump 001
  - **P-1000-N001**: Electric pump 001 - Test Codelco
  - **P-2000-N001**: Electric pump 001
  - **K1-B01-1A**: Valve 1
  - **K1-B01-1B**: Valve 2
  - **K1-B01-2**: Pump set 2
  - **K1-B01-3**: Pump set 3
  - **K1-B01-9**: Pump Codelco
- **K1-B02**: Filter building
- **K1-ER1**: 1st biological cleaning
- **K1-ER2**: 2nd biological cleaning
- **K1-KWT**: Clarified water test tank-fish culture
- **K1-SLB**: Sludge processing
- **K1-CNT**: Container > Deposit site
- **K1-WE**: Waste water treatment

**General Data**

- **Technical Object Type**: Equipment
- **System Status**: INST
- **Valid From**: 04/14/1999
- **Valid To**:

**Basic Data**

- **Subtype**: Water pump
- **Weight/Unit**: 26.500 KG

**Reference Data**

- **Acquisition Value**: 1,285.16 EUR

**Manufacturer Data**

- **Manufacturer**: Vereinte Mechanische Werke AG
- **Model Number**: P-1
- **Manufacturer Part Number**: EP-3445-GH1

**Construction Type**: 

- **Size/Dimension**: 
- **Start-Up Date**: 

**Acquisition Date**: 

- **Country of Manufacture**: 
- **Month/Year of Construction**: 
- **Manufacturer Serial Number**: 
<table>
<thead>
<tr>
<th>Material</th>
<th>Image</th>
<th>Quantity in BOM</th>
<th>In Stock</th>
<th>Quantity</th>
<th>Actions</th>
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<tbody>
<tr>
<td>STB-BEARING2</td>
<td></td>
<td>2 PC</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STB-SCREW</td>
<td></td>
<td>1 PC</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STBVALVE-1</td>
<td></td>
<td>1 PC</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>STBVALVE-156</td>
<td></td>
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<tr>
<td>STBVALVE-244</td>
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<td>1 PC</td>
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<td>STBVALVE-333</td>
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<td>STBVALVE-35</td>
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<td>1 PC</td>
<td>Available</td>
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<td></td>
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<tr>
<td>STBVALVE-68</td>
<td></td>
<td>1 PC</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Schedule
How do we build and dispatch the work package?

Manual Planning
- Manual assignment creation in the Planning Board (via drag & drop)
- Manage potential resource conflicts with contextual alerts
- Further features like Qualification Matching, Tool Planning, Travel Times, Clocking Data, Capacitive Planning

Resource Selection
- Identical to manual planning but with pre-selection of resources based on different criteria

Automatic Planning
- Automatic Scheduling based on availabilities and qualifications
- Utilization based automatic scheduling
- Intelligent shifting

Optimization
- An optimization engine proposes an optimized schedule (travel times, SLA dates, etc.)
Execute and Confirm
Perform the work quickly, correctly, and safely?

- Access to prioritization, asset location, repair history, work order details, documentation, notes, and required materials
- Create additional notifications or sub-work orders
- SAP 3D Visual Enterprise Viewer embedded for work instructions
- Inspection rounds data capturing
- Issuance and consumption of materials, including material search
- Timesheet data entry with e-signature
- Complete work orders and capture all relevant data
<table>
<thead>
<tr>
<th>Issue</th>
<th>Work Item</th>
<th>Assigned To</th>
<th>Planned Effort</th>
<th>Status</th>
<th>Technical Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair Pump</td>
<td>atp bh2</td>
<td>Maintenance_Technici John</td>
<td>10.0 H</td>
<td>Created</td>
<td>Cooling Water Circulation Pump (210100091)</td>
</tr>
<tr>
<td>10000543</td>
<td>0010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>atp</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
<td>Created</td>
<td>Cooling Water Circulation Pump (210100091)</td>
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<tr>
<td>PG Water dripping from inlet</td>
<td>PG Water dripping from inlet</td>
<td>Maintenance_Technici John</td>
<td>2.1 H</td>
<td>Ready for Work</td>
<td>Inlet Water Pipes (1010-CWS-CTW-CTW024-LPS)</td>
</tr>
<tr>
<td>1000012</td>
<td>0010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>atp</td>
<td>0010</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
<td>Work Is Done</td>
<td>Cooling Water Circulation Pump (210100091)</td>
</tr>
<tr>
<td>10000013</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>test</td>
<td>test</td>
<td>Maintenance_Technici John</td>
<td>0.0 H</td>
<td>Created</td>
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<tr>
<td>10000040</td>
<td>0010</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>ATP check</td>
<td>ATP check</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
<td>Created</td>
<td>Cooling Water Circulation Pump (210100091)</td>
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<td></td>
</tr>
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<td>21212</td>
<td>21212</td>
<td>Maintenance_Technici John</td>
<td>10.0 H</td>
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<td>Cooling Water Circulation Pump (210100091)</td>
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<td>10000001</td>
<td>0010</td>
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<td></td>
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</tr>
<tr>
<td>1212</td>
<td>1212</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
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<td>Cooling Water Circulation Pump (210100091)</td>
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<tr>
<td>10000100</td>
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</tr>
<tr>
<td>21212</td>
<td>21212</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
<td>Work Is Done</td>
<td>Cooling Water Circulation Pump (210100091)</td>
</tr>
<tr>
<td>10000010</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>1212</td>
<td>121212</td>
<td>Maintenance_Technici John</td>
<td>1.0 H</td>
<td>Work Is Done</td>
<td>Cooling Water Circulation Pump (210100091)</td>
</tr>
<tr>
<td>10000120</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Urgency</td>
<td>Priority Descr.</td>
<td>Description</td>
<td>Tech Object</td>
<td>Start Date</td>
<td>Start Time</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
<td>--------------------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>Monthly shutdown</td>
<td>1000-HAM-FL-03</td>
<td>05/25/2017</td>
<td>08:00:00</td>
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<tr>
<td>High</td>
<td></td>
<td>test order</td>
<td>1000-MAC-AA-02</td>
<td>11/19/2014</td>
<td>00:00:00</td>
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<tr>
<td></td>
<td></td>
<td>Maintenance of Pump</td>
<td>P-1000-N001</td>
<td>02/24/2015</td>
<td>00:00:00</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>Pump Repair</td>
<td>P-1000-N001</td>
<td>03/02/2015</td>
<td>00:00:00</td>
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<tr>
<td>High</td>
<td></td>
<td>Preventive Maintenance of Pump</td>
<td>P-1000-CF01</td>
<td>08/04/2015</td>
<td>00:00:00</td>
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<tr>
<td>High</td>
<td></td>
<td>Generated by MOC on 2015/08/24</td>
<td>10006769</td>
<td>08/24/2015</td>
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<tr>
<td>High</td>
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<td>Leakage of pump</td>
<td>P-1000-CF01</td>
<td>09/18/2015</td>
<td>00:00:00</td>
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<td>Abnormal noise of pump</td>
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<tr>
<td>High</td>
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<td>Track Inspection</td>
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<td>High</td>
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<td>Investigate temperature rise in pump</td>
<td>P-1000-CF02</td>
<td>03/10/2016</td>
<td>00:00:00</td>
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## Pump leaking

<table>
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<tr>
<th>Malfunction</th>
<th>Work Center</th>
<th>Assigned To</th>
<th>Planned Effort</th>
<th>Actual Effort</th>
<th>Finally Confirmed</th>
<th>Status</th>
<th>Actions</th>
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<tbody>
<tr>
<td>Bearing broken</td>
<td>ME03</td>
<td>EL03</td>
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<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact corroded</td>
<td>EL01</td>
<td>EL00</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td></td>
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<tr>
<td>Chipped</td>
<td>ME00</td>
<td>ME00</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 inch crack</td>
<td>ME01</td>
<td>ME00</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Job Details

**Work (1)**: Standard

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Work Center</th>
<th>Assigned To</th>
<th>Planned Effort</th>
<th>Actual Effort</th>
<th>Finally Confirmed</th>
<th>Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump leaking 0010</td>
<td>Mechanics (RES-0100)</td>
<td>Maintenance_Technician John</td>
<td>0.0 H</td>
<td>0.000 H</td>
<td>No</td>
<td>Work Is Done</td>
<td></td>
</tr>
</tbody>
</table>

### Parts (1)

**Material**: Stop valve bellow seal PN40 DN15 flange

<table>
<thead>
<tr>
<th>Image</th>
<th>Material</th>
<th>Planned Quantity</th>
<th>Quantity Issued</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image_url" alt="Image" /></td>
<td>Stop valve bellow seal PN40 DN15 flange</td>
<td>1.000 PC</td>
<td>0.000 PC</td>
<td></td>
</tr>
</tbody>
</table>
### Pump Leaking (10000458)

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Work Center/Plant</th>
<th>Description</th>
<th>Planned Effort</th>
<th>Assign To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearing broken</td>
<td><strong>RES-0200</strong></td>
<td>Electrical Fix</td>
<td>3.0 Hours</td>
<td>50008313</td>
</tr>
<tr>
<td>Contact corroded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chipped</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Inch Crack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Job Details**

- Work Item: Pump Leaking (0010)
- Work Center: Mechanics (RES-0100)

**Parts (1)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Planned Quantity</th>
<th>Quantity Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop valve bellow seal PN40 DN15 flange</td>
<td>1.000 PC</td>
<td>0.000 PC</td>
</tr>
</tbody>
</table>
Confirm Actual Effort

Work Center:
Mechanics (RES-0100)

Assigned To:
Maintenance_Technici John

Description:
Pump leaking

Planned Effort:
0.0 H

Actual Effort:
5.0HR

Posting Date:
06/09/2017

Final Confirmation:
### Work (2)

<table>
<thead>
<tr>
<th>Work Item</th>
<th>Work Center</th>
<th>Assigned To</th>
<th>Planned Effort</th>
<th>Actual Effort</th>
<th>Finally Confirmed</th>
<th>Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump leaking 0010</td>
<td>Mechanics (RES-0100)</td>
<td>Maintenance_Technician John</td>
<td>0.0 H</td>
<td>5.000 H</td>
<td>No</td>
<td>Work Is Done</td>
<td></td>
</tr>
<tr>
<td>Electrical Fix 0020</td>
<td>Electric (RES-0200)</td>
<td>Rachel Posner</td>
<td>3.0 H</td>
<td>0.000 H</td>
<td>No</td>
<td>Ready for Work</td>
<td></td>
</tr>
</tbody>
</table>

### Parts (1)

<table>
<thead>
<tr>
<th>Material</th>
<th>Planned Quantity</th>
<th>Quantity Issued</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop valve bellows PN40 DN15 flange STBVALVE-288</td>
<td>1.000 PC</td>
<td>0.000 PC</td>
<td></td>
</tr>
</tbody>
</table>

### General Data

Order:

4000867
Close & Analyze
How is the work tracked and managed?
How can we continue to improve?

• Optimization can be reached by changing the maintenance strategy to a more agile approach.

• Condition data allows for a ranking of assets according to a health score.

• For “healthier” assets the service interval can be prolonged while it can be shortened for others.

• This results in less failures while reducing maintenance cost.
### Breakdown Year / Breakdown Quarter / Equipment

- **Breakdowns Reported**: By year and equipment type.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Breakdowns Reported</th>
<th>Time To Repair (H)</th>
<th>Time Between Repair (H)</th>
<th>Mean Time To Repair (H)</th>
<th>Mean Time Between Repair (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Plant: 1010</td>
<td>15</td>
<td>810,000 HUR</td>
<td>45,044,000 HUR</td>
<td>54,000 HUR</td>
<td>3,003,000 HUR</td>
</tr>
<tr>
<td>Maintenance Plant: 1710</td>
<td>1</td>
<td>0,000 HUR</td>
<td>1,885,000 HUR</td>
<td>0,000 HUR</td>
<td>1,885,000 HUR</td>
</tr>
<tr>
<td>Maintenance Plant: 2110</td>
<td>3</td>
<td>21,000 HUR</td>
<td>1,052,000 HUR</td>
<td>7,000 HUR</td>
<td>351,000 HUR</td>
</tr>
<tr>
<td>Maintenance Plant:</td>
<td>3</td>
<td>368,000 HUR</td>
<td>1,360,000 HUR</td>
<td>123,000 HUR</td>
<td>453,000 HUR</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td><strong>1,200,000 HUR</strong></td>
<td><strong>49,142,000 HUR</strong></td>
<td><strong>55,000 HUR</strong></td>
<td><strong>2,234,000 HUR</strong></td>
</tr>
</tbody>
</table>
Co-Pilot to communicate and collaborate
### Costs

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Description</th>
<th>Estimated Costs</th>
<th>Planned Costs</th>
<th>Actual Costs</th>
<th>Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>YB1</td>
<td>Internal Activity</td>
<td>0.00</td>
<td>0.00</td>
<td>80.62</td>
<td>134.20 EUR</td>
</tr>
<tr>
<td>YB2</td>
<td>Stock Material</td>
<td>0.00</td>
<td>0.00</td>
<td>540.00</td>
<td>0.00 EUR</td>
</tr>
<tr>
<td>YB3</td>
<td>3rd party Material</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 EUR</td>
</tr>
<tr>
<td>YB4</td>
<td>3rd party Services</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 EUR</td>
</tr>
</tbody>
</table>

### Settlement Rules

<table>
<thead>
<tr>
<th>Number</th>
<th>Settlement Category</th>
<th>Settlement Receiver</th>
<th>Receiver Description</th>
<th>%</th>
<th>Equivalence Number</th>
<th>Settlement Type</th>
<th>Amount</th>
<th>Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Cost center</td>
<td>10101701</td>
<td>Plant &amp; Maint (DE)_A</td>
<td>100.00</td>
<td>0</td>
<td>Full Settlement</td>
<td>0.00</td>
<td>EUR</td>
</tr>
<tr>
<td>002</td>
<td>Cost center</td>
<td>10101701</td>
<td>Plant &amp; Maint (DE)_A</td>
<td>100.00</td>
<td>0</td>
<td>Periodic Settlement</td>
<td>0.00</td>
<td>EUR</td>
</tr>
<tr>
<td>000</td>
<td>10101701</td>
<td>Plant &amp; Maint (DE)_A</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>000</td>
<td>10101701</td>
<td>Plant &amp; Maint (DE)_A</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Order:** 4000867  **Description:** Pump leaking  **Order Type:** YBA1, Corrective Maintenance  **Technical Object:** 10071536  **System Status:** REL PCNF JiPR MSPT PRO SETC  **0 Document(s)**
Asset Centric Mobility
SAP Work Manager

Complete work orders and capture all relevant data
Access to asset location, repair history, work order details, materials needed
Create notifications or work orders

Master data integration
- Create, update, display equipment and functional locations unrelated to work orders and notifications
- Install and uninstall of equipment
- Edit equipment and functional location characteristics
- View equipment and functional related data

Upload and download of attachments
Linear asset management
Inspection rounds
SAP Work Manager, Deployment Options

**SAP Work Manager, Cloud Edition**
- SAP Work Manager Clients
- Public Internet
- Agentry Cloud Edition (ACE)
- Cloud Platform
- Public Cloud
- Mobile Add-on
- Cloud Connector
- SAP Enterprise Resource Planning (ERP) or S4/HANA

**SAP Work Manager, HEC**
- SAP Work Manager Clients
- Public Internet
- SAP Mobile Platform
- HANA Enterprise Cloud
- Public Cloud
- Mobile Add-on
- SAP Enterprise Resource Planning (ERP) or S4/HANA

**SAP Work Manager, On-Premise**
- SAP Work Manager Clients
- Public Internet or Wireless (or LAN)
- SAP Mobile Platform
- Public Internet or LAN
- Firewall/DMZ
- VPN
- LAN
- Mobile Add-on
- SAP Enterprise Resource Planning (ERP) or S4/HANA
SAP Geographical Enablement Framework
Spatial centric business processes

- Data federation between GIS and SAP
- SAP Geographical Enablement Framework at the center of geo-enabling SAP business applications
- SAP HANA is the spatial data store
- Simplification of the GIS / SAP landscape
SAP Geographical Enablement Framework for SAP S/4HANA
Scope for SAP S/4HANA 1709

- Foundation to enrich business data with geometric attributes
- Exposure of geometries and attributes of geo-enabled SAP business objects as REST-based feature classes to be consumed using standard GIS map editing tools**
- Comprehensive customization that allows geo-enablement of any SAP business object and feature, such as adjusting map UIs for different user groups and scenarios, configuring application launching functionality from the map, and setting up external GIS connections
- Standalone web-based Geometry Explorer with streamlined, new UI design to view both business data from geo-enabled S/4HANA functions and data from Enterprise GIS systems** on the same map
- Standalone web-based Geometry Editor to search, view, and update geometry for any geo-enabled SAP business object.
- Time-dependent geometries for geo-enabled SAP objects
- Mass actions, custom backend actions, reference layer actions and dialog action parameters
- Measurement tools
- Navigation from and to an application with list of objects
- Combined spatial and attribute search for objects on the map
- Personalization (save locations and/or search variants)
- Temporary sketches and comments
- Import of shapefiles
- Other various improvements

* Additional Installation & License
** Support for Esri ArcGIS as default
SAP Geo Framework for SAP EAM / S/4HANA Asset Management

Run geo-enabled EAM business processes

Supported EAM business objects *
- Equipment
- Functional location
- Maintenance order
- Maintenance notification

Example: Drill-down into SAP EAM backend system directly from the map
SAP Geo Framework for SAP S/4HANA Asset Management
Scope for SAP S/4HANA 1709

- Includes SAP Geographical Enablement Framework for SAP S/4HANA
- Bidirectional navigation between Geo Framework and S/4HANA Asset Management solution
- Manually create and change geometries of selected business data
- Geo-enabled technical objects*: Equipment, functional location
- Geo-enabled business transactions: PM notification, PM order
- Automatically copies geometry from superior technical objects
- Automatically copies geometries from technical objects and/or PM notifications to PM order.
- Automatically copies geometries from technical object to PM notification.
- Single action: Initiate creation of PM notification and PM order from a technical object via Geo Explorer
- Mass action: Selection of geo-enabled master data and transaction via the Geo Explorer with further processing within the backend Order and Notification List

*Linear Asset Management and time-based geometry not supported

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Integration into Asset Management
SAP Asset Intelligence Network
Cloud-based platform for asset information exchange

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Service provider</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nameplate info</td>
<td>Service bulletin receipt</td>
<td><a href="http://www.sap.com/ain">www.sap.com/ain</a></td>
</tr>
<tr>
<td>Maintenance strategy</td>
<td>Service bulletin processed</td>
<td></td>
</tr>
<tr>
<td>3D parts # / BOM</td>
<td>Usage information</td>
<td></td>
</tr>
<tr>
<td>Service bulletins &amp; revs</td>
<td>Installation information</td>
<td></td>
</tr>
<tr>
<td>Failure modes</td>
<td>Failure / incident data</td>
<td></td>
</tr>
<tr>
<td>Recalls</td>
<td>Design recommendations</td>
<td></td>
</tr>
<tr>
<td>Safety controls</td>
<td>Risks and controls</td>
<td></td>
</tr>
<tr>
<td>Process controls</td>
<td>Measurement documents</td>
<td></td>
</tr>
<tr>
<td>Service bulletin</td>
<td>Telemetry</td>
<td></td>
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<tr>
<td>Designs and drawings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design improvements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor definition</td>
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<tr>
<td>Licensing</td>
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<td></td>
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<tr>
<td>Operating instructions</td>
<td></td>
<td></td>
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<tr>
<td>Maint instructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety instructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product training</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SAP Asset Intelligence Network
Sharing Model and Equipment Information

Information
- Model Information
- Model Attributes
- Equipment Attributes
- Installation Information
- Life Cycle Information

Structure and Parts
- Structure
- Spare Parts

Documentation
- Model Documents
- Equipment Documents
- Instructions
- Announcements

Monitoring
- Measuring Points
- Error Codes
- Improvement Cases
- Time Line
SAP Asset Intelligence Network
Cloud-based platform for asset information exchange

Manufacturer
ABC offers different pump models.

ABC owns the most recent documentation for the models.

ABC can provide this info through SAP Asset Intelligence Network to all customers.

ABC can create the "digital twin" of his equipment and use all the specific information ...

ABC can link the equipment to the model information.

The operator is using different pumps. Some of his pumps are from Manufacturer ABC.

Model:

Pump 100

Pump 200

Pump 500

Pump 100

Equi 1001

Equi 1002

Equi 1003

Equi 1004

Pump 200

Pump 500

Equi 5001

Equi 5002

Equi 5003
Solutions Predictive Maintenance
SAP Predictive Analytics
Gain completely new insights from your assets

Telemetry data
- Sensor measurements
- Geospatial data
- Diagnostics
- Events

Business data
- Warranty information
- Maintenance/service history
- Customer profile
- Dealer events
- Cost and risk

Third-party data …
- Structured and unstructured, such as a weather forecast

Design improvements
Selling performance/pay per use
Machine health and early warnings to prevent downtime
Prioritizing maintenance and service activities
Optimized warranty and spare parts mgmt.
Benchmarking
# SAP Predictive Maintenance and Service
## From Sensor to Insight to Outcome

### Sensor
**Connected assets**
- Onboarding
- Connectivity
- Device management
- Security

### Data
**IT/OT Convergence**
- Big Data ingestion
- Big Data infrastructure
- Merging sensor data with business information

### Insight
**Data analysis**
- Root cause analysis
- Asset health monitoring
- Machine learning
- Anomaly detection
- Triggering of corrective actions

### Action
**Maintenance activities**
- Prioritized maintenance and service activities
- Optimized warranty and spare parts management
- Prescriptive Maintenance
- Quality improvements

### Outcome
**Business Value**
- Customer experience
- Increased quality
- Lower costs
- Operational efficiency
- R&D effectiveness
- Material procurement

![Sensor Data Insight Action Outcome](image-url)
Solutions Asset Strategy and Performance Management
“Support the asset management organization in **defining**, **planning** and **monitoring** the **optimal maintenance strategy** for physical assets by providing the required level of **collaboration** and **integration** as well as the needed **data** and **analytics**”
Vision: optimizing the maintenance strategy portfolio

Current Maintenance Strategy

Optimal Maintenance Strategy

Maximize asset productivity and availability

Drive safe operations

Minimize costs

This is the current state of planning and may be changed by SAP at any time.
SAP Asset Strategy & Performance Management
End-2-End Process Enablement to optimize maintenance strategies

- Increase overall asset availability
- Reduced MTBF - Increase equipment reliability
- Better utilization of assets
- Control Maintenance spend
- Reduce work backlog
- Identify savings opportunities through preventive and predictive maintenance
- Reduction of capital tied-up in spare parts inventory
- Adopt a proactive and targeted maintenance strategy
- Ability to change the sequence of the process using Point Apps
Asset Criticality Assessment

Which are the critical assets? Which assets are likely to benefit most from application of which analytical processes (i.e. RCM, FMEA)?

- **Description:**
  - Assessment of asset (i.e. equipment, location and group of) criticality based on risk score.
  - Informed assessment based on historical maintenance data and relevant KPIs (EAM/PdMS integration).
  - Calculation of risk score based on different dimensions and scales and for different impact categories.
  - Supporting the selection of the most appropriate analytical process (i.e. RCM/FMEA, PM review, CM) based on the result of the criticality assessment.

Asset Management Monitoring

How is the asset and the asset management strategy performing?

- **Description:**
  - Providing dashboards and reporting capabilities to monitor asset performance in terms of relevant KPIs for different categories (reliability, availability and maintainability, capacity, output quantity, output quality, safety and environment impact, etc.)
  - Providing dashboards and reporting capabilities to monitor the efficiency and effectiveness of asset management strategy.
  - Triggering and supporting informed updates of asset management strategy.

Asset Management Strategy

What asset management strategy (CM, PM, CBM, PdM) is appropriate at asset and, eventually, failure mode level? How can the current maintenance strategy be improved?

- **Description:**
  - Supporting the identification of recommended actions at asset and, eventually, failure mode level by providing RCM/FMEA capabilities.
  - Supporting PM review and optimization.
  - Integrating OEM/3rd party content libraries.
  - Enabling collaboration with manufacturers and service (e.g. content) providers on failure modes, recommended actions, etc.
  - Identifying the optimal maintenance strategy among different scenarios based on risk, cost and performance objective functions.
Digital Transformation in Asset Management driven by IoT, cloud, and business networks

What does Digital Transformation mean for Enterprise Asset Management?

Connect to the asset
– Bring together information from operational and business systems (IT/OT convergence)
– Leverage IoT for scaling transparency without neglecting existing information sources

Predict the asset system behavior
– Avoid unplanned downtime and major operational consequences through simulation and prediction
– Discover patterns of failure and preserve operational integrity
– Blend business IT information with operational (OT) data

Share asset information and collaborate
– Activate the ecosystem of OEMs, EPCs, service providers, and operators
– Make sure there is one version of truth on asset master data
– Use a business network to enable integrated processes in the cloud
– Optimize your maintenance strategies to move from reactive to proactive
Thank you!

More information:

www.sap.com/eam
www.sap.com/roadmaps
www.sap.com/solutionexplorer
http://scn.sap.com/community/eam

Martin Janssen
Solution Manager EAM
Line of Business Asset Management

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