SAPinsider

This article appeared in the Jan ▪ Feb ▪ Mar 2014 issue of *SAPinsider* (www.SAPinsiderOnline.com) and appears here with permission from the publisher, WIS Publishing.

WIS pubs

Moving **Maintenance** from Preventative to **Predictive** with **SAP HANA**

Innovate with Leading Data Analytics Techniques

by Axel Janssen and Jens Hagen, SAP

Axel Janssen (axel.janssen@sap.com) is an SAP HANA Solution Architect, part of the innovation program in SAP Custom Development and Strategic Projects. He works on topics such as predictive maintenance and is based in Palo Alto.

Jens Hagen (jens.hagen@sap.com) is an SAP HANA Solution Architect in the SAP Custom Development organization. He is focused on identifying SAP HANA development use cases with customers in the MEE region and is based in Walldorf.

One of the biggest opportunities in equipment manufacturing today is the optimization of maintenance and providing supporting services to enable cost savings. Helping equipment buyers increase uptime and streamline business processes is a win-win for both the buyer and the seller. To make these improvements, businesses have traditionally looked at historical data only to see what has happened in the past and made limited conclusions based on these kinds of analyses.

Today, however, businesses want to understand more than only why something happened — they want to determine the condition of their equipment to foresee a need for maintenance in the near future, so they can make informed decisions. They want to move from preventative maintenance to predictive maintenance. The availability of machine-to-machine connectivity and vast amounts of data makes that goal possible, but the "time to insight" is often delayed by a lack of data consolidation across a variety of different data sources and formats, as well as outdated processing methods — enough of a delay that predictive maintenance hasn't been a real possibility for most manufacturers.

In-memory computing helps make predictive maintenance a reality. The SAP Custom Development and Strategic Projects organizations co-innovate with customers to bring this reality to manufacturers. Using the real-time data processing capabilities embedded in SAP HANA and leveraging the power of predictive analytics, either with the SAP HANA-integrated Predictive Analytics Library or with well-known statistical software such as R, SAP Custom Development can create customer-specific solutions that expedite the time-to-insight and insight-to-action cycles in manufacturers' maintenance strategies and operations — all while featuring innovative, easy-to-consume user interfaces based on SAPUI5 that hide the complexity of what is happening behind the scenes.

Big Data in Big Demand

Manufacturers have long understood that data analysis holds the key to product, service, and process improvement. Data can help the research and development organization understand how changes to a product's design can improve quality and reduce service needs, resulting in increased customer satisfaction.

With machines and equipment constantly sending signals about their performance, manufacturing companies now have access to a level and volume of data they never dreamed possible. However, much of that data remains siloed and unrelated to other data. For instance, companies often access sales data in one system, service visit reports in another, and warranty claims in yet another. While sales patterns for replacement parts can be analyzed to determine optimal replacement timing, field service technicians' reports can provide data on when and why repairs take place, and data generated by machine sensors can indicate when service should take place. If these analyses happen in isolation, an opportunity for a holistic strategy is missed.

Unlocking the Value of Data

The growth of machine-to-machine and telematic data — data that is transferred wirelessly for remotely monitoring environmental conditions or equipment parameters — has opened up an

array of new data sources for use in predictive models. Products that have been sold and are functioning in the field can send a flow of information to the manufacturer to indicate a product's performance status and when a service visit could help avoid a major warranty claim repair or even a recall later. While this flow of data can be useful, it can also overwhelm an organization that is not prepared to manage and analyze that level of data. What is ultimately important is the ability to have the right information at the right time.

Manufacturers can also leverage an increasing variety of third-party data to determine the optimal maintenance strategy for a given product or customer. For example, if a product is affected by temperature or moisture, a maintenance planning cycle can incorporate weather reports. Organizations can also tap online product reviews by customers to better understand quality issues and timing in a predictive model. However, the variety of data types in these third-party sources can slow processing and integration times.

It is a challenge to seamlessly combine and analyze all these types of data in a predictive model that can help users draw accurate conclusions, and it requires extremely fast statistical computations and readily accessible research capabilities. Even with the technical aspects in place, a limited number of users at each organization is available to perform this level of analysis. But a truly holistic predictive maintenance strategy is not possible without these elements in place.

The SAP Custom Development and Strategic Projects organizations can build solutions that detect potential maintenance issues and create cost savings by limiting risk on production.

Cost Savings and Leaner Manufacturing

The SAP Custom Development and Strategic Projects organizations can build solutions that integrate all data types and, through data analysis, detect potential issues and cross-reference them against warranty information to shorten the detection-to-correction cycle. Doing so creates cost savings for organizations by limiting risk on production. Better-functioning, reliable machines will break down less, causing more efficiency in the manufacturing process.

Imagine a manufacturer rolls out a new product line and, in the first month, the machines are installed at 100 different locations around the world. If the product is defective, the OEM may not be aware of the defect until warranty claims or returns come in through traditional methods. By that point, a group of new customers is likely very unhappy and the manufacturer's reputation has been damaged — and in the meantime, more of those defective products have been sold and shipped to customers. Any adjustments made to production or design are too late, and if the issue is broad enough, it could result in a recall of a brand-new product.

With a predictive maintenance solution, the OEM could have used data analysis to identify that defect on the first day the machines were operational, and then check against warranty information and effectively plan to contact customers and schedule the required service — possibly before customers even knew the defect existed.

No Two Alike

One of the unique aspects of the maintenance business is that every customer or consumer uses the equipment in a slightly different way, depending on their business model, type of equipment or asset, or other factors. As a result, the process a company employs to gain insight from its machine data might be similar but cannot be identical to another company's process — and that even includes how a company accesses data.

The user interface designed for a predictive maintenance application must be both intuitive and targeted to allow individual end users to focus on business challenges rather than being bogged down in the technical aspects of the solution. The back-end complexity of the predictive analytics must be invisible to the end user, and the UI must be customer-specific to address all needs end users might have.

To meet this unique requirement, SAP Custom Development tailors solutions to the specific customer needs by including the most valuable data and setting the right goals based on the customer's business processes and expectations. This lets the manufacturer and OEMs better cater services to their own customers' needs as well.

By processing the right data in a real-time environment, the specific predictive maintenance solutions developed by SAP Custom Development can shorten the time from insight to action and help manufacturers reduce costs and improve product reliability. The move from preventative to predictive maintenance is finally possible.

To find out more about custom development on SAP HANA, visit **www.sap.com/customdev**. ■