DELL Technologies

Innovation Built-In intel

Artificial intelligence ensures efficient maintenance

Dell Technologies is helping EDAG to implement predictive maintenance for a customer in the automotive industry.

EDAG | Engineering services for the automotive industry | Germany

Challenge

The motto of the automotive industry is: Time is money. Machine downtime must be prevented to avoid costly production outages. The EDAG Group had been commissioned to implement predictive maintenance for a customer, requiring a combination of intelligent software and high-performance hardware.

The solutions

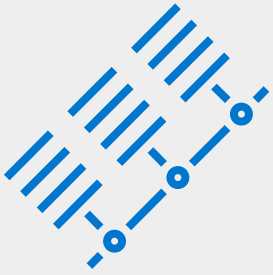
- Dell EMC PowerEdge servers, including PowerEdge XR2
- Dell Precision 3930 Rack Workstation
- Dell OptiPlex XE3 Desktop
- Dell Latitude 5000 and 7000 Notebook
- Dell Embedded Box PC Series 3000 and 5000
- Dell Edge Gateway Series 3000 and 5000

The outcomes

- Focusing on the automotive industry, EDAG achieved all of the targeted goals with the introduction of a predictive maintenance solution.
- Unplanned machine outages have been minimized and spare parts management optimized.

Reducing downtimes

for higher overall equipment effectiveness



Better planning

of maintenance and service intervals

A modern predictive maintenance system avoids costly production plant outages

Manufacturers today cannot afford outages or disruptions so production must continue, even when changes and optimizations are pending. As the world's largest independent engineering partner for the automotive industry, the EDAG Group understands the industry's demand for greater efficiency and optimization of cost structures. Founded in 1969, the company is active in the areas of Vehicle Engineering, Production Solutions and Electronics, with a comprehensive service portfolio. A large customer in the automotive industry wanted to implement a modern predictive maintenance solution to detect irregularities in the machines at an early stage and to use these findings to determine maintenance intervals.

Goal: Optimize maintenance, avoid outages

In the past, maintenance was always carried out at fixed, predetermined intervals. In addition to being extremely time consuming, this practice also involves checking machines that are actually functioning properly, taking production facilities out of use. "Digitalization and increasing efficiency are top priority for automotive decision makers, followed by reducing costs. Our customer wanted to optimize maintenance of its production facilities by using intelligent technologies to become significantly more efficient in terms of cost, quality and time," explained Mark Kramer, Head of Production IT (Smart Factory Solutions) at EDAG Production Solutions GmbH & Co. KG. He is responsible for consulting, planning and implementation of production-related IT at the engineering service provider. This includes the development of cyber-physical systems, production control systems such as MES, big data solutions for production optimization, quality management, real-time information systems and predictive maintenance. "The challenges of this project were sophisticated, as the underlying software had to be developed individually. The customer's systems and infrastructure are very specialized, so a wide variety of expert knowledge was required to tailor the AI system and the hardware to each other."

Intelligent technologies were designed to optimize maintenance of production facilities.

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Mark Kramer, Head of Production IT (Smart Factory Solutions) at EDAG Production Solutions GmbH & Co. KG

The flood of data must be processed and stored

Processing big data is a major difficulty in dealing with predictive maintenance. Being able to make reliable statements about the condition of machines and therefore being able to record possible disturbances quickly entails collecting large amounts of data, relating not only to the condition of the systems themselves, but also to their environment, such as temperature and humidity. This data must be stored, processed and analyzed using intelligent algorithms. The size of the database as well as the intelligence and performance of the analysis algorithm are critical for the quality of the insights obtained.

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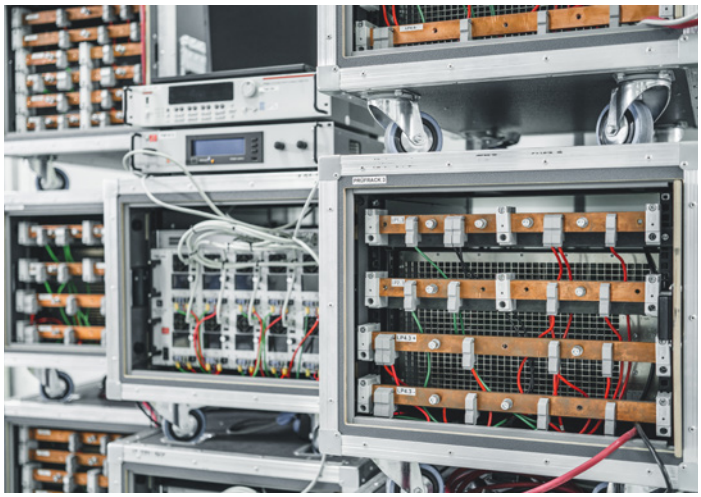

"The first step in this project was to consider how we would collect the data, what data was still missing, and how we could obtain it via additional sensor units. The next step was to analyze and understand the data in real time: Is a part getting too hot? Is the pressure decreasing somewhere? Is the current flow too high or too low? And what are the consequences? We worked with specialist experts to formulate meaningful hypotheses which were ultimately validated," is how Jacek Burger, Project Manager for Embedded Systems & Artificial Intelligence and Software Development Expert at EDAG Engineering GmbH, described the project procedure. The resulting AI-based solution for predictive maintenance is connected via interfaces to all other systems, such as Logistics, PLP (Product Longevity Program), MES (Manufacturing Execution System) and ERP (Enterprise Resource Planning).

Pilot project rolled out worldwide

The storage and processing of the huge amounts of data is handled by a Dell Technologies infrastructure package both in the data center and on-site. This includes a mix of Dell EMC PowerEdge servers, including the XR2 servers, the Precision 3930 Rack Workstation, the OptiPlex XE3 Desktop PC, Latitude 5000 and 7000 notebooks, and 3000 and 5000 Series Embedded Box PCs and Edge Gateways. "We implemented a pilot project with Dell Technologies that could only be achieved jointly and in close cooperation. A project like this involves pure research and you cannot simply fall back on something that is already available, that you simply pull out of a drawer," continued Jacek Burger.

The huge amounts of data are stored on the Dell EMC PowerEdge XR2, among other devices.

All the benefits the customer hoped for from predictive maintenance were achieved: better planning of maintenance and service intervals, fewer service personnel deployments, fewer unplanned machine failures, optimized spare parts management, higher machine performance, and better machine knowledge through analysis of the collected data. Reducing downtimes increased the key figure Overall Equipment Effectiveness (OEE) by two percent. "Although that might sound insignificant at first, this improvement in overall plant efficiency is excellent in an automotive sector that has already trimmed its processes to maximum efficiency. We initially assumed the figure would be lower, so the customer is really happy," summarized Mark Kramer. The pilot project will now be rolled out to other plants and factories worldwide and the data analytic cluster will be further expanded in this regard.

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Jacek Burger, Project Manager for Embedded Systems & Artificial Intelligence and Software Development Expert at EDAG Engineering GmbH

More information about the EDAG experts' approach to predictive maintenance projects is available in the current blog article at EDAG TECH INSIGHTS.

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