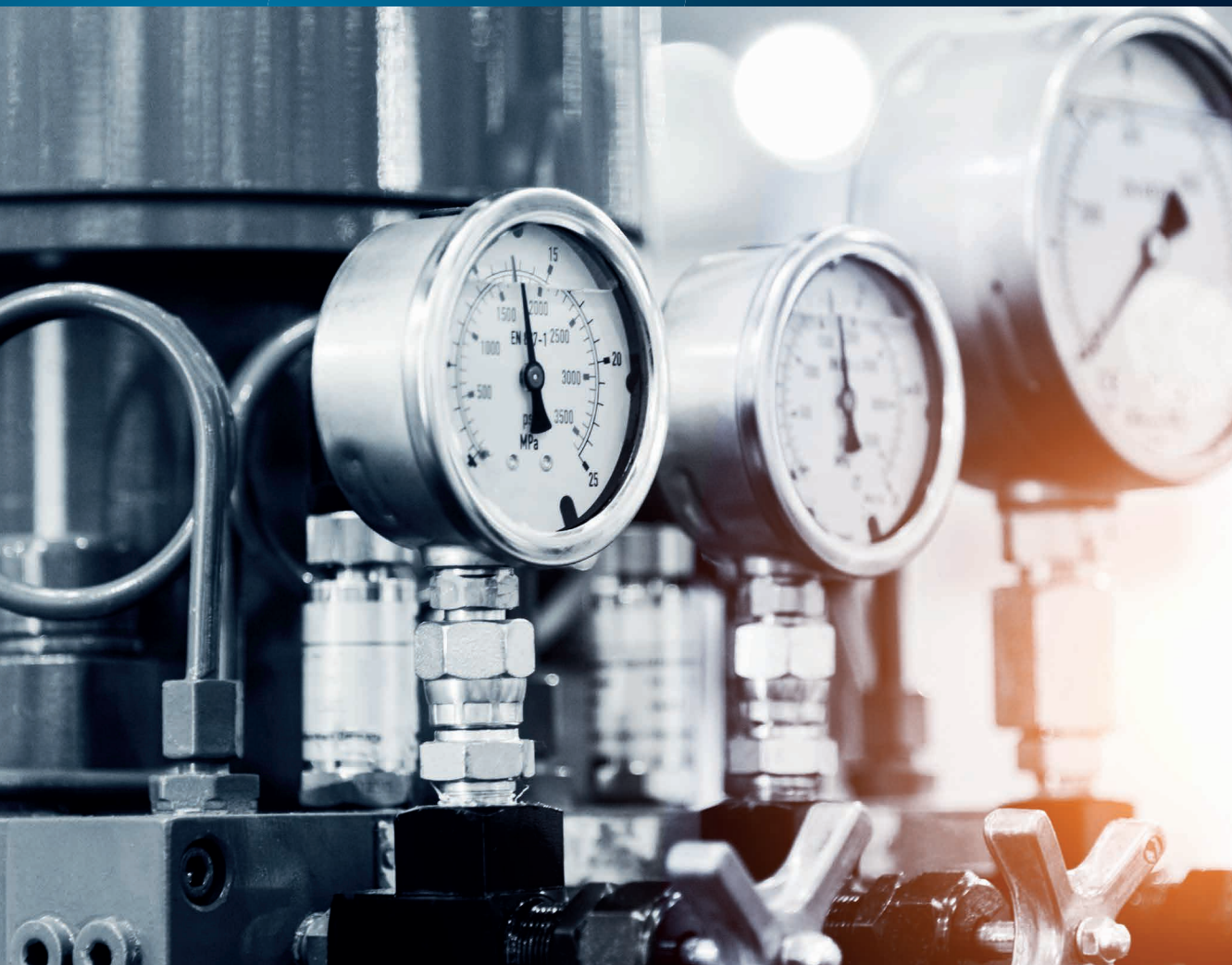


Case Study: Hoerbiger

Predictive maintenance solution
for gas compressors

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HOERBIGER is a globally active technology company providing performance-critical products and safety solutions for the oil, gas, automotive, and process industries. ↘

Challenge

The challenge for HOERBIGER was to implement a predictive maintenance solution for gas compressors that is fully connected and can be extended to offer a web-based customer portal. Gas compressors are critical components in an energy distribution infrastructure and must operate 24/7 with or without cloud connectivity. Therefore, predictive maintenance functionality calculation at the edge device is a key functionality.

The wear of critical components like piston rings, bearings, and valves can be estimated by measuring the cylinder pressure in relation to the crank position. To obtain good data, at least 50 kHz sampling is required, which results in very high data rates for large compressors with up to 12 cylinders. Up to 650,000 samples per second must be ingested and processed. With these high sample rates and the need for operation without cloud connectivity, predictive maintenance algorithms must be executed on edge computers instead of cloud systems. These edge computers must be rated for operation in hazardous areas (ex-rated edge devices).

Solution

For HOERBIGER's use case, the Nerve edge computing platform was installed on an industrial PC from MOXA with an Intel Core i7 processor. Nerve's Soft PLC module provides high-speed data acquisition, reading pressure and crank position values at the required 50 kHz sample rate. Data is processed through Nerve's Data Services module by using Nerve's gateway application to send data to the Timescale Time-Series Database, where data is post-processed to estimate compressor wear. Data can also be visualized with the Grafana system integrated in Nerve.

As Nerve is a fully connected system with a central Management System, it is possible to give customers access to the data pre-processed at the edge through a central web-portal.

Key Benefits

Nerve provides high-speed data access with an extremely short time-to-market. The customer's solution did not require more than 150 lines of code and configuration and it was possible to complete the proof-of-concept with an estimated 100 hours of development time in three weeks – from the concept definition to the successful test and presentation of the results. This shows the efficiency of Nerve when it comes to the reduction of development effort for highly demanding edge applications.

With Nerve, customers receive a stable and secure basis for their IIoT projects, as Nerve is a proven commercial-off-the-shelf (COTS) product, used by IPC vendors and customers from different industries, not a customer-specific development.

Nerve provides key functionalities for all aspects of the use case: high speed data ingestion, data storage, data visualization, operation with or without cloud connectivity, hosting of analytics and visualization in a cloud management system. Nerve provides a set of base features, including built-in security and user rights management to ensure customers receive a secure foundation for managing their software and devices.

Nerve is an open and modular solution. This means it can be scaled to provide new features and to add compressors already in the field to the predictive maintenance monitoring. Nerve supports machine builders in setting up predictive maintenance solutions for their production. It provides reliable, high speed data access and online as well as offline operation modes and can be scaled according to the customers' needs.

