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Emerson Connected Services extends Plantweb™ Digital Ecosystem with experts to improve reliability, performance

Cloud-based technologies enable remote Emerson experts to continuously monitor plant assets and processes and generate actionable data to optimize operational performance.

The Industrial Internet of Things (IoT) is enabling plants to generate unprecedented amounts of data from their assets and processes as they deploy complex technologies aimed at improving operational performance. But making sense of that data to drive real improvement is a growing challenge. It's costly to develop dedicated experts who solely focus on value-added analysis – and even tougher to retain them. As technology continues to expand, the result is a widening gap between a technology's capability and a plant's ability to fully realize that capability.

Emerson Connected Services are bridging that gap by harnessing the Industrial IoT to help its customers maximize the health, reliability and performance of plant assets and processes through proactive, predictive analysis that delivers actionable data. A key component of Emerson's Plantweb™ digital ecosystem, the service offers remote, continuous assessment of a plant's equipment and processes by Emerson experts to empower customers with the information needed to improve efficiency and avoid unplanned downtime. Emerson Connected Services utilize Microsoft Azure cloud services and data analytic tools that provide a scalable and secure cloud application environment.

Emerson Connected Services offer support across four main subscription-based service offerings in which experts analyze data from critical equipment to provide actionable insights so customers can align their maintenance and operational responses with their business

strategies. These offerings currently include Control Valve Connected Services, Steam Trap Connected Services, DeltaV™ System Health Connected Services, and Machinery Connected Services.

These new services are an integrated part of Emerson's Lifecycle Services offerings, enabling Emerson to provide customers with more effective and efficient access to its experts. Rather than physically sending experts to inspect and analyze data from critical equipment on a customer's site, Emerson is able to bring the data to the experts, wherever they are located, with secure connectivity and cloud services. For the most part, users are leveraging the existing infrastructure in their facility making it easy to start small and focused, and grow the service to deliver more business results.

Control Valve Connected Services

Emerson is the first to offer control valve condition monitoring with a continuous, non-intrusive health monitoring service that delivers predictive analysis. The service analyzes a wide variety of diagnostic data collected from digital valve controllers to identify potential control valve failures before they cause significant interruptions to a plant's operations.

The service, which employs time series trend analysis to generate predictive data, has already helped a major chemical company identify a potential failure condition on a critical valve that would have caused a multiple-day plant shutdown resulting in millions of pounds of lost product.

Using Emerson's Control Valve Connected Services, a major chemical plant in the Gulf area substantially lowered its cost of control valve maintenance by eliminating costly and unnecessary preventive maintenance tasks. Emerson also identified a supply pressure issue on a critical control valve, enabling the customer to isolate and repair the control valve before it failed and avoid a multiple-day plant shutdown and millions of pounds of lost product.

Control valve condition monitoring makes use of the tools and smart technology existing in many plants, such as Fisher FIELDVUE™ digital valve controllers, ValveLink™ online software, and AMS Device Manager — for an optimal return on investment. Benefits include:

- Diagnostic and valve data analysis from continuously monitoring control valve condition that provides insight into the health of critical assets.
- Access to highly trained, expert valve analysts, most having more than 10 years of experience.
- Use of time-series trending from ValveLink™ software test results that provides predictive insight into control valve health for early identification of potential valve issues.
- Data-driven, recommended actions provided by expert analysts in a timely summary report that identifies potential failures.
- Improved personnel efficiency – eliminates difficulty of maintaining resources and skills at all sites/shifts with the depth to support a complex asset like control valves and allows managers to focus staff on core competencies of the business.

Steam Trap Connected Services

Steam trap health monitoring provides a cost-effective means to significantly reduce energy costs. Given the limited maintenance programs in place and the time required to accurately identify a steam trap failure through traditional means, steam trap leaks can account for 5 to 10 percent of total energy costs. In steam systems that have not been maintained for three to five years, as many as 15 to 30 percent of installed steam traps may have failed without maintenance personnel being aware.

Emerson uses wireless acoustic transmitters to remotely monitor steam traps, even in hard-to-reach locations. These devices are installed by clamping them to the pipe, so installation requires no pipe cutting or downtime. The state of each steam trap and its monitoring device is communicated wirelessly to a central database where maintenance personnel can effectively plan and prioritize work. Up-to-the minute visibility of all steam traps allows manual rounds to be eliminated and energy waste to be dramatically reduced. Savings for a typical site are five percent or more of the energy cost for steam production.

The subscription-based service is a transformative, outcome-based business model based on operational expenditure spending by the customer and requires no capital investment.

Using Emerson's Steam Trap Connected Services, Denka Chemicals Singapore realized a 7 percent reduction in steam demand after identifying 24 steam traps as having failed and an additional two to three failures per month as well as flank leaks and bypass valve passing. They are now monitoring nearly 150 steam traps.

Impacts of well-maintained steam system include:

- Increased yield and product quality by assuring optimal temperature control and transfer of steam enthalpy.
- Improved plant reliability by reducing damage to equipment caused by water impingement, water hammer, corrosion and freezing.
- Reduced risk of safety incidents by minimizing water hammer, manual rounds and foot traffic in high risk areas.
- Optimized productivity by enabling plant resources to focus on more critical activities.
- Reduced environmental impact by minimizing carbon emissions and water usage.
- Improved energy efficiency by expediently addressing steam leaks and blow-thru failures to reduce boiler load and fuel use.

DeltaV System Health Connected Services

The DeltaV System Health Monitoring services provide continuous health scanning of a plant's integrated control system, spanning from controllers and servers, to switches and network components. The service identifies intermittent issues and underlying health warnings, which could result in unplanned downtime if not proactively mitigated, and eliminates manual health checks, enabling effective use of plant maintenance resources.

An onsite monitoring device automatically checks important health information of system assets and routes detected health warnings to Emerson. The solution works 24/7 to automatically diagnose health warnings and provide timely alert notifications. Actionable alerts include possible causes and recommendations to address the root cause of any problem detected.

Using Emerson's DeltaV System Health Monitoring Service, a global petrochemical company has increased its awareness and coverage of system diagnostics as well as freed up an entire full-time role to focus on operations and production at its site in the United Kingdom. To date, this service has processed and diagnosed more than 7,000 abnormal conditions from this system, providing actionable recommendations and root cause analysis. This has allowed the customer to respond proactively to more than 20 different hardware events, reducing unplanned downtime and driving its Guardian System Health Score into Top Quartile performance. The solution has automated the customer's diagnostic and hardware monitoring of its DeltaV Systems, providing continuous 24/7 coverage across hundreds of diagnostic parameters.

Benefits of the DeltaV System Health Connected Services include:

- Improved asset availability – provides earlier issue detection and quicker resolution, resulting in reduced equipment failures, data loss and downtime.
- Reduced maintenance costs – allows maintenance managers and personnel to shift from a reactive maintenance strategy to a proactive strategy.
- Improved personnel efficiency – eliminates difficulty of maintaining resources and skills at all sites/shifts with the depth to support a complex asset like a control system and allows managers to focus staff on core competencies of the business.
- 24/7 monitoring coverage – connects the right information with the right people at the right time, reducing the need for manual monitoring.

Machinery Connected Services

Machinery Connected Services utilize a network of global expertise on vibration to improve the health and reliability of a plant's key rotating equipment, such as blowers, pumps and fans. The service uses advanced handheld analyzers to collect data that is then analyzed by a team of Emerson experts who determine potential degradation problems and optimal efficiency.

Machinery condition monitoring is a predictive maintenance method for early problem detection in rotating machinery. With this service, a customer can improve rotating equipment availability while reducing operations and maintenance costs. It is achieved through a three-step process:

1. Machinery data collection – Any vibration data from a CSI 2140 Machinery Health Analyzer, CSI 9420 Wireless Vibration Transmitter, or CSI 6500 Machinery Health Monitor can be uploaded and analyzed remotely by Emerson experts. Route-based collection can be performed by the customer or by the local Emerson service provider.
2. Monitoring and analysis – Waveform and spectrum data are analyzed for machinery issues, while DC Gross scans reveal wiring and sensor problems on online systems. Data is compared to previous readings to identify changes and determine if the equipment is deteriorating. Analysis experts issue easy-to-read, comprehensive reports that provide actionable information.
3. Report interpretation and corrective actions – Emerson analysts and local service providers help customers interpret the report and take the appropriate corrective and preventative maintenance actions.

About Plantweb

Emerson's Plantweb™ digital ecosystem is a next-generation Industrial IoT portfolio that extends the power of automation beyond process control to the entire enterprise to enable Top Quartile performance. The ecosystem supports Emerson's Operational Certainty program, which is designed to help companies improve earnings as much as 15 percent. It meets four critical needs to do this: real-time operating data across the business, secure transport of that

data where it is needed, robust and scalable software applications to convert that data into actionable insights, and the domain expertise to make decisions and drive outcomes. Flexible, integrated and scalable, the Plantweb digital ecosystem features robust, real-time visibility from Pervasive Sensing™ technologies, protected by Secure First Mile™ connectivity. Applications including Plantweb Insight, Plantweb Advisor and the AMS ARES™ Platform provide embedded domain expertise across the enterprise. Emerson Connected Services offer secure cloud-based access to experts and analytics for real-time asset monitoring and performance optimization with no-to-low capital investment.