**COLLECTING AND STANDARDIZING HETEROGENEOUS SHOP FLOOR DATA**

Getting the most out of production data

Manufacturing companies are under immense pressure. Not only do they have to deal with a shortage of skilled labor, limited resources, and increasing regulation to keep up with the competition, but they also need to produce more flexibly and efficiently. One way for companies to respond to these challenges is to collect as much operational data as possible from different production lines, contextualize it, and make it available for further processing.

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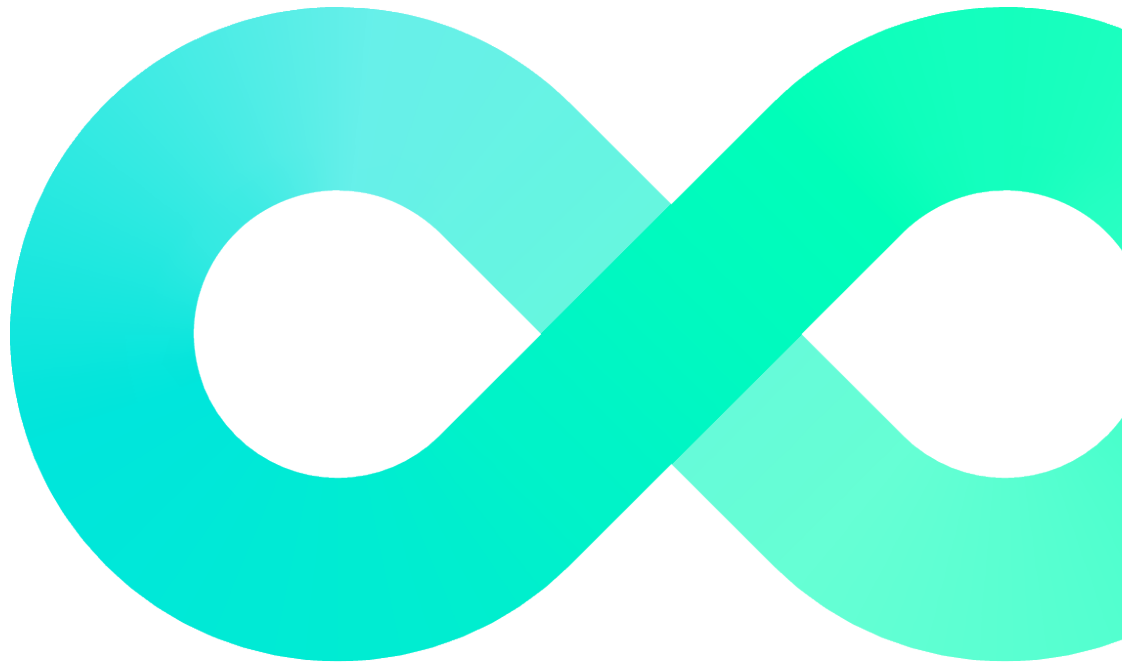
Leverage and contextualize critical data

Manufacturing machines generate vast amounts of data of all types. Today, it is more important than ever for companies to access, contextualize, and understand this data in order to draw valuable conclusions and identify optimization potentials.
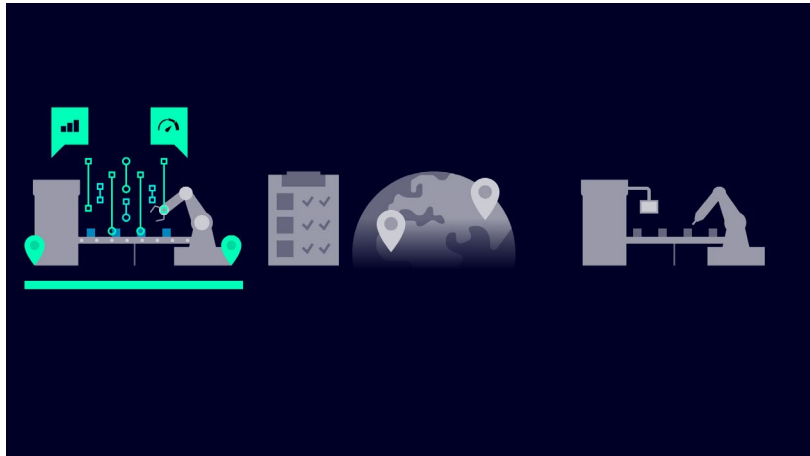
Effective decision making requires centralized collection of shop floor data from multiple production lines.

The industry is undergoing significant changes driven by various factors. Leveraging and contextualizing relevant production data is critical to meeting today's challenges.

How to create data transparency

The performance of various machines and systems at the shop floor level contributes significantly to the overall performance and Overall Equipment Effectiveness (OEE) of a production line or an entire factory. However, monitoring and evaluating these KPIs requires production data from these different manufacturing systems. This data is often siloed and difficult to access, resulting in many manufacturing decisions being based on observations or assumptions.

This data contains automation data, including process variables, equipment status, production metrics, and maintenance data, represented by various tag names. To access and read or write this data, a variety of communication protocols need to be used, such as S7, MELSEC, EtherNet/IP, OPC UA, MQTT, PROFIBUS, EtherCAT. The goal is to enable data-driven decisions. This is the only way to create data transparency and ultimately derive value from the data available. How can this be achieved? With different technologies!

Data is the gold of the digital age. It's the foundation of every company's existence and future growth.

For example, *Industrial Edge* from Siemens can be used to collect and contextualize data from a heterogeneous shop floor. Industrial Edge devices can be easily connected to machine controllers or entire lines. So-called *Industrial Apps* and *Connectors* collect operational data from greenfield and brownfield systems to make it available to higher-level systems or other applications, such as analytics or dashboard apps, in many different suitable formats like OPC UA, MQTT or other interfaces such as REST or GraphQL. In many cases, a so-called aggregator device is used as a central data lake and integration layer within a factory, which in turn provides and even exchanges data with higher-level systems.

To scale all the applications used in such a use case across machines, lines and even production sites, Industrial Edge Management comes into play. It acts as a central management and configuration layer (at the factory or IT/cloud level) for all related apps, connectors and devices. Edge systems can be very suitable for production setups with lower real-time requirements, as they offer localized processing and faster response times closer to the operational technology, or for distributed automation stations - even across production sites.

The production process generates huge amounts of data. The goal for companies must be to use it profitably.

A SCADA system, such as SIMATIC WinCC V8, can also serve as a data collector by providing multiple communication channels to connect devices on the shop floor. This enables efficient and seamless data collection and management, ensuring that companies have access to the information they need to operate. In addition, SIMATIC WinCC V8 provides powerful data forwarding capabilities, enabling companies to efficiently transfer data to other IT applications. With a variety of communication channels and protocols, SIMATIC WinCC V8 enables companies to effectively meet their specific needs. For complex, data-intensive manufacturing environments, a SCADA system or data integration layer often provides suitable centralized control, data aggregation, analytical and redundancy capabilities.

Another way to access machine data from heterogeneous systems is through Field Data Enablement (FDE). This approach allows direct access to field data for use in SCADA, Edge, IT, or Cloud applications without routing through controller devices at the automation level. As a result, PLC performance remains unaffected, and no additional engineering effort is required. By combining hardware (such as SIMATIC IoT 2050 or SIMATIC IPCs) with software (Field Data Enabler PN App), existing systems can leverage real-time data without adding

extra sensors or modifying PLC programming. This ensures seamless integration and enhanced data utilization without disrupting current operations.

Data is everything

There are several ways to access data from a heterogeneous production environment. The solution that makes the most sense depends on the production environment and may vary from company to company. Ultimately, however, it is important to understand the relevance of data from the production environment. This data not only provides transparency into production performance and resource consumption at the machine, line and company level, but ultimately helps companies ensure product quality and identify optimization potentials