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HighByte Partners with InfluxData to Transform Industrial DataOps and Improve Overall Equipment Efficiency (OEE)

HighByte and InfluxDB deliver deep insight into industrial operations and drive system optimization

HighByte

Company in brief

HighByte is an industrial software company based in Portland, Maine building Industry 4.0 based solutions that address the data architecture and integration challenges inherent in manufacturing. The company developed the first DataOps solution purpose-built to meet the unique requirements of industrial assets, products, processes, and systems at the Edge.

Case overview

HighByte identified a major gap between operational technologies in architectures in Industry 3.0 and information technologies in Industry 4.0. The company created a solution to process and contextualize raw data from industrial processes so that data becomes useful and actionable in an Industry 4.0 context. HighByte leverages InfluxDB to store, analyze, and act on the time series data generated by manufacturing processes. Used together, HighByte and InfluxDB provide mission-critical information, like overall equipment efficiency (OEE) data, that gives industrial operators deeper insight into their systems and drives optimization.

The business challenge

As industrial manufacturers move to modernize their systems and infrastructure, existing interoperability gaps become apparent. HighByte seeks to provide manufacturers with the critical data and infrastructure that they need to achieve industrial transformation from an Industry 3.0 environment to a next-generation, Industry 4.0 environment with extensive interconnectivity and highly contextualized data.

The technical challenge

The landscape of industrial technology ecosystems is rapidly changing. The technology stack that dominated Industry 3.0 (called the Purdue model) functions in a very linear way that limits the observability of industrial processes. This model contains multiple hierarchy levels, and bi-directional communication can occur between successive levels, but that is it.

For example, the Wired I/O layer connects to the machine controller/PLC layer. The PLC layer only interacts with the connectivity/OPC layer. The OPC layer can talk to multiple application layers. In the diagram below, these are the Supervisory Control and Data Acquisition (SCADA) and Manufacturing Execution Systems (MES) layers. Each application communicates directly with the ERP layer.

Data transmission in this ecosystem is linear between successive layers only. Non-sequential layers cannot communicate with each other.
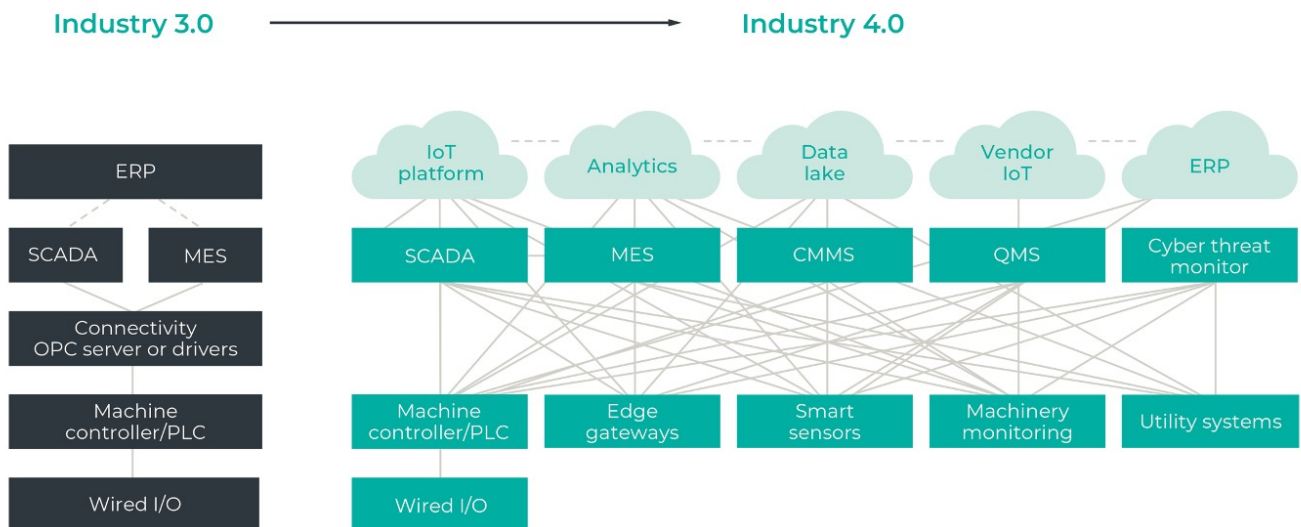
Many industrial operators recognize how critical the data produced by machines and systems on the factory floor is, but while the Industry 3.0 model produces a lot of data, it lacks the ability to use that data to its fullest potential.

By contrast, technological advancements powering Industry 4.0 provide new avenues for using and analyzing the data produced by industrial operations and the sensors and systems associated with it. Industry 4.0 contains multiple layers and applications with point-to-point connectivity where any layer or application connects directly to any other one.

However, evolving from a 3.0 context to a 4.0 one is complex. An area where companies struggle in this transition is the abundance of raw data hitting so many applications and layers. In an Industry 3.0 system, the SCADA layer cleans and models industrial data. But with point-to-point connectivity in Industry 4.0, the SCADA layer is no longer sufficient and raw data hits the different applications; that raw data lacks context, standardization, and normalization.

For example, the data generated by one machine may exist in a completely different shape than data from another machine within the same factory, or within the same company. Much of the context for that data is in the minds of the machine operators on the factory floor. Yet, it falls to IT developers to write scripts to add context back into this data once it hits the IT systems. For those on the IT end of things, writing and maintaining custom integration code, preparing data, and redundantly modeling data in each end application is time-consuming and these tasks don't scale.

Therefore, manufacturers that want the deeper insights into manufacturing operations and overall equipment efficiency (OEE) provided by Industry 4.0 technologies need a way to bridge the gap that exists between the operational technology stack in Industry 3.0 and the information technology stack in Industry 4.0.

This is where HighByte Intelligence Hub comes into play.

The solution

HighByte Intelligence Hub is a software solution that lives on the Edge, the place between the layers and applications generating data and the database storing it. This solution collects industrial data and tags it according to a pre-defined model for that type of machine or sensor, and then sends it to InfluxDB for storage and analysis. The core benefit of Intelligence Hub is its modeling engine, which allows users to create models for their data, to standardize the shape of that data across devices, and to contextualize that data for specific applications or end points.
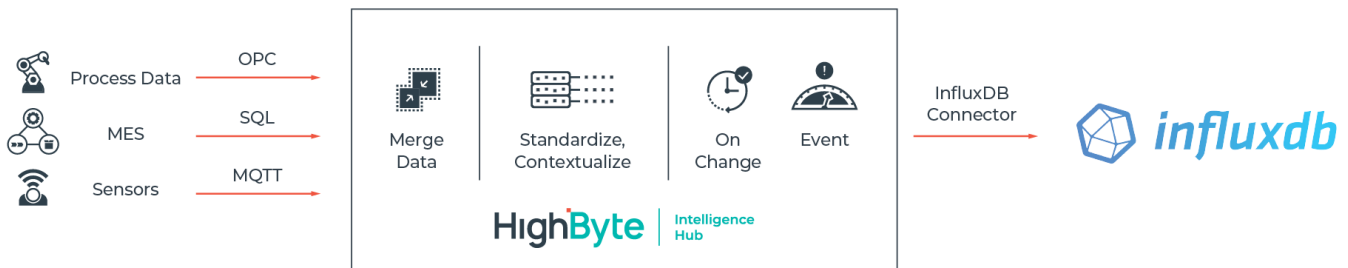
Because all these industrial devices in this new Industry 4.0 model produce a large amount of time-stamped data, the Intelligence Hub leverages InfluxDB to store and process that data. Using HighByte models in tandem with InfluxDB provides observability and drives optimization for industrial processes. In addition, the Intelligence Hub utilizes Flux, InfluxDB's scripting language, to process and transform data for predictive maintenance, traceability or quality monitoring processes, and models for OEE or other process analytics. HighByte also contributed an OEE Flux package that measures the effectiveness of production processes. Because InfluxDB is open source, developers at HighByte, or anyone else in the InfluxDB community, can contribute resources to the platform for community use.

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It's cool to be able to see how much InfluxDB has evolved over the years to the point where we're at now, and how HighByte and InfluxDB can work together to create a better solution."

Aron Semle, CTO, HighByte

Results

The combination of HighByte's Intelligence Hub and InfluxDB allows users to process and analyze vast quantities of industrial data, turning raw data into actionable information. For example, InfluxDB provides an OEE package—built by HighByte for use by all community members—for its Flux language that contains functions necessary for calculating OEE. Using HighByte's modeling capabilities, users can determine OEE for an individual machine, all the machines in a single location, or all the machines across an entire organization that match a given model. InfluxDB provides a range of options for visualizing the data HighByte collects.

What's next

HighByte continues to add features to its Intelligence Hub, such as the ability for HighByte to read directly from InfluxDB.

About InfluxData

InfluxData is the creator of InfluxDB, the leading time series platform. We empower developers and organizations, such as Cisco, IBM, Lego, Siemens, and Tesla, to build transformative IoT, analytics and monitoring applications. Our technology is purpose-built to handle the massive volumes of time-stamped data produced by sensors, applications and computer infrastructure. Easy to start and scale, InfluxDB gives developers time to focus on the features and functionalities that give their apps a competitive edge. InfluxData is headquartered in San Francisco, with a workforce distributed throughout the U.S. and across Europe. For more information, visit influxdata.com and follow us @InfluxDB.

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