

PERFORMANCE 360

PEAK INDUSTRIAL PERFORMANCE

Today global competitive pressure is driving manufacturers to become more agile, innovative, and cost-effective. Vendors, analysts, and consultants all push for the adoption of “Smart Manufacturing” or “Factory 4.0”. But, combined with a projected shortage of skilled labor and the accelerated growth of technology and data, it is little wonder that companies are overwhelmed and confused about their next steps.

The Challenges

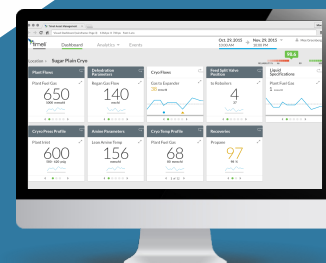
Fundamentally, manufacturers need to either improve output quality, yield, throughput, energy efficiency, or all of the above. Unfortunately, factors are standing in the way. In short, there is variability (between operators, input quality, feed properties, process speed, and temperature), manual set-point controls, runaway reactions, slow lab-based measurements, and overall bad actors. Most manufacturers have tried to address these issues with solutions such as advanced process control systems (APC) or predictive asset health management but with varying success. Because fixed models provide the basis for most of these solutions, they go out of tune as the process changes or do not extend far enough into the manufacturing processes itself.

The Answer

Enter Performance 360™ by Symphony Azima AI. Performance 360 is an all-inclusive process performance management solution that combines process condition insights, performance metrics, and process history. Unlike other solutions, it uses state-of-the-art artificial intelligence and deep learning technologies to predict how a process will perform in the future, and identify potential process disruptions, quality issues, and trip conditions. And, it provides this information with enough time for you to proactively act to avoid process trips, lost batches, decreased quality, and lost revenue.

How Does It Work?

Performance 360 provides prediction as well as situation awareness in real-time and a process health dashboard that displays KPI trending. Our process optimization model offers an operational analysis workbench complete with predictive and prescriptive analytics and smart alerts.



Solution Highlights

Flexible Data Intake: Whether it's OPC-DA or OPC-UA data through an OPC Gateway or data from a historian (e.g., AspenTech IP.21, OSIsoft PI), distributed control systems (DCS), SCADA systems and enterprise systems (IBM Maximo, SAP, etc.), Performance 360 can assimilate data from multiple heterogeneous systems. This flexibility allows you to keep your data collection points intact while enabling them to optimize your processes even further.

Adaptive Digital Twin: Using multiple neural network models, Performance 360 creates a digital twin to capture operating dynamics in real-time. Armed with this data, the twin "self-learns" to adaptively change and give accurate recommendations (such as optimal setpoints) or predictions (such as process trips or upsets). As a result, manufacturers can proactively adjust process parameters that either reduce energy consumption, improve quality, increase throughput, or reduce unplanned shutdowns.

Machine Learning Approach: Performance 360 uses a carefully curated library of methods leveraging best-in-class open-source frameworks such as Google's Tensorflow, Keras, SciPy, PyTorch to support deep learning algorithms, otherwise known as deep artificial neural networks (a subset of artificial intelligence).

What makes them "deep"? These networks train with data and self-learn - without needing human programming. Further, our Machine Learning approach employs convolutional neural networks that help analyze and classify imagery, text analytics of operations and maintenance service records using NLP (natural language processing),

LSTM (Long short-term memory) networks for classifying, processing, and making predictions based on time-series data, and autoencoders blended with methods such as K-Nearest Neighbor, Support Vector Regression, Arima computational techniques, etc.

Process Templates: Our platform contains several key process templates covering specific manufacturing processes such as grinding mill circuits (mining, cement), ammonia process (petrochemicals, fertilizers), and furnace operations (steel mills and glass making). Its open architecture allows your data scientists to write their algorithms in Python or any other language that conforms to our REST API standards and then import them into our solutions.

Powered by Microsoft Azure: By leveraging this cloud-based platform, Performance 360 offers a seamless and secure edge integration with zero disruption to your digital infrastructure. Even better, it combines Azure services (such as IoT Edge, IoT Hub, Event Hub, AKS, and Stream Analytics), Microsoft Power BI with MathWorks MATLAB to provide fast analytics and actionable insights into plant-wide processes.

Flexibility: Our docker based architecture allows ease of import of your proprietary analytics into our platform. Based on applications need, we have the option to deploy our solution stack as an EDGE/ on-prem variant.

Why Choose Performance 360?

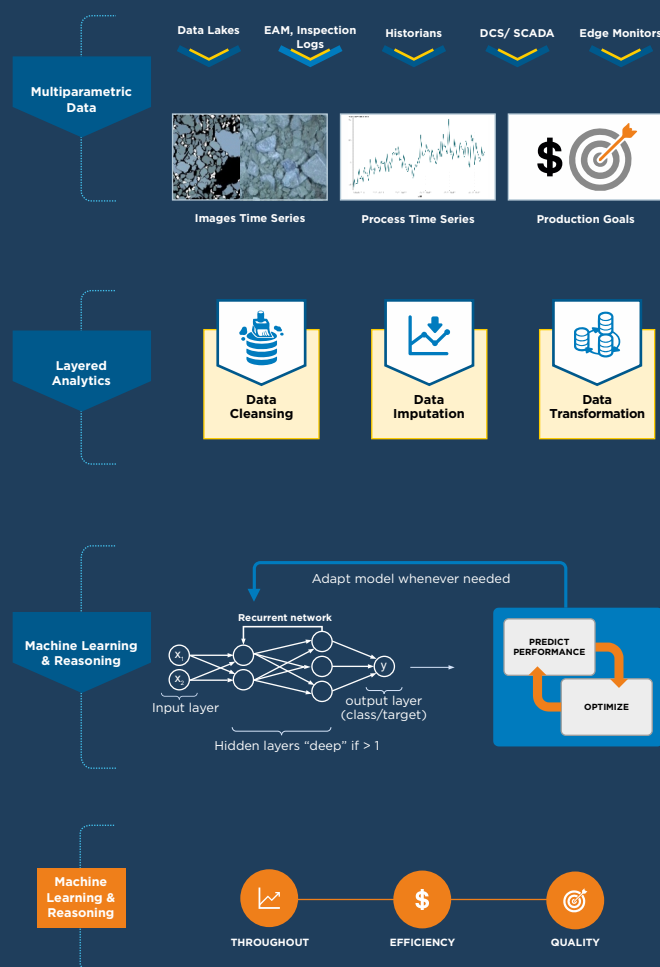
While other solutions promote their ability to configure assets and use process templates, Performance 360 is a unique product that optimizes process manufacturing by working with modern, advanced process control and real-time optimization systems.

Our customers benefit from:

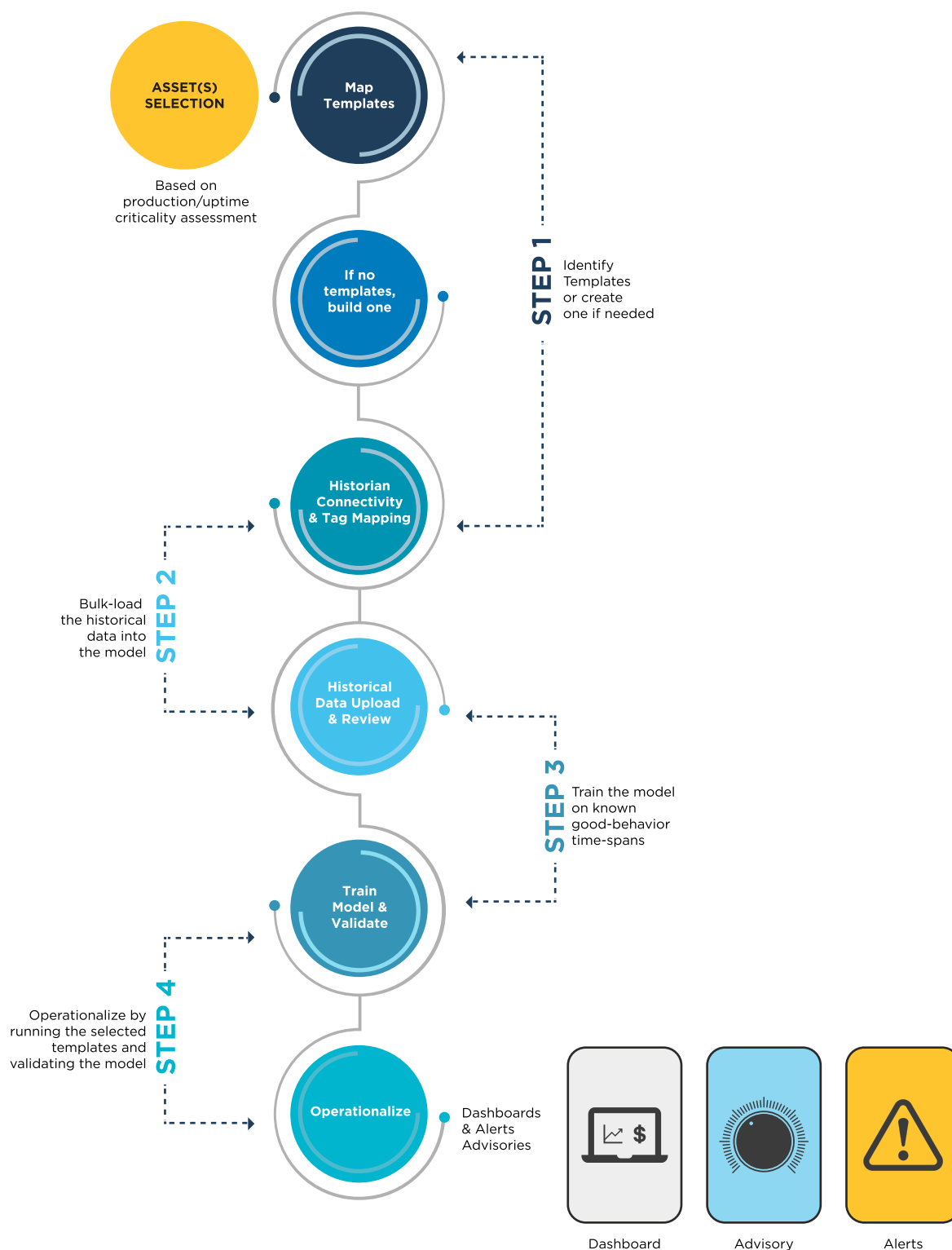
- Real-time guidance resulting in reduced variability (e.g., manual operators, temperature, setpoints, input settings)
- Incomparable accuracy due to adaptive Machine Learning driving the loss function down (e.g., soft-sensing estimates at 10X higher resolution than lab measurements allowing to more informed decision making in real-time leading to greater energy efficiency and improved output quality).
- Online, process-wide monitoring creates earlier warnings of process trips and bad actor identification. Combined with a calculated course of correction means minimal unplanned outages and reduced costs.

With Performance 360, companies can reach the ultimate goal of self-optimizing operations where the factory continuously adapts to demand, variations in supply, process deviations, and human factors.

Performance 360 Architecture



Performance 360- How To- Step-by-step



About Symphony AzimaAI

Symphony AzimaAI is the emerging leader of artificial intelligence-based monitoring, analysis, and prediction solutions that optimize the health and operational performance of industrial assets and processes. Our cloud-based platform integrates a wide variety of data streams with proven analysis models and deep machine learning to illuminate anomalies and recommend pre-emptive actions.

Headquartered in Boston, Massachusetts, Symphony AzimaAI serves a wide-range of industries from process to discrete manufacturing to defense.