PEAK
INDUSTRIAL
PERFORMANCE

APM 360

Making your operation more reliable while optimizing performance at a lower cost is a tough balancing act.

Beginning with the:
- Number and variety of assets to track,
- Increasing compliance and regulations,
- Volume of data to aggregate and analyze,
- Not to mention the retiring of a seasoned skillset, asset-intensive companies like yours have to do more than improve maintenance. Meeting both objectives requires you to digitally transform meaning, break down production siloes, and connect all assets, systems, and data.

The Challenges

Sounds easy enough. But whether you are transitioning from paper-based systems or evolving your condition-based monitoring and moving into APM requires a thoughtful strategy and flexible platform solution - one that can support your "step by step" journey.

The Answer

APM 360™ by Symphony AzimaAI. APM 360 is a cloud-based asset performance management solution that covers overall asset health, real-time condition monitoring, and predictive maintenance. But, unlike other APM solutions, it drives more value by recommending specific actions - accurately. APM 360 leverages machine-learning based on artificial intelligence to detect anomalies symd take into account complex, dynamic behavioral machinery patterns and contextual data relating to the manufacturing process at large.

The result? A continuous collection and management of all asset data across the enterprise, organized and analyzed to help you make the best business decisions: lower risk, lower cost with improved optimization, and asset performance.

How Does It Work?

APM 360 has an FMEA (Failure Modes and Effects Analysis) template library that uses failure detection algorithms to identify the inputs to our analytical module and maps these inputs to the asset template. It then uses "layered analytics," meaning supervised machine-learning algorithms, KPIs, and first-principle models to analyze the data. The apparent cause engine, along with layered analytics use the analyzed data to detect behavior anomalies in a multi-dimensional model (also known as a digital twin). APM 360 maps the model's behavior back for specific failure mode(s) to determine advisories, recommendations, and alerts. Also, the analyzed data is normalized and weighted based on the asset or system impact, summed and differentiated to determine the asset's overall ability to maintain its design function. This calculation is the Asset Health Score.

APM 360 uses this score to track the asset's health over time and provide early warnings and allows your team to focus on Mechanical or Process-driven degradation. Altogether, you get role-specific dashboards for maintenance, reliability, and operations by asset, plant, and across plants.

Solution Highlights

Flexible Data Input
Our asset templates and models can use information from data historians such as OSI PI and Aspentech IP21, distributed control systems, EAM (enterprise asset management), and our WATCHMAN 360 platform which encompasses high-resolution advanced vibration analytics executed by a purpose-built inference engine.

Incorporated FMEA Library and Asset Templates
Our platform contains a library of faults with associated recommendations. APM 360 doesn't just alert you that something is abnormal but goes one step further by recommending a prescriptive course of action.

Open Platform
It allows you to write your algorithms in Python or any other language that conforms to our API standards and then imports them into the APM 360 platform.

Asset Health Intelligence
Performing additional calculations based on layered analytical results and AI algorithms based on the asset's digital twin, APM 360 generates an accurate asset health score. Our platform leverages this approach to track health over time and generates early warnings for proactive intervention.

Predictive Workbench
It gives you the ability to test and deploy new models as well as run ad-hoc analytics.

Powered by Microsoft Azure
By leveraging this cloud-based platform, Asset 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.
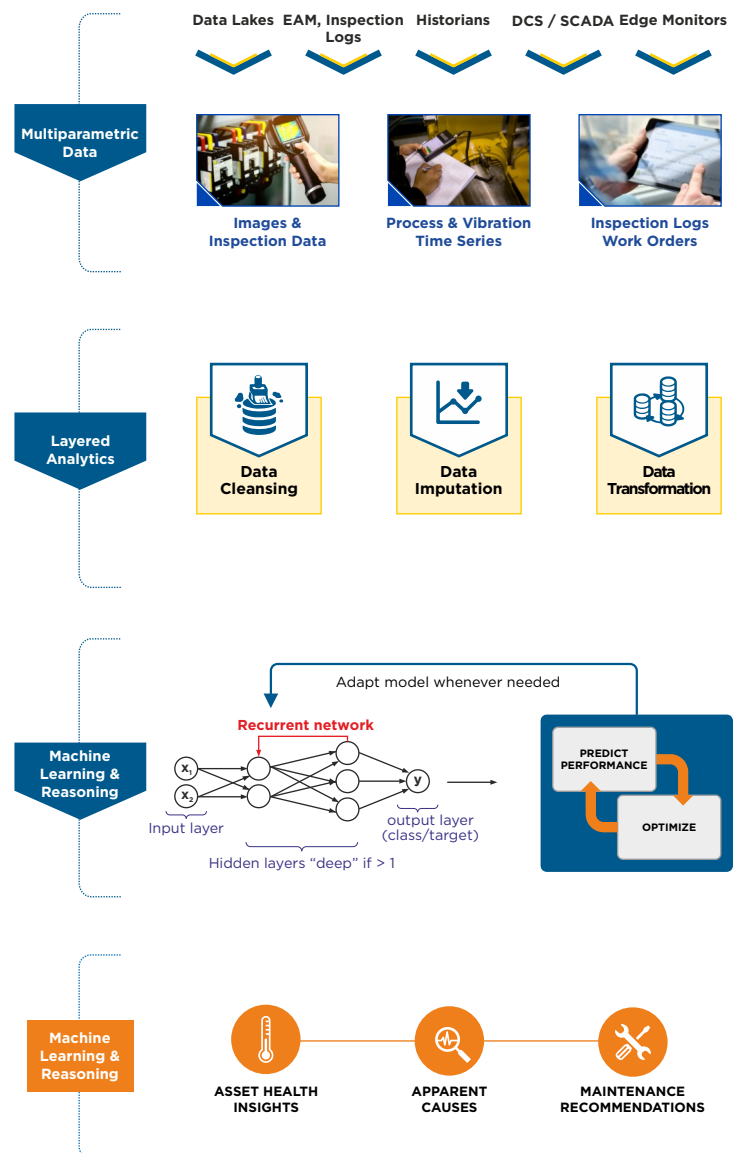
Why Choose APM 360?

When it comes to asset maintenance and reliability, there are several solutions to consider. Most CMMS (computerized maintenance management system) and EAM (Enterprise Asset Management) solution have reliability applications that use statistical models of leading indicators like MTBF (mean time between failures), MTTF (mean time to failure) to identify "bad actors" and improve asset maintenance. However, this is based on historical events and do not take into account asset state under continuously changing operating conditions. APM on the other hand, uses advanced models to learn from continuous, real-time analysis and visibility to predict operating issues and provide actionable actions for mitigation while balancing risk, cost and performance.

What makes APM 360 unique is the breadth of the asset template library, its ability to use asset data from several sources, and its open platform approach. While other APM solutions use only one type of AI algorithm to identify an asset failure, APM 360 uses six different algorithms in a layered approach. Also, the system can ingest CMMS/EAM data to increase the accuracy of APM analytics. The result is reduced false positives and negatives and higher levels of diagnostic and advisory accuracy.
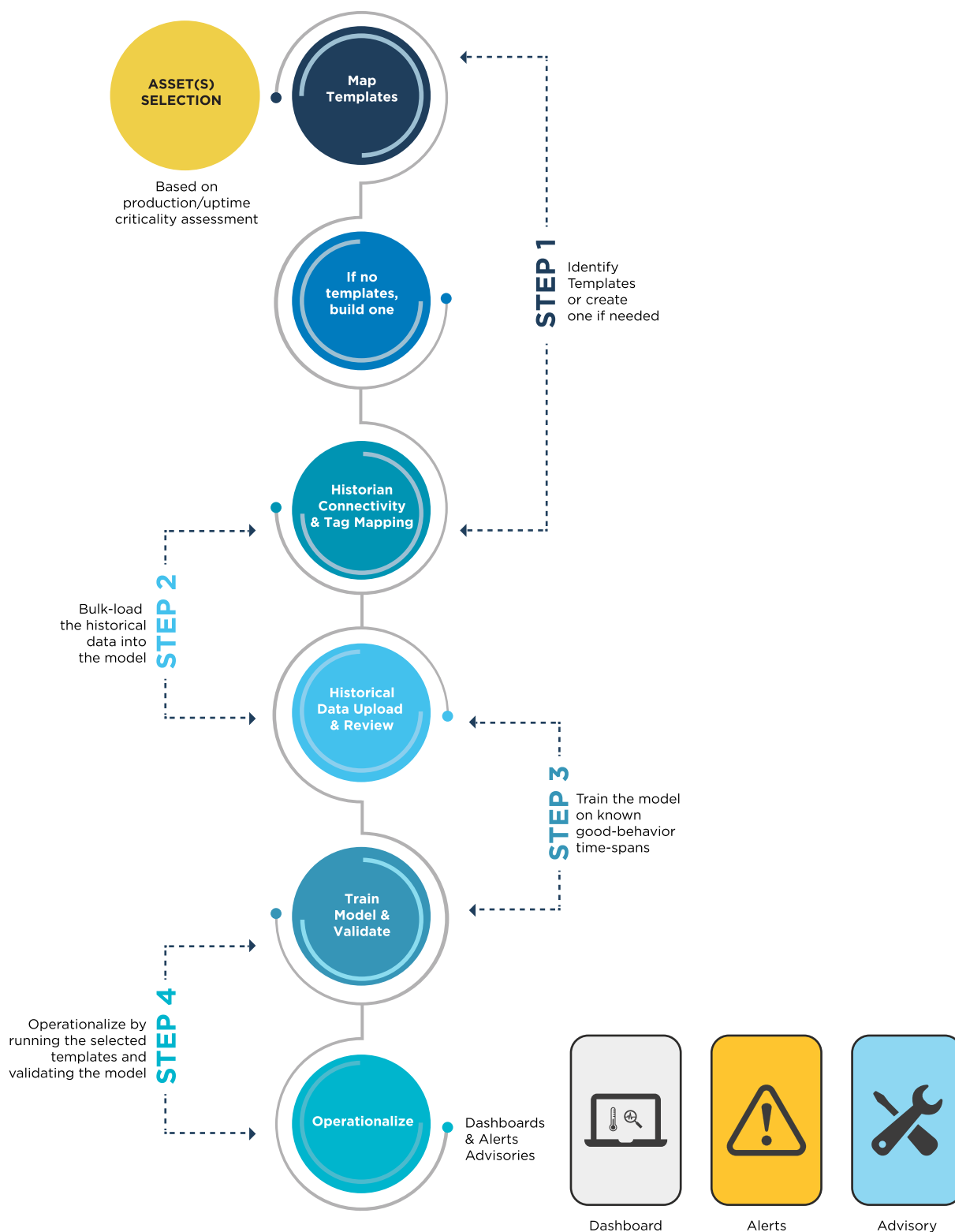
Best of all, APM 360 focuses on mechanical component health, asset process health, and system/unit health that is all rolled up, giving you full view at the plant level and across plants. Our customers benefit from:

- Cost reduction through predictive maintenance
- Greater accuracy in predicting an asset's remaining useful life by creating conditions that improve asset performance while maintaining its health
- Improved quality control and safety conditions

APM 360 ARCHITECTURE

Multiparametric Data

Data Lakes   EAM, Inspection Logs   Historians   DCS / SCADA Edge Monitors

Images & Inspection Data

Process & Vibration Time Series

Inspection Logs Work Orders

Layered Analytics

Data Cleansing

Data Imputation

Data Transformation

Machine Learning & Reasoning

Adapt model whenever needed

Recurrent network

x_1

x_2

y

Input layer

output layer (class/target)

Hidden layers "deep" if > 1

PREDICT PERFORMANCE

OPTIMIZE

Machine Learning & Reasoning

ASSET HEALTH INSIGHTS

APPARENT CAUSES

MAINTENANCE RECOMMENDATIONS

APM 360- How To- Step-by-step

ASSET(S) SELECTION

Based on production/uptime criticality assessment

Map Templates

If no templates, build one

STEP 1
Identify Templates or create one if needed

Historian Connectivity & Tag Mapping

STEP 2
Bulk-load the historical data into the model

Historical Data Upload & Review

STEP 3
Train the model on known good-behavior time-spans

Train Model & Validate

STEP 4
Operationalize by running the selected templates and validating the model

Operationalize

Dashboards & Alerts Advisories

Dashboard   Alerts   Advisory

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.