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THE POWER OF **NOW**

ANALYZE

Unlock Actionable Insights in Your Operational Data with Powerful IIoT Analytics Capabilities

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The true value of Industrial IoT solutions lies in the data. Every connected device can generate thousands, or even millions, of data points every day. Contained in that data are the answers to business problems, the diagnosis for a machine failure, even predictions for the future.

The analytics process can be simplified into three steps: first, capture and process data; apply logic to the data to unlock value; and produce insights to enhance decision-making and operations across the enterprise.

ThingWorx uses advanced artificial intelligence and machine learning techniques to extract insight from data, then exposes the complex relationships and analysis via simple-to-understand outputs suited for consumption by non-expert users.

Analytic methods and outputs vary depending on what questions are being asked and how or where they should be answered:

- *Descriptive: What happened?*
- *Diagnostic: Why did it happen?*
- *Predictive: What will happen?*
- *Prescriptive: What should I do?*

ThingWorx is built to understand and tackle the unique challenges of IIoT data and simplifies access to the information industrial enterprises need to make informed decisions quickly.

ThingWorx Makes It Possible to:

- Transform data into insight via intuitive, user-friendly interfaces that enable complex analytics capabilities for non- expert users
- Operationalize insights, predictions, and recommendations across enterprise functions to enhance decision-making
- Detect data anomalies in real-time to quickly identify changes in connected devices or operating conditions
- Optimize performance outcomes using simulations to diagnose problems and generate recommendations for corrective action

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ThingWorx Analytics Capabilities:

Descriptive and Diagnostic

Descriptive Services include pre-built calculations and other transformations useful in both general IoT application development and as a preparation step in changing raw data into useful insights for predictive analytics training and scoring.

Explanatory Analytics enables better understanding of IIoT data, using advanced algorithms that discover useful patterns and correlations within data.

Real-Time Monitoring uses a variety of statistical and machine learning techniques to learn "normal" conditions and identify unexpected changes in behavior.

Predictive and Prescriptive

Predictive Modeling applies machine learning to historical data to make predictions about future outcomes, such as machine failures, quality degradation, or when service will be required.

Predictive Scoring anticipates future outcomes and offers the ability to make relevant outcome- based predictions based on data within ThingWorx.

Confidence Models provide a range of uncertainty for a given prediction to better facilitate automated processes and enhance human decision-making.

The Complete IIoT Analytics Solution:

Descriptive and Diagnostic

Platform Analytics ThingWorx contains native analytics capabilities that deliver reliable, actionable insights to applications built on the ThingWorx platform. Models are created using automated machine learning, which delivers diagnostic, predictive and prescriptive outputs via an intuitive user interface.

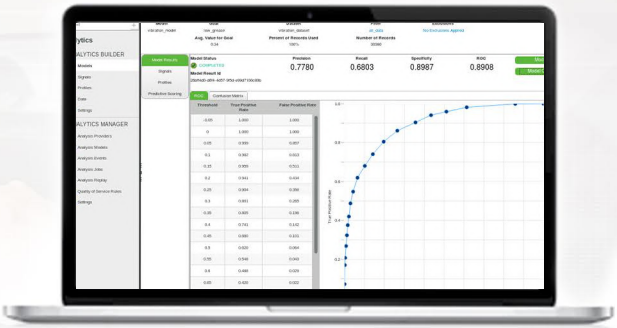
Analytics Extensions Tools and interfaces are available to extend the native functionality of the ThingWorx platform, further operationalizing data models. These extensions include:

- *Analytics Builder*: Provides an interactive user interface for creating and managing advanced models for use in ThingWorx-powered solutions
- *Analytics Manager:* Provides an integration frame work to connect external computational and simulation providers into IIoT applications

Analytics Server

The analytics engine simplifies and automates complex analytics using sophisticated artificial intelligence and machine learning to create, operationalize, and maintain advanced intelligence from IoT data.

The Analytics Server is not a black box. It details how a model was created, scores against validation data, and uncertainty range, providing deeper insights to accompany the data output.



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Rockwell Automation

Backed by the largest combined IIoT ecosystem in the world, PTC and Rockwell Automation have developed a collaborative solution that connects devices, applications, and systems to make data more accessible, enable better-informed business decisions, and facilitate long-term growth and continuous innovation.

Solutions:

- Benefit from seamless integration of your enterprise and operations systems
- Deliver real-time and near-time information that decision-makers need, from the plant floor to the C-suite
- Scalability accommodates connectivity to one or many facilities for optimized global operations

Value:

- Enhance worker performance and minimize safety and compliance risks with easy access to information
- Improve equipment uptime and operating efficiency through real-time monitoring
- Reduce costs and speed time-to-market with flexible process enforcement and dynamic scheduling

ANSYS®

PTC and ANSYS have developed a framework which allows customers to build predictive simulation-based digital twins, combining ANSYS Twin Builder and PTC's ThingWorx Analytics to predict how an industrial component operates and responds to its environment.

Solutions:

- Combine ThingWorx IoT data with ANSYS Twin Builder to mirror life and experience of connected asset
- Accelerate manufacturers' ability to offer predictive service to their customers
- Ideal for process-critical applications operating in challenging environments

Value:

- Reduce operational costs by eliminating unscheduled downtime
- Reduce service costs through predictive service and intelligent monitoring
- Improve ROI by running assets at optimum performance

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