

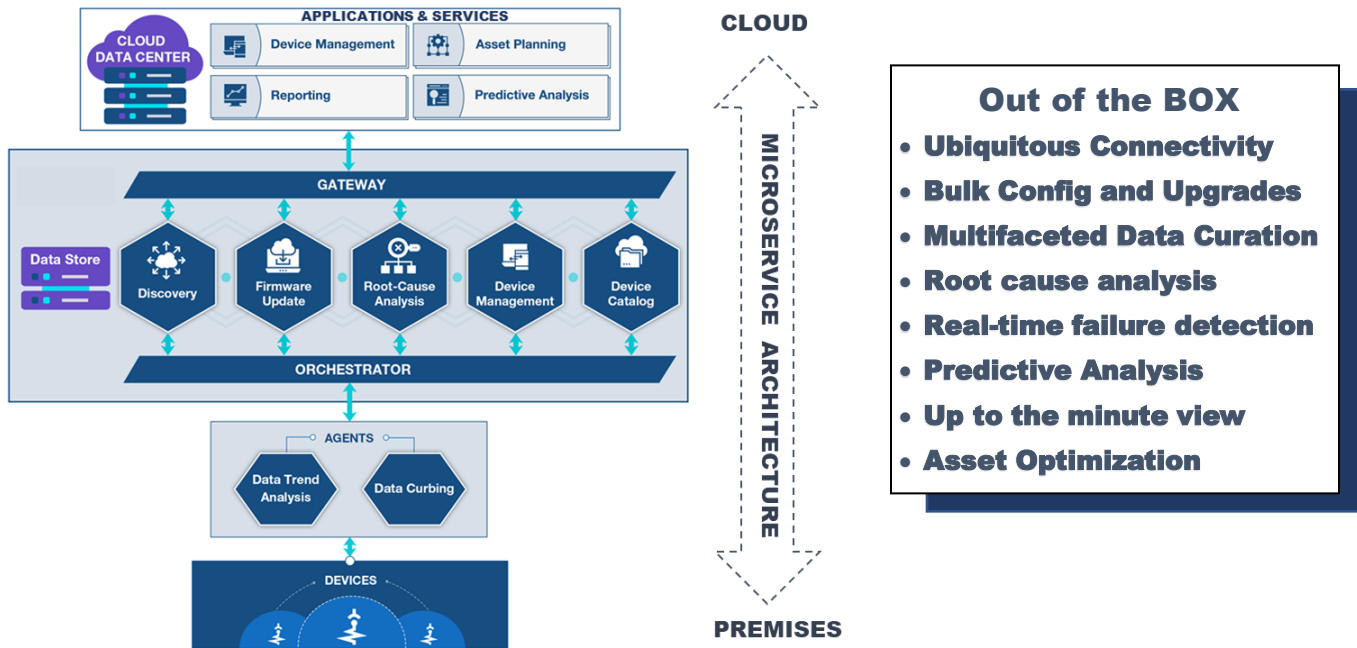
A PRACTICAL FRAMEWORK FOR IIOT EDGE

The Industrial “Revolution” at the Edge

Have you accounted for the “edge” in your IIoT journey? This software-based model radically improves operational efficiency bringing data governance, real-time analysis and decision-making to the most optimal location close to action, reduces backend cost, solves critical latency-depending issues while improving serviceability of devices.

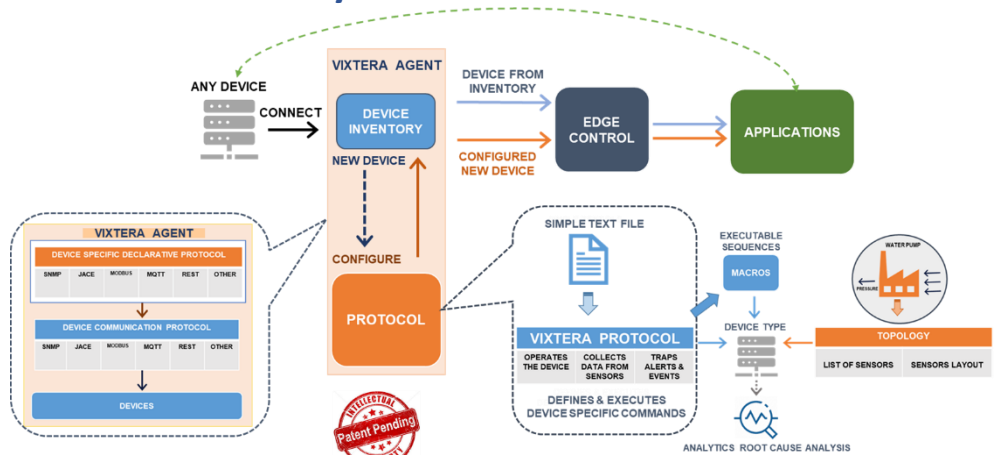
Vixtera is developing the IIoT edge distributed software and delivering integrated solutions to Industrial Enterprises, Manufacturers and VARs with a single focus on accelerating and simplifying IIoT deployment and operation.

The ready-made software framework (VIEdge) is powered by patent-pending algorithms and techniques helping to speed up time to value, expand operational visibility and reduce the cost to automate infrastructure and operation.



The Hidden Truth of IIoT Device Connectivity

In the “perfect” world, you pick a communication protocol, take a pain to develop a driver or may find an SDK to connect the device. Yet, you still have to constantly “mingle” with code when making software changes or upgrades – think about large-scale deployment. The **enormity of different brands and types of IIoT devices** demands a far-reaching approach to solve this alarming problem.

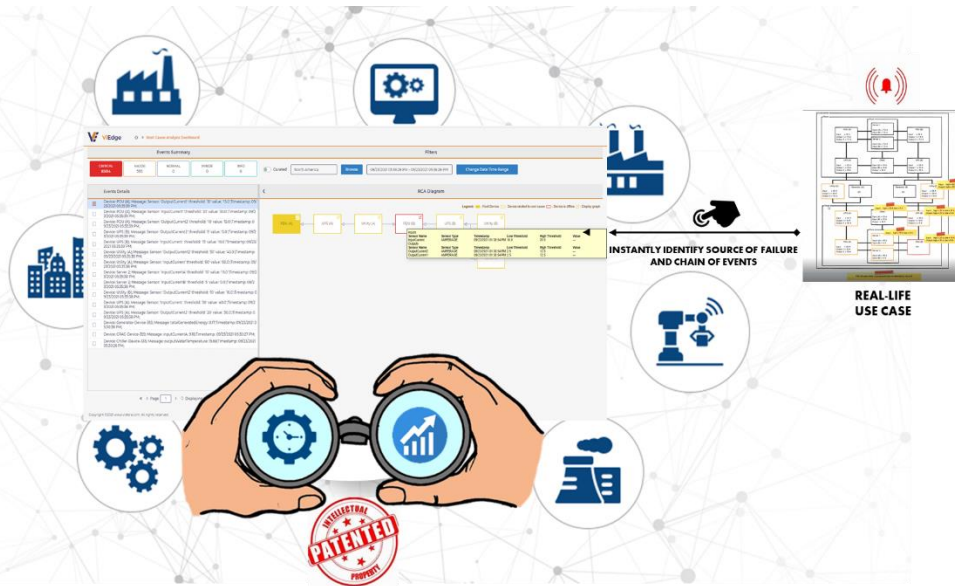


Vixtera **patented technique allows** effortless onboarding, maintenance and management of ANY device across ANY communication protocol without ANY need for a driver, SDK or firmware change (e.g., adapting device to MQTT). Regardless of model or brand, one can quickly configure a declarative protocol specific to a device or its class - minimum effort is required. The protocol commands and macros can be easily customized providing rapid response to frequent changes and upgrades instantly adapting to ever-changing conditions of complex heterogeneous IIoT environment.



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Identifying IIoT Problem is like Looking for a Needle in a Haystack



Running mission-critical applications and working in highly-constrained environment leaves no room for failure and requires a solution that: a) detects irregularities and **pinpoints a failure in real time**; b) provides mechanism for prediction and prevention of potential problems. Vixtera developed an **algorithm helping to detect IIoT system anomalies and identify**

source of failures preventing potential breakdowns and costly track rolls. The patented methodology takes holistic approach to gauge inputs and outputs of connected devices while using correlation-based analysis, rules and priorities to parse-out actionable interconnected events. This technique is more earnest and less complex than NN training and error-prone AI/DL modeling, and is a better fit to solve the uptime issues of Industrial IoT.

To **mitigate the AI/DL labeling issue**, a machine-generated source of failure can be used as a reliable “etalon”, a label, for accurate predictive analysis.

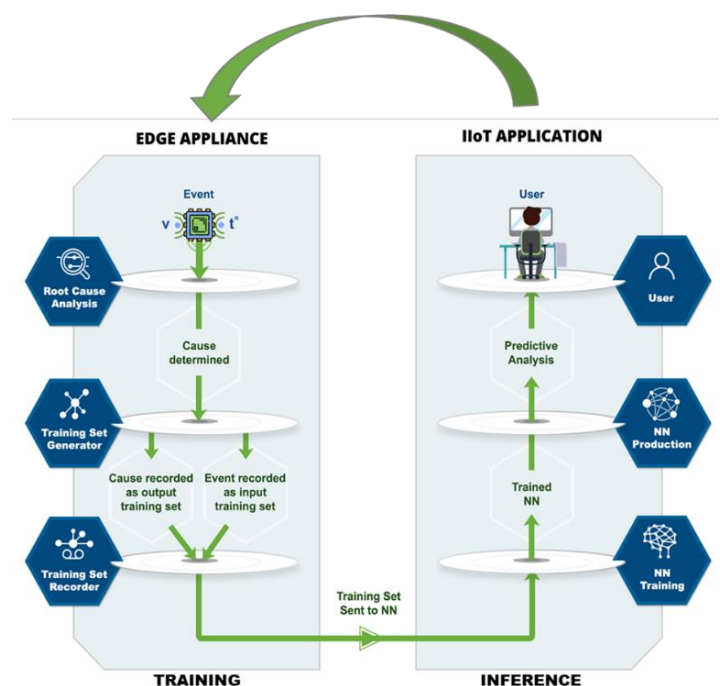
Laying Gorundwork for Reliable Predictive Analysis

One of the technological challenges of using Artificial Intelligence (AI) for predictive analysis is classification of data that correlates with the outcome you want to predict. In order for AI to be used, it has to be trained. Each training data set consists of input and “etalon” data sets or label. The latter is used for comparison between data generated by AI and desired data sets. The quantity of data and quality of the label really drives AI effectiveness.

However, the biggest challenge with today’s AI training in Industrial IoT is that, unlike consumer IoT with well-defined manual labeling (e.g., a cat), there’s no easily identifiable labels and patterns that can be used for AI modeling given enterprises’ infinite variety of technological permutations.

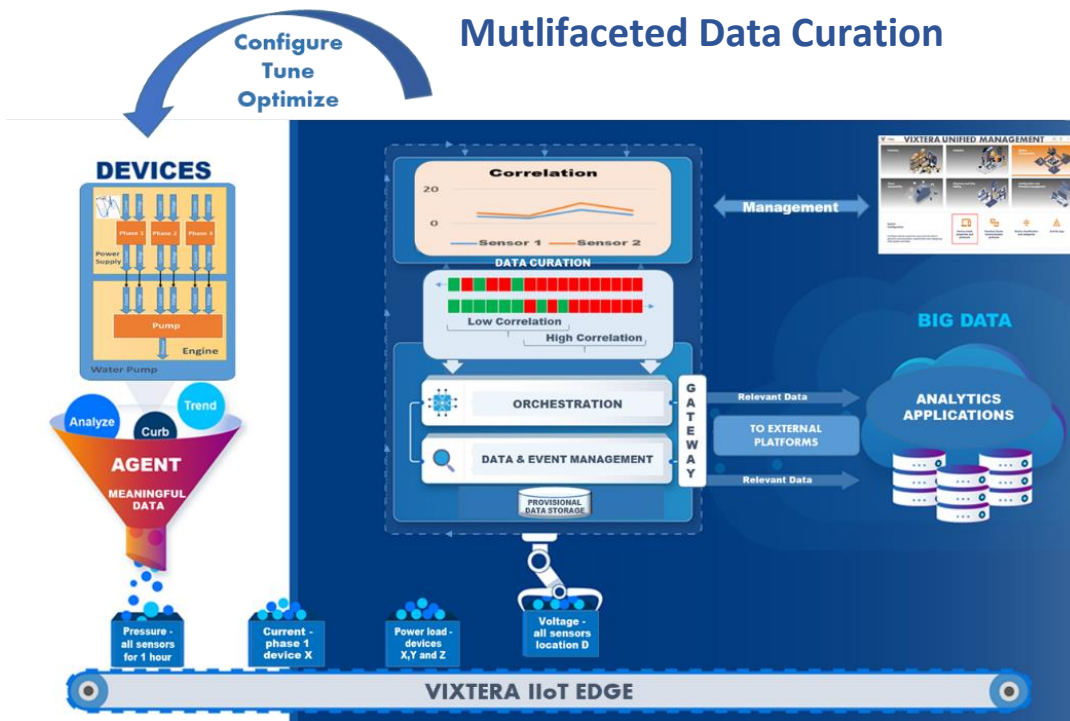
Vixtera patented Root Cause Analysis algorithm explicitly identify a source of failure (and chain of events that’s leading to a problem) that can be used as a reliable label (and a pattern) for AI training and modeling.

This method significantly improves IIoT operational efficiency helping to eliminate shortcomings of AI using auto-generated, accurate and dependable data for predictive analysis and services.



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Multifaceted Data Curation



The digitalization presents profuse dilemma in defining the values and boundaries of data. It's widely known that, while running industrial applications, a large bulk of collected data is incoherent, irrelevant and is... practically useless. Besides overwhelming the network supplying flawed and poorly-understood data, it creates enormous challenges for real-time and predictive analysis. In the IIoT data-intensive environment, curating data helps to resolve inevitable

challenges exposed by bandwidth, latency and speed providing the means/relevance of your data and ensuring validity of your services.

Vixtera's multifaceted data curation is probing, trending and "cleaning" data while performing it across sensors and devices, and aggregating it by any group or context (e.g., interval, environment). It eliminates duplication of metadata whereas reducing frequency of transmission and size of collected data.

Depending on service requirements, data curation can be performed at different levels, including but not limited to:

- 1) device level across sensors
- 2) agent level across multiple devices
- 3) orchestrator level collecting and processing data from multiple agents
- 4) gateway level (a plug-in to external platforms, clouds and applications)
- 5) application/system/data quarry level
- 6) aggregation level using data context as a common denominator for data curation

The software applies innovative trend analysis, create provisional footprint storage and normalize data streams while identifying and filtering out meaningful event and data coming from devices.

As the result, it allows asynchronous application independent data processing driving measurable response to any malfunction while addressing low latency and network congestion requirements for mission-critical and wireless (5G) based applications. The filtered-out data can be rapidly conditioned providing for instant access to any aggregated stream of information while dispensing it to multitude of external platforms and clouds for further processing and analysis.

We Uplift Your IIoT Journey

To get you started, we offer an extensible software framework with essential components to start the deployment, and empower you with variety of services and applications to assist with rapid customization and productization of your solution.

