electric imp™

Petasense

Highlights

Requirements

- Reliable WiFi connectivity

- Comprehensive security from the wireless vibration sensor (Mote) to the Petasense cloud

- A solution that addresses essential IoT requirements so Petasense engineers could focus on core product features

Solution

- Use the Electric Imp IoT Connectivity Platform to enable their predictive maintenance solution

- Embed Electric Imp connectivity modules into Motes for secure Wi-Fi connectivity and pre-processing of data

- Data from Motes is further processed by the Electric Imp Cloud and delivered securely to Petasense's cloud for analysis

Results

- Solution was completed on time and on budget with existing team

- Solution was validated in an early trial when it identified a failing pump at a municipal electric utility

- Petasense has won deals with several major industrial companies in two years

Company Overview

Petasense is a leading IIoT Silicon Valley startup focused on increasing reliability, productivity, and efficiency for industrial companies by predicting and preventing unplanned downtime.

Challenge

Unplanned downtime due to equipment failure is a chief concern for manufacturers, refineries, utilities and other enterprises as it results in lost production, increased maintenance costs, low productivity and reduced revenue. Predictive maintenance — identifying and fixing equipment failures before they occur — can significantly reduce downtime, but only 10% of industrial equipment is currently monitored by such solutions due to their high cost and complexity.

Recognizing a tremendous market opportunity, Petasense began developing a simple and cost-effective predictive maintenance solution based on IoT — literally a "Fitbit for industrial equipment."

However, Petasense quickly realized it faced a major challenge. Though staffed with talented engineers, building their solution required greater experience in Wi-Fi connectivity, security and embedded development than their team possessed. Overcoming this lack of critical expertise would either require hiring additional engineers or a long learning curve for their existing team. Neither option was ideal due to increased costs and a longer development effort.

> "Electric Imp's connectivity and security expertise allows us to focus on our core strengths, which are the design of hardware sensors and development of core prediction software. The Electric Imp Platform supports reliability and security by design, and provides a host of powerful advantages that allowed our team to dramatically reduce the time and cost of embedded software development."
>
> — Abhinav Khushraj, Co-founder, Petasense

Solution

Facing a "build versus buy" decision, Petasense turned to Electric Imp after determining that the company's innovative IoT connectivity platform — the first and only to be cybersecurity certified by UL for industrial controls (UL 2900-2-2) — met all of their security, connectivity and edge processing requirements "out of the box." This freed their engineers to focus on perfecting the sensors, cloud software and Machine Learning analytics and accelerated the development of Petasense's first product, the Vibration Mote.

This egg-sized, battery-powered sensor monitors vibration patterns in industrial motors, pumps, compressors, fans and other equipment that rely on rotating parts. Abnormal or excessive vibration often indicate potential failures with such equipment and when identified early enough, repairs can be made before a breakdown.

Embedded in each Mote is an imp module that provides WiFi connectivity and substantial edge processing performance. This processing capability allows the imp module to implement specialized filtering algorithms to improve the quality of the vibration data and reduce data volume. The processed data is batched in the Mote and periodically transmitted to the Petasense Cloud for further analysis by the company's machine-learning software.

Transmitting periodically, rather than continuously, dramatically extends the Mote's battery life to up to two years and results in lower operating costs.

Petasense also uses the secure Over-The-Air (OTA) update capabilities of the Electric Imp platform to enhance its Motes in the field. The platform allows them to safely push new firmware releases to all their Motes simultaneously without the risk of failed updates or corruption.

Benefits

EDGE PROCESSING
The computing power of the imp module in each Mote pre-processes vibration data at the edge to reduce noise and the volume of data to be transmitted. This provides the Petasense cloud with optimized data sets for analysis and allows for periodic rather than continuous transmission.

LONG BATTERY LIFE
Replacing batteries is the only servicing a Mote requires and can be done every two years thanks to its low power requirements. This is accomplished by transmitting batched data periodically to minimize the number and duration of Wi-Fi connections.

OVER THE AIR UPDATES
Petasense regularly upgrades Motes in the field with new capabilities or to improve performance using the Electric Imp platform's OTA update feature. New firmware is pushed to Motes securely and simultaneously, which is vastly faster and less costly than manually updating each Mote.

Why Electric Imp?

The key reasons Petasense chose Electric Imp as the basis of its predictive maintenance solution include:

- **Time-to-Market:** Rather than spend time and money developing the in-house expertise to build their solution, using the Electric Imp IoT Connectivity Platform enabled Petasense to get to market on time and within budget

- **Security:** The comprehensive security features of the Electric Imp Platform and the imp modules ensure a secure connection from the Motes to the Petasense cloud

- **Flexibility:** The flexibility of the Electric Imp Platform allows Petasense to easily add new features and capabilities to its solution, including cellular connectivity

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