



How Spiio's IoT Platform uses InfluxData to beautify major US cities

AN INFLUXDATA CASE STUDY

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Overview

Green wall installations are becoming very popular in corporate offices and big buildings around the world, but maintaining them in a city is a complex problem – that’s why Spiio uses sensors to understand plant performance from data. As part of its IOT platform, Spiio chose InfluxData because it is open-source with a promising future, has a simple to use query language, InfluxQL, and it enabled them to use their own technology.

The result: Spiio’s data analytics service empowers horticulturists to understand the performance of living green wall installations. This service provides a full digital remote overview of irrigation development and allows plant service companies to bring “rain” through the digital cloud at optimal schedules. InfluxData runs underneath Spiio’s service, meeting the company’s need to track metrics and events, detect anomalies, and generate insights over time to inform future green wall design.

About SPIIO

Spiio uses its sensor-based Spiio Cloud Platform – featuring wireless systems, smart irrigation and plant data analytics – to give clients a full view of green wall installations anytime, anywhere. Using Spiio’s real-time analytics, clients can understand their plants’ condition, share insights across their organization, and make data-driven decisions to boost maintenance efficiency and improve green wall design. Spiio is a global company with US, Denmark, and Germany offices and an international client base. Spiio CTO Jens-Ole Grauland spearheads the company’s technology development.



“As more people populate cities and miss nature, nature is moving to the city. But for nature cities to be a reality, we need to understand greenery performance from data. That’s why Spiio is using InfluxData to accelerate the green revolution.”

Jens-Ole Graulund, CTO

The Business Problem

Recognizing the greenery industry’s need to maintain installations, extract insights on plant performance, and improve green wall design based on data-driven decisions, Spiio knew from the beginning that they had to build a plant monitoring system. To get quickly up and running, they chose to use an IoT cloud platform from Xively and created their own Time Series Database with MongoDB. Unfortunately, they soon realized that this solution was inefficient and could not provide the remote real-time monitoring of green walls that was required to support their vision of sustainability. This led them to research other pre-built IoT platforms but found that these solutions would require them to change their business processes to match the technology. What they really needed was a platform that could map to their business processes and allow them to simply track how the plants were doing, detect anomalies, and support predictions to correct poor performance overall.

The Technical Problem

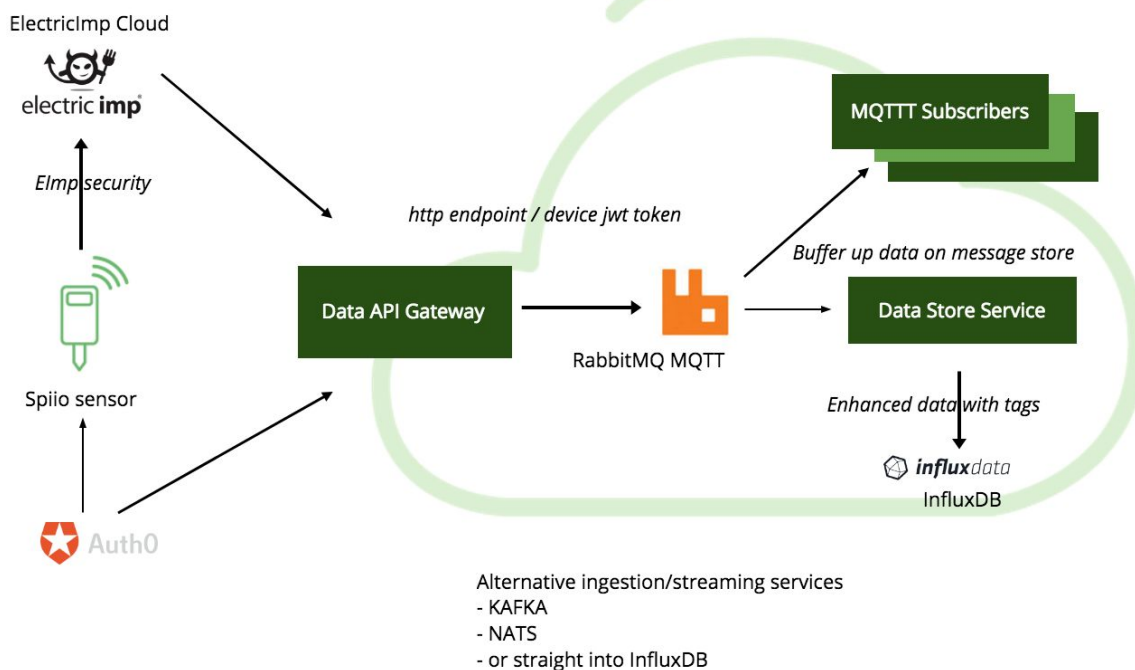
Spiio’s need to understand plant performance from data analytics has taken it a long way from its early stages of testing with hydroponics. When work started on their 2nd generation monitoring solution, they explored several IoT platforms (such as AWS Greengrass, Azure IOT, IBM Bluemix), database technologies (such as MySQL, Cassandra, ElasticSearch) and Time Series databases (such as OpenTSDB). As they mapped out what IoT architecture would best suit their needs, they determined that what they needed was a solution that was made up of the best components.

“InfluxDB was a tech enabler for our vision: bridging the gap between things and people.”

The Solution

In Spiio's IoT use case, InfluxData as the core engine underneath their app to store and analyze metrics from their sensors (moisture, light, and temperature to maintain plants as well as battery health and signal strength). Here's the architecture diagram:

Data collection/ingestion



- Spiio uses Electric Imp at the Spiio sensor to safely & securely send sensor data to their gateways. Electric Imp fulfilled the requirements of device security and connectivity, and the various components of the InfluxData platform hosted on an AWS instance was able to fulfill the requirements of Data processing analytics, presentation, and integration.
- Spiio uses InfluxDB for their Data Store Service, with data enhanced by tags (such as green wall location, type of irrigation, owner, supplier and system).
- As part of Spiio's architecture, Kapacitor streams data analytics and scopes event detection by tags while Chronograf visualizes data and creates client-defined alerts, and Telegraph is used for metric collection from their gateways.
- Data is sent hourly per sensor, then sent in 5-hour batches from their gateway to InfluxDB. As green walls need to be monitored over the long run, the data tracks "slow" trends of

irrigation and performance over seasonal changes to view long-term impact and is retained indefinitely for historical purposes.

- To enable high-precision sensor-based monitoring, a green wall is approached as a grid divided into zones, with each zone divided into sections and each section divided into spots.
- A sensor swarm aggregates the overall green wall condition while enabling data drilldowns into the zone, section, and spot levels to detect overall performance patterns, identify problem areas, and optimize irrigation timing.

“Having permanent access to Time Series data and plant analytics was like the blinds fell off to eliminate guesswork, reveal trends, and enable data-driven decisions not only for green wall maintenance but also for its design - for green walls built to perform.”

Results

InfluxData has spurred Spiio’s global expansion, enabling it to create new applications quickly and offer competitive Service-Level Agreements. Ever since its adoption of InfluxData platform, Spiio has gained momentum and accelerated its growth, landing its first US installation in San Francisco in 2016, then New York and Miami.

Spiio now enables horticulture professionals everywhere to make data-driven decisions and retain full control of millions of plants with the use of real-time analytics. Its clients can access and share never-before possible insights on optimizing green wall maintenance and design by tracking the impact of factors that influence plant performance:

- Irrigation type (rockwall, drip, sprinkler) and direction (above/below plants)
- Irrigation systems for indoor versus outdoor plants
- Weather factors such as wind and cold for outdoor installations
- Lighting for indoor plant installations
- Location on green wall and particular wall structure
- Nighttime versus daytime stress

Powered by InfluxData, Spiio can now answer how and why green walls perform in a certain way, which makes the company’s vision of nature cities an actionable reality.