

The logo for GadgEon, with 'Gadg' in blue and 'Eon' in orange.

Engineering Smartness

PRECISION FARMING SOLUTION

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Version 1.0





Precision Farming Solution



A start-up in the Agriculture technology domain was looking to optimize water usage monitoring and control solution with multiple access nodes like cloud/web and mobile apps.

Solution Description

- Gadgeon provided a fully integrated system involving Wi-Fi enabled sensor nodes, cloud platform and mobile apps.
- The system was integrated to weather.com to control watering based on prediction of the rain
- The cloud application collects the sensor data and records it to the database. Based on the data analysis and weather reports, the irrigation system controls each zone with the right quantity of water. The system also generates reports for users.
- The mobile application creates schedules for watering and real-time notifications to users

Outcome and Benefits Delivered

- The solution provided up to 50% savings on water usage, depending on the environmental conditions
- The usage of water was optimized by real-time data-collection from weather.com
- The sensors helped to supply only the right quantity of water as per the actual needs at each part of the farm
- This solution finally helped them to accurately measure the requirement of water at specific point on the farm and control the provision of watering accordingly



The Business Context and Challenges of the Customer

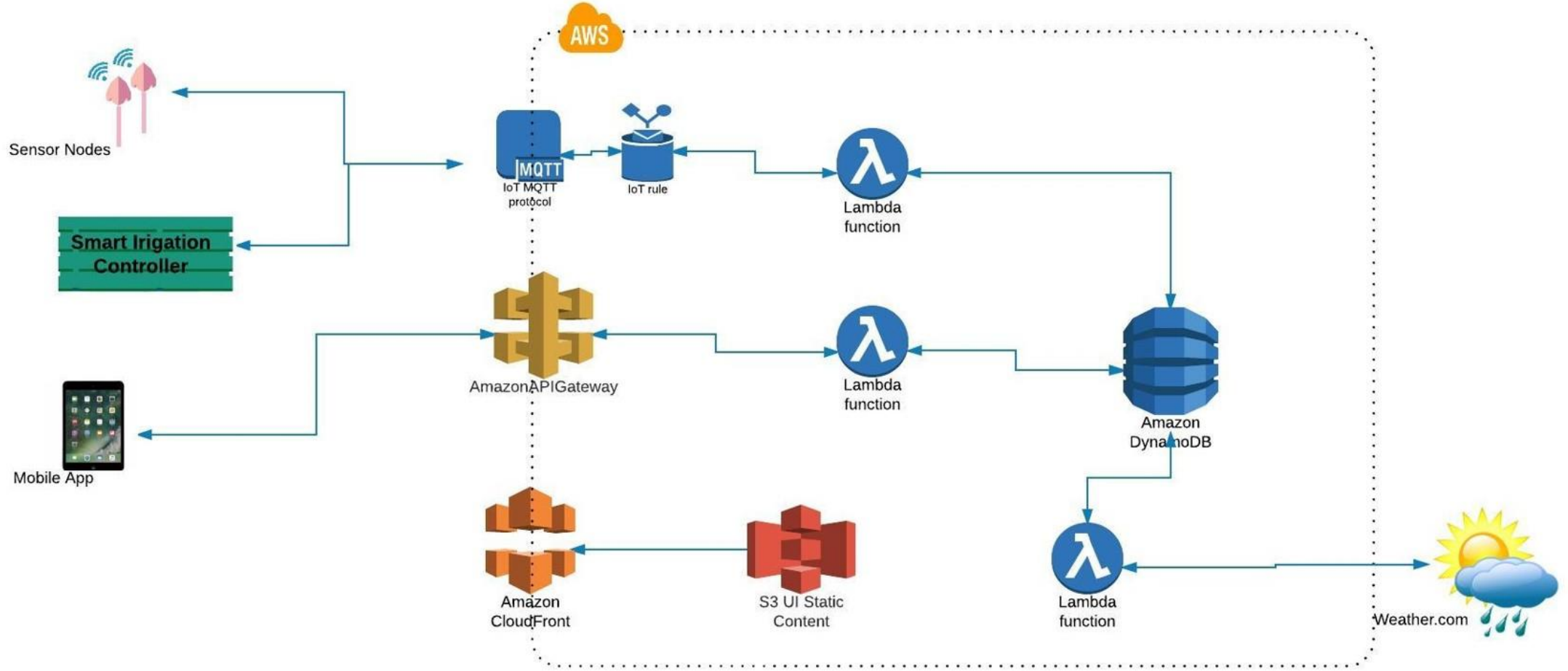
- The customer is an Ag-Tech start-up based out of North America geography. Their area of focus was on providing solutions to farm growers to optimize their water usage. Farm owners were needed a solution which can sense the water-deficit areas in a farm and water them based on the need. For which they were in the lookout of an Engineering services company to develop an IoT solution encompassing sensor nodes, cloud, and mobile apps.
- Some of their challenges were Precise control of watering based on actual needs at each part of the farm. Needs accurate measurements and control of watering accordingly
- Optimizing the sensor nodes to operate at very low power to get multi-year battery life



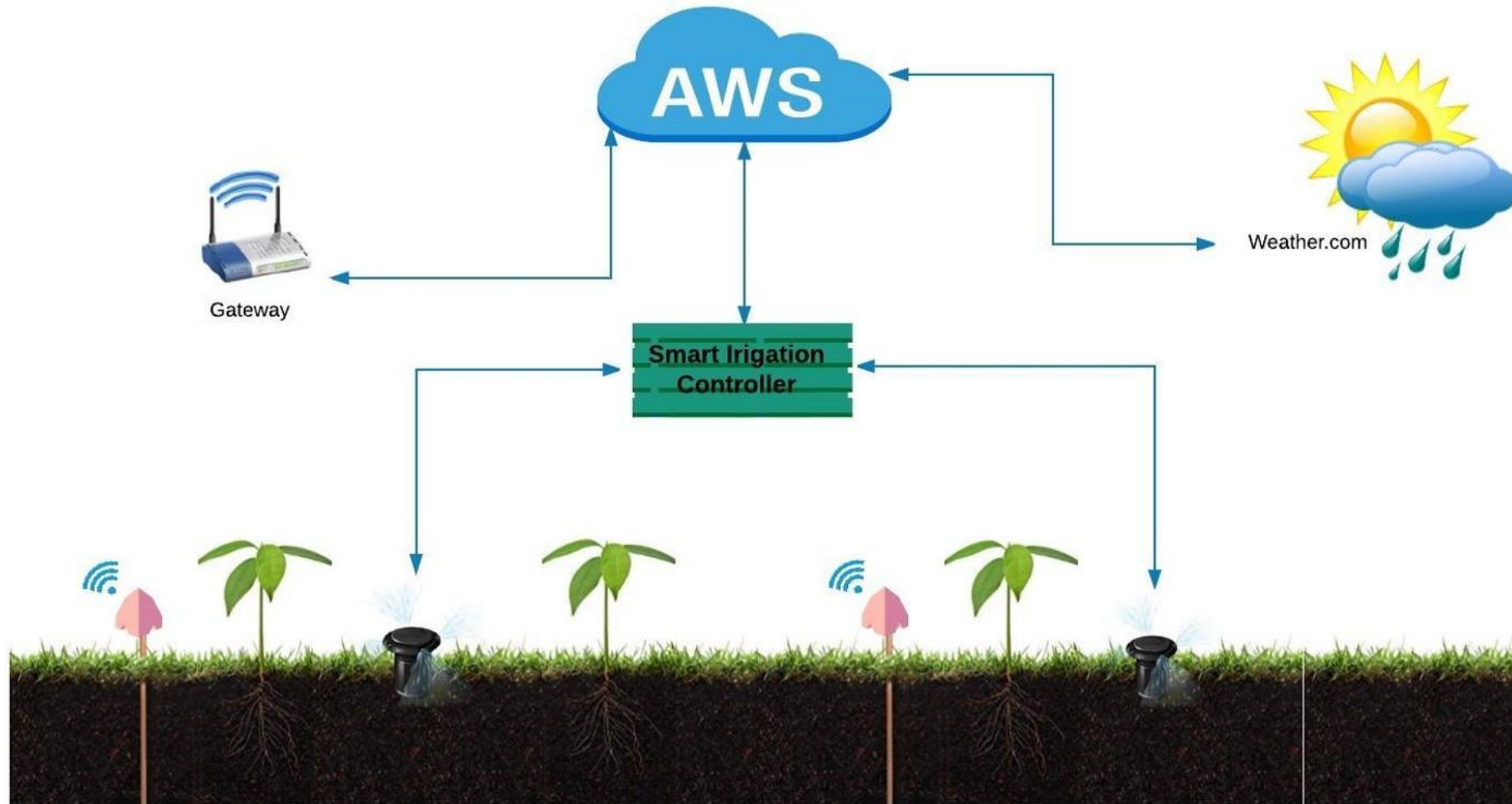
The Solution / System Description

- Gadgeon developed a fully integrated system involving WiFi enabled sensor nodes, cloud platform, and mobile apps.
- The cloud application collects sensor data and records it to a database. Based on data analysis and weather reports, the system controls the irrigation system for each zone with quantity water. The system also generates reports for users.
- Cloud server hosted in Amazon. AWS IoT is used for the MQTT interface between the cloud server and sensor nodes and irrigation controller
- API Gateway was used for integrating Mobile Apps. AWS Dynamo DB is used as the database and AWS Lambda functions are used for implementing the business logic.
- The system was integrated into a weather forecast website called weather.com to control watering based on the prediction of rain
- The system had mobile applications which create schedules for watering, set preferences using MVC architecture, real-time notifications, RESTful APIs for cloud communication which were developed by following the recommended design patterns from Apple and Google
- The Technology used included CC3200, MQTT, AWS, Restful APIs, Swift (iOS), Android App
- Sensor Mote Firmware on cc3200:
 - Integrate soil moisture, ambient light, temperature and humidity sensors to cc3200 microcontroller
 - Integrate lightweight MQTT stack to the firmware. Collect sensor readings periodically and publish it to MQTT.
 - Low power optimization. CPU in sleep mode most of the time. CPU wakes up periodically and turns the radio on to upload sensor readings.
 - AP mode for initial setup and configuration over web-based GUI.
 - OTA firmware update
 - Optimized for low power operation

The Solution-Cloud Architecture



▶ The System Overview



THANK YOU



For More Details, Let's Connect



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