

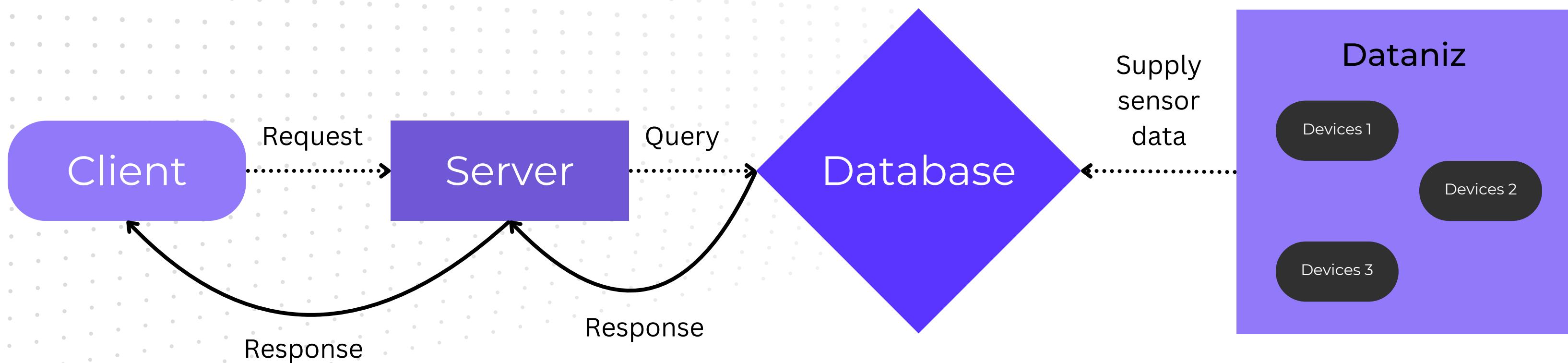
CECS 328 ASSIGNMENT 8

End-to-End IoT System

Presenters: Dante Berouty & Thomas Nguyen

System Architecture and Components

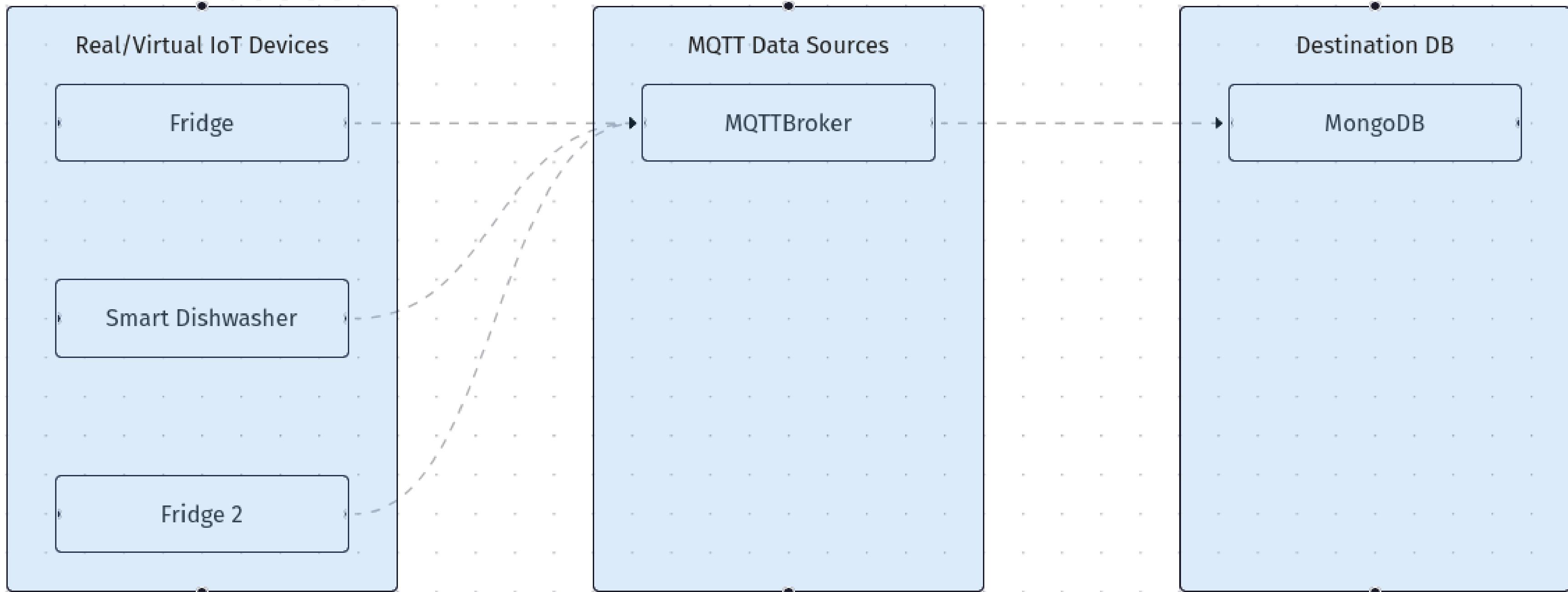
- The system is composed of a TCP Client, a TCP Server, the device system created in Dataniz, and a MongoDB database
 - Data from the sensors is supplied to the database
 - Requests are sent from the client to the server
 - The server process these requests into queries to the database
 - Correct data is retrieved, processed into imperial units, and returned to the client
- For this project, to simulate realistic client-server communication, the client and server are ran on separate virtual machines



MongoDB Overview

test								CREATE COLLECTION
Collection Name	Documents	Logical Data Size	Avg Document Size	Storage Size	Indexes	Index Size	Avg Index Size	
327Test	0	0B	0B	4KB	1	4KB	4KB	
327Test_metadata	3	3.4KB	1.13KB	36KB	1	36KB	36KB	
327Test_virtual	87908	34.87MB	416B	6.39MB	1	1.52MB	1.52MB	

Dataniz Overview



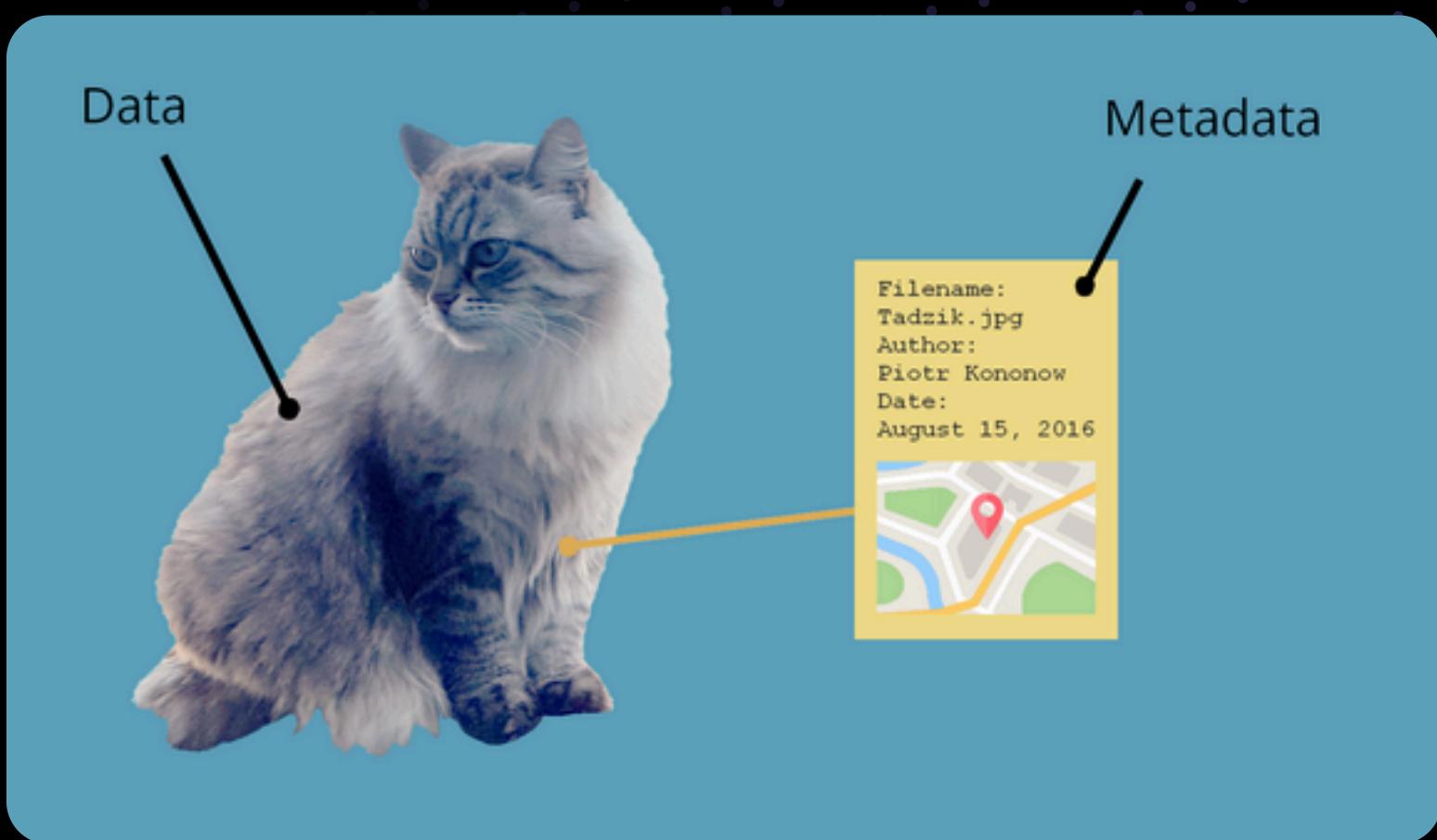
Meta Data Usage

How Metadata Was Used:

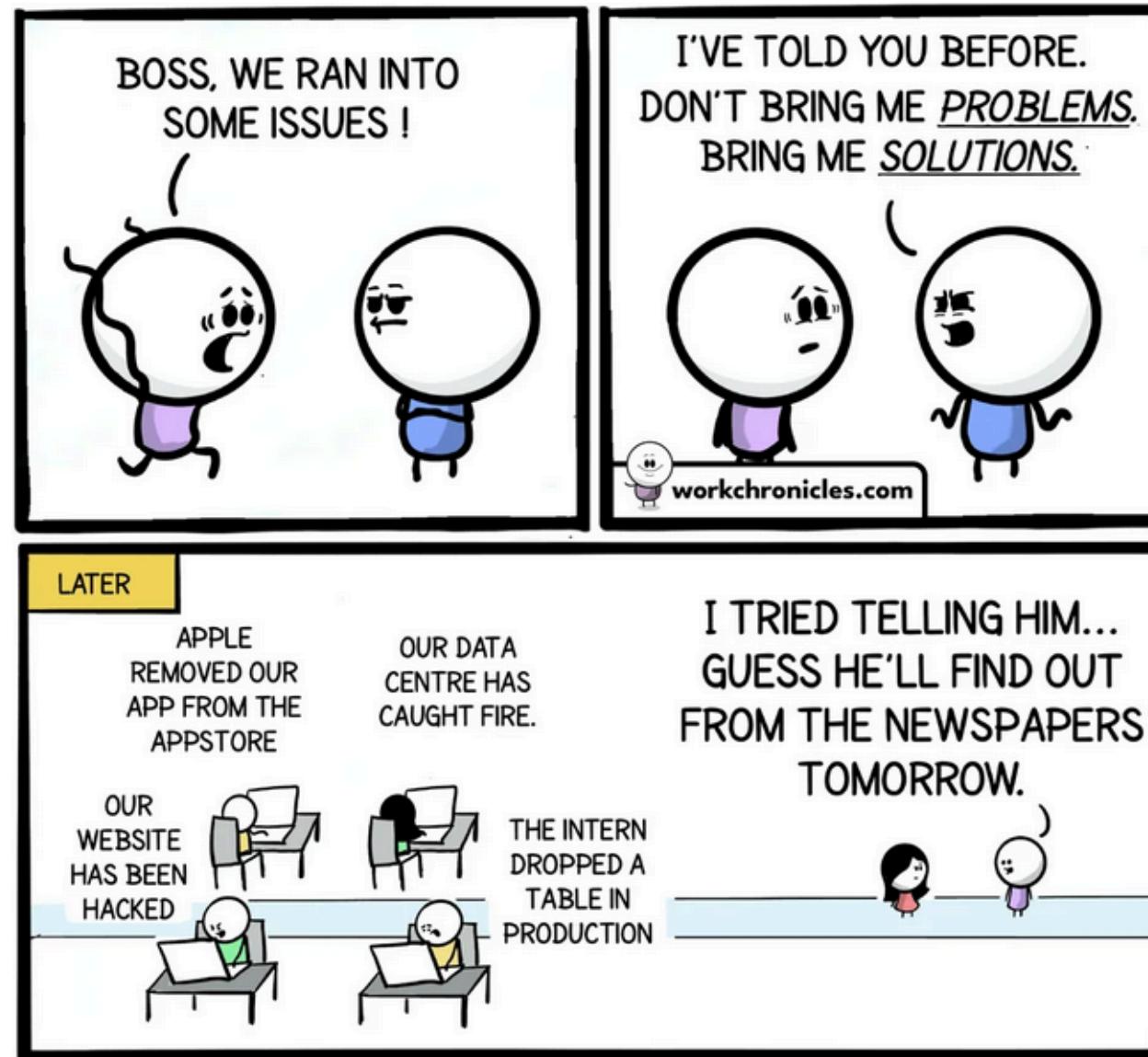
- Structured organization of devices, boards, and sensors.
- Enables dynamic device and sensor management.
- Links sensor data in the database using unique identifiers (assetUid).
- Supports unit conversions and calculations (e.g., relative humidity, liters, kWh).

Why Metadata Was Critical:

- Why Metadata Was Critical:
- Simplified the process of identifying and querying sensors dynamically.
- Made the system scalable for future devices or sensors.



Challenges And Solutions



One of the first hurdles setting up metadata for the project. After examining the structure and its parts more in depth, handling it became easier, allowing for the creation of a scalable system

Another issue was the optimization of queries using metadata.

The queries ran very slowly compared to our original hard coded approach. To fix this, we adjusted our retrieval algorithm, making it run faster.

Feedback for Dataniz

Strengths

System Readability

The platform makes it easy to create and test IoT devices and sensors.

Metadata Managing

Metadata management tools are helpful for organizing and keeping track of devices.

Data Generation and Visualization

Generate and view visualization tool is easy to understand.

Areas to Improve

Board, Sensor, and Device Editing

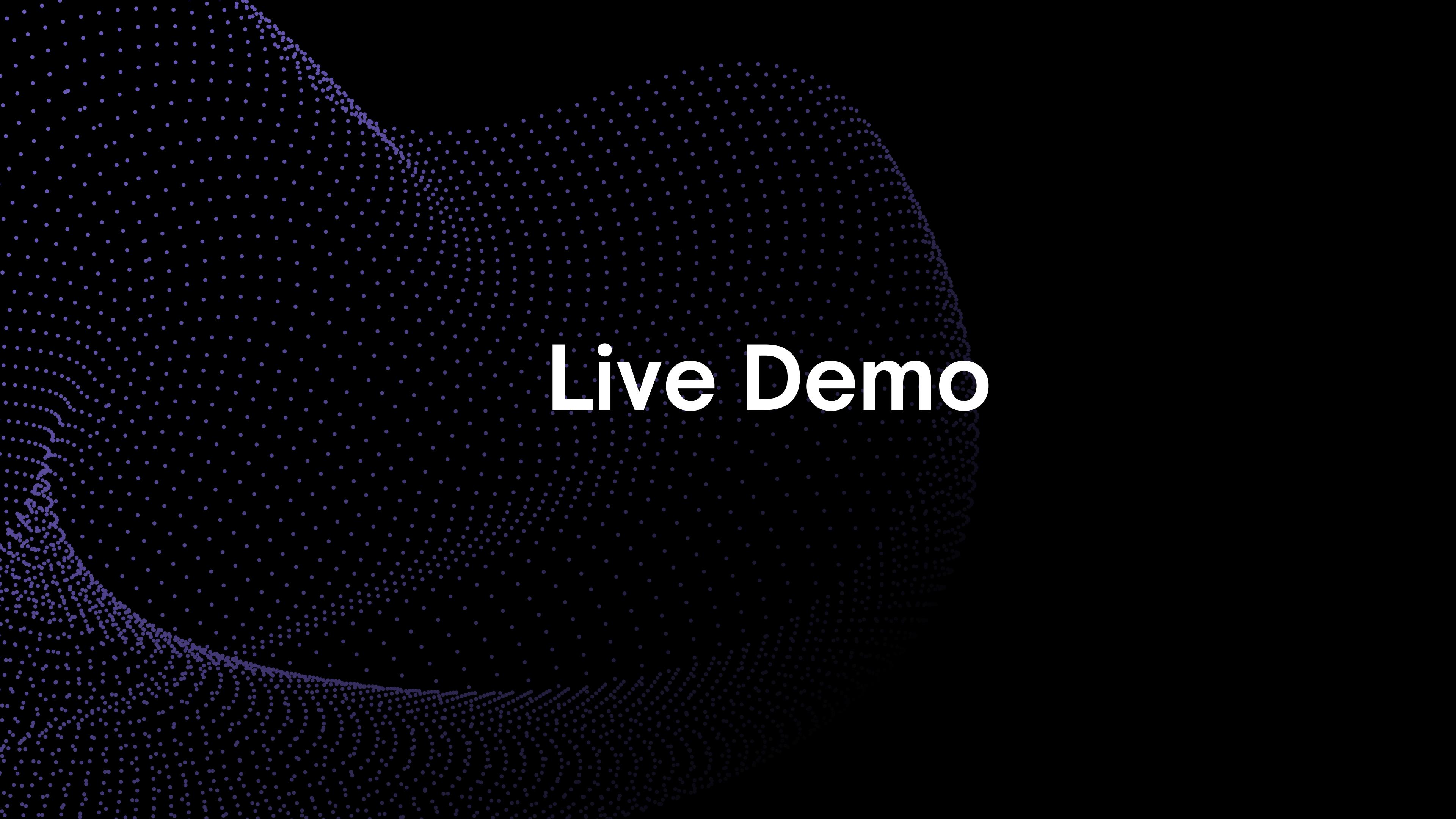
Allow for easier updating of boards, sensors, and devices. Once created, they can be tedious to edit

Metadata Deletion

You can't delete metadata once it's created, which can cause confusion when viewing it

Location Accuracy

Longitude and latitude only takes in integers. Changing it to floats would make a much more realistic system.



Live Demo

Conclusion

- For the project at hand, metadata was used in order to direct queries to the correct sensor data
- Challenges were addressed by mapping, validating, and use of conversions
- From here, further improvements can be made by developing the metadata usage in order to implement a more robust querying system