

# Assignment 8: Build an End-to-End IoT System

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# Using Metadata to enhance our project

- Using device IDs allowed us to uniquely identify devices which could then use specific queries based on the unique device.
- We also used units and proper measurements in order to obtain the correct results.
- Using proper time zones also allowed us to obtain correct query results.

```
Select a query:
1: Average moisture inside the fridge in the last 3 hours
2: Average water consumption per dishwasher cycle
3: Device with the highest electricity consumption
Type 'exit' to close the client

Enter your choice (1, 2, 3, or exit): 3
Response from server: Smart Fridge consumed the most electricity with 9.00 kWh
```

# Metadata not used

- We did not need to use some metadata like timestamps because we just needed the values themselves to perform calculations according to query.
- Including this metadata could possibly increase the time it takes to index and make things more difficult than it needs to be.

```
Select a query:
1: Average moisture inside the fridge in the last 3 hours
2: Average water consumption per dishwasher cycle
3: Device with the highest electricity consumption
Type 'exit' to close the client

Enter your choice (1, 2, 3, or exit): 2
Response from server: Average water consumption per cycle: 12.50 gallons
```

# Challenges

- Using MongoDB's methods to retrieve data.
  - Solution: Google what methods to use.
- Query operators for filtering data.
  - Solution: Looking up MongoDB manual to see what kind of query selectors are available.
- Ensured use of proper query operations to guarantee relevant sensor data. Also converting results to imperial units for consistency.
  - Solution: Use device id, unit conversion, and data validation to check for valid data before performing calculations.

```
_id: ObjectId('6758dc734d14b25412848d4a')
* payload: Object
  parent_asset_uid: "device2"
  timestamp: 1672531200
  Water_consumption_sensor_DW: 12.5
```

```
_id: ObjectId('6758dc734d14b25412848d4b')
* payload: Object
  parent_asset_uid: "device3"
  timestamp: 1672531200
  Electricity_Consumption: 3.4
```

# Feedback

- Dataniz helped us gain a deeper understanding of IoT concepts and provided a realistic environment to gain experience with virtual boards, sensors, data links, and managing metadata.
- This hands-on project helped simulate how data flows from virtual hardware to a database.

