Individual Weekly Report

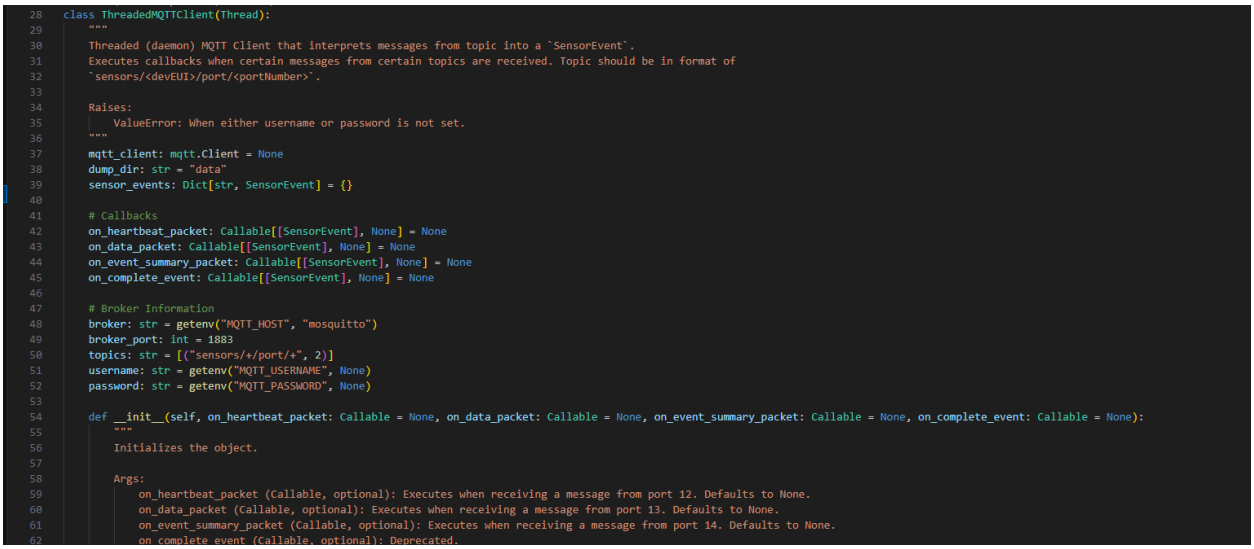
Name: Alex Kearney
Team: Bray IIoT Smart Solution
Date: 3/31/2025

Current Status

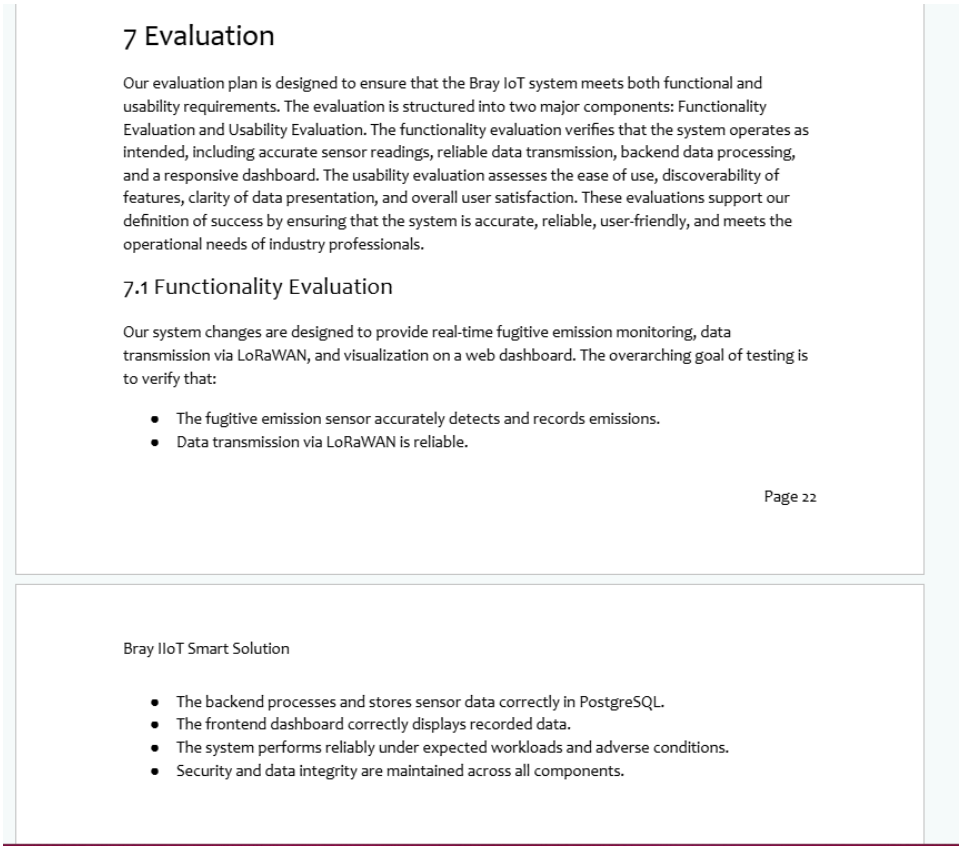
1. What did you **personally** work on this past week?

Task	Status	Time Spent
MQTT Configuration	In Progress	~1 hour
Report modifications	In Progress	~1 hour
Report: Evaluation Plan	Done	~2 hours

Include **screenshots/graphics** to illustrate what you did this past week:



```python
class ThreadedMQTTClient(Thread):
    """
    Threaded (daemon) MQTT Client that interprets messages from topic into a `SensorEvent`.
    Executes callbacks when certain messages from certain topics are received. Topic should be in format of
    `sensors/<devEUI>/port/<portNumber>`.

    Raises:
        ValueError: When either username or password is not set.
    """
    mqtt_client: mqtt.Client = None
    dump_dir: str = "data"
    sensor_events: Dict[str, SensorEvent] = {}

    # Callbacks
    on_heartbeat_packet: Callable[[SensorEvent], None] = None
    on_data_packet: Callable[[SensorEvent], None] = None
    on_event_summary_packet: Callable[[SensorEvent], None] = None
    on_complete_event: Callable[[SensorEvent], None] = None

    # Broker Information
    broker: str = getenv("MQTT_HOST", "mosquitto")
    broker_port: int = 1883
    topics: str = [("sensors/+/port/+", 2)]
    username: str = getenv("MQTT_USERNAME", None)
    password: str = getenv("MQTT_PASSWORD", None)

    def __init__(self, on_heartbeat_packet: Callable = None, on_data_packet: Callable = None, on_event_summary_packet: Callable = None, on_complete_event: Callable = None):
        """
        Initializes the object.

        Args:
            on_heartbeat_packet (Callable, optional): Executes when receiving a message from port 12. Defaults to None.
            on_data_packet (Callable, optional): Executes when receiving a message from port 13. Defaults to None.
            on_event_summary_packet (Callable, optional): Executes when receiving a message from port 14. Defaults to None.
            on_complete_event (Callable, optional): Deprecated.
```



7 Evaluation

Our evaluation plan is designed to ensure that the Bray IoT system meets both functional and usability requirements. The evaluation is structured into two major components: Functionality Evaluation and Usability Evaluation. The functionality evaluation verifies that the system operates as intended, including accurate sensor readings, reliable data transmission, backend data processing, and a responsive dashboard. The usability evaluation assesses the ease of use, discoverability of features, clarity of data presentation, and overall user satisfaction. These evaluations support our definition of success by ensuring that the system is accurate, reliable, user-friendly, and meets the operational needs of industry professionals.

7.1 Functionality Evaluation

Our system changes are designed to provide real-time fugitive emission monitoring, data transmission via LoRaWAN, and visualization on a web dashboard. The overarching goal of testing is to verify that:

- The fugitive emission sensor accurately detects and records emissions.
- Data transmission via LoRaWAN is reliable.

Page 22

Bray IIoT Smart Solution

- The backend processes and stores sensor data correctly in PostgreSQL.
- The frontend dashboard correctly displays recorded data.
- The system performs reliably under expected workloads and adverse conditions.
- Security and data integrity are maintained across all components.

2. What problems did you run into? What is your plan for them?
   We have overcome all major obstacles, and we plan on finishing the working version this week

3. What is the current overall project status from your perspective?
   The project is behind, but we have made significant progress.

4. How is your team functioning from your perspective?
   The team's communication has improved overall, and everyone wants to finish the working version.

5. What new ideas did you have or skills did you develop this week?
   I got more experience using the legacy code and learned more about MQTT.

6. Who was your most awesome team member this week and why?
   Matthew has been putting in good work and connected the LoRa gateway to the backend database.

Plans for Next Week

What are you going to work on this next week?

- Modify and update the Project Report
- Evaluation Plan Project Report
- MQTT Configuration