Proposal for Enhanced RFID and Data Management System

Company: Cachengo
Participants: Meredith, Caleb, Thel, Donald

Project Overview

The objective of this project is to prototype and implement an innovative system that integrates RFID technology with Sirqul's Edysen mesh network. This system aims to improve object tracking, manage large volumes of data effectively, and address critical challenges such as theft prevention and scalability. The focus will be on gathering, correlating, and utilizing data streams from both RFID and Edysen systems, while maintaining efficient database management.

Key Objectives

1. **Integration of RFID and Edysen Systems:**

- Leverage RFID to track tagged items and Edysen to track connected devices.

- Establish a seamless correlation between the data streams from these two systems.

2. **Data Acquisition and Storage:**

- Prototype a mechanism to gather all relevant data from RFID and Edysen with no NULL values.

- Design a database architecture capable of handling correlated data streams efficiently.

3. **Scalability and Adaptability:**

- Create a system that can scale to various retail layouts and inventory volumes.

- Ensure flexibility for future technological advancements or additional integrations.

4. **Enhanced Security and Theft Prevention:**

- Develop mechanisms to detect and prevent theft, even in cases where RFID tags are damaged or missing.

- Use data analytics to identify theft patterns and intent.

5. **Collaboration and Communication:**

- Maintain clear and consistent communication with Thel and other stakeholders to ensure project alignment.

Constraints

1. **Data Correlation Challenges:**

- The data outputs from RFID and Edysen are distinct and must be effectively integrated into a unified system.

2. **Scalability Requirements:**

- The database must handle high data volumes while maintaining real-time performance.

3. **Prototyping Limitations:**

- The initial prototype may need iterative improvements as new insights are gathered during implementation.

4. **Tag Issues:**

- RFID tag damage or absence may require alternative tracking methods, such as object fingerprinting or camera systems.

Proposed Approach

1. **Step 1: Data Gathering**

- Research and define the data outputs from RFID and Edysen systems.

- Develop a system prototype to capture and consolidate these data streams into a unified pipeline.

2. **Step 2: Data Storage**

- Use tools like Elroy to ensure comprehensive data capture with no NULL values.

- Build a robust, scalable database architecture to manage the correlated data streams.

3. **Step 3: Data Utilization**

- Develop analytics tools and strategies for actionable insights, such as real-time tracking and theft detection.

- Ensure the system supports seamless integration with existing POS systems.

Systems

1. **RFID System:**

- Tracks tagged objects at the store level.

- Generates data used for inventory management and theft detection.

2. **Sirqul's Edysen:**

- Tracks devices through a mesh network of multiple nodes.

- Provides a "fingerprinting" system to monitor objects and expand coverage without tracking individuals.

3. **Database Architecture:**

- A scalable, real-time system designed to store and manage data from RFID and Edysen systems.

- Tools like Lucid Chart, Turso, and LibSQL may be used to design and implement the architecture.

4. **Elroy Data Management Tool:**

- Captures all data streams with no NULL values to ensure data integrity.

Conclusion

This project will prototype a scalable, integrated tracking system that combines RFID and Edysen technologies to address existing limitations in inventory tracking and theft prevention. By focusing on effective data acquisition, management, and utilization, Cachengo can enhance operational efficiency and prepare for future expansions.

We look forward to developing this system and collaborating to achieve these objectives.