

MICHIGAN STATE

UNIVERSITY

Project Plan Presentation

Branch Pick Up Lockers

The Capstone Experience

Team MSUFCU

Rida Mahmood
David Kuehn
Lucas Fankhauser
Abdulla Alblooshi
Will Morant

Department of Computer Science and Engineering
Michigan State University

Fall 2024



*From Students...
...to Professionals*

Project Sponsor Overview

- Credit Union based in East Lansing
- Comprehensive personalized financial services
- Committed to integrity, service, and community collaboration



Project Functional Specifications

- Members find it hard to visit branches to pick up items during business hours
- Branch Locker System to store items
- Allow members to easily place orders
- Empower employees to easily manage orders
- Generate one-time passcodes
- Notify members when their order is ready for pickup

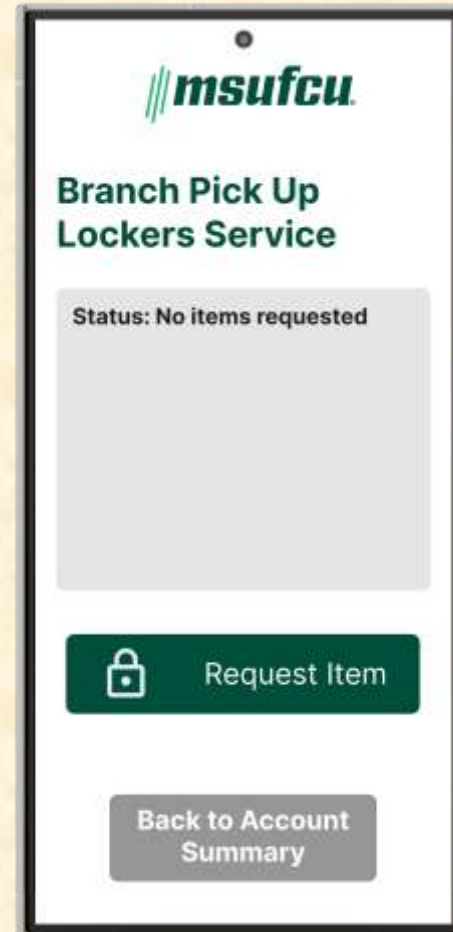
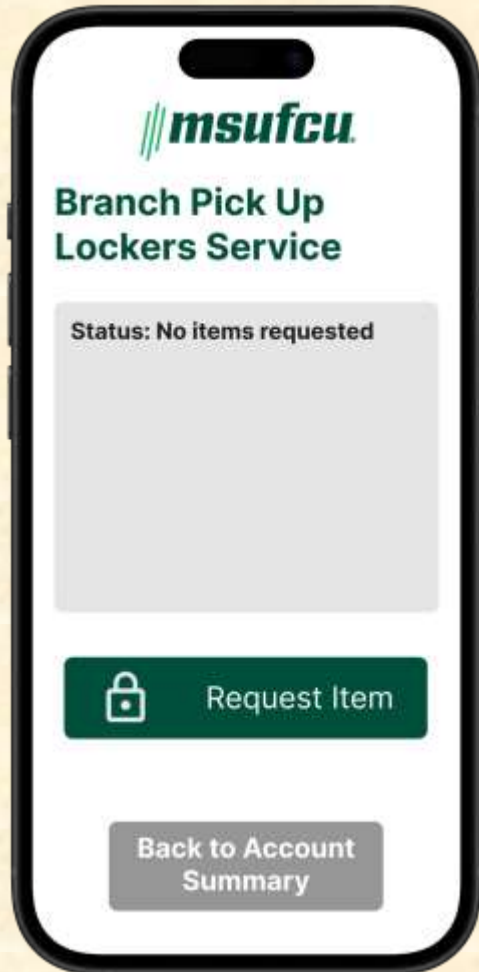


Project Design Specifications

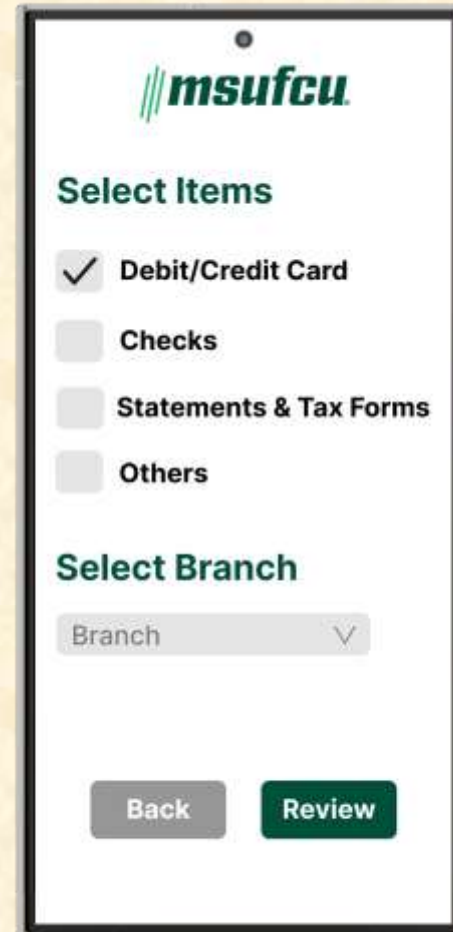
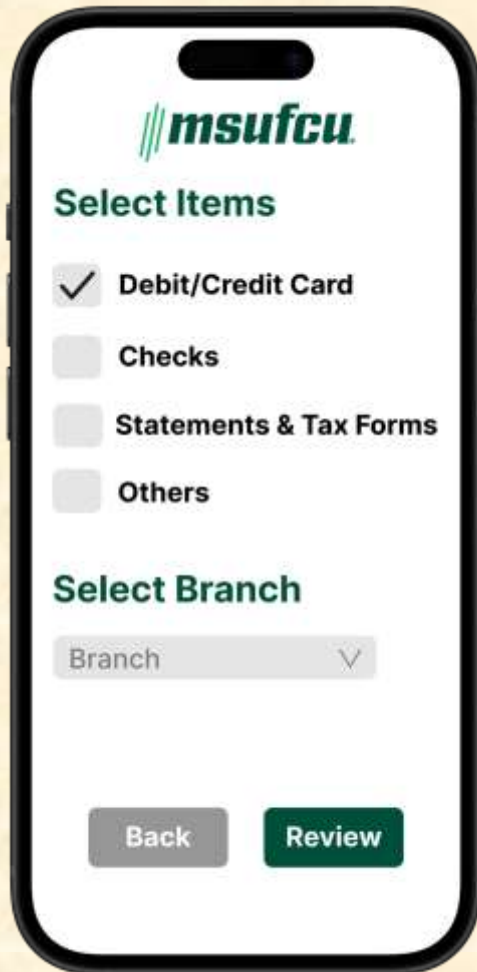
- Member facing mobile apps
 - Easy to use, place orders fast
- Employee facing web app
 - Easily track orders
- Secure lockers that use one-time passcodes
- Communication servers for locks and apps



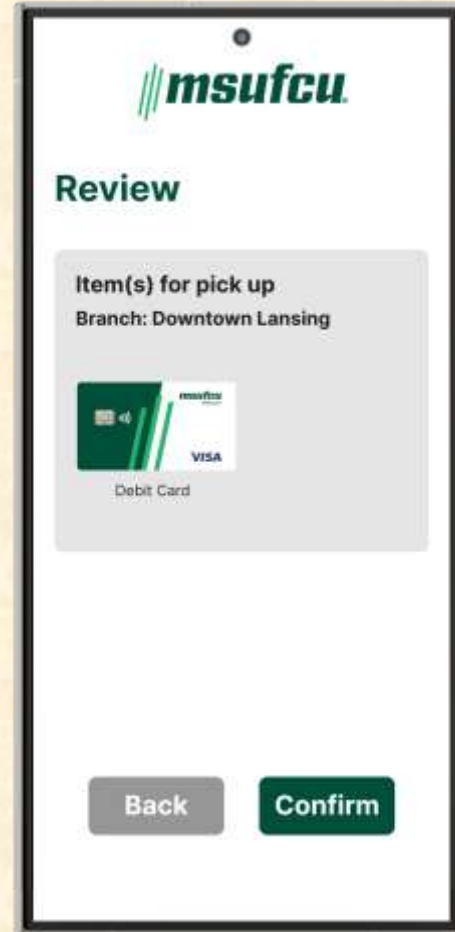
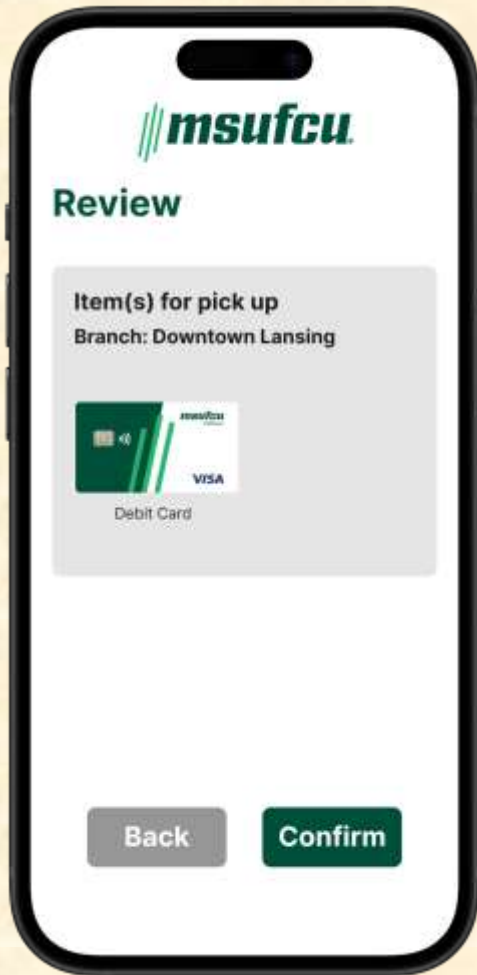
Landing Page



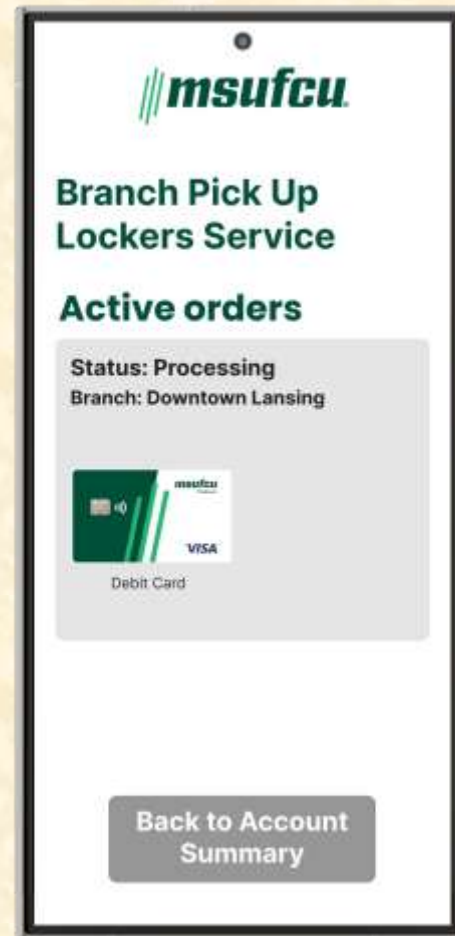
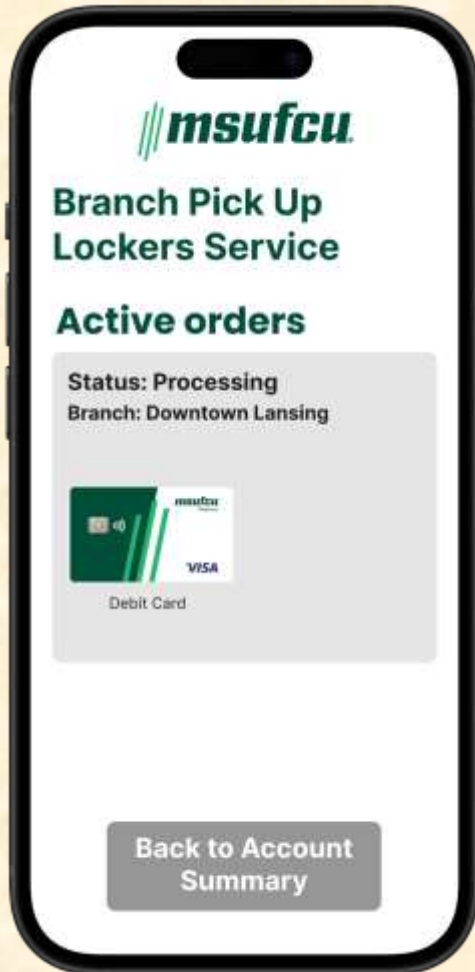
Request Item Page



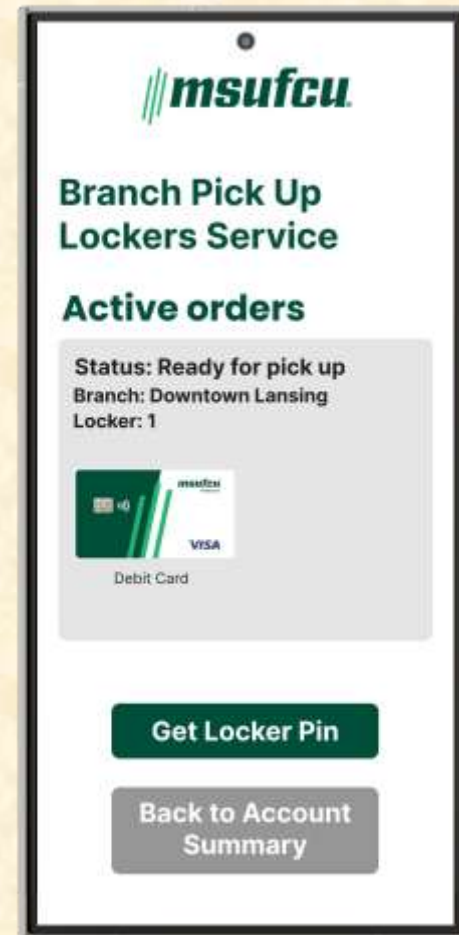
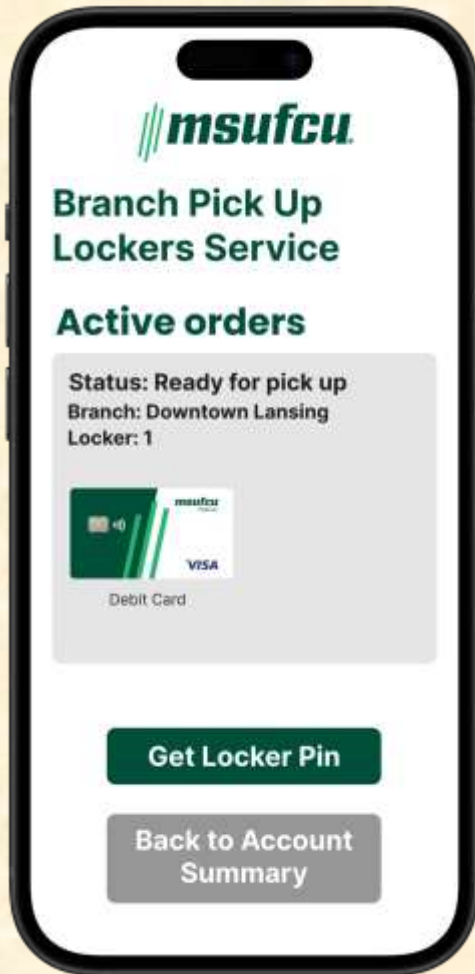
Review Item(s) Page



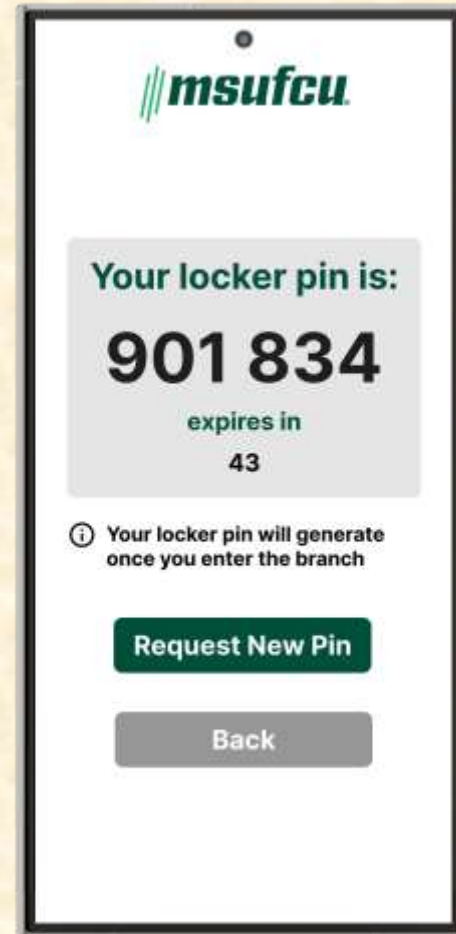
Landing with Processing Order Page



Landing with Ready for Pick Up Page



Locker Pin Page



Employee Page

The screenshot displays the MSUFCU website interface. At the top, the URL 'msufcu.org' is visible. The main header features the MSUFCU logo and navigation tabs for 'Queue', 'All Requests', and 'Completed'. Below the header is a search bar. The main content area is divided into two panels. The left panel shows a list of 10 requests, with the first one, '1. Walter White', highlighted. The right panel provides a detailed view of 'Walter White's Order', showing two items: 'Item 1 Credit Card' and 'Item 2 Checkbook'. At the bottom right of the right panel are 'Cancel' and 'Fill Order' buttons.

msufcu.org

msufcu Queue | All Requests | Completed
MSU FEDERAL CREDIT UNION

1. Walter White

2. Jesse Pinkman

3. Saul Goodman

4. Hector Salamanca

5. Gustavo Fring

6. Hank Schrader

7. Mike Ehrmantraut

8. Skyler White

9. Ted Beneke

10. Walter White Jr.

Walter White's Order

Item 1
Credit Card

Item 2
Checkbook

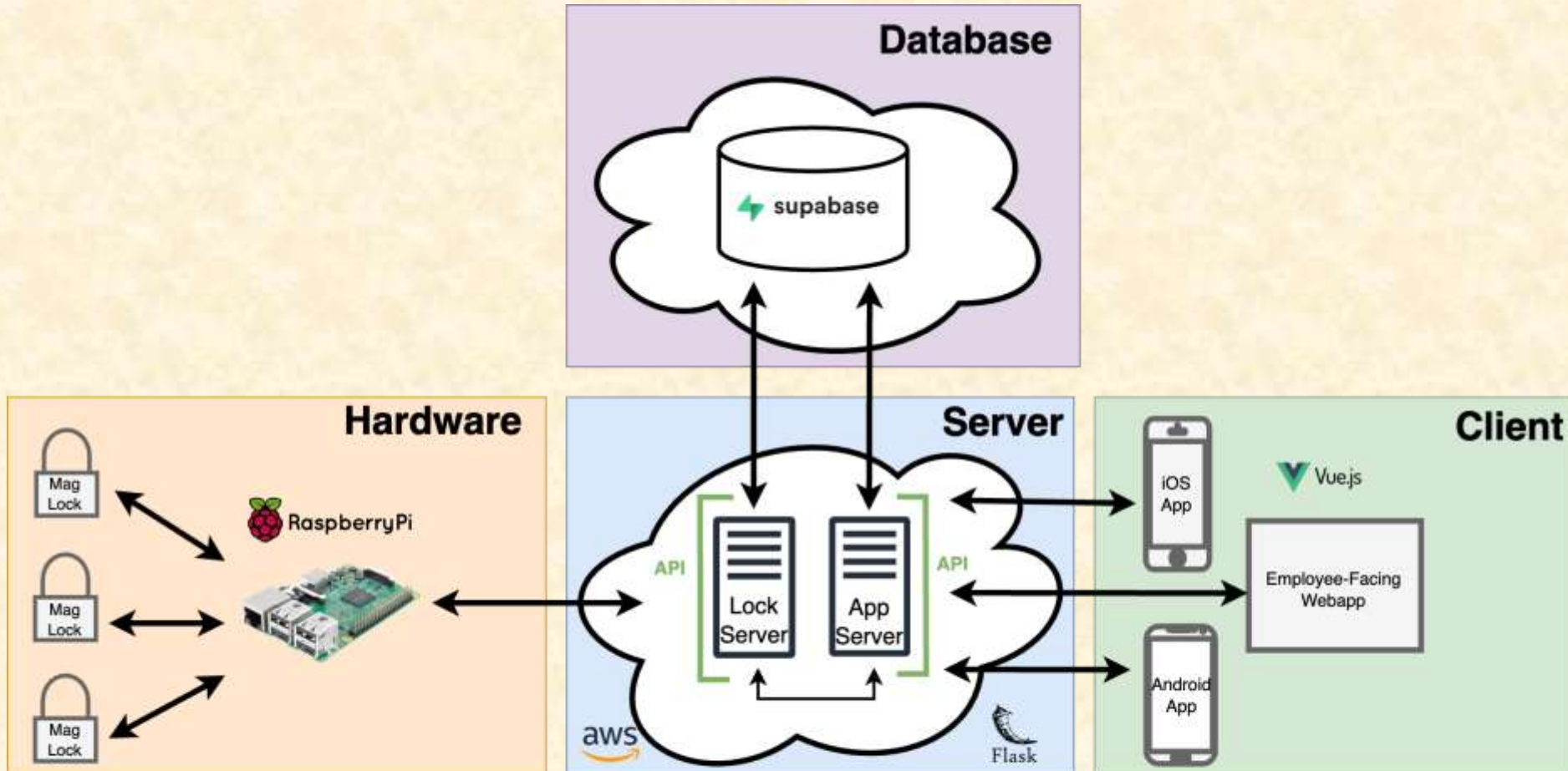
Cancel Fill Order

Project Technical Specifications

- Client
 - Members
 - ❖ iOS
 - ❖ Android
 - Employees
 - ❖ Webapp
- Hardware
 - Raspberry Pi
 - Mag locks
- Servers
 - App server
 - Lock server



Project System Architecture



Project System Components

- Hardware
 - Raspberry Pi
 - Maglocks
 - Relay modules
 - Power adapter
 - Pin pad

- Software Platforms / Technologies
 - AWS EC2
 - Vue.js
 - Flask
 - Supabase (PostgreSQL)



Project Risks

- Lock Hardware
 - Challenges in ensuring effective communication between our magnetic locks and applications.
 - Implement a Raspberry Pi as a communication layer between the locks and the applications
- Security Risks of OTPs
 - How do we make the lockers secure against password hacking
 - To prevent password guessing and brute forcing, a 6-digit OTP will be generated that is only valid for 5 minutes, making brute forcing nearly impossible
- Consistency across platforms
 - Different development environments could lead to inconsistencies in the mobile applications
 - A single API serves communication between all of the applications



Questions?

?

?

?

?

?

?

?

?

?

