MICHIGAN STATE
UNIVERSITY

Project Plan

Greenfields Labs SHARED Locker System

The Capstone Experience

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From Students…
…to Professionals

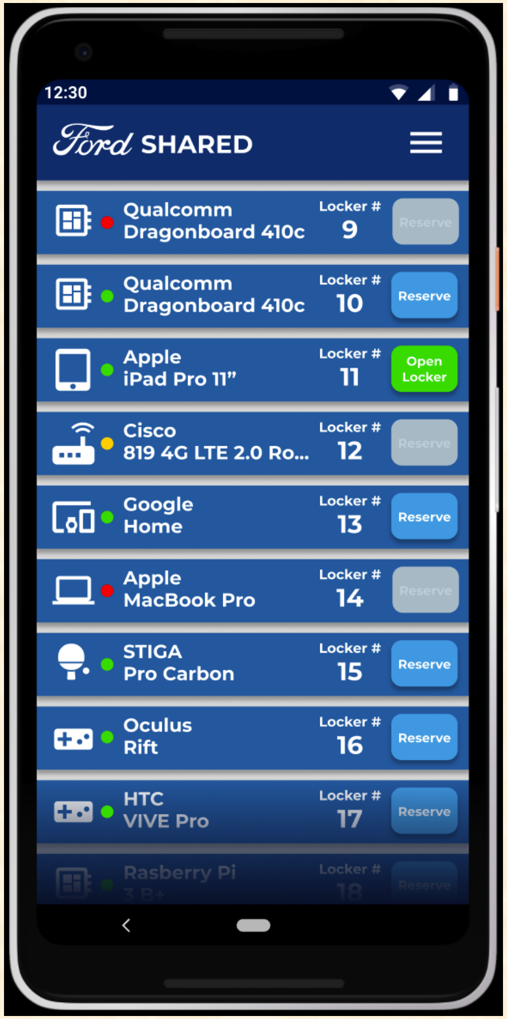
Functional Specifications

- Cross platform app Android/iOS/Web
- Check-in/check-out locker items
- RGB led status indicator
- Automated locker unlock
- Showcase items in locker
- Support for multiple lockers
- Admin metrics

Design Specifications

- Cross-platform
- Event-driven
- Containerized
- Restful Microservice Driven

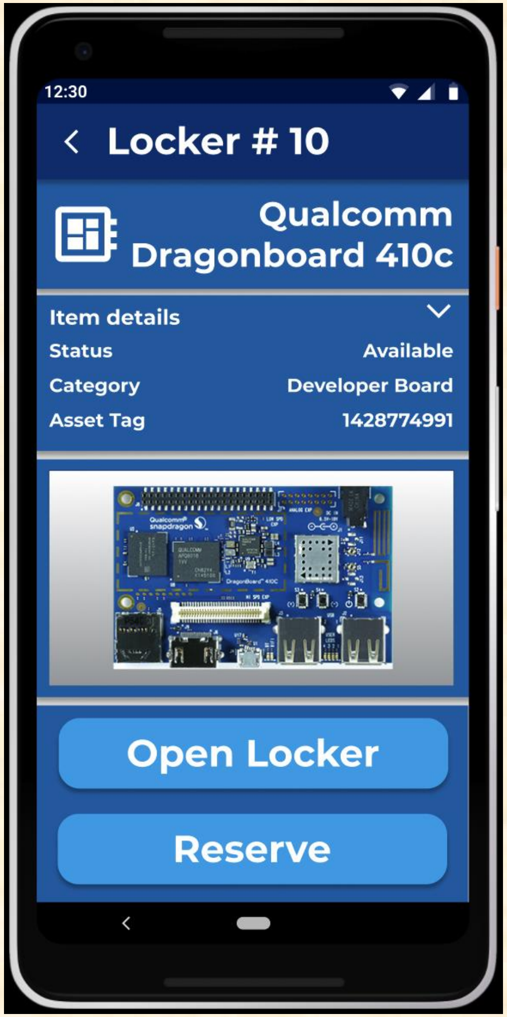
Screen Mockup: Mobile App



12:30

Ford SHARED

Qualcomm Dragonboard 410c	Locker # 9	Reserve
Qualcomm Dragonboard 410c	Locker # 10	Reserve
Apple iPad Pro 11”	Locker # 11	Open Locker
Cisco 819 4G LTE 2.0 Ro...	Locker # 12	Reserve
Google Home	Locker # 13	Reserve
Apple MacBook Pro	Locker # 14	Reserve
STIGA Pro Carbon	Locker # 15	Reserve
Oculus Rift	Locker # 16	Reserve
HTC VIVE Pro	Locker # 17	Reserve
Rasberry Pi 3 B+	Locker # 18	Reserve



12:30

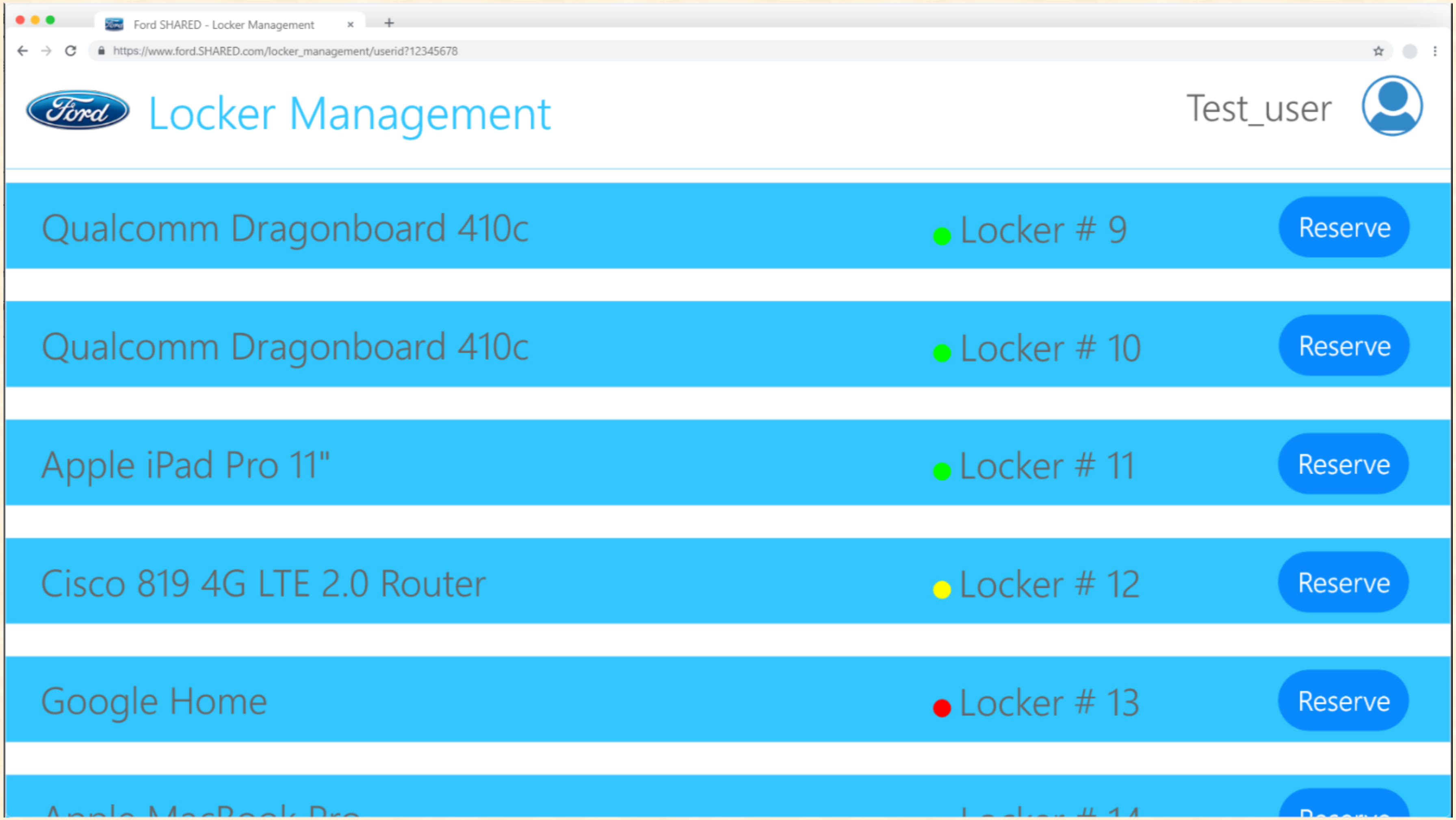
Locker # 10

Qualcomm Dragonboard 410c

Item details

Status	Available
Category	Developer Board
Asset Tag	1428774991

Screen Mockup: Web Locker Management



Ford SHARED - Locker Management

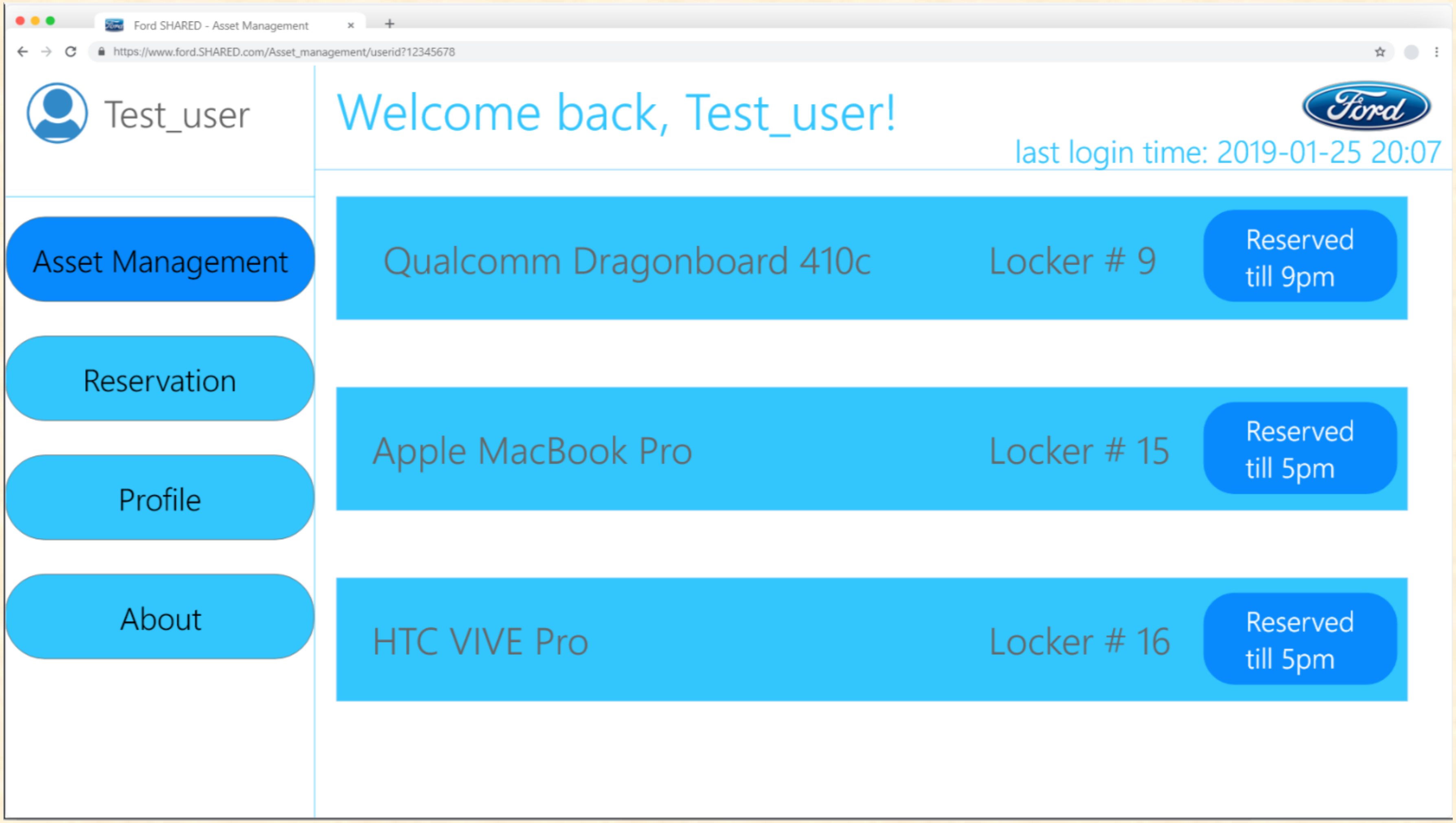
https://www.ford.SHARED.com/locker_management/userid?12345678

Locker Management

Test_user

Qualcomm Dragonboard 410c	🟢 Locker # 9	Reserve
Qualcomm Dragonboard 410c	🟢 Locker # 10	Reserve
Apple iPad Pro 11"	🟢 Locker # 11	Reserve
Cisco 819 4G LTE 2.0 Router	🟡 Locker # 12	Reserve
Google Home	🔴 Locker # 13	Reserve
Apple MacBook Pro	Locker # 14	Reserve

Screen Mockup: Web User Interface


Ford SHARED - Asset Management
https://www.ford.SHARED.com/Asset_management/userid?12345678
Test_user
Asset Management
Reservation
Profile
About

Welcome back, Test_user!

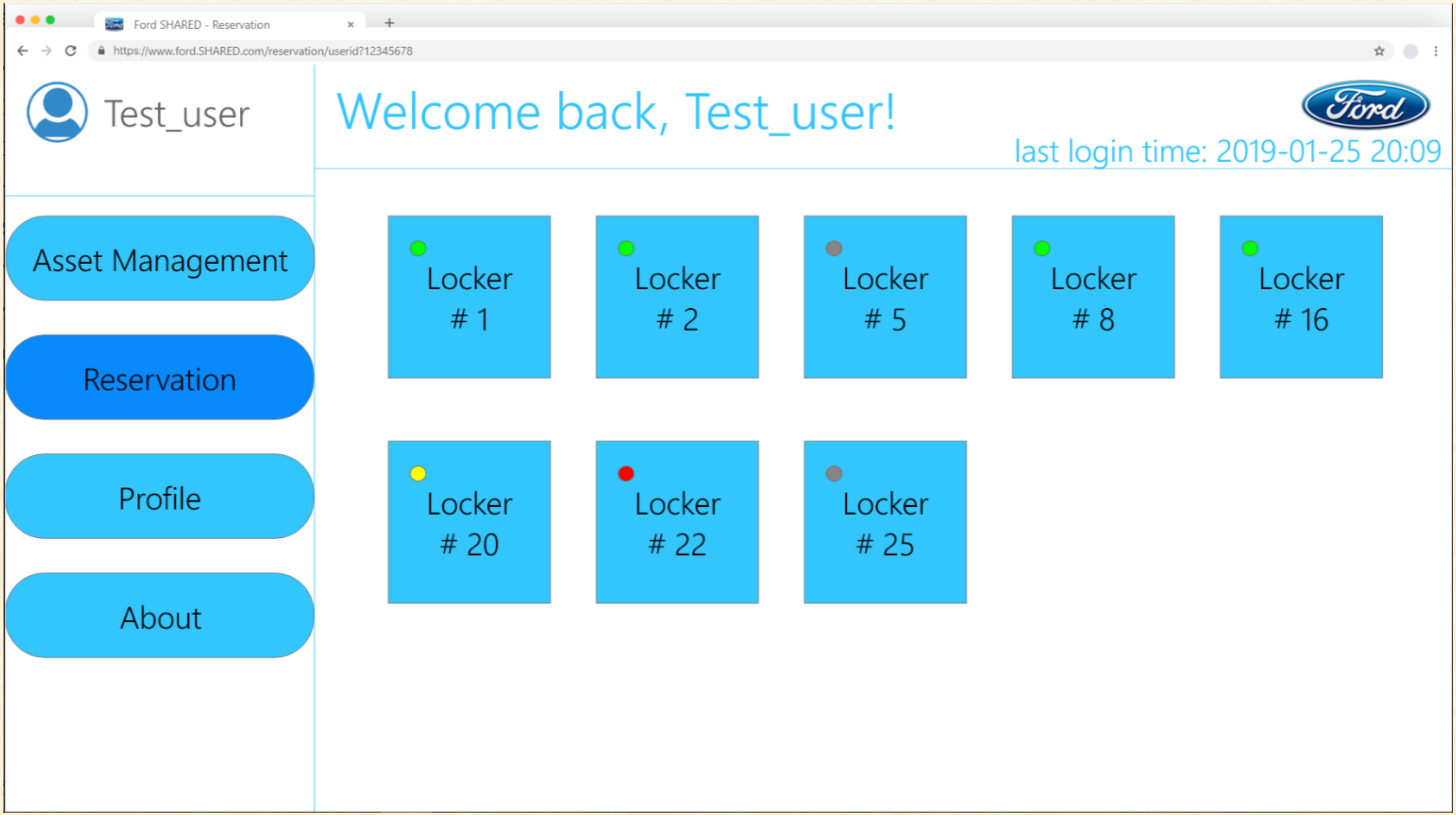
last login time: 2019-01-25 20:07

Qualcomm Dragonboard 410c Locker # 9 Reserved till 9pm

Apple MacBook Pro Locker # 15 Reserved till 5pm

HTC VIVE Pro Locker # 16 Reserved till 5pm

Screen Mockup: Web Reservations



Ford SHARED - Reservation

https://www.ford.SHARED.com/reservation/userid?12345678

Test_user

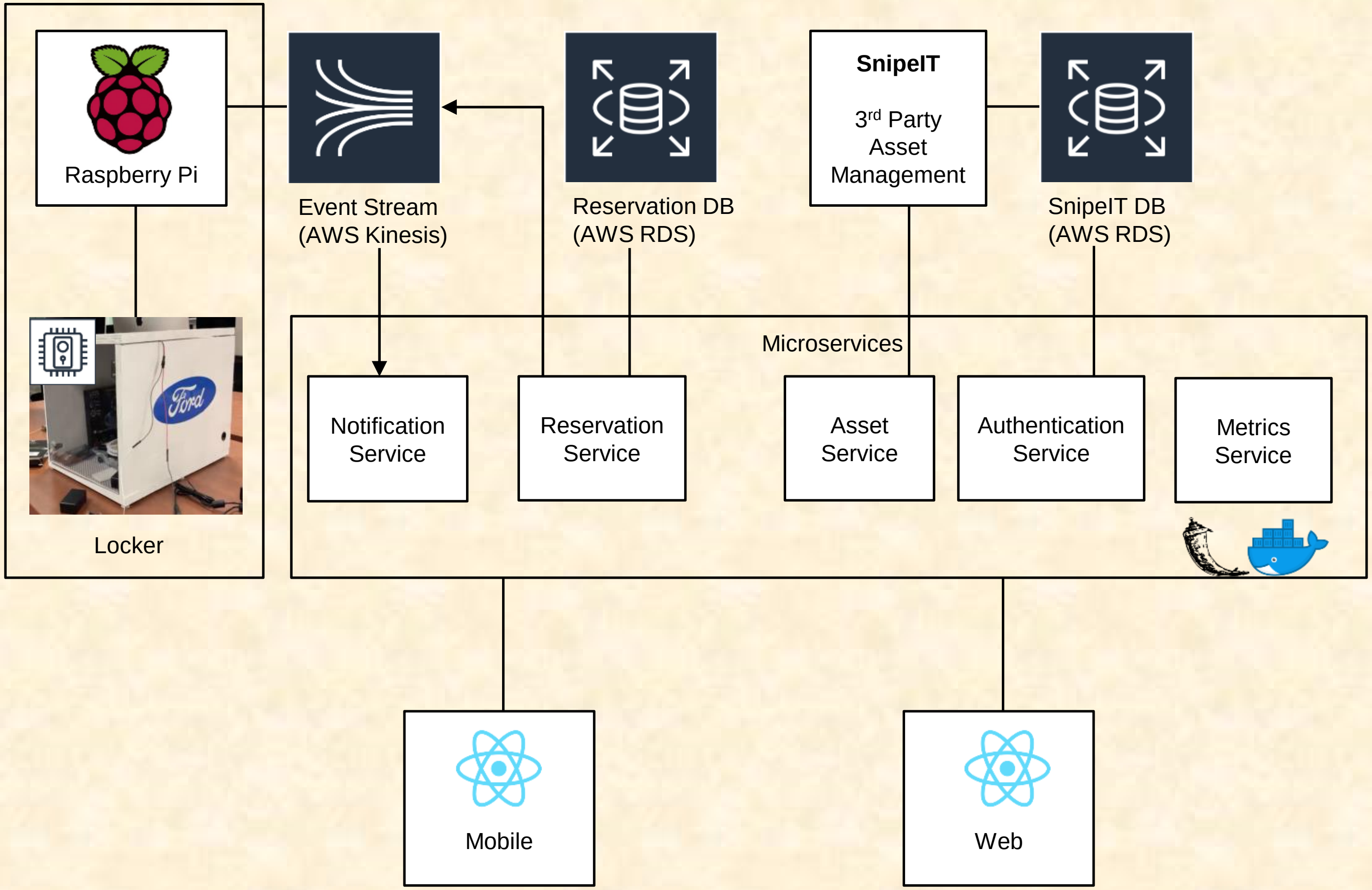
Welcome back, Test_user!

last login time: 2019-01-25 20:09

Technical Specifications

- AWS Kinesis used as Event Stream to facilitate publisher / subscriber model
- Raspberry Pi used as hub between lockers and Event Stream
- Microservices built in Flask and containerized in Docker
- Mobile and Web clients use React.js Framework

System Architecture



System Components

- Hardware Platforms
  - Raspberry PI
    - 12V electronically actuated lock
    - Arduino microcontroller
- Software Platforms / Technologies
  - React/React Native
  - Flask, Docker
  - AWS Kinesis
  - AWS RDS

Risks

Hardware

- Risk Priority: High (High probability, High impact)
- Mitigation: Working to find students with backgrounds in electrical and computer engineering.

Cross-platform Development

- Risk Priority: Medium (medium probability, medium impact)
- Mitigation: Using React and React Native for cross-platform development.

Data Loss

- Risk Priority: High (medium probability, high impact)
- Mitigation: Using Git for versioning control

Physical Damage

- Risk Priority: Low (medium probability, low impact)
- Mitigation: We have duplicates of most of the hardware and it is inexpensive and easy to order if the need arises.

Questions?

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