

**MICHIGAN STATE**  
**UNIVERSITY**

# Project Plan

## Shrink Reduction Using Blockchain Technology

### The Capstone Experience

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

# Functional Specifications

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- Develop a blockchain system to reduce shrink
- Track highly-perishable items to prevent waste
- Create an iOS and web application to access the data
- Notification system to alert users when products are close to expiration
- Dashboard to display product analytics

# Design Specifications

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- Single member network blockchain to store product information
- Access data through SQL Database
- iOS and Web App as user interfaces
- PowerBI for Web App dashboard analytics

# QR Scanner



# Search for Product

Carrier 6:42 PM

Back Search for Item Home

Order Number: \_\_\_\_\_

Name: Apples

UPC: \_\_\_\_\_

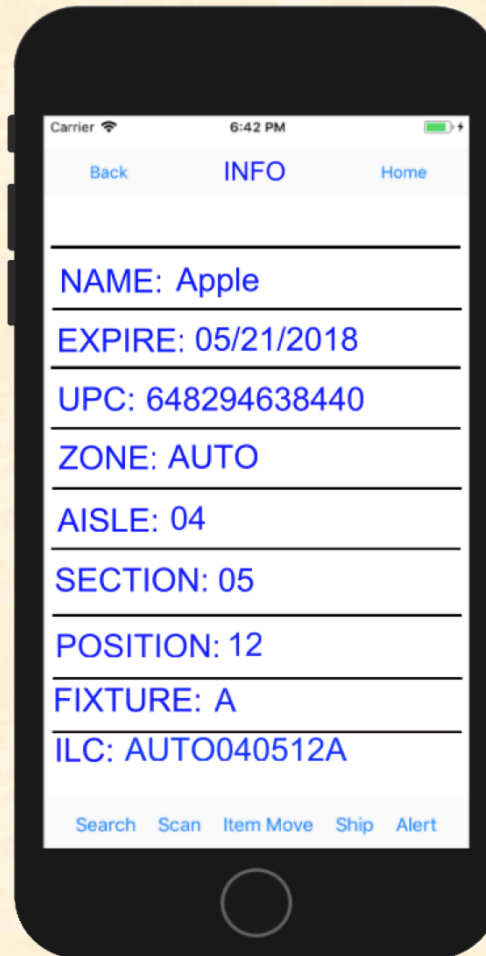
More Options

Search

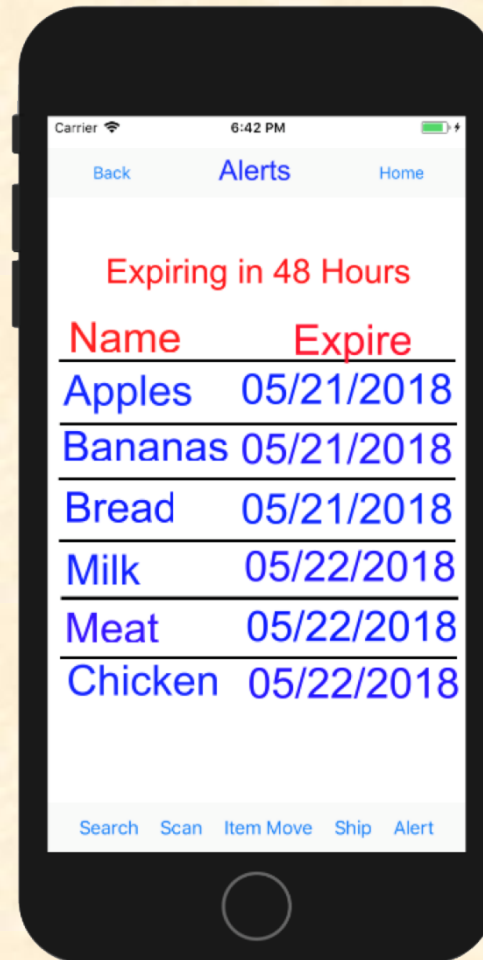
Name	Expire
Apples	05/20/2018
Apples	05/21/2018
Apples	05/21/2018

Search Scan Item Move Ship Alert

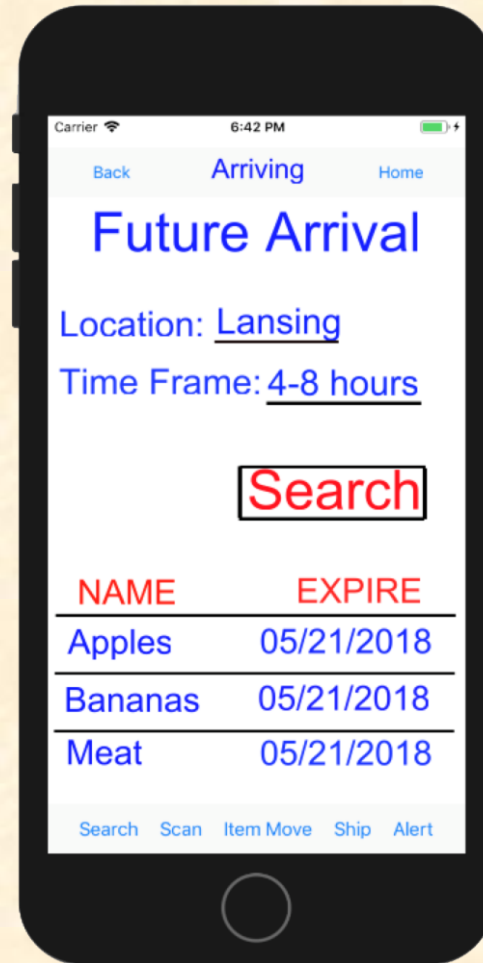
# Product Info



# Alerts



# Future Arrivals

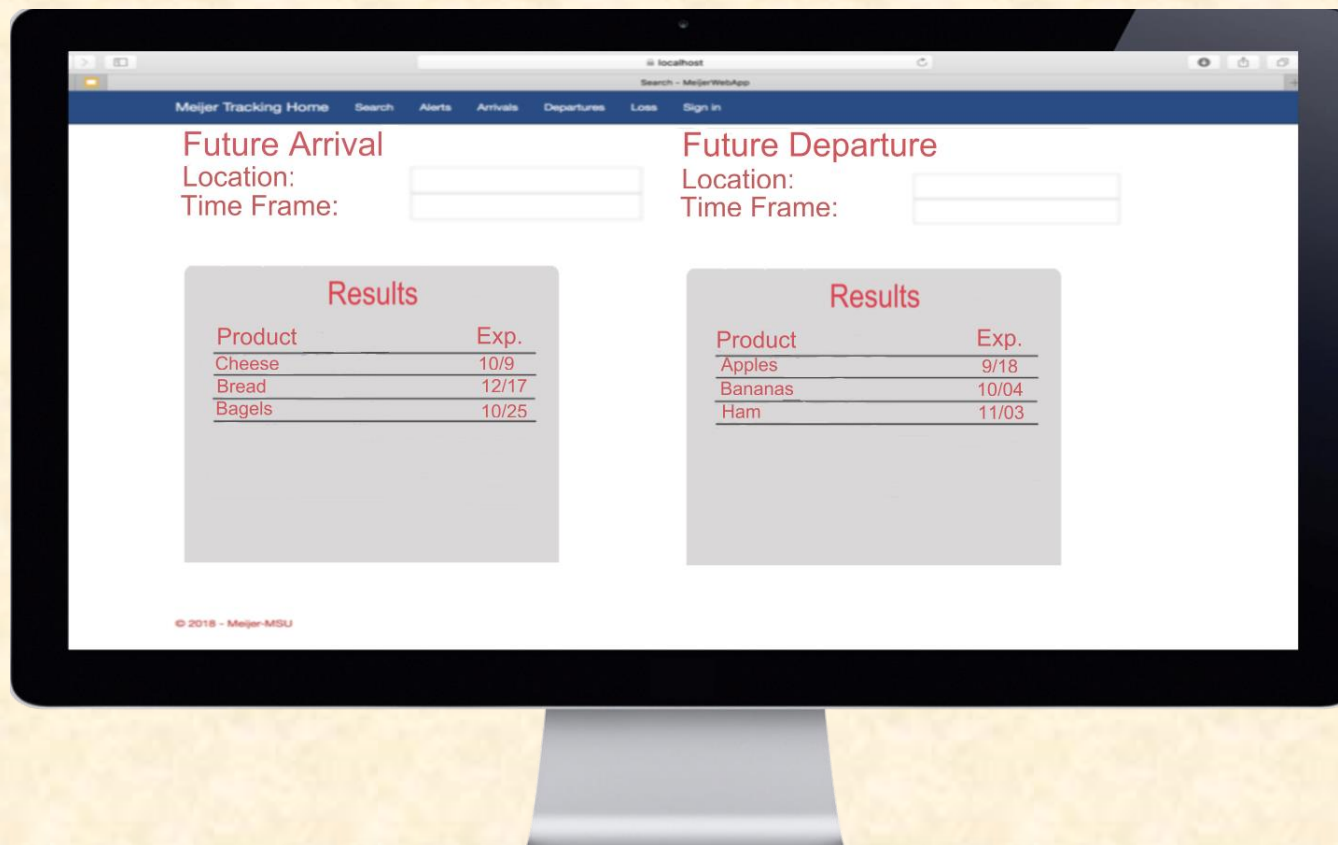




# Web Loss page



# Future Arrival

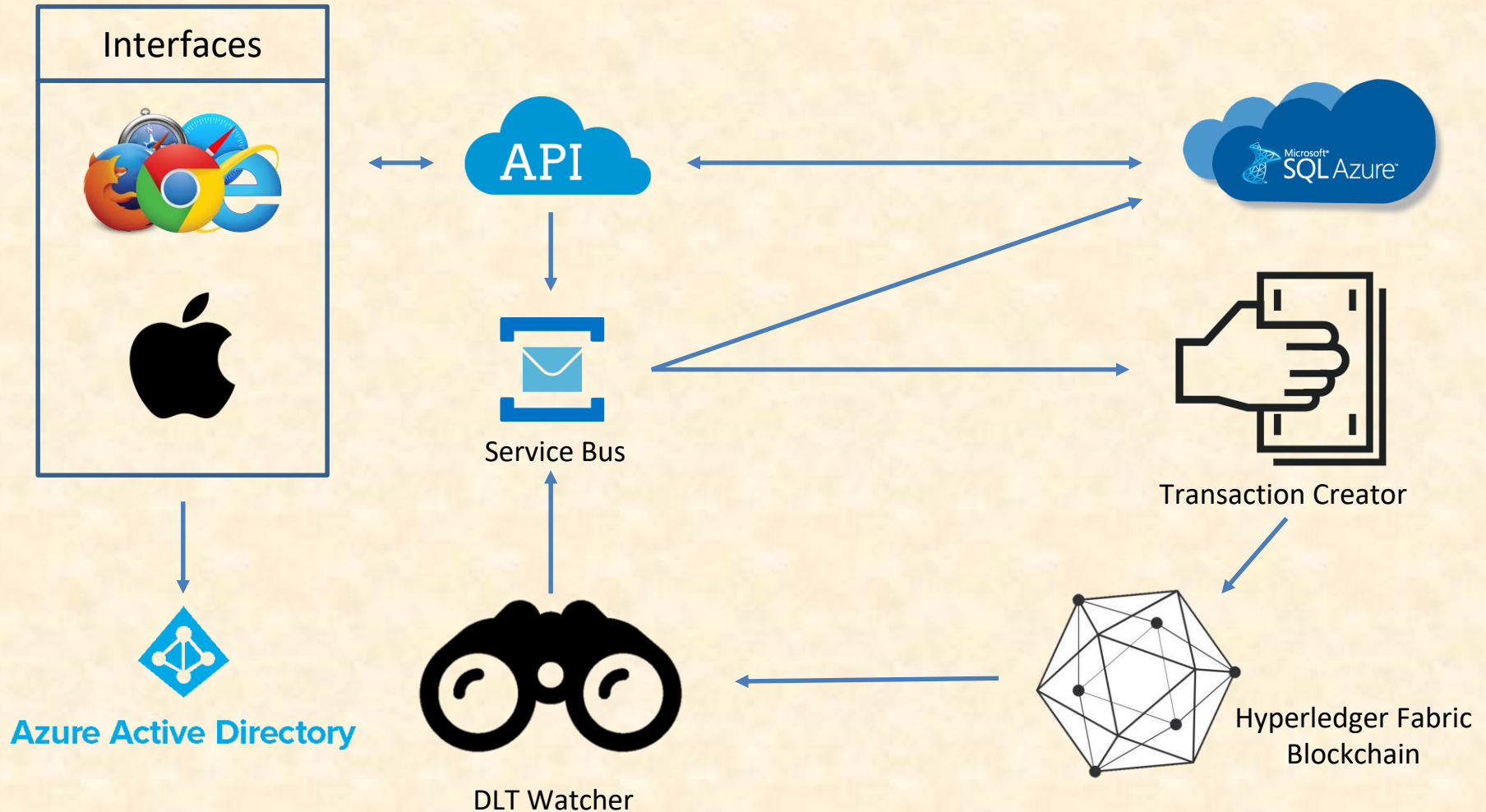


# Technical Specifications

- iOS and Web APP
  - Used to access and update data
- Gateway Service API
  - Connection point for iOS and Web apps to data
- SQL Database
  - Store all product information for easy query
- Hyperledger Fabric Blockchain
  - Store and distribute data across nodes
  - 3 kinds of nodes – Member, peer, orderer
- DLT Watcher
  - Updates SQL Database when changes are detected



# System Architecture



# System Components

- Hardware Platforms
  - Apple iPhone
  - Computer for Web App
- Software Platforms / Technologies
  - Microsoft Azure
  - Microsoft Azure Blockchain Workbench
  - Azure SQL
  - Hyperledger Fabric Blockchain
  - XCode
  - ASP.NET
  - PowerBI
  - Microsoft Visual Studio
  - VSTS
  - QR Scanning



# Risks

- Implementing Blockchain Technology
  - Difficulties in starting up an initial blockchain framework
  - Spinning up a simple 2 node network which will be expanded
- Creating Effective Smart Contracts
  - Creating a contract that will add/edit data to the blockchain
  - Using “Go” to write chaincode to add blocks to blockchain
- Integrating iOS and Web Applications
  - Ability to read data from SQL Database and display
  - Use Azure SQL Server Management Studio to pull queries
- Integrating QR Code Product Tracking Technology
  - QR reading abilities to process product information on device
  - Configuring library to pull correct information from QR code

# Questions?

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