

MICHIGAN STATE

U N I V E R S I T Y

Project Plan

CATALyst: Mapping CATA Routes and Buses in Real-Time

The Capstone Experience

Team Michigan State University

Jimmy Mkude

Catherine Dinsmoor

Thomas Beaver

James Dodge

Charles Ward

Department of Computer Science and Engineering

Michigan State University

Spring 2017



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

Functional Specifications

- The primary goal is to allow for MSU students to easily use the bus system to arrive at a destination on time.
- Users can view all routes and buses within the CATA bus system in real-time.

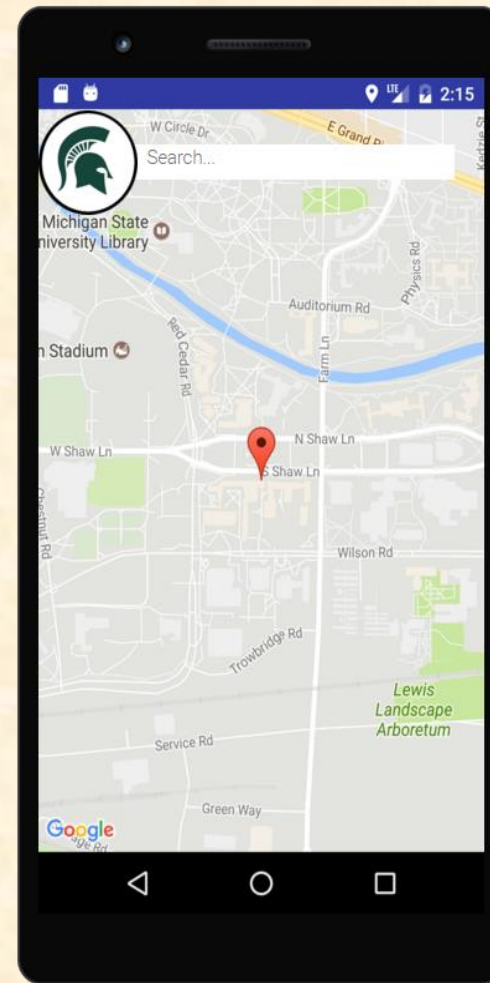
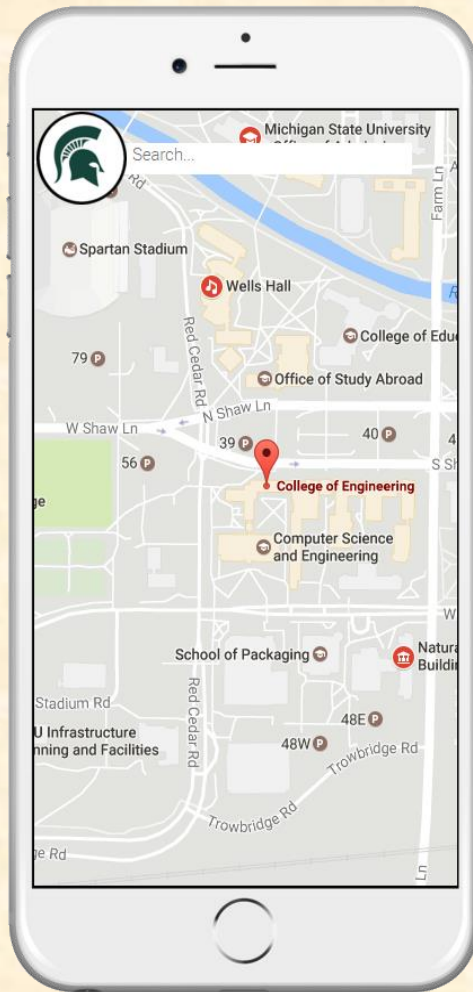


Design Specifications

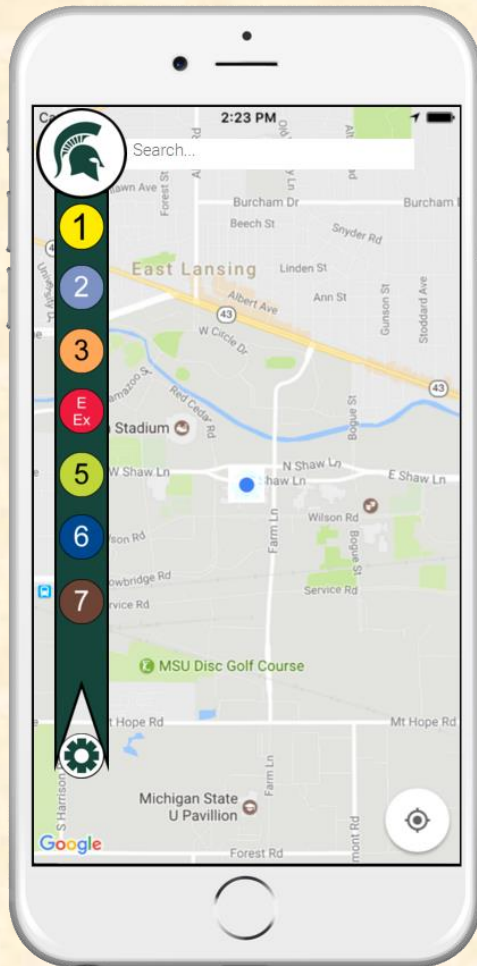
- Allow users to access real-time CATA bus locations, stops, routes including filtering of this information.
- Students can enter their class schedules and push notifications will notify them when they should leave to catch the bus.
- Clean design to allow for easy use on-the-go.



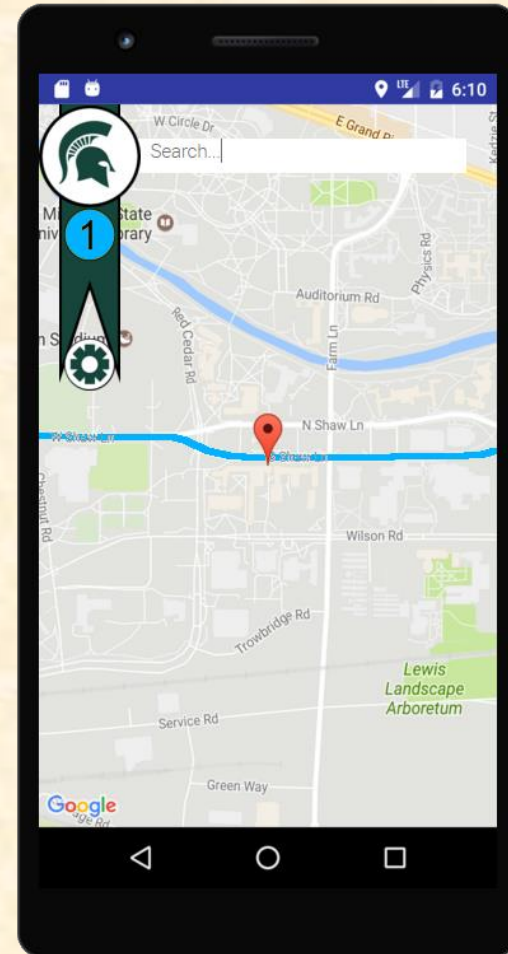
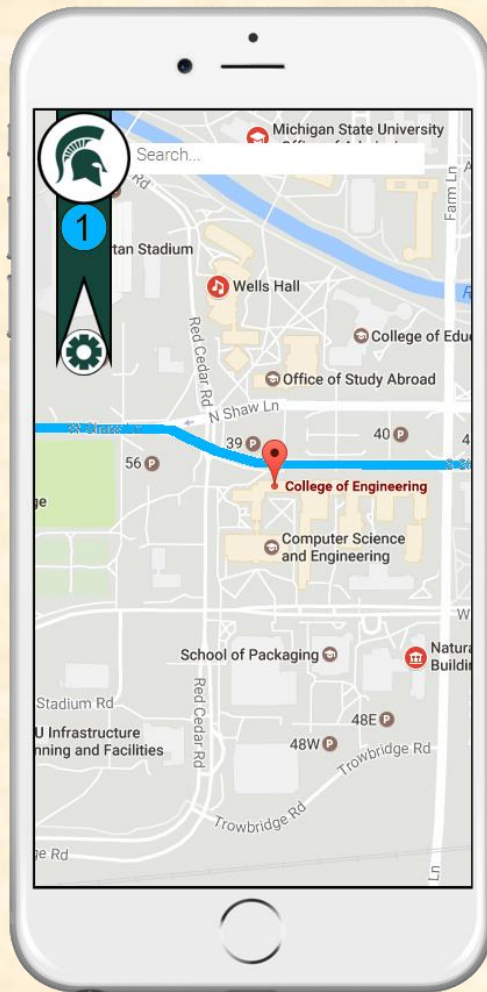
Screen Mockup: Home Screen



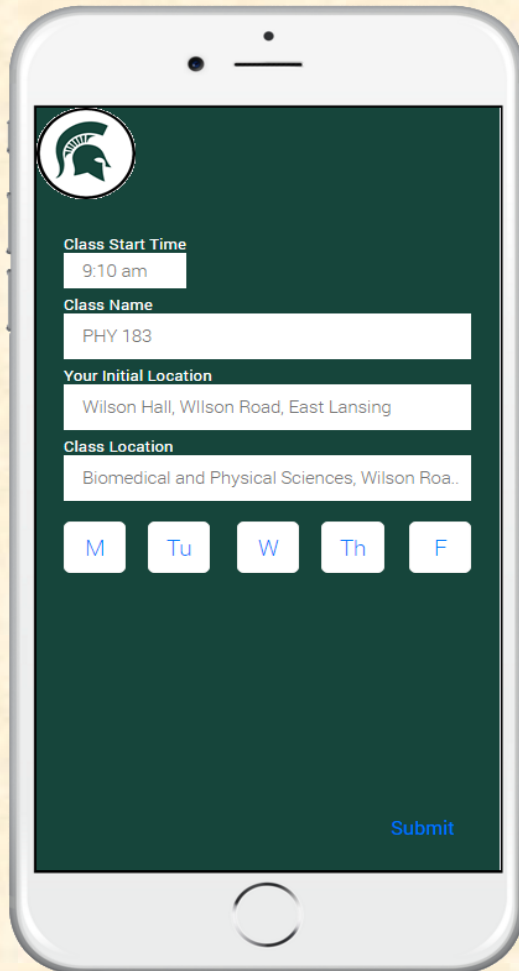
Screen Mockup: Route Filtering



Screen Mockup: Route Selection



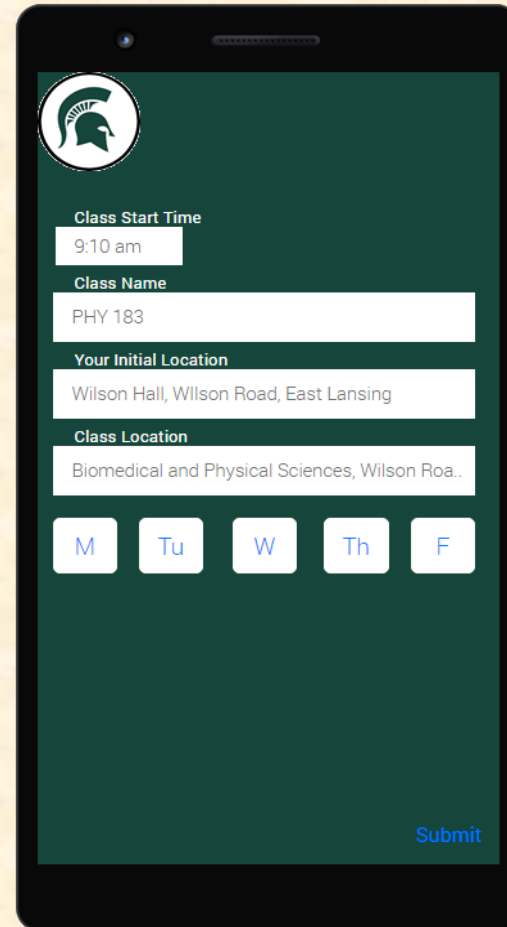
Screen Mockup: Schedule Input



A white smartphone mockup displaying a schedule input form. The form has a dark green background and a white Spartan helmet logo in the top left corner. The form fields are as follows:

- Class Start Time:** 9:10 am
- Class Name:** PHY 183
- Your Initial Location:** Wilson Hall, Wilson Road, East Lansing
- Class Location:** Biomedical and Physical Sciences, Wilson Roa..

At the bottom, there are five buttons for days of the week: M, Tu, W, Th, F. A blue "Submit" button is located at the bottom right of the form.



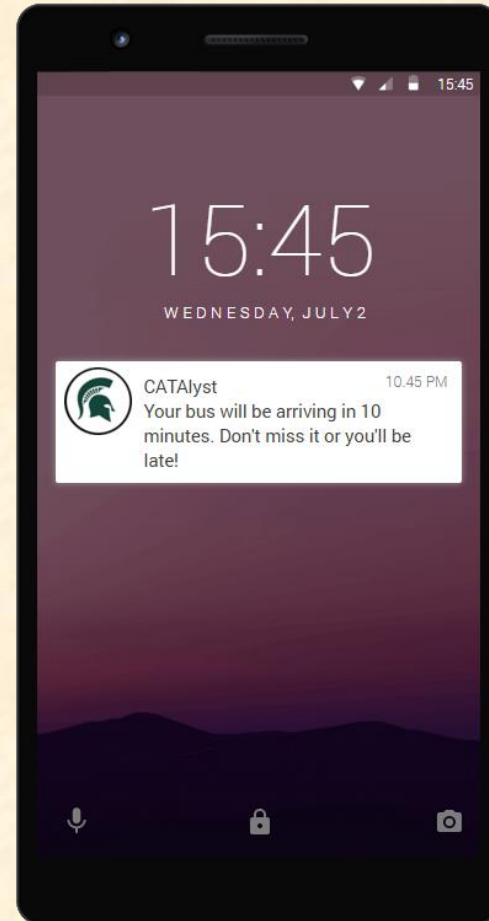
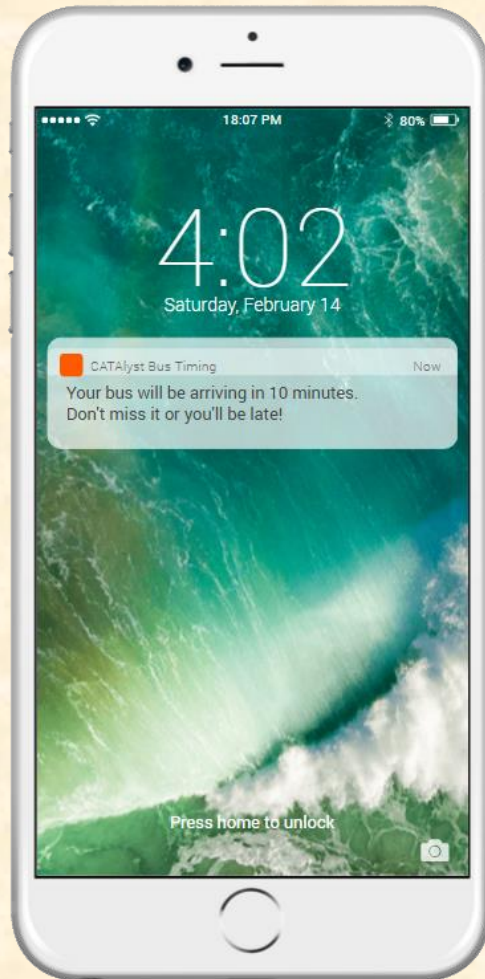
A black tablet mockup displaying the same schedule input form as the smartphone. The form fields are as follows:

- Class Start Time:** 9:10 am
- Class Name:** PHY 183
- Your Initial Location:** Wilson Hall, Wilson Road, East Lansing
- Class Location:** Biomedical and Physical Sciences, Wilson Roa..

At the bottom, there are five buttons for days of the week: M, Tu, W, Th, F. A blue "Submit" button is located at the bottom right of the form.



Screen Mockup: Push Notifications



Technical Specifications

Server-side:

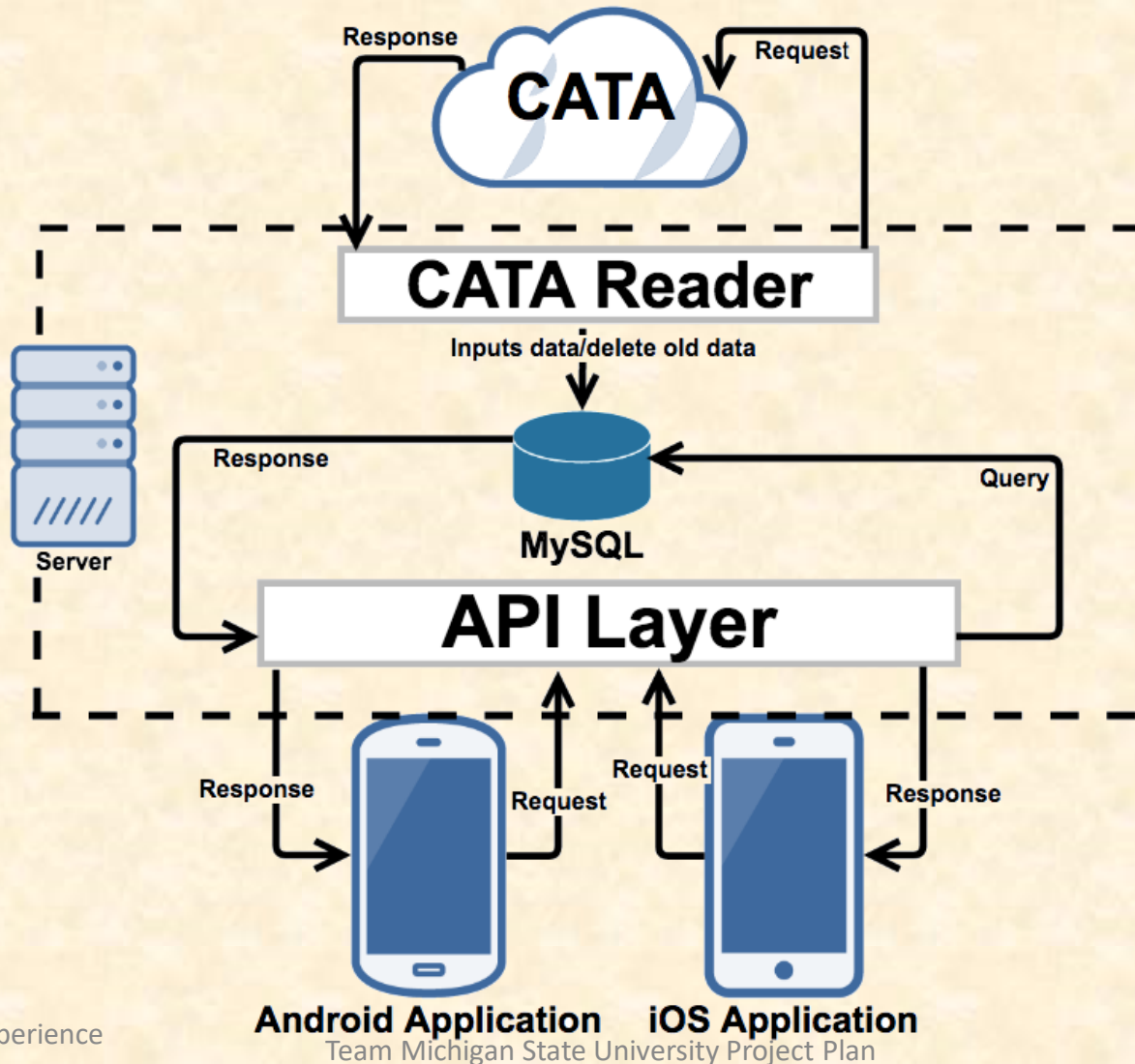
- RESTful Web Services
- Spring Boot Maven Java application

Client-side:

- iOS application with Swift
- Android application with Java



System Architecture



System Components

- Hardware Platforms
 - Capstone Server Ubuntu 16.04/ AWS server
 - iPhones
 - Android phones
- Software Platforms / Technologies
 - iOS
 - Android
 - RESTful Web Services



Testing

- RESTful API and database queries will utilize unit tests.
- Apps tested on multiples devices, screens and OS versions.
- Scaled tests with multiple users
- Field testing of multiple scenarios



Risks

- Accurately Interpolating CATA Bus Locations Between Updates
 - CATA only updates data from their GTFS system 120 times an hour (once every 30 seconds).
 - Cross reference the CATA route data with Google Maps API ETAs
- Implementing User Schedules
 - Need to allow users to input their schedules and provide trip planning for them.
 - A calculation will have to be determined to figure out a bus's estimated time of arrival for each possible path between the two points
- Consistent Application Interface Between iOS and Android
 - Application needs to appear and function the same for both iOS and Android users.
 - Both the Android and iOS teams will work together closely to ensure they are at similar development points and will make decisions about roadblocks as the emerge



Questions?

?

?

?

?

?

?

?

?

?

