Software Release

The current version of the application provides for a starting place for future releases. The application as of right now is modular, meaning that it can easily be updated, changed, or have components completely swapped without affecting core functionality.

Software Release 0.1 (Alpha)

Releasing the software in its current state to our customer requires a simple package build from within Android Studio. The build process packages our application into an executable APK file, which can be downloaded onto any device running Android. An executable of the application will be included separately from the source code.

All documentation below will also be included in the source code files, in the case of issues transferring or updating future versions.

Current Functionality
With this release of the software, the application is in an early state with only core functionality being represented.

- Displaying a map
- Display current VDOT owned tolls.
- Searching of two points.
    - Source Point - where the user is currently located.
    - Destination Point - where the user plans to go.
- Selection of VDOT owned tolls as of May 3, 2019.
- Triggering the Pay Activity, by selecting the pay button.

Future Functionality
In future updates, with the current version of our requirements baseline, the future functionality of this application should include:

- Requesting a user's current location.
- Auto-populating the tolls that a user will pass through.
- Querying a database containing current toll information needed.
- Allow for forward and backward navigation between the two activities, as well as editing the current route selected.
- Allow for automatic transactions in real-time when passing through the geolocation of a toll.
- Allow for turn-by-turn navigation.
- Support for multiple payment methods.
- Cross-platform support on iOS.

Code, Gradle, API Reference

Overview:

1. Map Activity

(~/ ... /toll_mapbox_test/MainActivity.java)

a. Acted as the core "activity" of the application.
b. This is the file that is triggered when the application is launched.
c. This activity runs throughout the entirety of application's lifetime.
d. Triggers the **Pay Activity** when making a payment.

2. Pay Activity

(~/ ... /TollPayActivity/MainActivity.java)

a. The activity called when a user triggers the 'Pay' event.
b. Overlays **activity_main.xml** with **pay_activity_main.xml**.
    i. References
    pay_content_main.xml & **toll_list_layout.xml**
c. Retrieves and transfers the amount for each toll selected, and sends the total amount to Stripe for transaction handling.

3. Toll Application

(~/ ... /toll_mapbox_test/TollApplication.java)

a. Both activity files used this file as a reference point for important values.
b. Centralized and unified values.
c. ***

Map Activity

Language: Java
Location: (~/TollMapBoxTest/app/src/main/java/com/example/toll_mapbox_test/)
Layout: activity_main.xml (~/Toll MapBox Test/app/src/res/layout/)

Future usage headings are suggested actions to be taken by any future development team based on our current requirements.

Interfaces With:

Application Programming Interfaces & Files:

a) **Toll Application** (.java)
    i) Used for:
        (1) Centralized variable control.
        (2) Acted as a "Parent" class.
            (a) Held references to the original variable information contained in:
            Strings.XML
            Values.XML

~/app/src/main/res/layout/.xml*
(all xml files within the ./layout/ directory)

b) Maps SDK

i) Used for:
   (1) displaying the map image
   (2) map style
   (3) updating & moving the camera
   (4) querying the map

ii) Full Documentation
(https://docs.mapbox.com/android/maps/overview/)

c) Navigation SDK & Navigation UI SDK

i) Used for:
   (1) map and app design elements

ii) Full Documentation
(https://docs.mapbox.com/android/maps/overview/)

iii) Future Usage
   (1) Updating the camera view into a navigation view
   (2) User Location
   (3) Generating a Route
   (4) Custom Routes

d) Geocoding API

i) Used for:
   (1) latitude & longitude coordinate retrieval
   (2) starting & ending points
   (3) toll locations (latLng Points)
   (4) keeping track of POI's
      (a) Points of interest (POI): tolls, previous locations, current location, etc.

ii) Full Documentation
(https://docs.mapbox.com/api/search/)

Installation

Step-by-step tutorial at (https://docs.mapbox.com/android/maps/overview/)

1. Include Mapbox's SDK in the *build.gradle* file.
2. Get a mapbox access token - *full details at link above.*
3. Setup permissions in *AndroidManifest.XML*
4. Add a map in *MapActivity.java*

Pay Activity

Language: Java
Location: (~/TollMapBoxTest/app/src/main/java/com/example/TollPayActivity/)

Future usage headings are suggested actions to be taken by any future development team based on our current requirements.

Interfaces With:

e) **TollApplication** (.java)
- i) Used for:
  - (1) Centralized variable control.
  - (2) Acted as a "Parent" class.
    - (a) Held references to the original variable information contained in:
      Strings.XML
      Values.XML
      ~/app/src/main/res/layout/.xml*
      (all xml files within the ./layout/ directory)

Application Programming Interfaces:

f) Google Pay API
- i) Used for:
  - (1) Adding Google Pay as an option.
  - (2) Allowing the user to pay with Google Pay.
  - (3) Invoice Control
    - (a) Transferring payment amount from the application to Stripe for processing.
- ii) Full Documentation (https://developers.google.com/pay/api/)

g) Stripe API
- i) Used for:
  - (1) map and app design elements
- ii) Full Documentation (https://stripe.com/docs/api)
- iii) Future Usage
  - (1) Updating the camera view into a navigation view
  - (2) User Location
  - (3) Generating a Route
  - (4) Custom Routes

Installation
Instructions at (https://developers.google.com/pay/api/)

Application Information
References from the build.gradle(app) file.

*Containing versions for all **APIs**, **SDKs**, **JDK**, **IDE**, **Emulators**, and contains specific **Gradle Dependencies** needed.*

Debugging the Gradle Dependency conflicts occupied much of our time when developing this application.
*- With this reference, all dependency issues within **build.gradle** should be greatly minimized.*

Application

IDE	Android Studio
Language	Java (JDK 1.3.x & earlier forced)
Android SDK Version	28.0.0
Platform	Android 9.0 (Pie)
API Level	28
Emulator	Android Emulator (Version 28.0.23)
XML Scheme	1.0

Android Information

Compiled SDK Version	28
Minimum SDK Version	22
Application ID	“com.example.toll_mapbox_test”
Target SDK	28
Version Code	1
Version Name	“1.0”

Remote Repositories	Maven Central, https://mapbox.bintray.com/mapbox

Gradle Dependencies

Name	**Version**
Google Code Gson	2.8.5
Android Support	v4:28.0.0
Android Support-Compat	28.0.0
Android Support-Core-Utils	28.0.0
Android Support-Core-UI	28.0.0
Android Support-AppCompat	v7:28.0.0
Android Support-Design	28.0.0
Android Support-Constraint:ConstraintLayout	1.1.3
Mapbox-Android-SDK	7.3.0
Mapbox-Android-Plugin-LocationLayer	0.5.0
Mapbox-Android-Plugin-Places	v7:0.7.0
Mapbox-Android-Navigation	0.34.0
Stripe-Stripe-Java	1.47.0
Stripe-Stripe-Android	1.0.4
Google-Android-Gms:Play-Services-Wallet	16.0.1