# Project Title

**SessionOn**



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# 1. Project Statement

My app idea is a social app that will be location based. So, a user creates an account and gets set up add friends etc. Then when the user goes out to his local pub for example and checks in saying what is on. Then using location, geo mapping and boundaries set by the user their friends will get a notification and be able to look where they are and see who is with them also, what event is happening. They can then choose to join the session or look in their radius to see who else is out closer to them. The app will include a messenger for quick conversation. The app will continuously process data to give live updates, so if people move etc. One's account can be public or private as they can choose. I will have it connected to an API that connects to a cloud to save locations and accounts. The problem I want to eradicate is the whole group chat scenario when someone tries to organise something and it just falls through. Hopefully the outcome of this project will be a full up and running app that people will use to organise nights out between groups of friends or random parties.

# 2. Research

## a. Background Research

This part of the report contains the background research conducted before any implementation or any design of the project. Before making any head way on SessionOn. Other projects existed were researched and learned to progress with the project and see what other approaches were taken etc. There are a few that came up that used the same kind of technologies, SessionOn would thrive with if incorporated. As location is a big thing nowadays and many social apps incorporate it into their applications and the development of SessionOn will benefit from the research of these other applications.

As mentioned before there are multiple apps now that are using location in their projects and then there are others that are based solely on location. There are a few that used different technologies that needed to exist in the project. For example, Snapchat, Whatsapp, Tinder, Facebook, Glympse, Life360.

## Snapchat

Snapchat is a big name now in the social network community and released a new feature called snapmap in June 2017. "Snapchat appeared to have copied social map startup Zenly for this feature, but now we've learned that Snap Inc has acquired Zenly for $250 million to $350 million in mostly cash and some stock. Snap will keep Zenly running independently, similar to how Facebook runs Instagram independently." [1].

The feature lets you see where all your friends are and what they are doing by them sending their photos/videos to their public story. This feature is something SessionOn could use to benefit it. There are a lot of pros and cons to this feature of course.

"When it comes to Snap Map, young people aren't scared about stalkers or strangers – their biggest worry is each other. The map can jeopardise relationships in a number of ways. People can see when their friends are hanging out without them, they can tell when someone has lied about setting off but is still at home, and – when checking at night – they can figure out who's sleeping with whom. The feature even allows you to see the last time someone sent a Snap, meaning you can tell if they've been ignoring your messages." [2]


Figure 1: Tweets under comment in snippet [2]

When asked some possible users about this, they said that they would prefer to have the option whether to broadcast their location publicly or with friends. The snapmap architecture is slickly designed as to get into it a user only has to open the app and then just pinch the screen to access it.

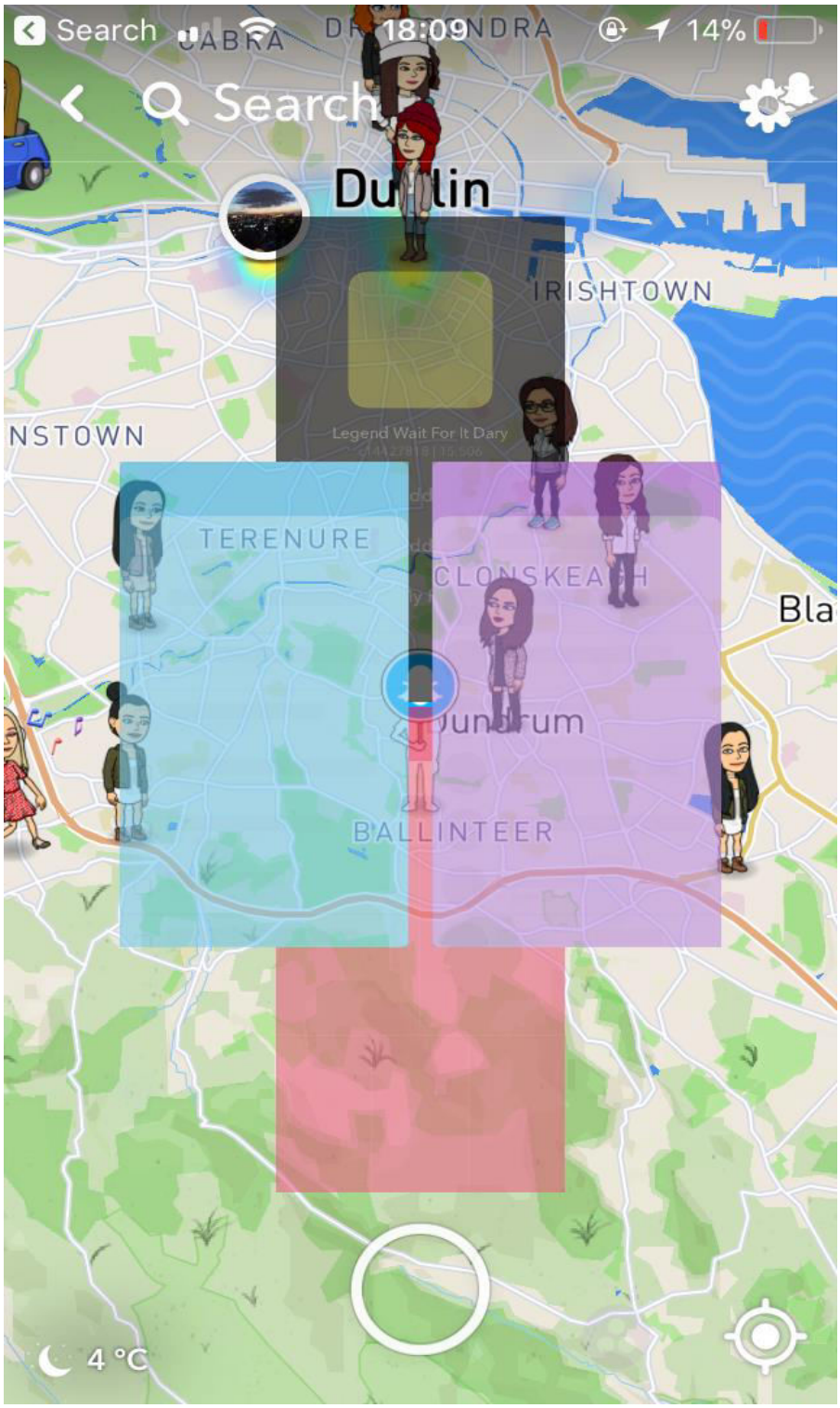


Figure 2: Snapmaps Access Screenshot

### Tinder

Tinder is also a huge social dating app now which incorporates geo mapping and geo boundaries into its application." The 2016 Editor's **Top Pick - Dating App** Award goes to **Tinder**. 2016 was another big year for Tinder being the most popular dating app on iOS and Android. Its estimated value was pegged at $1.2 billion USD in 2016 and it has now more than 1.5 million paid subscribers" [3].

This is one of the features the project would flourish with when to included. And in Tinder a user can choose how far the radius is to match with other singles within that radius.

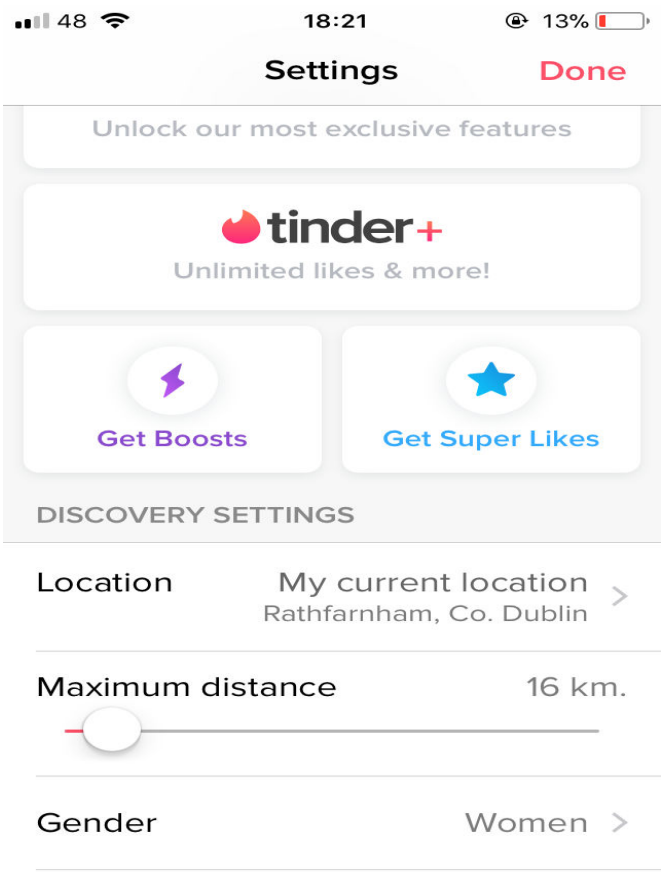


Figure 3: Tinder settings screenshot

Android has this built in using the Google API and has functions that can be used to inherit the ideas of this geo mapping and geo fencing.

| | | |
|---|---|---|
| int | GEOFENCE_TRANSITION_DWELL | The transition type indicating that the user enters and dwells in geofences for a given period of time. |
| int | GEOFENCE_TRANSITION_ENTER | The transition type indicating that the user enters the geofence(s). |
| int | GEOFENCE_TRANSITION_EXIT | The transition type indicating that the user exits the geofence(s). |
| long | NEVER_EXPIRE | Expiration value that indicates the geofence should never expire. |

Figure 4: Functions screenshot [4]

## b. Technologies Researched

### Google services API

Google developer provides a lot of useful functions and a location API that you can go to developer page and get your personal API key and then include it into your code. This allows one to create a location tracking functionality into ones app. One can also use the features of Google maps which will allow one to include functionality that is included e.g. route planning, network provider, GPS provider, Google places.

### Firebase

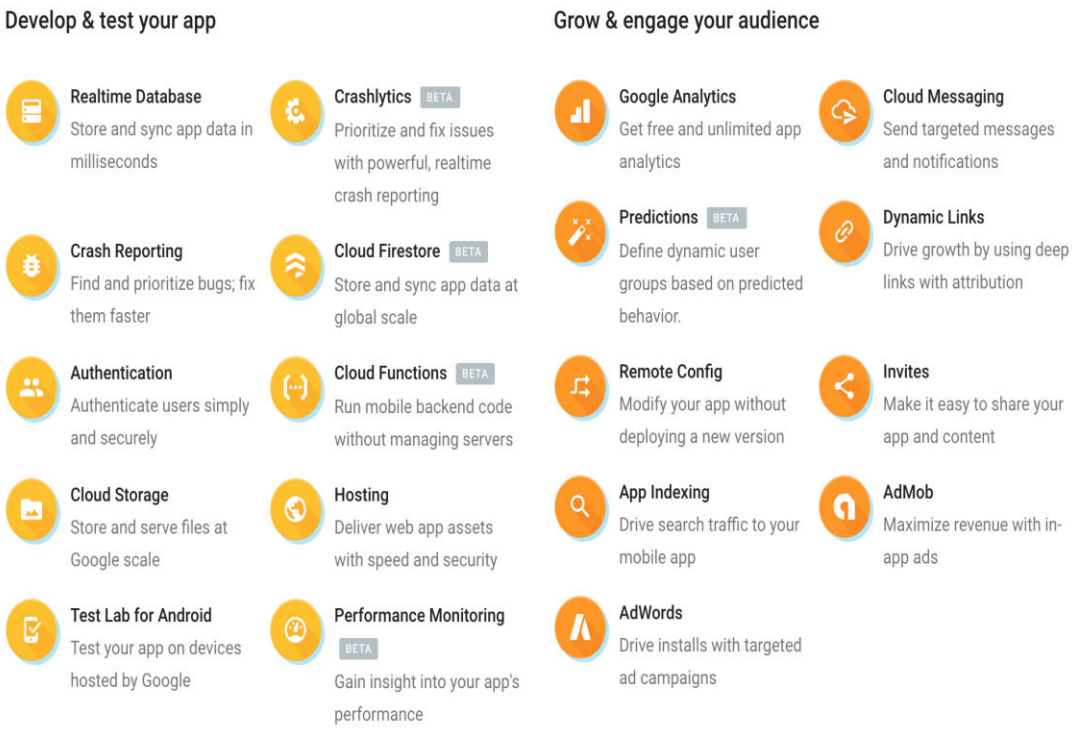


Figure 5: Abilities of Firebase [5]

Firebase is a backend service and incorporates a lot of features as shown above and if the project had said features included it will hopefully boost its efficiency and its performance.

“Firebase frees developers to focus crafting fantastic user experiences. You don’t need to manage servers. You don’t need to write APIs. Firebase is your server, your API and your datastore, all written so generically that you can modify it to suit most needs. Yeah, you’ll occasionally need to use other bits of the Google Cloud for your advanced applications. Firebase can’t be everything to everybody. But it gets pretty close.” [6]

**Real-Time database:** “When you connect your app to Firebase, you’re not connecting through normal HTTP. You’re connecting through a WebSocket. WebSockets are much, much faster than HTTP. You don’t have to make individual WebSocket calls, because one socket connection is plenty. All of your

data syncs automagically through that single WebSocket as fast as your client's network can carry it.
Firebase sends you new data as soon as it's updated. When your client saves a change to the data, all connected clients receive the updated data almost instantly." [6]

If the project was to incorporate this feature it would better the real-time updates for the regular location update and data processing. Also, the project would run smoother if more users intend to use it. It will also aid the project as it will keep all clients connected and all updates would be instant.

**File Storage:** "Firebase Storage has its own system of security rules to protect your GCloud bucket from the masses, while granting detailed write privileges to your authenticated clients." [6]

**Authentication:** "Firebase auth has a built-in email/password authentication system. It also supports OAuth2 for Google, Facebook, Twitter and GitHub. We'll focus on email/password authentication for the most part. Firebase's OAuth2 system is well-documented and mostly copy/paste.
If you've ever written an authentication system, let's commiserate for a moment. Custom authentication is terrible. I will never write an auth system again for as long as I live. I fell in love with Firebase Auth at first sight, and the flame has never wavered. Sometimes I get frustrated. Sometimes we fight. But I never forget the cold, dark abyss of a custom auth system. I count my blessings.
Oh, and Firebase Auth integrates directly into Firebase Database, so you can use it to control access to your data. I'm writing this as if it's an afterthought. It's not. It's the second reason that you will love Firebase Auth." [6]

This feature will aid the project and reduce the number of bugs at runtime, rather than being coded from scratch. Also, if the project wants to have more available features like sign in with the users Facebook or Github etc. it can be

added to the project quite quickly and easily from the developer page of the firebase website.

**App platform features:** "The Firebase team has integrated a bunch of new and existing Google products with Firebase. I don't plan to cover these features in detail quite yet…

A bunch of these features apply to iOS and Android but not to web.

- Remote Config
- Test Lab
- Crash
- Notifications
- Dynamic Links
- AdMob

"[6]

```
implementation 'com.google.firebase:firebase-database:11.6.0'
implementation 'com.google.firebase:firebase-auth:11.6.0'
implementation 'com.firebaseui:firebase-ui-auth:1.2.0'
implementation 'com.firebaseui:firebase-ui-database:1.2.0'
```

Figure 6: Adding firebase screenshot

Overall the project will benefit greatly in its security and also the effectiveness of the app like data processing (for updating user's location). As seen in these snippets there is a lot that the project can benefit from by including Firebase into it and greatly improve its functionality.

## c. Other Relevant Research Done

### Life360

Life360 is a social network application that is built more about family life the idea of meeting up with family for things such as dinner or just checking in on one another. It uses the gps tracking and also messaging features that SessionOn would thrive with. "With Life360's geo-fencing feature, called "Places", users can now designate specific places to receive alerts for. Whether it's a school, mall, office, or home, now people can quickly be informed when someone has arrived at that destination." [7]. This also uses the idea of family members checking in and letting them know they are home safe or at work etc.

## d. Resultant Findings and Requirements

- Database
- GPS tracking
- Geo fencing
- Geo mapping
- Google API/Cloud

## e. Bibliography

[1] available from: https://techcrunch.com/2017/06/21/snap-map/ Author: Josh Constine Accessed: 29/11/17

[2] available from: https://www.newstatesman.com/science-tech/social-media/2017/07/what-is-snapchat-snap-map Author: Amelia Tait Accessed: 16/09/17

[3] available from: https://www.datingsitesreviews.com/article.php?story=2016-dating-sites-reviews-choice-awards---dating-app Author: Admin Tom Accessed: 29/11/17

[4] available from: https://developers.google.com/android/reference/com/google/android/gms/location/Geofence Author: Google Accessed: 21/11/17

[5] available from: https://firebase.google.com/ Author: Google Accessed 21/11/17

[6] available from: https://howtofirebase.com/what-is-firebase-fcb8614ba442 Author: Chris Esplin accessed: 21/11/17

[7] available from: https://thenextweb.com/insider/2012/12/18/life360-to-hit-25-million-users-adds-geo-fencing-feature/ Accessed: 26/11/17 Author: Ken Yeung

## 3. Description of Solution

Hopefully my solution should be a fully functioning app that a user can create an account using email and password, then sign in with their account. Then show their location using Google maps and a create session button at the bottom of the screen. The user will also hopefully be able to see where their friends are or others who broadcast their session publicly. The user should be able to create a session with a description of what the session is, or where it is going to be moved to. Then broadcast their own location be it just to friends or publicly. Then other users will be able to see the session on their own app. If one sees a session from a friend or public user they will hopefully be able to join it and then create a group of the other users. The user's location should be continually updated, so if the user moves it will be updated in the app using data processing. Then maybe a chat function so users can chat within the app. A huge percentage of messages between friends nowadays is the, where are you? Question. "Our research shows that 6 to 8 text messages a day are dedicated to this question. Why not just open the Life360 map and answer it for yourself?" [1]. SessionOn will hopefully answer this question when fully operational and save the time of trying to figure out what to do for the night.

# 4. Approach and Methodology

## Iterative Design Methodology

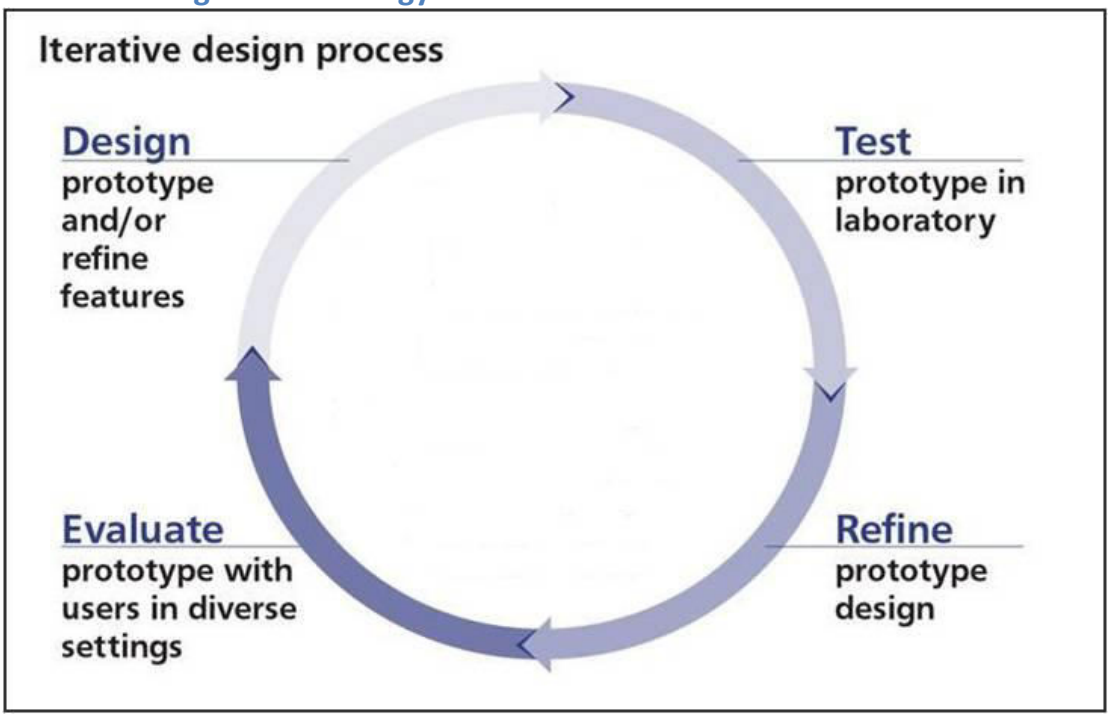


Figure 7: Iterative design[2]

This design methodology is the idea of going around the requirements as shown in the figure above multiple times design, prototyping/coding, testing, refining, evaluating. On completing one segment of the app then using that as the basis for the design of the next segment. Alistair Cockburn says "**Iterative** fundamentally means **re-do**. Iterative development helps you improve your **product.**" [3]. If SessionOn uses this methodology it will aid it to be a better app for users. As there is only one person developing I feel that this methodology is the only way that the development if the software will be completed successfully and efficiently.

# 5. Design

## a. Technical Architecture Diagram

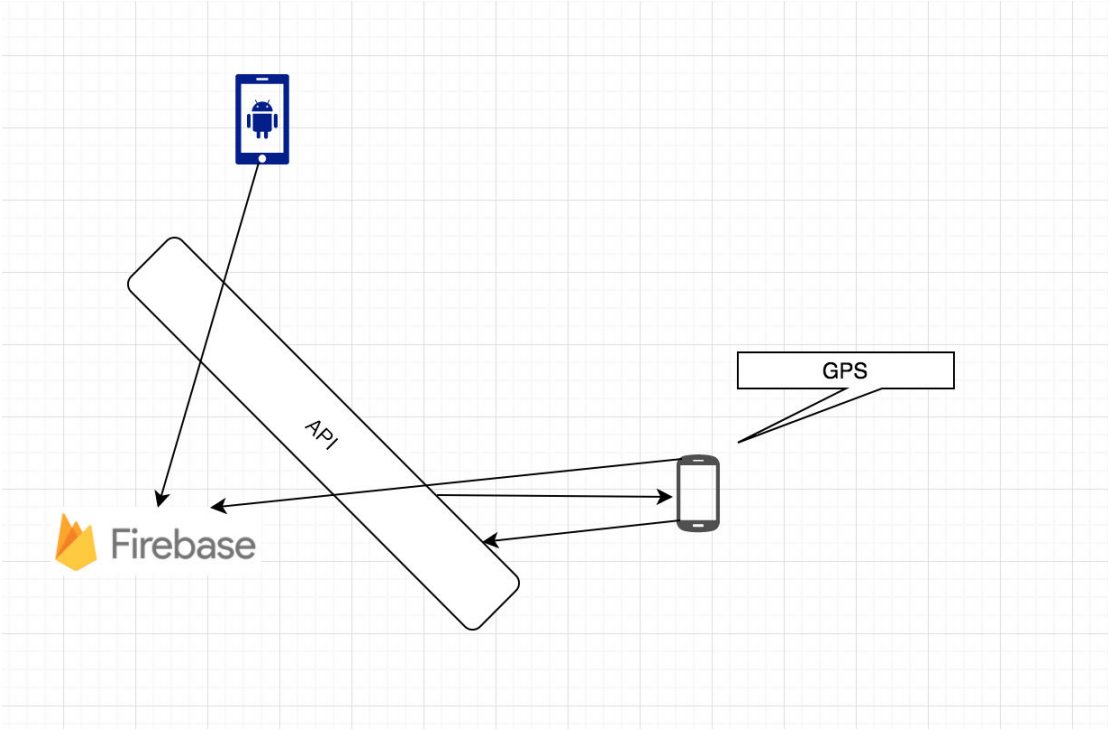


Figure 8: Components

As shown above the app connects to firebase through an API and then the GPS co-ordinates are sent to the database to track the user's location and connects to the API to continuously process and broadcast the live location of the user.

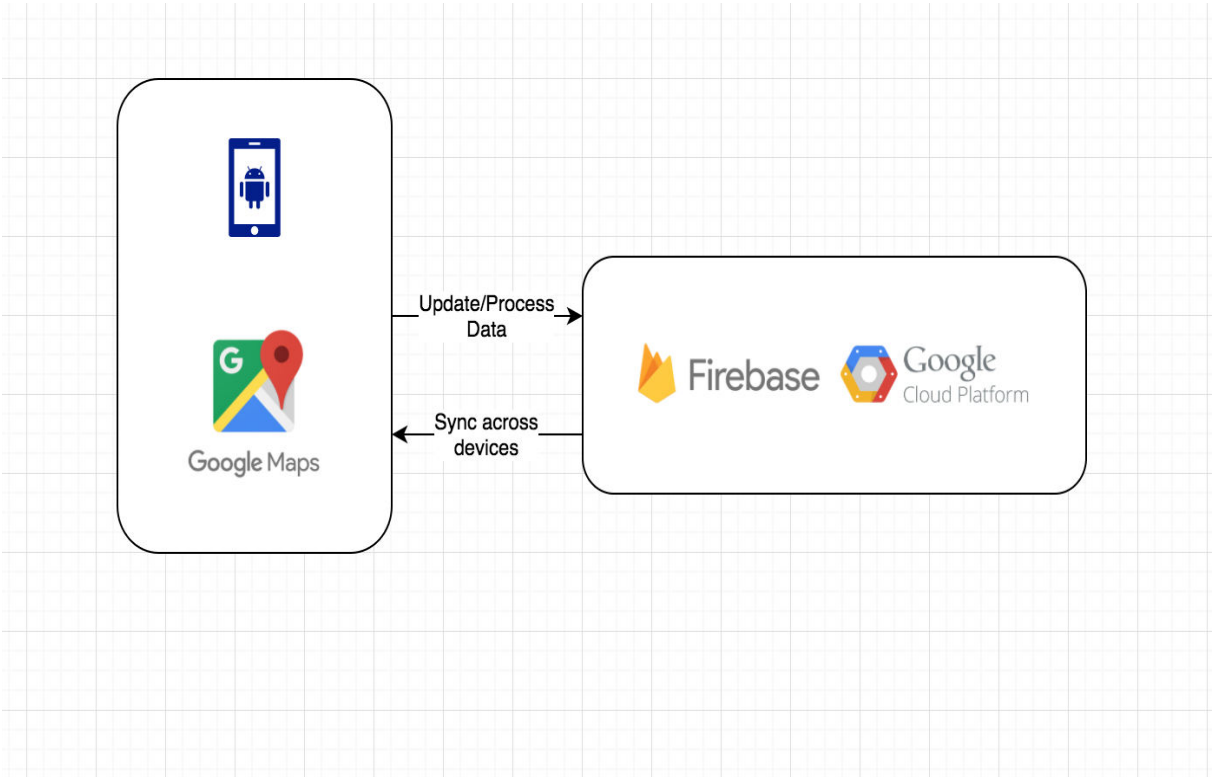


Figure 9: Technical architecture

As shown above the presentation layer has the app with google map activities and it connects to firebase and Google's cloud platform. The location and if added the cloud messaging that can be continually updated and then all changes will be synced across all devices that want to run the app. For example, if a user moves then their location will be updated and other users on other devices will see this updated.

## b. Other Design Documents

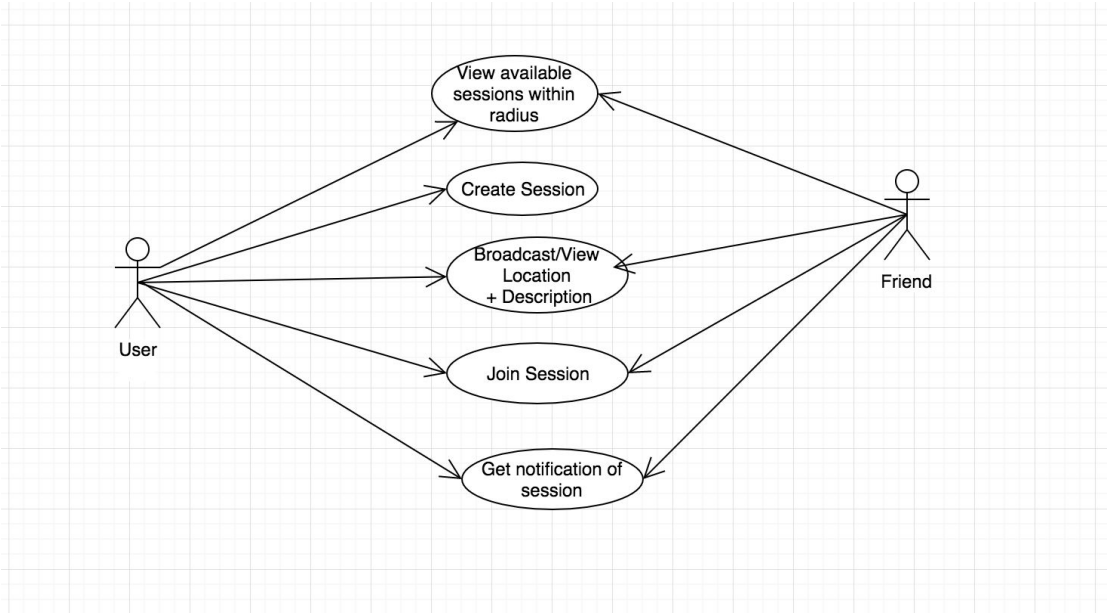


Figure 10: Use Case

Above is the Use Case diagram portraying some of the main features available to each user. The user is the one who creates a session be it a night out or a simple meet up with friends. Both the user and friends can see a location and description of what is taking place and who is there. When a session is created both will get a notification if they are in the boundaries of said person. The user location will be tracked and can create a new session if they have moved elsewhere and a new notification will be triggered.

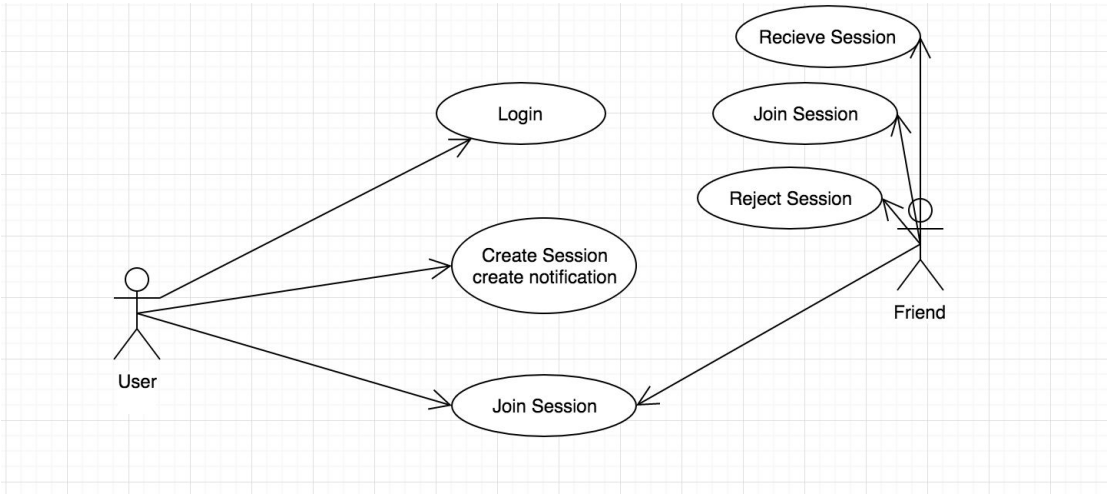


Figure 11: Use Case

Above shows the Use Case for the notification system and how a user can quickly create a session and notifications are automatically sent and location broadcasted. A user can choose to accept the session invitation and join the group or simply reject it if they do not wish to go out.

## 6. Prototyping and Development

The prototyping and development I have completed is incorporating firebase into my application for a real-time database and for secure login authorisation. I have also added in google maps activity so that when a user logs and their location is shown in app and I have added in to sign in another user and show how far they are from one another. Also in another prototype, I have added in that they can use their network provider or GPS if network fails, as shown below.

```
locationManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER, 0, 0, new LocationListener() {
    @Override
    public void onLocationChanged(Location location) {
        //Get Lat
        double latitude = location.getLatitude();
        //Get Long
        double longitude = location.getLongitude();

        //Instantiate class: LatLong
        LatLng latLng = new LatLng(latitude, longitude);

        //Instantiate class: Geocoder
        Geocoder geocoder = new Geocoder(getApplicationContext());
        try{
            List<Address> addressList = geocoder.getFromLocation(latitude, longitude, 1);
            String str = addressList.get(0).getLocality() + ",";
            str += addressList.get(0).getCountryName();
            mMap.addMarker(new MarkerOptions().position(latLng).title(str));
            mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(latLng, 10.2f));
        }catch (IOException e){
            e.printStackTrace();
        }

    }
```

Figure 13: Network code screenshot

As shown above this code function can use the network provider the user has and get the co-ordinates of the user and show their location in the app. Also added for learning purposes is the country where the user is.

```
else if (locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER)){

    locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0, new LocationListener() {
        @Override
        public void onLocationChanged(Location location) {

            //Get Lat
            double latitude = location.getLatitude();
            //Get Long
            double longitude = location.getLongitude();

            //Instantiate class: LatLong
            LatLng latLng = new LatLng(latitude, longitude);

            //Instantiate class: Geocoder
            Geocoder geocoder = new Geocoder(getApplicationContext());
            try{
                List<Address> addressList = geocoder.getFromLocation(latitude, longitude, 1);
                String str = addressList.get(0).getLocality() + ",";
                str += addressList.get(0).getCountryName();
                mMap.addMarker(new MarkerOptions().position(latLng).title(str));
                mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(latLng, 10.2f));
            }catch (IOException e){
                e.printStackTrace();
            }

        }
```

Figure 14: GPS code screenshot

As shown above the same with the network provider if that fails the code then goes to the GPS provider to get the users location and show it in app.

# 7. Testing

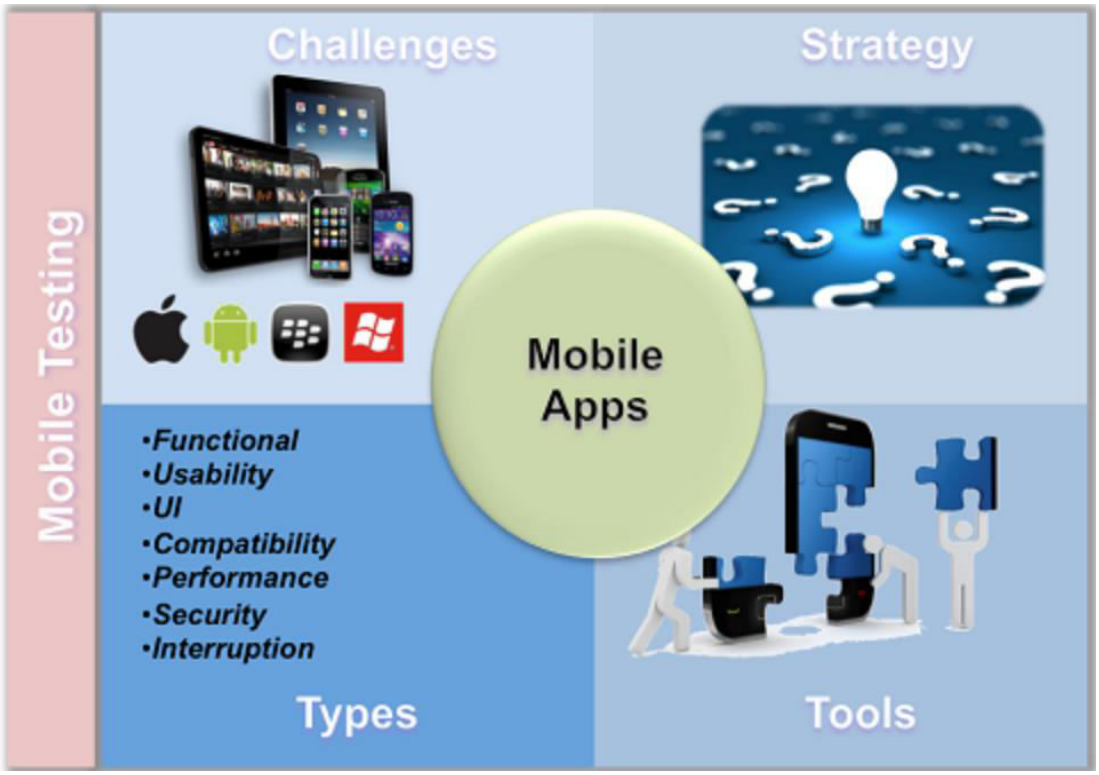


Figure 15: App testing challenges [4]

So far, I have just been testing the app by myself. Seeing if a user can log in and does the app broadcast the location correctly. Today building app is not just about writing a good code, the success of app is largely driven by user experience. A successful app should have an aesthetically pleasing UI and should deliver best user experience on all devices and various form factors, of course there are other important factors to be taken into consideration as well. Outstanding testing strategy is the only way to make your mobile app ready for business. "[4]. Hopefully soon I will be able to do some usability testing getting a questionnaire done to and getting users to complete it as they test the app.

## 8. Issues and Risks

One of the issues I feel that I will have is making enough platform considerations, like making the app executable on IOS and windows phones. This could be a huge downfall for the app narrowing my clients down to ones that only have android phones. “While any app developer will find themselves forced to confront this question, often they fail to comprehensively dissect each option at their disposal. Some developers base their platform choice on stereotypes. It’s not uncommon to see someone develop for iOS just because they believe monetization would be easier on the App Store. While this may be true in some cases, it’s not universal. Additionally, there are many other considerations that must go into platform selection.” [5]. Android phones are more popular on a global scale but IOS is still extremely popular. Only being able to run on one could be a serious downfall for my application.

## 9. Plan and Future Work

My plan for future work is to hopefully have the back bone of the app done and set in stone. Then once I have that all operational then move onto the other features like geo mapping etc. I am not sure of an end date yet as I still must learn how to incorporate the other features for SessionOn. Also, if I might try to add in the firebase cloud messaging giving the users the ability to have an in-app chat and communicate within the app. Effective planning and research are key in the overall production and successful development of this app. Sticking to a structure and planning before attempting to do any coding will be key for this app, therefore preplanning will be essential for continuing development of this application.

## 10. Conclusions

The experience I am gaining from doing the interim report is quite valuable to me as I have never done anything like these before. It is challenging as I must learn as a go be it new technologies or new IDEs. I am learning about technologies I have used but never actually tried to make or create myself. I

firmly believe that the experience gained from completing this report will be invaluable and will aid me in the completion of the project and dissertation as a whole. through the research and design process, I have gained experience in taking an idea and building it from the foundation up, by researching what technologies would be best for the project, and by designing before writing code. By designing a methodology and sticking to a structured process that it is more manageable to do and also aid in the end goal of overall completion. I do hope to have the app completed and able to do all the tasks I set to achieve and my little previous knowledge of this does not hinder me in that respect.

## 11. References:

[1] available from: https://www.life360.com/how_it_works/ Author: Life360 Accessed: 29/11/17

[2] available from: http://sites.path.org/rhtech/files/2012/07/Iterative-design-process.jpg accessed: 26/11/17

[3] available from: http://alistair.cockburn.us/incremental+versus+iterative+development accessed: 26/11/17 Author: Alistair Cockburn

[4] available from: http://www.hummingwave.com/web/mobile-testing.htm accessed: 26/11/17 Author: Sandeep Koul

[5] available from: https://www.entrepreneur.com/article/238849 accessed: 26/11/17 Author: Himanshu Sareen