Technical Architecture

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1. Use Cases

1.1

Title: Register Account with Facebook

Primary Actor: New Application User

Scope: User Registration/login facility

Level: Sub function

Story: In this Use Case a user will be presented with a login screen with the option to login using Facebook account or to exit the app. If the user selects login with Facebook they will be taken to authenticate with Facebook.

Once authentication is completed the User will be brought to a home screen, if already signed up or to a "house creation" page if not.

1.2

Title: Create a new House

Primary Actor: New Application User

Scope: Account Creation

Level: User Level

Story: Once logged in, if the user is not a member of a house they will be brought to a page to either join an existing page, or to create their own house. Joining an existing house will involve either searching by name or by a unique ID.

Creating a House will involve setting up the basics of a new house such as the name of the house, number of occupants etc.

1.3

Title: Adding Person to House

Primary Actor: House Owner/Administrator

Scope: House Administration

Level: Sub function

Story: After making an application to join a house, the individual will need to approved by the administrator of the house. The admin will have ability to approve or deny applicants as warranted.
If approved the applicant will become a member of the house.

1.4

Title: Create New Expense

Primary Actor: House Owner/Administrator

Scope: Finance facility

Level: User Level

Story: One of the goals of this application is to provide a facility to manage bills and finances between people. In order to achieve this the administrator will be provided the ability to create a new expense.

When creating this expense the Administrator will have the ability to define the type of bill (utility, rent etc.) , the amount of the bill, how much each person pays and the payment rate. This expense will then be counted towards the total house expenses and each person involved in the expense will be notified of it.

1.5

Title: Mark Expense Paid

Primary Actor: House Member

Scope: Finance facility

Level: User Level

Story: A user will also be provided the ability to mark an expense associate with them as "paid" this will update the overall total to reflect the new total paid. The user will also be provided the option to upload a receipt or other proof of payment for record.

1.6

Title: View previous expenses

Primary Actor: House Member

Scope: Finance facility

Level: Sub Function

Story: This Use Case will allow a member of a house to view the financial information from previous months. This will allow them to see the total paid, how much each person contributed and, any proof associated with payment.

1.7

Title: Create New Task

Primary Actor: House Member

Scope: Task Facility

Level: User Level

Story: This app will also provide the ability to create and assign tasks to members of the house. For example one member of the house could create the task "Clean the dishes" and assign it to another member of the house. Alternatively rotating schedules can be set up for tasks so that a task is automatically assigned a new person each time it needs doing.

With this in mind to create a task a House Member will be required to enter a title, select a member to assign it to, choose the reoccurrence interval and select whether it is a rotating task. Once a Task is created the person it is assigned will be notified when it needs completion.

1.8

Title: Mark Task Finished/Unfinished

Primary Actor: House Member

Scope: Task Facility

Level: User Level

Story: The person assigned task will be able to mark a task as "finished" or "unfinished" as needed. They will also be able to provide a note which can be read by the other house members with this.

1.9

Title: Create Guest Area

Primary Actor: House Administrator

Scope: Guest Facility

Level: User Level

Story: The owner of the house will be able to create a guest information area associated with their house. This will allow members of the house to share information with any guests. An example of this would be wifi code, door code, house address etc.

This could be achieved using NFC to pass a token from one Android phone to another, which the guest's version of the app could then use to gain access to the guest info page.

2. Technical Architecture

Software Components

For this project I will be focusing on building Android App and ASP.NET Web App with an Azure based backend for storage. I plan to use Visual Studio to build the Web App and Android Studio to build the Android App. The Android version I plan on targeting is Android 5.1 "Lollipop".

Platform Libraries

I plan on utilizing the Android's Material Design style for UI creation, I will also need to make use of Android's Camera API to allow users to upload proof of payment. I also want to look into using Android's Near Field Communication (NFC) API to pass tokens to enable the Guest functionality. To enable communication with the REST API I also plan to use Android's built in HTTP APIs.

For authentication I plan on utilizing the Facebook SDK, I will also be using Facebook to gain access to user information such as their name and profile picture.

Distribution and Deployment

I will be using a REST API built in ASP.NET to handle data distribution. Ideally there will be next to nothing stored will be stored on the client side. This will allow me to access the same information using the common REST API for both the Web Client and the Android Client.

This REST API will connect to an Azure SQL backend which will be generated code-first using the entity framework.

Risks

The primary risk in this project is the scale of the task I am trying to achieve. Building a REST API, Android App and ASP.NET Web App is a large effort which will require a lot of time and work. In the interest of completeness I will be focusing on developing the Android App and REST API first, then focus on the Web App if time allows.

Another risk area is my unfamiliarity with the Android Platform. I haven't yet worked on an Android based application and this project will require fairly advanced use of it. This presents a risk to my ability to finish the project.

Another area which I am unfamiliar is REST APIs, while I have been looking into this in recent weeks I have yet to build a project based around REST. Since my application relies so heavily on the use of a REST API this poses some risks.

While relatively minor, another risk area is Facebook availability, which it is generally pretty reliable if Facebook experiences an outage, users will no longer be able to login to the application. Rendering it unusable. This has happened recently to other Facebook based apps such as Tinder.

3. Prototype

First Prototype

For the initial prototype I want to focus on building the REST backend and creating some basic Android functionality. This will include login through Facebook, creation of a house, adding people to a house. Depending on the time I will also be looking into developing some of the expenses functionality.

To test this I will be using Unit Tests. I also plan to give out some prototype builds to other friends/other classmates. I plan on doing short informal interviews to get feedback based on this prototype builds.

Second Prototype

For this prototype I want to expand the functionality of the Finance facility and also get a start on the Tasks feature. I will at this point have the REST API up and working allowing me to add to it as I need to.

I will be using the same testing methodology for this phase of the project as I did in the first prototype.