The SimTech Group

Deliverable F – Prototype I & Customer Feedback

GNG1103 (A00) – Engineering Design

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University of Ottawa

Group #17

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1 – Introduction

After finalizing our project plan and estimating our project costs, we're now ready to start making prototypes. The first prototype will be a very simple UI that attempts to measure the accuracy of the location API provided by Shabodi. The app utilizes an array to request the location of a device connected to the Shabodi Sandbox, and then compares the responses to determine how precise the responses are.

2 – Client Meeting II Feedback

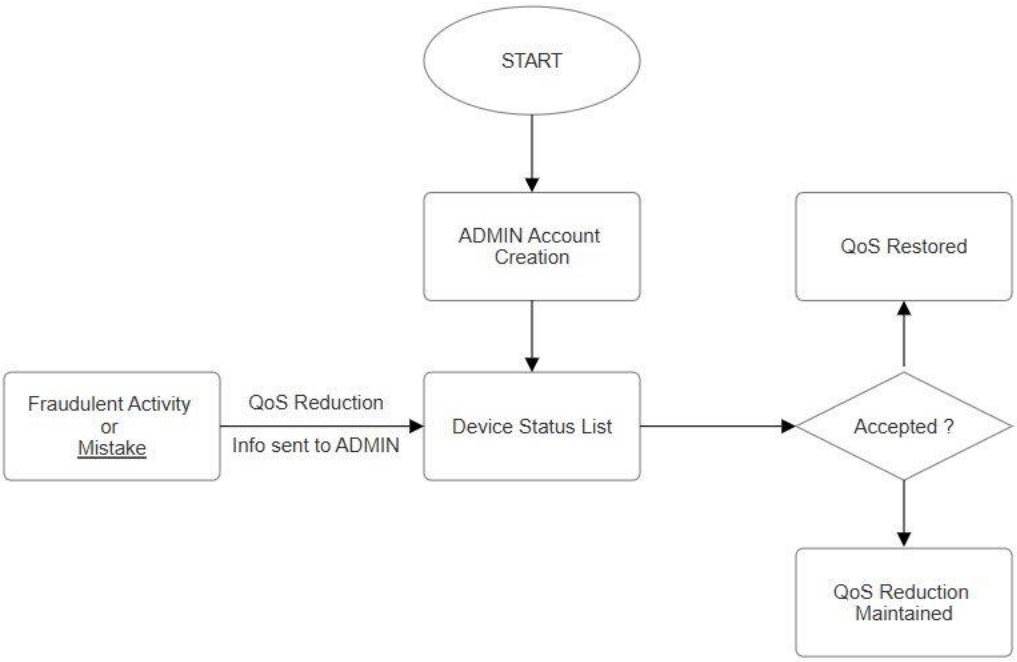
The second client meeting allowed us to present our ideas to the client personally. Presenting conceptual designs for the four subsystems (detection, alert/snapshot, QoS reduction, and UI/UX), we received helpful feedback from the client about each subsystem design for improvement.

Below are some of their suggestions:

- Employee lists: Initially, we had assumed that the application would allow both employees and administrators to create separate accounts that are linked by the administrators to detect SIM swapping.
    - The Shabodi representative informed us that administrators handle IoT devices rather than employees in regard to SIM swapping.
    - We have updated our prototype testing and BOM to reflect this change outlined below.
        - Updates to testing: the prototype will allow administrators to log in and track their devices while eliminating employee log-ins.
- QoS Reduction: The representative was satisfied with our QoS reduction and wanted us to continue with the same ideas when creating prototypes.

3 – Updated Application Block Flow Diagram

After receiving feedback from the client, we are removing the employee aspect of the Flow Diagram; only ADMINs should login and have access to device info. The overall flow diagram has been condensed and simplified to ensure easy comprehension.



4 – Prototype I: Test Plan, analysis and results

4.1 - Plan:

The goal of this first prototype is to test the ability of our app to successfully utilize the Location API in order to retrieve the location of a device on the Shabodi Sandbox Network. The initial plan was to test the accuracy of the application by moving the object and testing to see if the location received by the API accurately reflects the change in location. Since we now know that we cannot move the object ourselves, we will instead get the location multiple times using the API and compare the results to make sure that they are all the same (test for precision, assuming that the object is not being moved).

The prototype consists of a simple function mapped to a very simple user interface (UI). The application makes a request for the location of a device on the network by using the Location API. These request results are each added to an array, and then the function compares the longitudes and latitudes of the group of requests to ensure precision in the results. When the coordinates aren't all the same, the admin is notified that the device may have been moved.

Unfortunately, we were unsuccessful in receiving a response from Shabodi when attempting to utilize the Location API. Having spoken to other teams, it seems to be a widespread issue. Since

we made a contingency plan, we moved forward with the prototype. The simple application was created as described above, but the locations are manually inputted instead of requesting the location of the device using the API. We can simply add the code to make requests in the future, once the Sandbox is functional.

4.2 - Analysis & results:

Our ability to evaluate the effectiveness of the prototype is limited since it seems there were issues with the Shabodi Sandbox. We can however evaluate the effectiveness of the logic of the application. When the same location is input 5 times, the application successfully determines that the locations are the same and that the device wasn't displaced. When the locations are not all the same, the application warns the admin that the locations are not all the same and that the device might have been displaced.

*Add Kushal's images

5 – Modified Prototyping Test Plan

Prototype	Test Objective	Description of prototype and test method	Results	Estimated test duration

Prototype I	Test snapshot location precision	Request the location of device via Location API multiple times and compare results for precision	Quantitative: Longitude + Latitude coordinates of device	45 minutes
Prototype II	Test snapshot info accuracy	Request device info via API multiple times and compare results accuracy	Quantitative: Snapshot info (time, UE ID) can be compared to actual values	45 minutes
Prototype III	QoS reduction efficiency testing	Trigger a QoS reduction and determine if the bitrate matches the required reduction	Quantitative: Compare bitrate to the bitrate that we are supposed to be receiving after QoS	30 minutes
Prototype IV (if time permits)	UI / UX user feedback testing	Design a mockup of different interfaces and ask people (students, TA, prof?) what they think (maybe present to client next meeting if finished)	Qualitative: User feedback from various people will help us determine what color schemes are more popular with users, button shapes, etc...	1-2 hour

6 – Updated BOM

Based on further information we've received after the client meeting; we now understand that we can only utilize devices that the client has provided on their network. Our BOM has been updated accordingly, showing that we have no upfront costs for the creation of the application.

Item	**Purpose**	**Cost per Unit ($)**	**Quantity Subtotal ($)**
Shabodi NetAware Sandbox	Needed to learn and utilize Shabodi's APIs	0$	0$

Python 3.12.7	Needed to code the subsystems of our product	0$	0$
Microsoft VSCode	Needed to code to code in python outside of the NetAware Sandbox	0$	0$
Tkinter GUI library	GUI library for python that is easy to use and accesss and has a lot of documentation and tutorials	0$	0$

7 – Prototype II – Future Work

The testing plan for Prototype II can be seen in the overall prototype testing plan in section 5. The goal of Prototype II will be to request the device ID of one of the devices on the network and keep track of the time that the request was made as well. We will then be able to compare the results from the API to the actual values (time and Device ID) to test the accuracy of the application.

8 – Conclusion

Despite the malfunctioning of the Shabodi Sandbox, we were able to create a very simple proof of concept prototype. The prototype attempts to utilize the Location API to receive the location of a device multiple times and compare the precision of the results. The prototype currently cannot receive the information from Shabodi, but will be updated to do so once the problems are resolved. Work will soon begin on prototype II, and once this prototype is complete and tested, we should be able to merge Prototypes I & II. The resulting application should request the device ID, as well as the location and time. This will allow us to complete the Snapshot functionality of our Design Concept, allowing us to take all the necessary info of a device when a fraudulent activity occurs.

9 – Trello Board Link

https://trello.com/b/u6dVFniw/gng1103-project