

Deliverable D – Conceptual Design

GNG1103 (A00) – Engineering Design

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Group #17

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1 Introduction


Using the problem statement as well as a list of prioritized design criteria established in the last deliverable, each member of the design group came up with conceptual designs for each subsystem of the application. The design concepts were analyzed and evaluated as a group, and the best concepts or a combination of concepts were chosen that we will use moving forward.

2 Concepts for each subsystem

2.1 Detection


Steph's Concept: The admin can login to the application. The admin links their ID to be notified when there is a SIM Swap. The admin can pair the SIM with the User Equipment (UE). The program runs on startup and continuously checks to make sure the SIM and UE match. If they don't match, send an alert and snapshot to the linked admin.

Detection

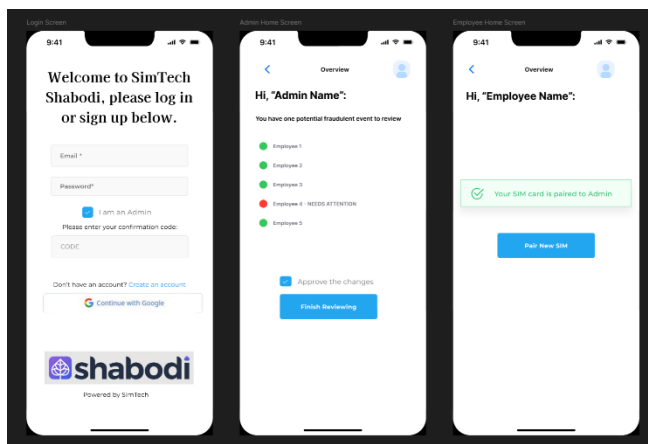

Shabodi Sim Swap Detection

Username:

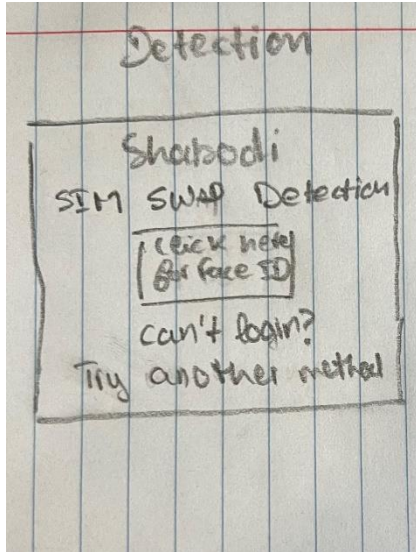
Password:


Set Admin ID

Pavithra's Concept: Both the employees and administrators have separate accounts that are linked, giving the administrators the power to view any malicious threats. The employees also have the ability to request a SIM change so that they can warn the administrators of the change.



Nour's Concept: The admin can access the application using the face ID as it is safer to use. In case the employees are accessing the application, only one username and password is shared with everyone so they can login to the same account. This makes the application more controlled by the admin. Another method is to have two separate accounts, one for the admin and the other for the employees.




Kushal's Concept:



2.2 Alert / Snapshot


Steph's Concept: The admin has access to a page that lists recent alerts, and they can check or delete them. When checking the alert, admin can view a snapshot that includes UE ID, date, time of the SIM Swap as well as location. Admin can accept or deny swap; if they accept new SIM is linked to UE. If they deny, Quality of Service is reduced to the UE.

Alert / snapshot




Recent Alerts

UE ID / Date / Time	CHECK	DELETE



UE ID / Date / Time



Accept Deny

Pavithra's Concept: Once the application recognizes a SIM swap, Quality of Service (QoS) is limited until the administrator approves and acknowledges the swap. Once accepted, the QoS stays reduced and further action can be taken. However, if the swap is denied, QoS gets back to normal and regular activities may continue.

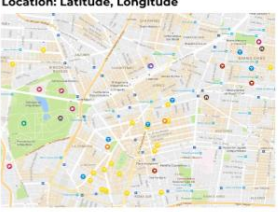
SIM Swap Snapshot

9:41

< Activity Snapshot >

Employee Name and ID

Location: Latitude, Longitude



Date: XX/XX/XXXX Time: XX:XX

Action:

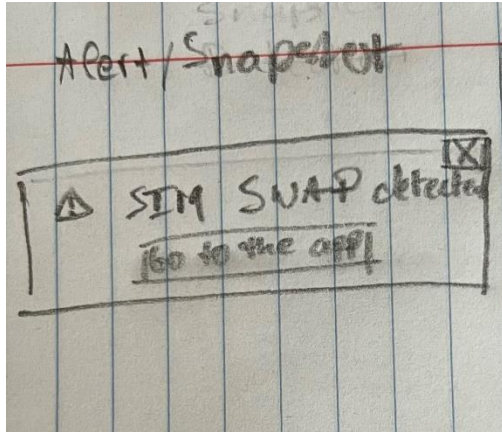
SIM Information:

User Equipment Information:

Accept this Swap

Deny the Swap

Nour's concept: Once a SIM Swap has been detected, an alert is sent to the admin where a box appears in the middle of the screen. They can deny it by clicking on the cross at the top of the box which doesn't change anything about the Quality of Service (or it can be changed). If they accept it by going to the app to see all the information about the user (User ID, date, time, and location), they can approve the swap.

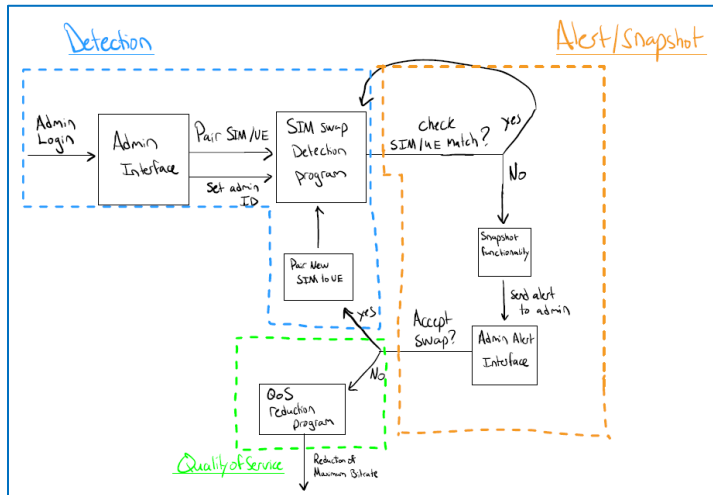


Kushal's Concept:

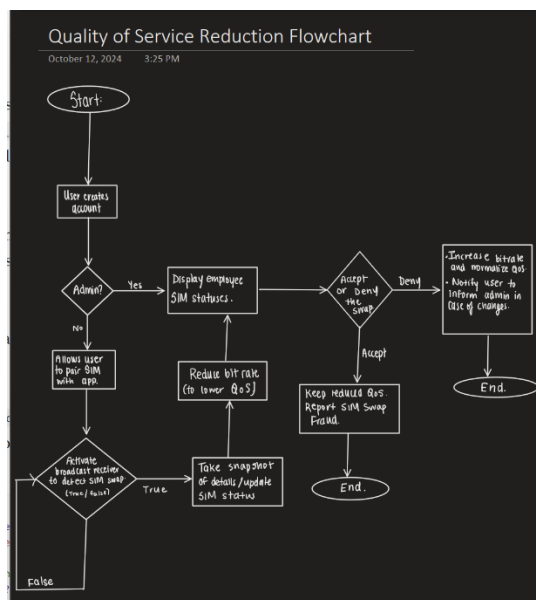


2.3 Quality of Service Reduction

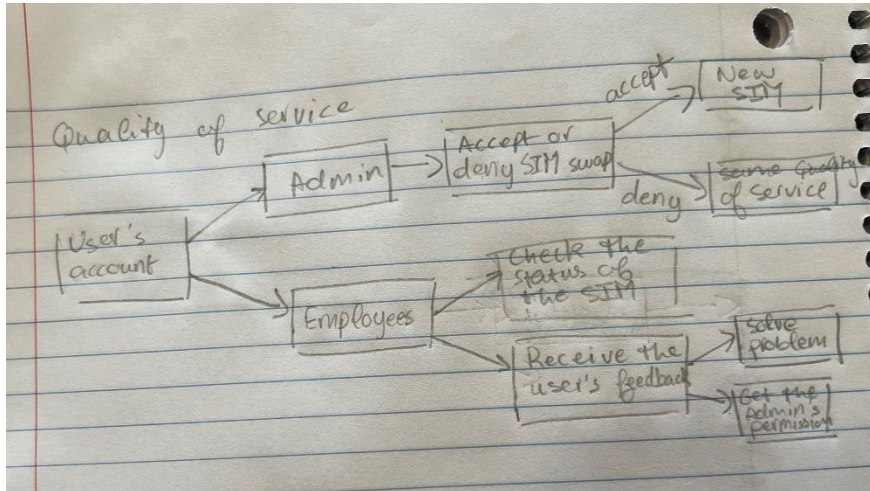
Steph's Concept: Quality of Service Reduction is mostly a backend concept, so shown here is a block diagram going through different stages leading to the reduction of the UE's maximum uplink/downlink bitrate.



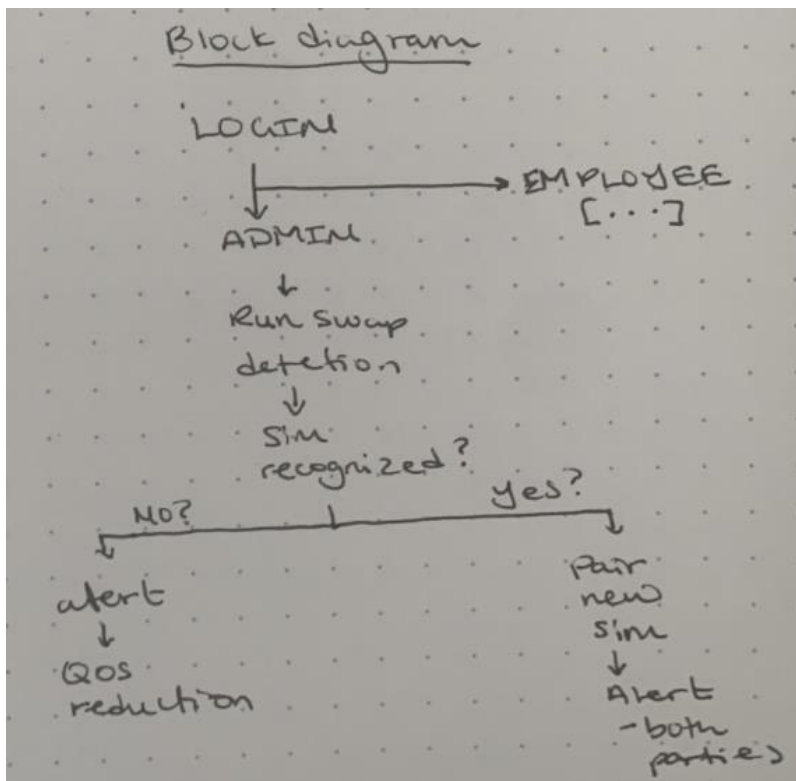
Pavithra's Concept: This concept is shown on a block diagram as well. The Quality of Service (QoS) reduction can be done by lowering the bit rate from the required levels to a predetermined committed information rate (CIR) while the admin is investigating the cause. If the swap is accepted, the bit rate can be lowered further, and fraud can be reported as well.



Nour's Concept: Both the admin and the employees have access to the User's account. The admin is the only one who can accept the SIM swap, so a new SIM is linked to the User's account. Or they can deny the SIM swap, so the Quality of Service stays the same. The employees on the other hand, can check the status of the SIM card and they also receive feedback from the User. In case the User is facing a problem, the employee can solve it, or they must get the admin's permission first if the solution has a risk of affecting the SIM card.

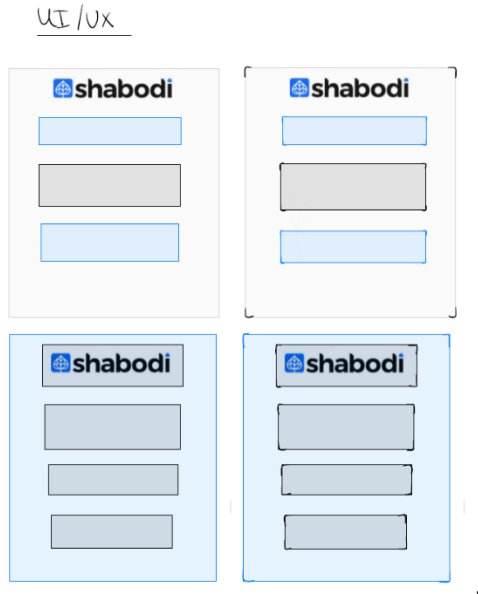


Kushal's Concept:



2.4 UI/UX

Steph's Concept: A general color scheme that attempts to match the colors of the client's logo. The edges of boxes can be sharp or curved and different color combinations are shown.



Pavithra's Concept:

All text and colors in the application will aim to match the client's website (1).

Text: Shabodi NetAware (Montserrat)

Color Codes:

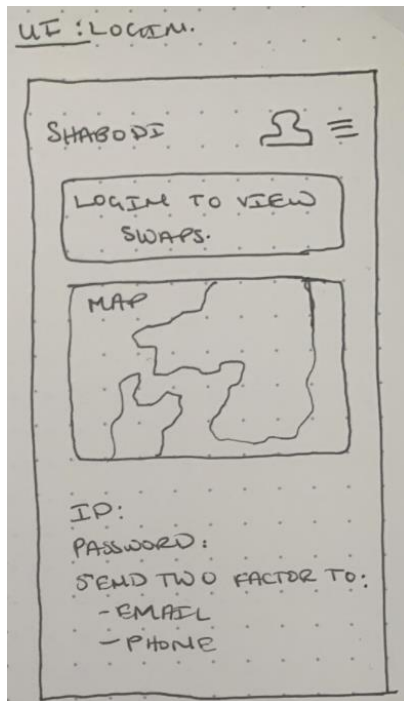
HEX: #0482a5, RGB: rgba(4,130,165,255)

HEX: #0041aa, RGB: rgba(0,65,170,255)

HEX: #45b3d3, RGB: rgba(69,179,211,255)

Nour's Concept: The text, color, and shape of the boxes should match the client's website (1).

Kushal's Concept:



3 Refinement and Final Concepts

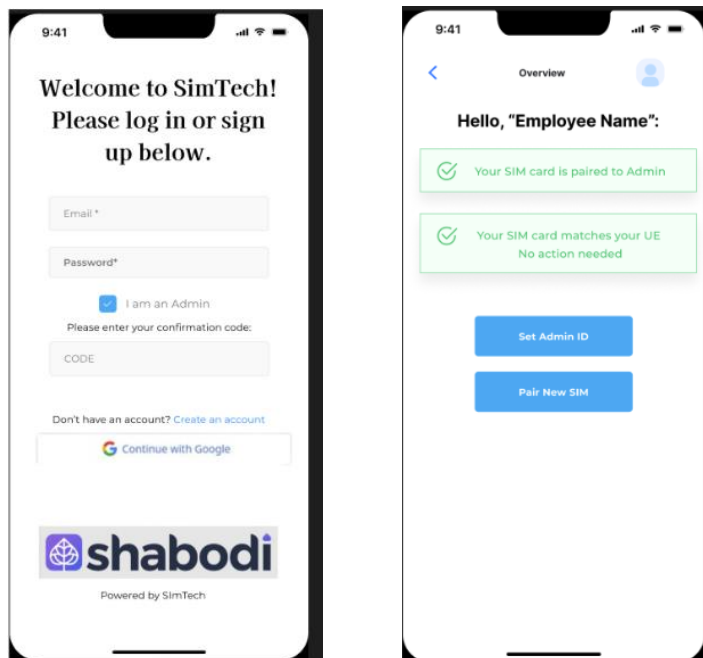
After going through the submitted concepts, we decided on these final concepts to be used moving forward in our design project. These concepts will be presented to the client during our next meeting to receive feedback.

3.1 Detection

We decided to go with a mix of Pavithra's and Steph's Concepts. Employees can set the admin ID and pair a new SIM to their User Equipment themselves. Either of those actions sends a message to the linked admin and requires their permission.

Advantages: By letting the Employee login and do some of the functionality themselves, it removes some of the work that must be done by the admin.

Disadvantages: There is a larger number of accounts to keep track of and to keep secure.



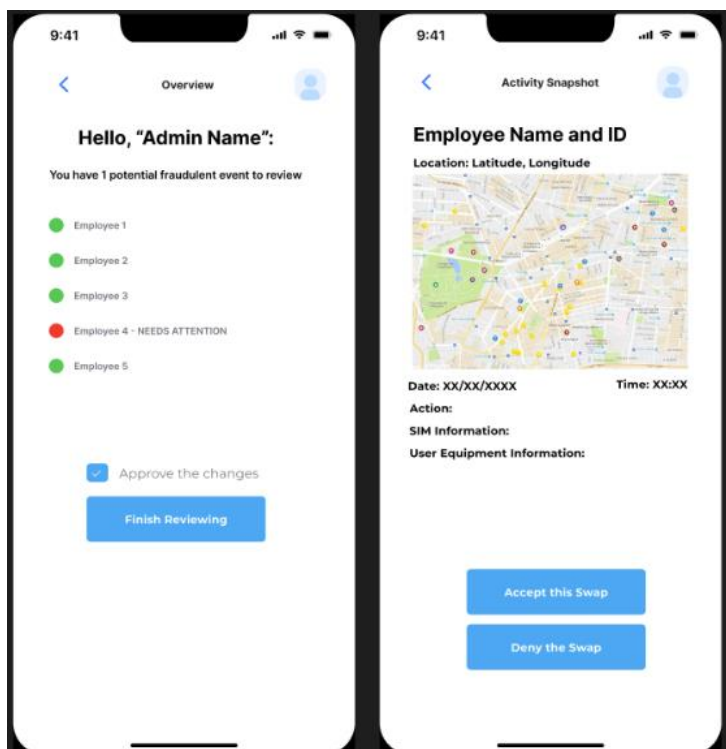
3.2 Alert / Snapshot

We decided to go with a mix of Steph's and Pavithra's concepts for this one as well since they were very similar. When a SIM Swap or Admin ID change is made, the system sends a notification to the admin that is linked to that UE's app.

The admin can login to see a list of Employee and their status'. The admin can click on a status that requires attention to see a snapshot of an event that includes the date, time, location, SIM & UE info and the action that took place. The admin can accept or reject these changes. Accepting will update the info on the employee side, rejection will reduce the QoS of the employee's UE.

Advantages: Admins can easily monitor a list of all employee UEs under their supervision. They can easily accept or detect changes and reduce QoS if necessary.

Disadvantages: An active list of employees could be very large depending on the number of UEs. Ideally a company would hire enough admins so that each has a reasonable number of UEs under their supervision.

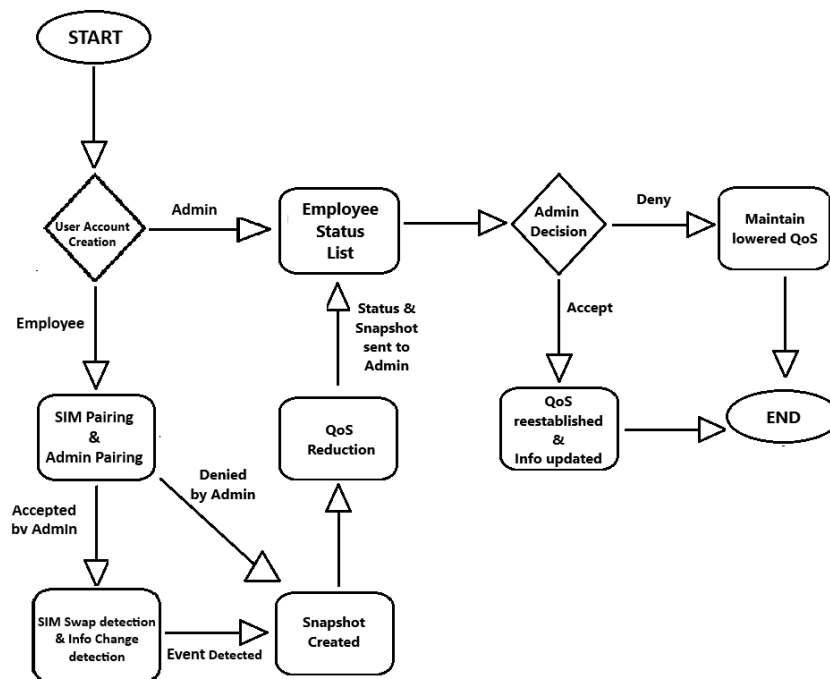


3.3 Quality of Service

We decided on a Quality-of-Service Block Diagram flow chart that most represents how we would like the app to behave. Quality-of-Service is diminished as soon as any type of non-desired behavior occurs in order to protect the company from nefarious activities. Only once the admin accepts the changes can the UE go back to receiving full QoS.

Advantages: Any strange or not-allowed behavior will be met with a reduction of QoS which protects the company from any potential threats.

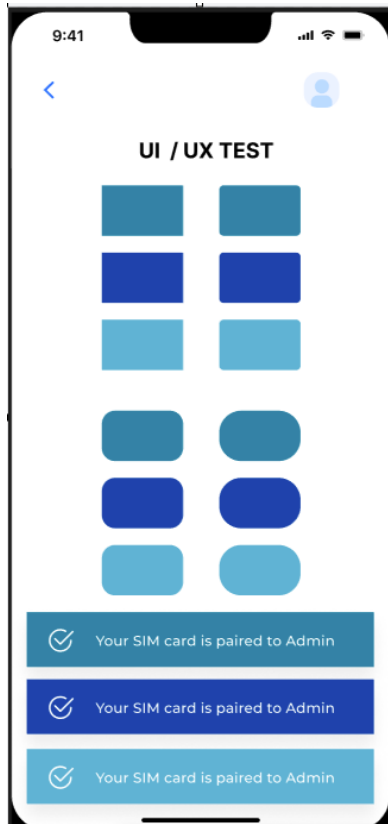
Disadvantages: Any small mistake or misstep by the employee will result in a reduction of their QoS, and they will have to wait for an admin in order to rectify the mistake.



3.4 UI / UX

Everyone agreed on a color scheme that matches the Shabodi website and color scheme. Feedback and prototyping will allow us to dial on what the client and users think looks best when it comes to shapes and layouts.

Advantages: Matching the client's already established color scheme creates a sense of unity between the application and the client's other works. This also allows for better marketing, where the client can be recognized by their characteristic colors and designs.



4 Trello Board link

<https://trello.com/invite/b/66e37f958d247214e32ecb49/ATTI213d79dc5c8b9b0129e2b35b239791f887C4B413/gng1103-project>

5 References

1 – Shabodi, <https://www.shabodi.com> , last visited October 13th, 2024