UTM

UNIVERSITI TEKNOLOGI MALAYSIA

SECP 1513

TECHNOLOGY AND INFORMATION SYSTEM

GROUP PROJECT

Low Fidelity Prototype

PROJECT 1 (PART 2): REPORT

Prepared by: GROUP 3

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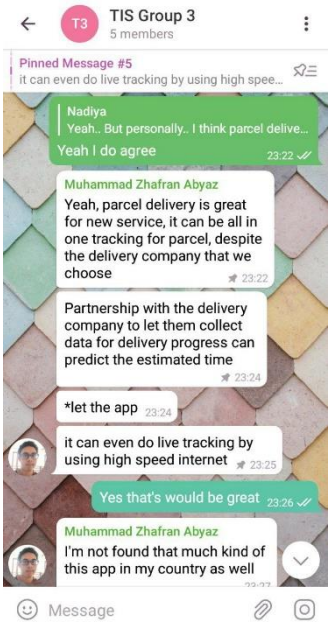
1.0 Introduction

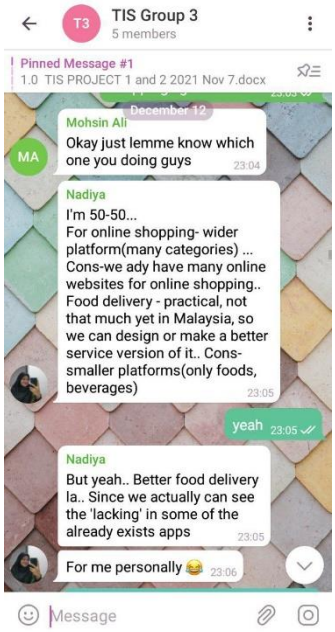
This report is about our project in creating a low fidelity prototype project. This project is divided into two parts. The first one is more towards the brainstorming between each of the members and the creation of the report and in the second half part we have to do the full report, project video and presentation. This report is the overall report including part one project where we would be focusing on the discussion of the idea, dividing the task for each member and the implementation of the report and part two is more focusing on the creation of our low-fidelity mock-up and presenting the outcome.

By using what we have learned throughout this subject, we believe we will manage to create a prototype for this project. We could apply some topics like Cloud usage like Amazon Web Services and 4th IR technology applications in our projects. Project development continues with the distribution and completion of tasks among the members. This report will cover the 4th IR technology options appropriate for our application, an architecture that demonstrates the flow of the system and contains features about the Amazon Web Services used that fully meet customer needs. Not only that we will apply this into the AWS architecture design and show the business flow for this application from the beginning until the end. We provide the result and the main part for this project which is the low-fidelity mock-up of the application that we have selected.

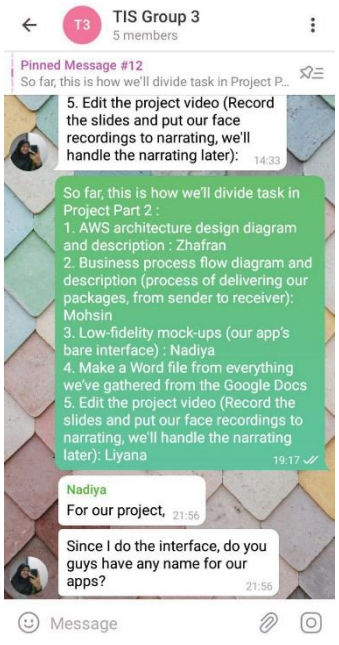
2.0 Step and Progression

As an initial step for this project part 1, the discussion is conducted through our Telegram group to brainstorm some ideas and suggestions regarding the application or website that we want to create. As a result of this discussion, we came up with a few ideas such as creating a prototype for online food delivery and an online shopping app. However, we finalized our decision by creating a parcel delivery application as the existing application has lacked services. Our team members agree that we should improve the service and add some new features to this system to make it one of the best apps that many people can use.

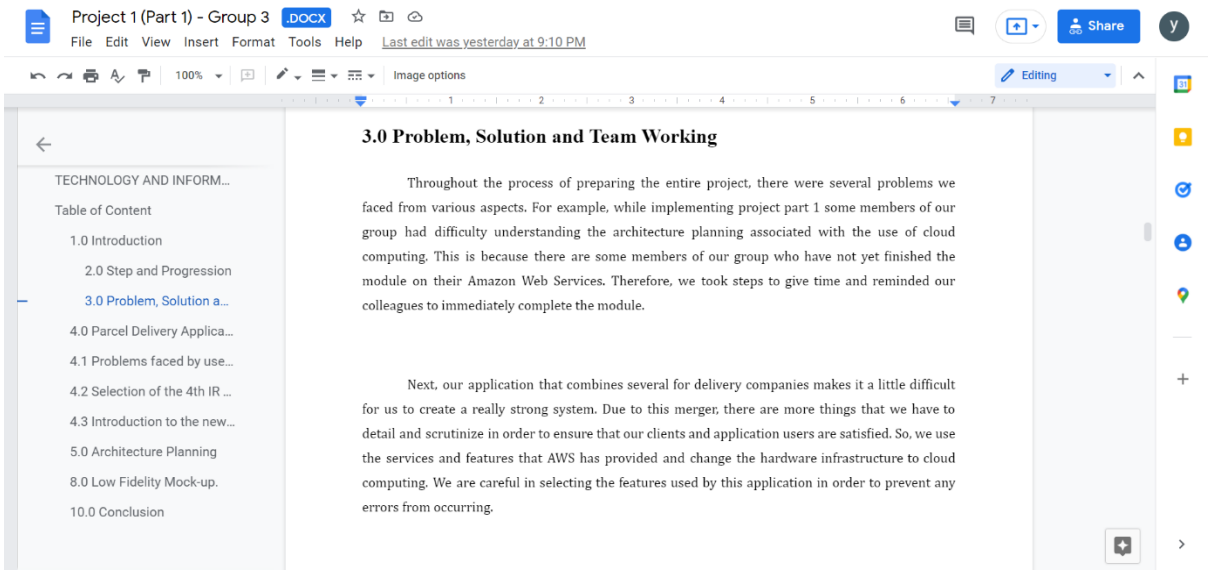


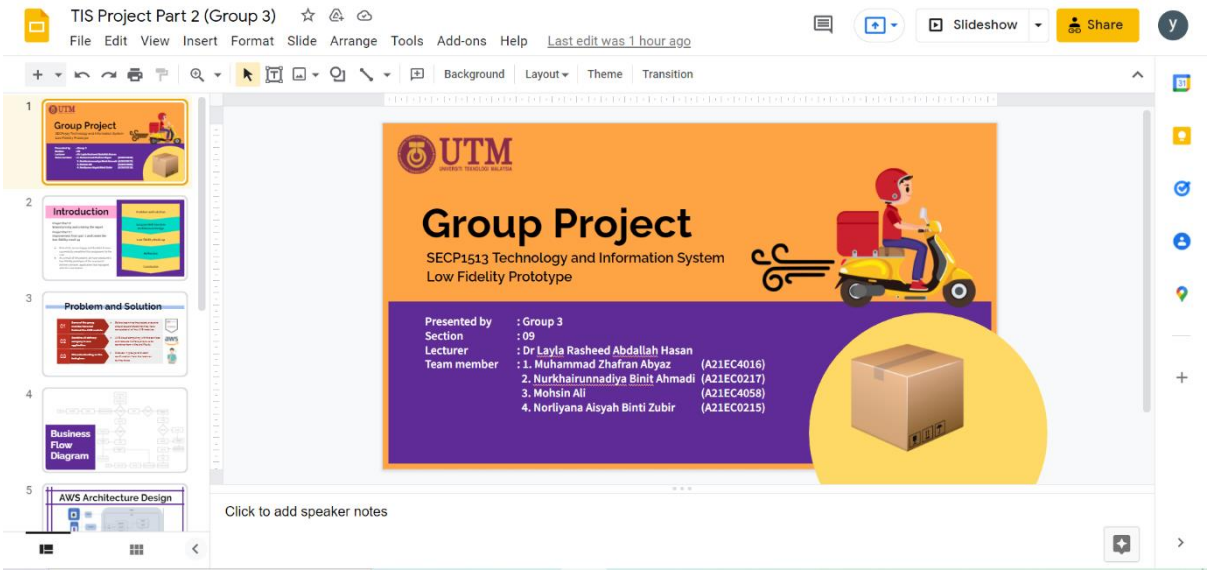


On the 13th of January, all students must meet in their own group during class time to receive feedback from the lecturer on the first part of the project. Our group received positive comments from the lecturer, although there was a comment on one of the parts of the report that needed to be corrected. We have all accepted all of the comments and feedback, and we were able to correct the mistakes in project part 2. When the class is over, we review the task distribution for the second part of the project, and everyone gets back to work on their work progress.



We decided to edit our own task using the same Google document we used in part 1. Following the completion of the report, we begin video filming for the project as well as the presentation using the rubrics provided. Finally, on January 24, 2022, our team completed all three major components of this project, including the report, project video, and presentation and submit it on time.





3.0 Problem, Solution and Team Working

Throughout the process of preparing the entire project, there were several problems we faced from various aspects. For example, while implementing project part 1 some members of our group had difficulty understanding the architecture planning associated with the use of cloud computing. This is because there are some members of our group who have not yet finished the module on their Amazon Web Services. Therefore, we took steps to give time and reminded our colleagues to immediately complete the module.

Next, our application that combines several for delivery companies makes it a little difficult for us to create a really strong system. Due to this merger, there are more things that we have to detail and scrutinize in order to ensure that our clients and application users are satisfied. So, we use the services and features that AWS has provided and change the hardware infrastructure to cloud computing. We are careful in selecting the features used by this application in order to prevent any errors from occurring.

Finally, the challenges we faced included misunderstandings that occurred among group members about a given task. Each individual has their own views and perspectives and sometimes different understandings cause us to err in doing a given task. This problem is solved by discussing among group members in the Telegram group to describe any problems or confusion faced by our group members. We also get confirmation from the lecturer after discussing in the group to get a clearer and more accurate answer.

4.0 Parcel Delivery Application

In 2021, BTL Express, PosFast Delivery, JnU Delivery and Leopard Van categorize as the biggest delivery companies in Malaysia and currently, they are still using the traditional computing system which is hardware infrastructure. During this covid-19 pandemic, this company launched an application that can be used by their customer to deliver their own parcel without the need to have much physical contact such that the user does not have to queue while waiting for their turn instead they can use the application to fill up the details for their parcel delivery and drop it at the office. The payment for delivery services also can be done through this application that helps users to go cashless. Since this company keeps growing, they have been receiving a lot of parcels day by day that leads to some of the problems stated below. Thus, our team is assigned by this company to solve the problem that they are facing to make sure that the user has a better experience by using their application and services.

4.1 Problems faced by users with the old application

The delivery tracking system of many companies is outdated. It doesn't give proper shipment tracking information to the user. It is a headache for both sender and the receiver that they cannot properly track the shipment. Most parcels are nowadays from online business retailers to their customers. Most retailers have the requirement to pay for the product before the delivery, and some orders are cash on delivery. In case of the payment in advance, customers are worried about their product delivery, in case of late delivery when they cannot properly track the delivery, it makes them more worried, and it is bad for the customer and retailer relationship.

4.2 Selection of the 4th IR Technology.

Delivery services are interconnected with IR 4.0 technologies such as Artificial Intelligence (AI) and Machine Learning (ML), The Internet of Things (IoT), Big Data Analytics and High-speed mobile Internet.

Artificial Intelligence is used to take and identify the data such as problems or services that suit the user's needs. Once it was identified, the AI will suggest the best solution that was already automated in the systems. However, when it encounters questions that are not available in the AI systems, it will directly lead to live customer service. The AI is also used to send notifications to the courier companies, the users, and the receivers.

Machine Learning is also used as it allows the systems to learn from experiences. For example, the users might find suggestions if they have been using the same courier company based on the previous history. The usage of AI and ML also improves security as they self-adjust and learn over time. Hence, it can identify and defend vulnerable systems and ensure the security of users' privacy and personal information.

Next, IoT is used as a tracker that allows the delivery drivers to keep track and update about the parcels. If they face problems throughout the delivery process, it will alert and notify the delivery office center and the receivers. In detail, the Global Positioning System (GPS) navigation system is used to locate the exact location of the parcels. Because of that, IoT improves the location accuracy of the parcels' whereabouts.

Big Data Analytics is also used to record and identify user's preferences and history. Since the services we provide are engaged in collaboration with multiple courier companies, it is important to keep the users' data and details from each of the companies used through our service. Big Data Analytics can improve customer service as it records and monitors the users' activities while using the service, hence it can identify the problems faced by the users and solve it.

Finally, High-Speed mobile Internet is used to connect to live locations of the recipients and to keep updated the estimated delivery time. Hence, it is important to avoid delays while updating the information. High-Speed mobile Internet has greater reliability as it is not affected by weather and has a consistent network signal that improves the speed to access cloud-based activities.

4.3 Introduction to the new application.

So, our application has solutions for all these problems. This application will be connected to all the major Parcel delivery companies. It can be both used to book a delivery of a parcel with delivery companies and track the delivery. The user first must create an account in this application, his/her account will be verified after that one can use this application. The user can also login using social media accounts. The customers must set up their profile including address and personal information.

This application will provide many services such as online booking of parcel delivery. The delivery orders will be filtered by location, time added, package size. The system will have a matching algorithm and automatically assign the delivery to the nearby respective courier. After booking the delivery, the **user** booking details will be shared with the **delivery company**. Then the user has the option to manually drop the parcel at the office of the nearby respective delivery company or the delivery company will come and collect the parcel from the customer's given address. After the parcel is collected by the courier company, the user will be given a QR code and tracking number. The user will pay for the delivery charges online with the specified payment method. The user will be provided with 24 hours customer support.

The parcel tracking system will be GPS-enabled. Using tracking features present in the application, the sender and receiver can view the current location of the parcel. The live location of parcels will be updated in the application. Estimated delivery date will be shown in the tracking feature of the application. In addition to that, when the parcel has reached the receiver's local area. The contact details of the delivery man will be shared with the receiver, so when tracking the parcel, he can contact the delivery man. This will significantly reduce the failed delivery attempts. It is both beneficial to the user and the courier company. After collecting the parcel, the user will scan the QR code using the application.

At the end, the customer will have the option to rate the courier company and can give their valuable reviews. There will be a history of the booked and completed order in the application.

5.0 Architecture Planning

Because of the features of our application, we need a powerful foundation for our cloud architecture. We need an architecture that provides core components from the start like high-speed servers and networking, virtual machines, databases, management, and security. For this case, we use Infrastructure-as-a-Service architecture that provides all those core components, while also letting us manage/customize other components like applications, middleware, and runtime.

Within the application, we have put our custom shipping API that connects our services with other delivery companies. We also put the tracking API by utilizing GPS on smartphones for the package tracking feature.

Based on the application that we want to develop, we highlighted 3 major needs that we want from our cloud platform, which are scalability, speed, and capability. We want to ensure that we choose the components for the cloud that matches our needs and standards.

Scalability is required to fulfil the customer's demands, while also considering efficiency. We want to easily scale our cloud high or low based on how many users use our app. As a compute unit, Amazon EC2 exactly gives that, with its EC2 Auto Scaling that can easily resize the capacity of our computing power.

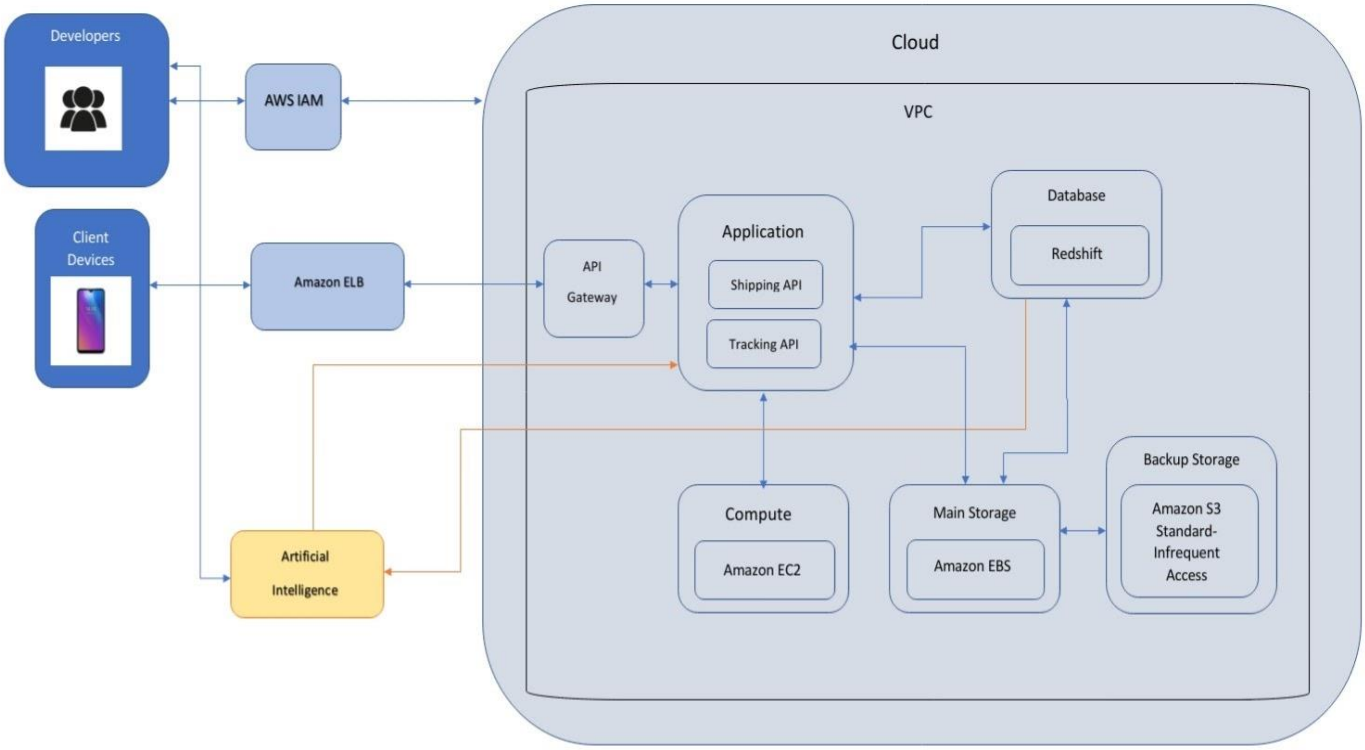
Speed is also a huge factor for our app, especially in our case since we need to analyze huge data and have a fast response time to enable such features in our app. Amazon Redshift can accelerate data analysis and provide a data warehouse using standard SQL. The database will be connected to our artificial intelligence to learn from the data that have been collected by the database, so it can improve several features of our app that uses machine learning and AI.

Capability is used for having efficient storage that can store huge data and enable us to set an alternate plan if there is something unexpected that happens on the cloud. Amazon EBS is able to send the backup data to other storage services, so we combined it with Amazon S3 Standard-Infrequent Access to do regular backup and storing recovery resources if there are some disasters.

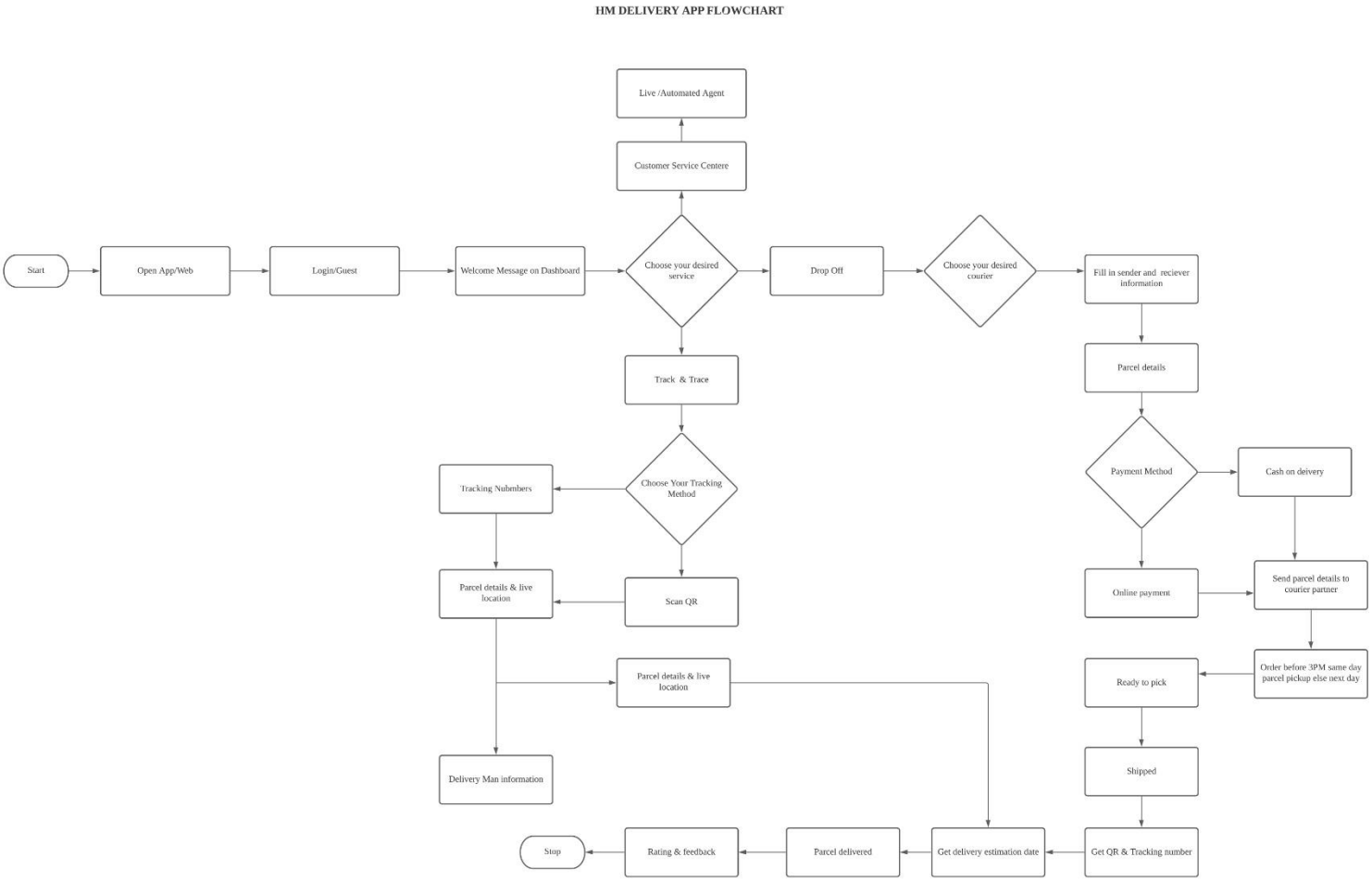
Besides those 3 major needs, we need to consider other components, like network, management, and security. We'll use Amazon VPC to create an isolated virtual network in our

cloud ecosystem. We can also set security groups and assign IAM roles for secure management. We also use Amazon IAM for managing our developer's roles for each section of their tasks. Not only that, but we took advantage of the Amazon Elastic Network Adapter (ENA) from Amazon EC2 to have high-speed networking with speeds up to 100 Gbps.

6.0 Amazon Web Services (AWS) Architecture Design



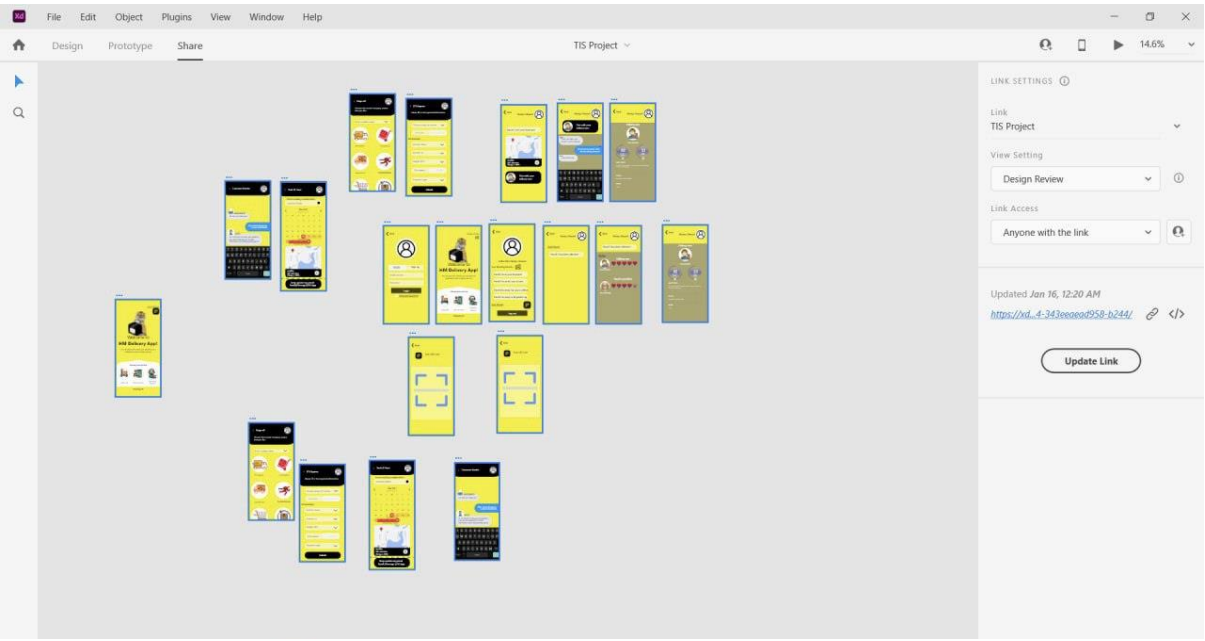
7.0 Business Process Flow Diagram



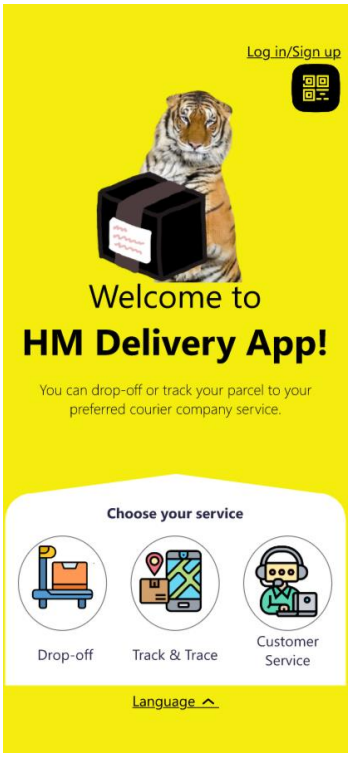
If the user does not have access to their phone, they can use the website version. The user will be asked if they want to log in or proceed as a guest. On the user's dashboard, a welcome message will appear. Following that, the user will be able to choose between three services which are customer care centers, track and trace, and drop-off. The user can talk to our live agents and automated agents about any problem or question he has in the customer service center. The user can choose from a variety of courier companies in the drop off menu. After selecting a courier partner, the user must complete the sender and receiver information as well as the package information.

The next step is to choose a payment method. The order will be confirmed after the payment method has been approved, and the details will be shared with the courier partner. If users place their order before 3 p.m., it will be picked up and shipped the same day, otherwise the next day. The user will be given a QR code and tracking number after the order is picked up by a courier partner, which may be used to trace the parcel's current location. The user will also be given the delivery man's contact details so that he or she can contact him or her. When the parcel is delivered, the user can leave comments and review the courier partner and delivery service. The third option is track and trace, which can be used to monitor the current location of the parcel as well as the delivery man's information.

8.0 Low Fidelity Mock-up.



Our HM app's low-fidelity prototype was produced with Adobe XD software, and the image above displays the total amount of pages in our prototype. We also use freebiesupply.com templates, although the logos and samples were originally downloaded and edited by using the Canva.



This picture shows the interface of our new application.

Click on the link below for demonstration:

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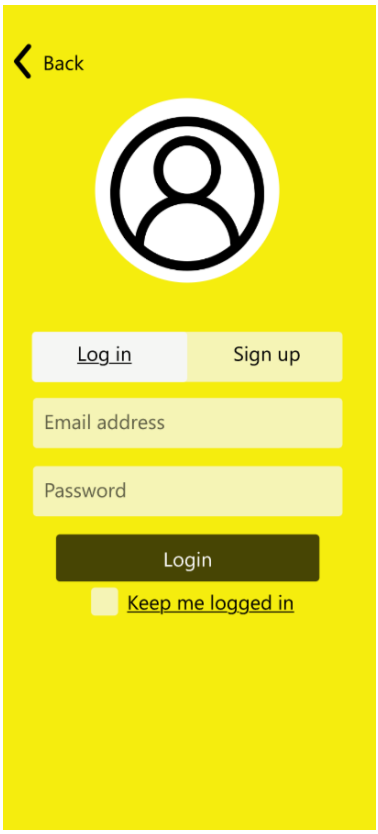
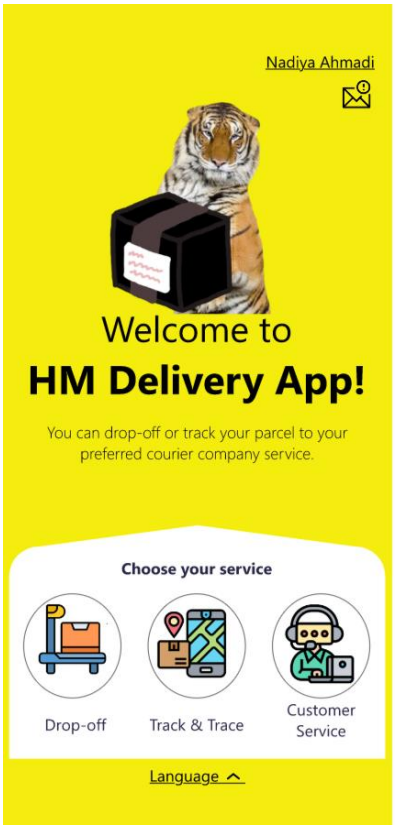
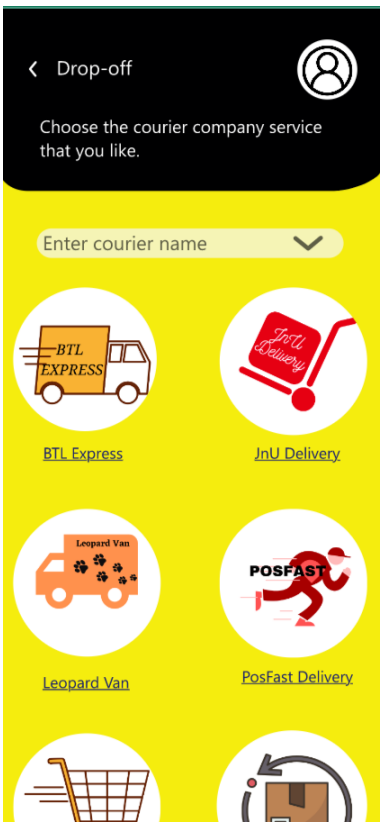


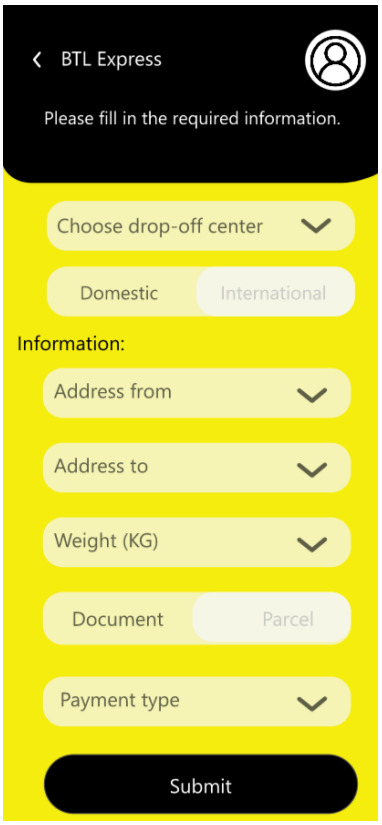
When the user clicks on log in/sign up button this interface will be



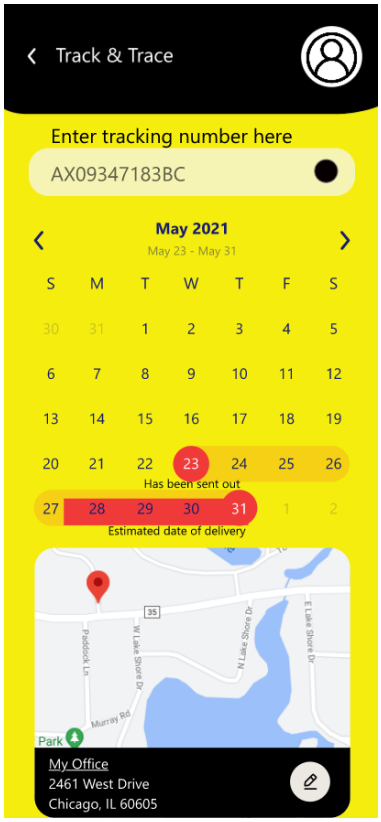
Once the user log in or sign up their name will pop-up on the top right.



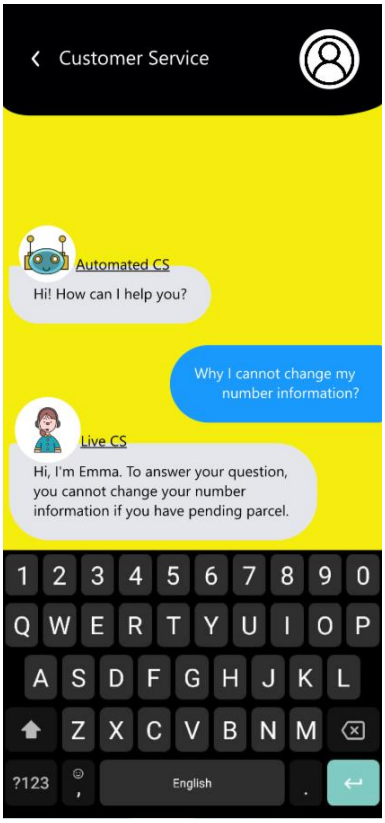
If the user click on Drop-off they can choose the courier company.



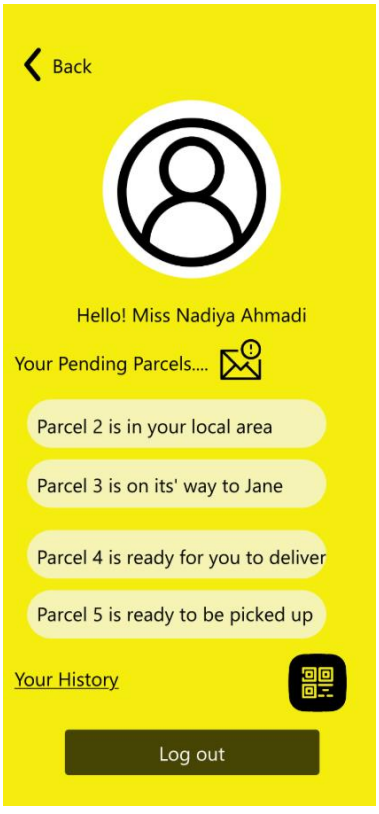
These are the details that user need to fill up after choosing the courier.



This is the interface when user click on the Track & Trace button.

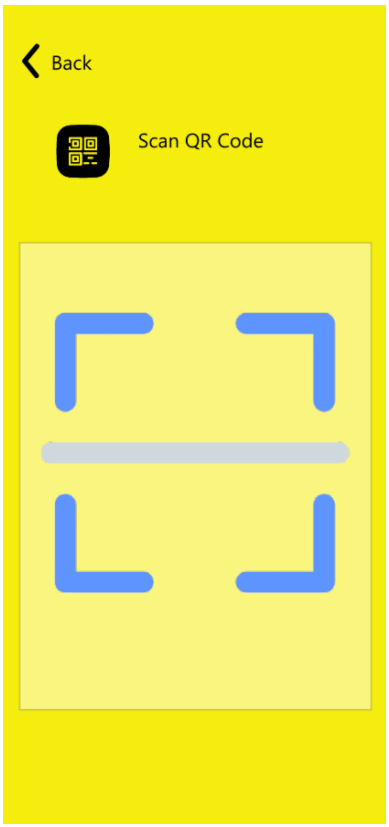


If the user clicks on customer services, it will lead to here.



If user click on their name, it will show all the parcels notification.

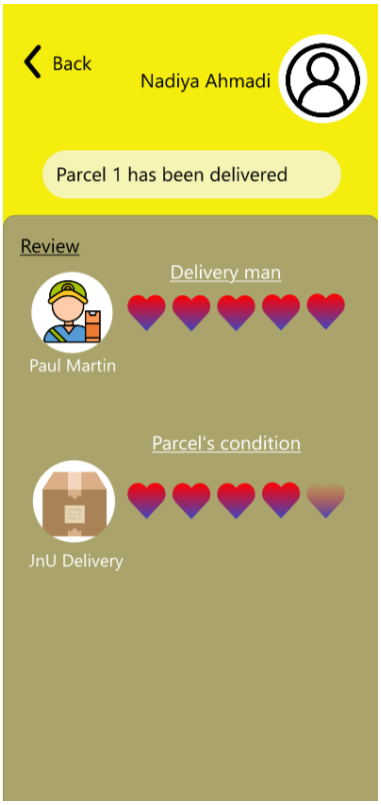
This shows the previous parcel that user have been received.



The user click this QR code button on the bottom left it can be used to scan the parcel.

The the delivery man's profile interface.

User can chat with the delivery man if they need to.



Once the delivery have been done the user can click on the parcel and give rating

9.0 Reflection

From this project, we learned about designing a solution to a problem using cloud architecture and low-fidelity mock-up. Learning more on cloud computing can help us on planning complex designs for cloud architecture. Using what we've learned from AWS Academy, we're trying to implement that knowledge to create our own cloud structure to solve the problem. We also utilize Adobe XD to design the concept for our app interface. If we work as cloud engineers, we can consider realizing our work to be a real app, with more features and better architecture design, so it can run on optimal settings. We need to learn more to design a great concept and look for more information about architecture designs on cloud computing, so we can make more complex cloud designs to implement it in real-world cases, like running huge apps and websites.

10.0 Conclusion

Delivery services existing are great and productive. However, they also have problems and insufficiencies just like other services such as high server latency that makes the service loading too long and progressing too slow. The lack of some features of services also delays the update about the parcels' whereabouts, but using AWS, delivery services can make a big difference by improving its amenity in many aspects like performance, server speed, storage and much more.

The utilization of IR 4.0 technologies can take our application to a next level. Technologies like AI and ML will make the application easier to use since it will learn your behaviour and allow you to repeat the progress used before but with fewer steps and more systematic. It also reduces the manpower as live customer service does not have to go through customer problems one by one and solely focus on more important and complicated issues. Our service also has IoT and High-Speed mobile Internet which will make tracking much faster and easier to ensure the progress or the live location of the parcels are in real-time. In short, new features will be added to our services such as a completely new tracking system with many features that allows the user to choose and select according to their preferences and at the same time will give the customers the best service and a more appreciated deal.

Many new features and improvements also lead to much works. Hence, making all of that is not an easy task as IR 4.0 technologies are hard to achieve and require a lot of time to be done. In addition, the pandemic COVID-19 that we are currently facing makes the work more difficult because these kinds of services that involve the application need full cooperation and commitment and if failed to pursue, it will slow the progress to complete the full product or application.