



**UTM**  
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**TECHNOLOGY AND INFORMATION SYSTEM**

**GROUP PROJECT**  
**Low Fidelity Prototype**  
**PROJECT 1 (PART 1): REPORT**

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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 basically more towards the brainstorming between each of the members and the creation of report and the second half part we have to do the full report, project video and presentation. This report is a part of the first project where we would be focusing on the discussion of the idea, dividing the task for each member and the implementation of the report.

As an initial step for this project, discussion is conducted through our Telegram group to brainstorm some ideas and suggestions regarding the application or website that we want to create. The results of this discussion, we came up with few ideas such as creating a prototype for online food delivery and online shopping app. However, we finalize our decision by creating parcel delivery application as the existing application have lack of 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.

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.

## 2.0 Parcel Delivery Application

### 2.1 Problems faced by user 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The delivery tracking system of many companies is outdated.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.

### 2.2 Introduction to the new application and the potential clients.

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. 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 to 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 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.

### **2.3 Selection of the 4<sup>th</sup> 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 the questions that are not available in the AI systems, it will directly lead to live customer service. The AI 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 improve the 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 trackers 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 centre 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 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 the 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.

Last but not least, 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 delay while updating the information. High-Speed mobile Internet has a greater reliability as it is not affected by weather and has a consistent network signal that improve the speed to access cloud-based activities.

## 3.0 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, and databases. For this case, we use Infrastructure-as-a-Service architecture that provides all those core components, while also letting us manage and customize other components like applications, middleware, and runtime. We can put our custom API that connects our services with other delivery companies like DHL, FedEx, and many more. We use public cloud services by Amazon Web Services (AWS) that provide many options of services to choose from based on our needs and are capable to run our services properly, while also providing support services to manage our cost reports, security, and accessibility.

Delivery services really need great scalability and flexibility, so we can change the compute capacity based on the customer demands to balance performance and reduce energy waste. Amazon EC2 provides a resizable compute capacity thanks to EC2 Auto Scaling. This option will allow us to reconfigure our compute system and its instances based on the workloads that we need. We can also take advantage of the Elastic Network Adapter (ENA) from EC2 for fast networking with speeds up to 100 Gbps from the ENA interface.

As for the storage, we'll use Amazon EBS. Its block-design storage will be efficient for our server storage and its low latency will help to boost our server speed too. It can also send the backup data to other storage services as well, which is why our backup storage solution is Amazon S3 Standard-Infrequent Access. This is not only for regular backup, but it will also store the recovery resources if there are some disasters.

For the database, we need a database report that is capable of doing big data analytics, which is an important part of our services. Because of that, we'll use Amazon Redshift that can accelerate data analysis and provide a data warehouse using standard SQL. It can provide scalability for our server while reducing the cost of databases. It can automate common administrative tasks and provide strong encryption for security.

## 4.0 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 delay 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.