

TECH CATALYSTS

ORDER TRACKING AND GPS ENABLEMENT FOR KESHPRO

Submitted by

Group – 17

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EXECUTIVE SUMMARY



GPS tracking feature
for their delivery
employees

Real time order
tracking feature for
users

The Tech Catalysts Consulting team is satisfied to present the proposal for the design of KeshPro Hair Oil In-House delivery and order tracking services set up. It's a good idea, women prefer natural products to protect their beauty. We understand that the management of KeshPro is committed to using environmentally friendly packing and sustainably sourced ingredients in their products, it is good for planet earth, and we also understand with their 100% natural-based and pleasant-smelling hair oil provides natural beauty to all women.

The goal of this proposed project is to develop an application for KeshPro to track orders which delivers home with improved quality and reduce time to deliver. As a result of this project, the client will receive reports with requirements that include GPS for drivers for better route optimization helps in the best shortest routes, order notifications to send notifications to customers about the status of their delivery and User management.

We estimate the project duration is 4 months and expect the drafts and reports with the prototype to be delivered to the client by June 13th, 2023. The expected fee is \$300,000.

With the help of the application, KeshPro has a significant benefit. We are assuming an increase in orders and overall profits for KeshPro. The application we develop as per KeshPro's needs will result in an annual \$18,000. The implementation also reduces the delivery charges by direct order.

We look forward to working with KeshPro to help further with their application and any updates. For any questions, please contact us at tech.catalysts@tc.com.



ABOUT THE CLIENT

KeshPro hair oil is a hair care product made to improve hair texture, improve hair growth, and limit hair loss. A vision that enabled it to develop into more than just an online gateway and became a marketplace where customers could purchase 100% natural, chemical-free hair oil.

The components in KeshPro Hair oil are said to nourish and strengthen hair from the roots, lessen hair loss, and encourage healthy hair development. The herbs and oils included in the formulation of KeshPro Hair oil are known for their beneficial benefits for hair and it could help improve women's hair care routine who are looking for an alternative to chemical-laden hair care products since the oil is free from harmful chemicals which makes it a safe option for regular use.

Regular usage of Keshpro hair oil can help to improve overall hair health by minimizing hair loss, encouraging hair growth, and preventing hair breakage. Moreover, it might aid in lessening split ends, dryness, and dandruff. The oil is simple to use and has a pleasant scent. To lessen its environmental impact, they are dedicated to using sustainable ingredients and eco-friendly packaging.

Overall, the main objective of KeshPro is to provide a very effective, 100% natural-based, light, and pleasant-smelling hair oil to all gorgeous women.





ABOUT THE BUSINESS PROBLEM

The market for hair oils is extremely competitive, with several well-known brands and recent newcomers continually fighting for market dominance. Because of this, it can be difficult for marketers to distinguish their goods and stand out in a crowded market. Even though women's use of hair oils is not always correlated with a specific season. The colder winter months, however, may cause some women's hair to grow drier, leading them to apply hair oil more regularly during that period. In the summer, some women can notice that adding oil to their hair makes it oily, so they might use less hair oil, such unfavorable economic conditions may be responsible for some of this fall.

Customer tastes and perceptions about hair care products may alter accordingly. So, marketers must remain updated with the changes to offer a highly effective, 100% natural-based hair oil.

Making clients trusting of hair oil products is one of the biggest obstacles. While making a purchase, shoppers might prefer to view, touch, and smell the item first. As a result, we require a system to control the flow of orders, including the capacity to accept, handle, and complete orders.

It might be challenging to send hair oil properly because it is a heavy and frequently fragile commodity. So, to guarantee that clients receive their products in excellent condition and on time, we need to have effective and dependable delivery systems that use GPS technology to track delivery vehicles in real time and provide the quickest routes, considering location, time, and driver availability provide up-to-date information on their location and progress.

Currently, there isn't a mobile application available for drivers that offers real-time navigation, delivery instructions, and delivery progress updates. A system that updates consumers on the status of their deliveries, including the estimated time of arrival, is also required.

Finally, the application must offer users a seamless and straightforward experience. This needs to have simple navigation, clear product descriptions, efficient checkout processes, and fast delivery.



Increasing company's profits by reducing expenses on external vendors



Including GPS Navigation to optimize delivery Logistics



Improved customer satisfaction by Order Tracking System

GOALS OF THE PROJECT

The purpose of this project is to set up the order tracking system for the clients KeshPro to improve their customer satisfaction and improve their logistics by implementing GPS navigation for their delivery employees. The profits of the KeshPro Oil company can be increased by reducing the company's expenditure on customer support service and at the same time with the taking over of delivery services they would be saving on what they otherwise would spend on external vendors for delivery.

This goal of increasing profits and enhancing user experience can be achieved by:

1. GPS Navigation enablement.
2. Real time order tracking feature.

The implementation also allows the customer to focus more on delivering products on time rather than clarifying customer's concerns on order status. The same work force which was involved in customer support services can be engaged in delivery services which can cover the extra cost that was unnecessarily spent on the external vendors.

Implementation of additional features like prime deliveries (which are delivered early as compared to others) can be introduced to attract customers who need emergency goods and are ready to pay more.



SCOPE OF THE PROJECT

As per the client description below is the list of deliverables requested:

1. Evaluate the current KeshPro application and suggest recommendations on improvements.
2. Through the help of Interviews and Workshops try to understand the pain points of the existing business.
3. Evaluate KeshPro's functional requirements that they are requesting like GPS navigation, Order tracking etc. and non-functional requirements which may majorly include the security and performance attributes.
4. Creating and making available a documentation that would act as a guide and manual for the stakeholders and client for the new features and changes that would be done as part of this project.

KEY DELIVERABLES:

1. GPS Navigation enablement:

We would include a GPS navigation feature that would allow the delivery employees to deliver the orders to their appropriate destinations in shortest time and distance possible. Route optimization would be done using the google map APIs that could help the drivers avoid traffic congested and damaged roadways.

2. Real time order tracking feature:

We will need to add a new plugin which will be accessed by the customers to get the real-time status of their order till it gets delivered at their location. We would need some programmers who would be developing this and once this is done it would be going through the monitoring phase where rigorous testing would be done to make the application bug free before it is released into production for the customers to use.

3. Integration with existing App:

The development of the above features would be followed by integration phase where they must be integrated with the existing app. The code, Database, architecture etc. should be

integrated so that the entire app functions smoothly without any hiccups. In the design phase itself the existing app infrastructure, tools & licenses used, and code would be studied so that the update won't hamper the app performance and user experience.

4. Developing a working model/Prototype:

We would be developing a working model of the deliverable that would be presented to the clients and stakeholders so that they can experience the feel of the final product that would be delivered. Upon the final approval after reviewing and testing of the model, the deliverable would be considered fit to be developed for the production.

LIMITATIONS :

The following activities are not involved in this project but can be performed at future time subject to additional agreement between the client and the team:

1. Implementation of Prime membership can help in prioritizing some orders over others to deal with emergency deliveries.
2. Concept of detailed notifications where customer is notified about each phase change of their product.
3. GPS navigation system could have SOS or accident alert notification facility which can be sent to the admins in case of any abnormal situation faced by the delivery employees.

The KeshPro team can investigate them and consider implementing them if they feel them important and, in any case, if they are profitable.



FUNCTIONAL REQUIREMENTS

Respected clients KeshPro are looking to change and update their current system and some of the changes that they are making are do wonders for their company in maintaining their relationship with customers, here are some of their functional requirements:

1. User interface design:

A simple navigation of the application.

2. GPS Tracking:

KeshPro requires GPS tracking software solution to track the location of delivery vehicles and ensure the packages are delivered to the right location.

3. Real time order tracking:

The development of a web portal that allows customers to track their orders in real-time, with integration with the GPS tracking system to provide location information and regular notifications on order status.



DATA REQUIREMENTS

Based on the above requirements this is some of the data we require:

1. Customer Data:
This may include customer information such as names, addresses, contact details, and order history.
2. Delivery Data:
This may include delivery information such as delivery addresses, delivery schedules, delivery status, and driver information.
3. Order Data:
This may include order information such as order details, payment information, and order status.
4. GPS Tracking Data:
This may include real-time GPS tracking data that allows for the monitoring of delivery progress and the location of delivery vehicles.
5. User Data:
This may include user information such as usernames, passwords, and user roles.
6. Routing and Dispatch Data:
This may include data related to the optimization of delivery routes, such as traffic data, road conditions, and delivery priorities.
7. Customer Feedback Data:
This may include customer feedback data such as ratings, reviews, and survey responses.



EXPERTISE

UI/UX Design:

Expertise in UI/UX design will be required to develop an intuitive and user-friendly interface for the CMS, e-commerce platform, and the order tracking portal.

Software Development:

Expertise in software development will be necessary to create the necessary software solutions for GPS tracking, routing and dispatch, and order tracking portal.

Integration:

Expertise in integration will be necessary to ensure that the various software solutions are integrated seamlessly and work together to meet the project objectives.

Project Management:

Expertise in project management will be necessary to ensure that the project is delivered on time, within budget, and to the satisfaction of the client.

Budget estimation:

Consider all the factors a rough estimate of project of this nature would vary between \$20,000 to \$30,000 but the actual budget would be more dependent on the more detailed analysis of the project requirements and the costs associated with the different phases.

Respected clients KeshPro are looking to change and update their current system and some of the changes that they are making are do wonders for their company in maintaining their relationship with customers.

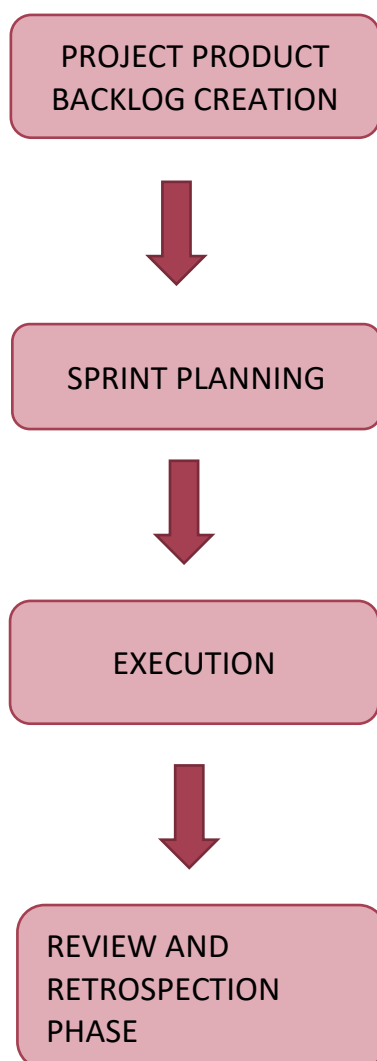


OVERALL APPROACH

The Tech Catalysts consulting IT firm has a proven record of implementing many successful projects using agile methodology.

Throughout the following phases:

**Project Product Backlog Creation,
Sprint planning,
Execution,
Review and retrospection phase.**



Above mentioned phases are conducted repeatedly, with each iteration resulting in the delivery of a new increment of the product up to the final product.

Tech Catalysts solutions have one of the fine business and data analysts who by engaging with clients in interviews and workshops dig deep into their needs and concerns and come up with genuine requirements that needs to be addressed. These become the foundation and the further planning on developing solution for this starts developing on top of this.

After product backlog creation, we head forward into planning and execution phases. In planning the team divides the project into manageable work packages and compiles a backlog of user stories. The team makes an estimate of the time needed to finish each user story. The team devotes its sprint to completing the story points in the sprint backlog. To monitor progress and spot any hurdles, the team has daily stand-up meetings.

In the Implementation phase the proof of concept is developed in the initial sprint meeting which are then verified by the client and once the heads up are given Tech Catalysts solutions would be happy to provide the real time tracking and GPS tracking feature in Kesh Pro's existing application. Regular sprint meetings will be done to ensure that the deadline is met and required features are included in the final product. After thorough testing and making sure that proper integration is done to the existing client ecosystem the product is finally launched.



SYSTEM DESIGN SPECIFICATIONS

SYSTEM ACQUISITION STRATEGY:



Based on the requirements of the client KeshPro:

The main requirement of our client is GPS tracking software for the purpose of tracking the location of delivery vehicles and ensuring the packages are delivered to the right location, a GPS tracking software solution may be used. This solution would need to be integrated into the client's existing system and create a software interface that allows them to monitor delivery progress in real time. For this the software that we are implementing after going through the budget, logistics and to optimize delivery routes, routing and dispatch software may be used. This software can help improve delivery efficiency and reduce costs.

Real Time tracking:

In the context of the KeshPro project, real-time tracking would be used to track the location of delivery vehicles and packages, allowing customers to see the status of their orders in real-time. To implement real-time tracking, the system would need to integrate with GPS tracking software and other location-based services, providing real-time updates on the location of the vehicles or packages.

The benefits of real-time tracking for KeshPro include:

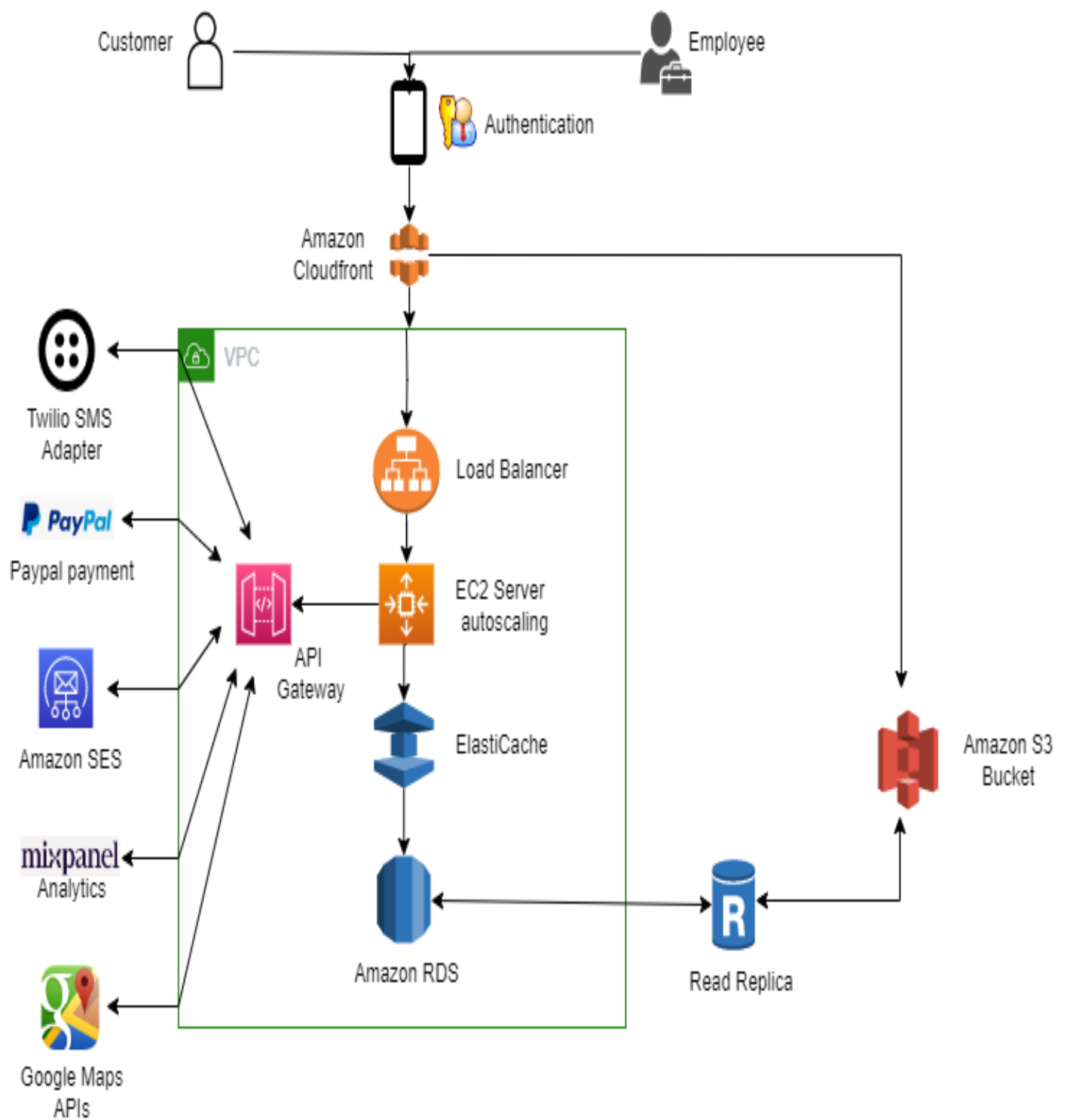
1. Improved customer satisfaction: Real-time tracking provides customers with accurate and up-to-date information on the status of their orders, which can help improve their overall experience and satisfaction.
2. Increased efficiency: Real-time tracking allows for more efficient route planning and dispatch, reducing delivery times and improving overall logistics.
3. Enhanced security: Real-time tracking can help prevent theft or loss of packages, as well as provide greater visibility and control over the entire delivery process.



ARCHITECTURE DESIGN

The architecture we have developed for the KeshPro aligns with the principles of AWS well architected framework we have focused on all the 6 pillars and tried to provide the client with a highly available, redundant, and highly cost-effective infrastructure with the help of AWS cloud services. Since the application is supposed to grow in the near future with the increasing awareness of the herbal products, we believe to cater the increasing demand of customers we have built an auto-scalable architecture which will reduce its capacity if it's no longer required.

1. Both the customers and employees will have a common app platform to get authenticated.
2. To reduce latency CloudFront is included here. Based on the user requests it would be decided whether the information is available in the CloudFront memory, S3 bucket or if it needs to be processed again.
3. The load balancer tries to modulate/balance the requested queries amongst the various EC2 servers in autoscaling group capable to scale as per load.
4. For fast retrieval we are using ElastiCache (Amazon's cache service), which otherwise would be fetched from Amazon RDS (cost-efficient, resizable capacity relational database service).
5. For redundancy we are keeping a read replica which would act as main DB in case of any failure of our primary RDS.
6. We will be using S3 bucket as a data source where data files can be stored and can be used by our RDS for any operations.
7. Amazon API gateway has been used here which sits in between the API services and our users and helps in exchanging thousands of concurrent API requests. All APIs including Google Map API and mixpanel analytics which are our primary area of focus all will be implemented with API Gateway.



SOFTWARE AND HARDWARE RECOMMENDATIONS:

	Mobile
Operating system	iOS 14 or higher or Android 11 or higher
Web Browser	Support almost any browser Google Chrome, Safari, Firefox etc.
Office Suite	Microsoft Office or Google Workspace or Apple iWork
Security Software	Encrypted data both at rest and in transit, AWS IAM policies and Firewall rules
Processor	Intel Xeon/ AMD EPYC/ AWS Graviton processor
RAM	4GB or higher
Storage	64GB or higher
Display	Adjusts as per the screen

Since the application sits on AWS cloud and would be using the AWS cloud services, most of the hardware part is already taken care. All the servers including compute power and databases would be sitting in cloud so burden of cost and space for maintaining its hardware is relieved from client side.

Above listed details are the basic minimum configuration that are needed for the mobile application to function which obviously is taken care with the help of even basic EC2 configuration of AWS. Since data is encrypted both at rest and transit in AWS along with highly secured application firewalls with highly comprehensive IAM policies makes the application very secured and protected even when accessed by any mobile web browser.



DATABASE DESIGN

The entities and relationship between them are well represented by the ER diagram for kesh pro. The main entities shown in the database design are order, customer, deliveries and product. They are linked with product key and foreign key. We will be using the My SQL relational database which makes easy the data storage and retrieval process. Also, the data maintenance in the future would also be easy and any changes can be easily studied and managed with the help of the ER and the navigation diagram.

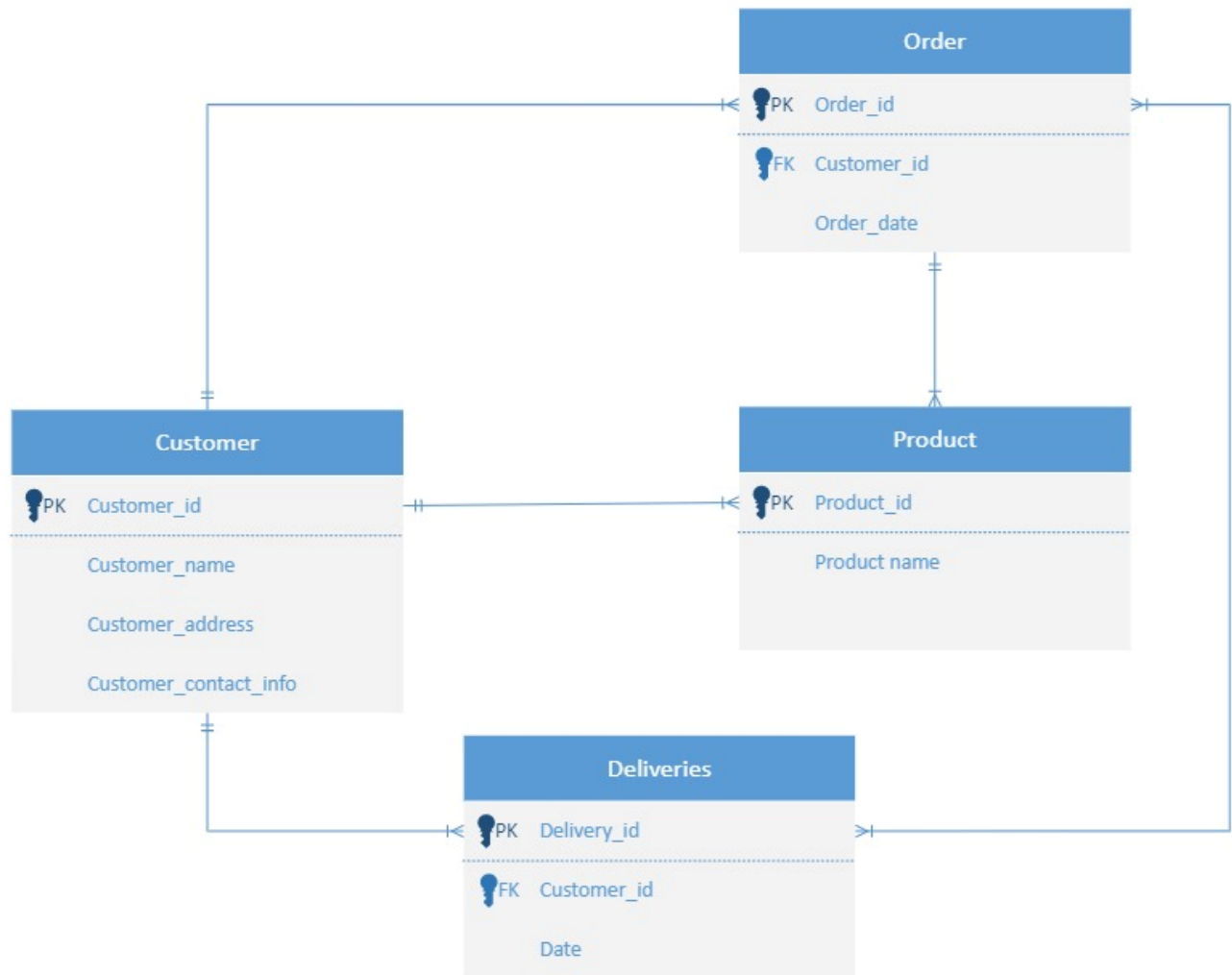
Entity and Referential integrity is taken care so that each row is unique and proper relationship is established between different entities of the database. This makes the database more consistent and accurate.

The table below shows the mapping of data stores for the database design.

Data store	Physical storage
Order info	SQL server: Order table
Customer info	SQL server: Customer table
Product info	SQL server: Product table
Deliveries info	SQL server: Deliveries table

E-R DIAGRAM:

The entity relation explains about the relationship amongst various important entities along with their primary and foreign keys. Each order has the customer details with the help of customer id present in order, similarly each delivery entity will be having details of customer and order because of the customer id present in the delivery table. The below ER diagram is designed as per the requirement of the keshPro mobile application use case.





USER INTERFACE DESIGN

The KeshPro application is used by two class of users:

KeshPro Delivery employees
KeshPro customers

The key goals for the design of the user interface for customers are:

1. Easy and user-friendly process to use the application
2. Ability to view and track orders.
3. Receive notifications at get updates about status of the order.

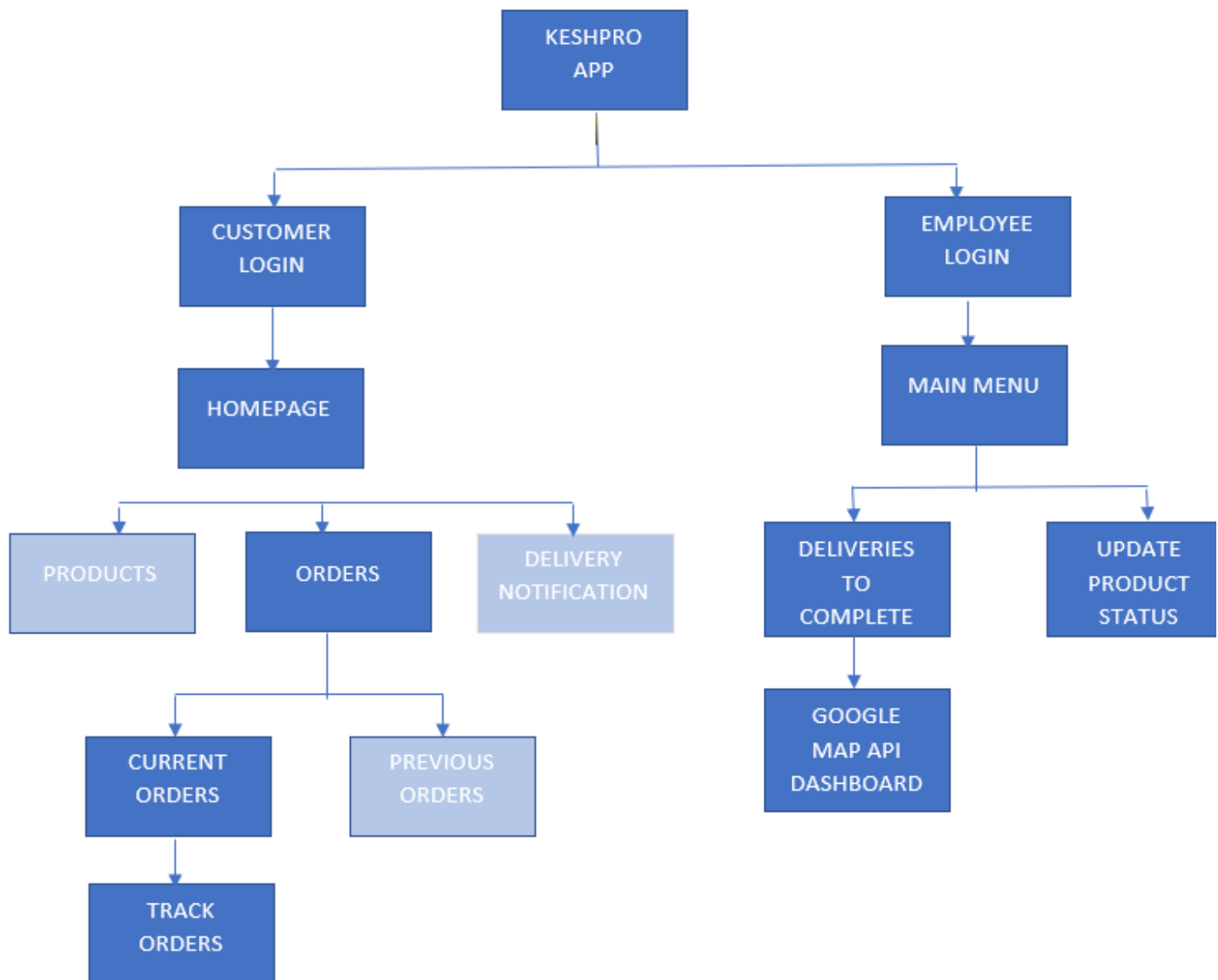
The key goals for design of the user interface for delivery employees are:

1. View and try best routes for deliveries.
2. Easy to use the route optimizations in a single click
3. Send notifications to the customers.

The following are the key goals implemented as per the client requirements and we are positive that we have done a good job in meeting the client requirements.

NAVIGATION STRUCTURE:

The navigation structure for the mobile application is given below. The navigation structure helps us to give a proper flow of the access to pages. The main scenario we are working are the order tracking and the google maps dashboard. The navigation flow diagram mentioned below gives reference to both the requirements we are proposing our solution with respect to both customer and employee perspective.



USER INTERFACE DESIGN STANDARDS:

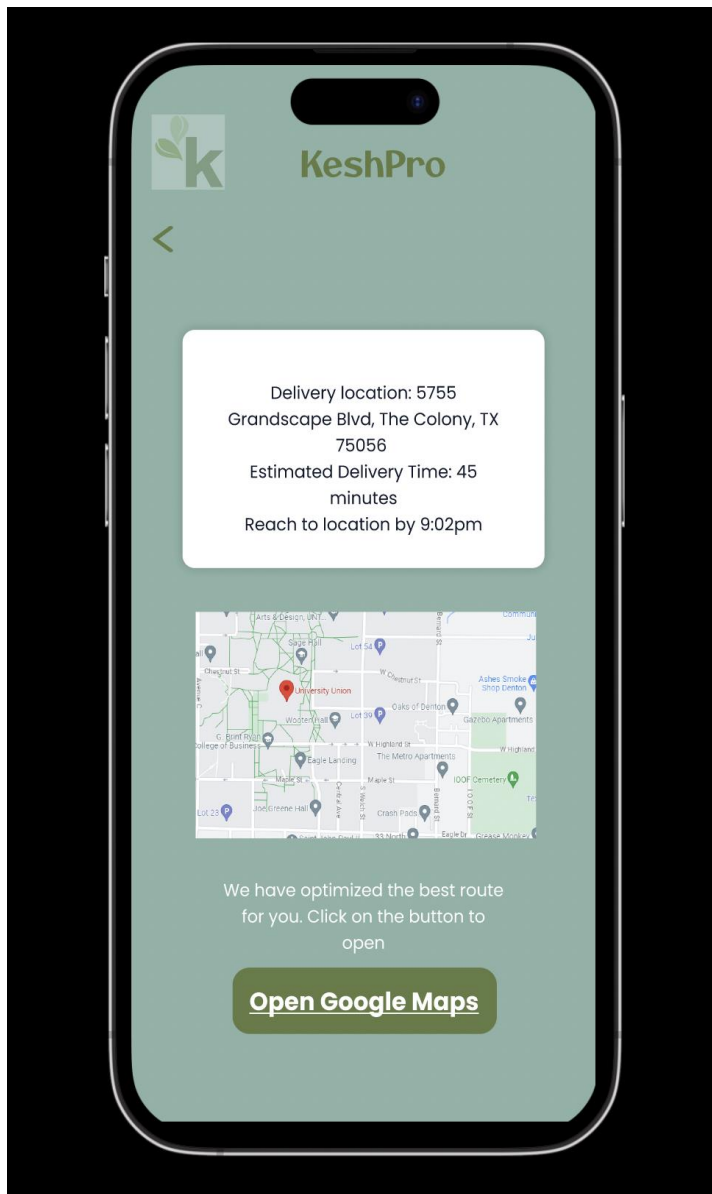
The home page screen looks like this:

Here the customer can login as customer, and it redirects you to the customer side of the application

The delivery partner can login and it redirects you to the delivery partners side of the application.



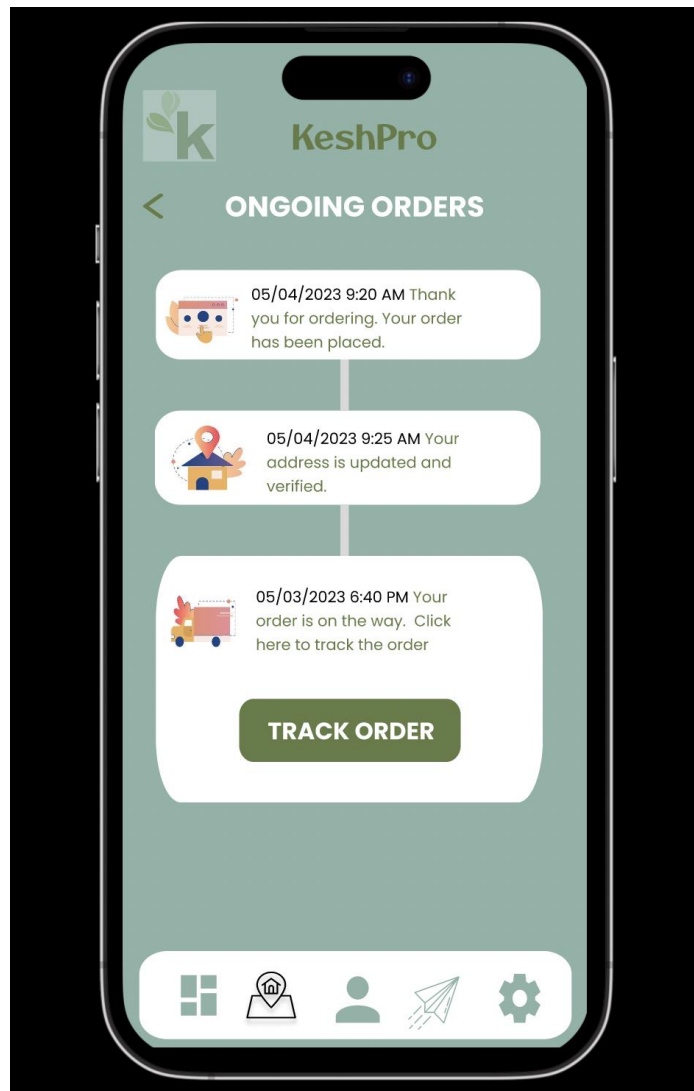
After logging in as a delivery employee, and going ahead with the delivery route optimization, this page will be opened and here the delivery employee can see the delivery location, time and open the route in google maps.



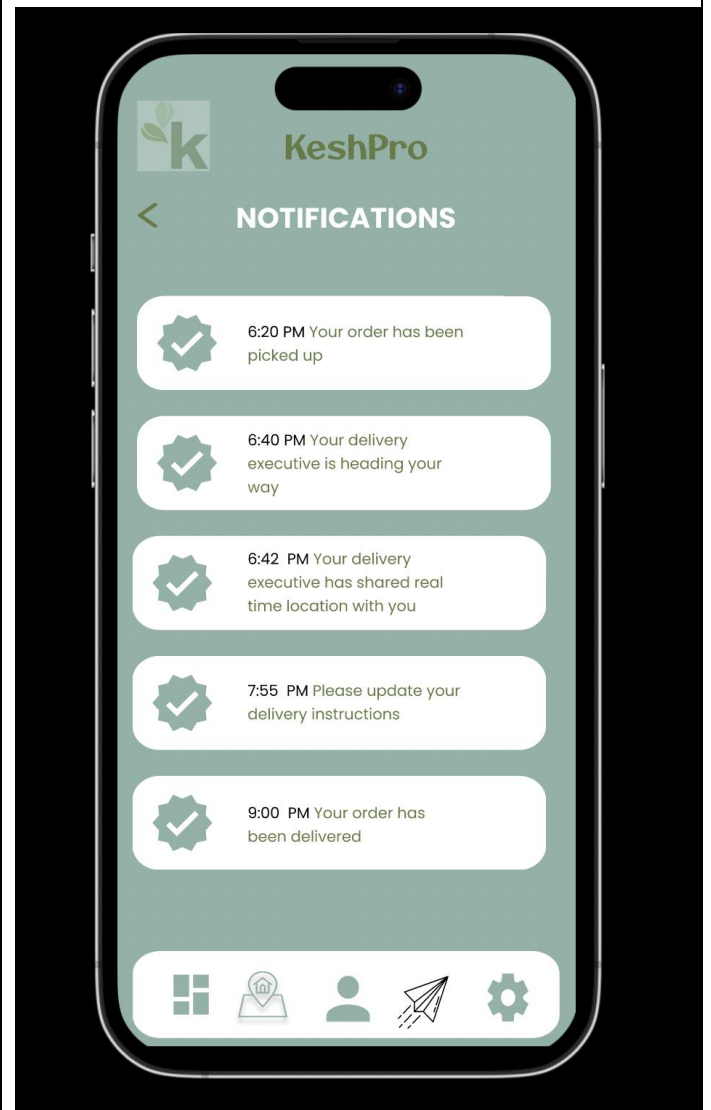
When the delivery employee has picked up the order or reached location or delivered, they can send the update message to customer. The screen looks like:



The Tracking of orders by the customers can be done in this screen:



When the customer receives the notifications about the delivery updates, The notification screen looks like this:





IMPLEMENTATION PLAN

System selection issues

Since the existing application is already built and setup using python and our proposed solution also operates in python so there's no possibility of integration problem. The tracking feature would get the data feed from KeshPro employees, so it is their responsibility to regularly update the status in the app so that the customers get to access the latest and most accurate status of their orders.

For delivery employees our solution of integrating maps in the existing KeshPro app we will include Google map API which will enable them to use the google maps to navigate to the destination. The route optimization program will help the employees to deliver the product fastest and in most feasible way by directing them through routes which are free of traffic and road congestions.

So, both the solutions go well with the existing system and doesn't hamper the performance of application, still in testing phase we will make sure to record the performance influence with the addition of these new features.

Test plan

Testing phase will include the application to be three parties i.e., the development team, the KeshPro team and the customers itself. In the beginning once the solutions are setup in the testing environment it would be thoroughly tested by our team based on all possible test scenarios that our team considers to be possible after which it would be released to the KeshPro team so that their employees also study the new features and test it.

Once both parties are confident about the performance of new features, we would add these new features to the production environment application so that customers can start using it. For the initial 1-month period we would allow the customers to use the application and watch carefully for any bugs, complaints or irregularities in the performance of the application, after which we would consider the completion of the testing phase.

Post Implementation review plan

Once the implementation is completed for 1 month the team will closely watch for any support needed regarding bugs encountered post which the system would be completely handled by the KeshPro team. Our team will create a documentation or user manuals and will provide the same to client which would contain the code and other technical intricacies related to the new features. After this Tech Catalysts will be supporting the KeshPro team for any technical assistance based

on the support agreement signed, the ownership of the code and licenses would be transferred to the clients, and they would be responsible from then onwards regarding the working, maintenance and update of the new features.



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Expertise in project management will be necessary to ensure that the project is delivered on time, within budget, and to the satisfaction of the client.

Budget estimation:

Consider all the factors a rough estimate of project of this nature would vary between \$20,000 to \$30,000 but the actual budget would be more dependent on the more detailed analysis of the project requirements and the costs associated with the different phases.

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PROTOTYPE

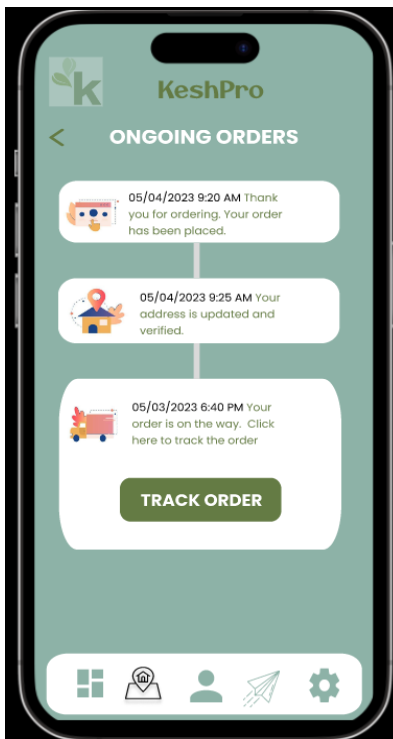
We designed the prototype using Figma application which gave a wonderful experience to our clients. It was able to integrate google API along with all the tracking feature which we tried to embed in the app. We were able to create multiple screens with validations and as per our navigation structural diagram with smooth transitioning and a help guide at every screen for educating user about the application.

The application can be accessed through below link.

URL: <https://tinyurl.com/KeshPro>

The application is assumed to have access to the Google map API and the KeshPro database which would be used by the employees to feed the data in and which in turn would be used by the customers.

For accessing the order tracking page, the customer has to login followed by choosing order and the current order information where he would see the last updated notification along with real time tracking to see where the product is exactly at.



For delivery employee after login, they would be directed to a screen wherein they can choose to view deliveries to see pending deliveries, update their status and map optimization to see the best map route for delivery.



We are very happy that we got the opportunity to work on this solution and showcase our learning and outcomes to the client.

Thank you