

Delivery Service Application

Phase I

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I Project Definition

I.1 Objectives

The project consists of six main objectives that align with the core features of the delivery service. The first objective is to provide a more convenient and intuitive way of requesting delivery for the client. The second objective is to present an accurate quotation of our service to the customer. The third objective is to facilitate communication about the service. The fourth one is to equip the customer with real-time order tracking of the package starting from the pick up all the way to the drop off. The fifth is to guarantee a secure and reliable payment system. The last primary objective is to offer chatbot assistance for inquiries regarding the service or the status of the package.

I.2 Defined Method of Approach

The project will proceed under agile methodology through iterative development. Each sprint, the team will target tangible deliverables while improving on previous ones if deemed necessary. Regarding team members' responsibilities, there will be one team leader in charge of monitoring the project progress and serving as a communication point between the team and the stakeholder when needed. Additionally, the team will use pair programming to build and implement the different features. Rather than separating who works on frontend and backend, we will separate the tasks according to features and have each pair work on all aspects of a given feature.

The deliverables consist of a functional feature for submitting a delivery request, a module to generate a price quotation according to a multitude of factors, a real-time tracking system, a secure payment integration, a chatbot and documentation for the whole process of building a prototype of these features. The documentation includes diverse technical documents featuring diagrams describing the system such as the context diagram and the domain model shown in this document. Another deliverable is the final presentation given to introduce the stakeholder to our proposed delivery system.

I.3 Project Scope

The project scope focuses on designing a delivery service where the customer's needs and preferences are central to the design. The team will be applying the following design principles: usability, scalability, consistency and security. Usability ensures that our application is easy to use and customers should quickly understand how to request a delivery, track their package and make a payment without needing extensive instructions. Scalability ensures that our system continues to run smoothly as demand increases. By dynamically designing our system, we will ensure that it can adapt to changes in demand and data. Consistency ensures that we are having uniformity in UI elements such as design patterns, colors, and buttons throughout the app. Finally, security will be integrated at every level, especially in the payment gateway and user data protection. We will ensure that users' data is handled securely and all sensitive data like user information and payment details is encrypted.

II Problem Definition

II.1 Problem

The delivery service industry faces the challenge of increasingly high demand for fast, reliable, and cost-effective deliveries all while managing logistical complications. Customers have certain expectations when it comes to the service of delivery. They expect same-day or next-day delivery options for their packages and want to make their payments securely. They also expect timely notifications and alerts for their package. Many companies struggle to meet the expectations of consumers consistently. This leads to several issues such as delayed deliveries, lost packages, lack of assistance from the service provider and inefficient routing which all lead to the customer not being satisfied. Additionally, there are concerns over package security, such as theft, tampering, and loss. The delivery service companies need to find a balance between customer demands and operational efficiency, which is our ultimate goal. [1]

II.2 Source

The problem emerged with the rapid growth of e-commerce in the past decade. Online shopping is at its peak and some companies have set very high standards in regards to quick and reliable deliveries. As a result, consumers have come to expect the same level of service from all providers. There have been many theft and loss complaints which raised concerns over the secure delivery and arrival of the package. This puts pressure on delivery service companies to expand their operations, provide better routes and invest in technology to not only meet but exceed customer expectations. Our aim is to develop a solution that addresses these challenges while enhancing the overall secure and efficient delivery experience for customers and providers alike.

II.3 Solution

The proposed solution is a user-friendly delivery service app designed to solve the problems customers face with traditional delivery methods. Our app will feature a simple interface that will allow users to request deliveries. Our app will include a tracking system that lets users receive live updates on their packages' delivery status. Moreover, it will include various methods of secure payment (credit/debit cards, digital wallets, etc.). The chatbot feature will be assisting with any issues or inquiries and we will ensure that the support is immediate to enhance user experience. The app will send notifications and alerts regarding important updates, such as when their package is out for delivery. However, users will also be able to check the live location of their package in between important checkpoints using the provided tracking number. Rather than a bloated website, our solution proposes a minimalistic one that highlights the shipping service to the user while offering access to any other additional information through the chatbot. In order to simplify the shipping process, our service will forego needing the user to sign up, wait for the confirmation email and log in in order to make a shipment. Instead, anyone can ship a package from anywhere, given that they pay for the service.

II.4 Advantages

Our delivery service app offers several advantages over existing solutions. First, it prioritizes user experience with a user-friendly interface, making the delivery request process simple and straightforward. In comparison, one of our competitors, FedEx, has a very bloated website with many tabs and content sections that provide information that most users will not care about. [2] Our solution avoids that in an attempt to make the online service itself much more user-friendly. This encourages a larger audience to use our service as even the elderly and children will find our interface easy to navigate. Users can pinpoint pick-up and drop-off locations on a map, which enhances accuracy and convenience. We also offer a range of shipping options tailored to different needs and budgets. Additionally, the app keeps users informed and at ease about the status of their delivery by sending notifications and alerts about important updates. The real-time tracking feature provides greater transparency and peace of mind, allowing customers to follow their orders closely. The secure payment options, coupled with robust data encryption, enhance trust and ensure customer safety. Lastly, the integrated chatbot provides instant support, setting our app apart by providing efficient 24/7 assistance, elevating the overall user satisfaction.

III Technology Used

III.1 Team Collaboration

Version Control:

We are going to use **Git** as our version control tool, ensuring all team members can contribute to the codebase efficiently. Git allows us to collaborate by branching, committing, and merging code.

Hosting the Repository:

Github is used for hosting our repositories and managing pull requests, issues, and project boards.

Communication Platforms:

Instagram and **Discord** serves as our main communication platform, allowing us to coordinate and discuss ongoing tasks.

III.2 Monitoring and Verification

Unit Testing:

Jest is being used for unit testing to verify the correctness of individual components and back-end services.

API testing:

Postman is used to test and monitor API endpoints, ensuring that requests and responses are handled correctly.

Static Analysis Tool:

SonarQube is implemented for continuous code quality monitoring and to ensure clean, maintainable code.

III.3 Design and Modeling Work

UML Modeling:

Draw.io is used for creating various UML diagrams, including context and domain models. Also **PlantUML** helps generate other architectural diagrams, such as class and sequence diagrams, in text-based format.

III.4 Interface

Front End:

The **React** library is used to create the front-end of our application, providing a dynamic, single-page application (SPA) experience.

React Router is implemented for client-side routing, allowing users to navigate between pages without reloading the entire application. [3]

III.5 Coding

Backend Development:

Node.js and **Express** are used to develop the back-end server and API endpoints for the delivery service.

Databases:

MongoDB is used as the primary NoSQL database, which stores and manages delivery requests, customer information, and real-time tracking data.

Mongoose is used to model the data and simplify database interactions. [3]

IV Context Diagram

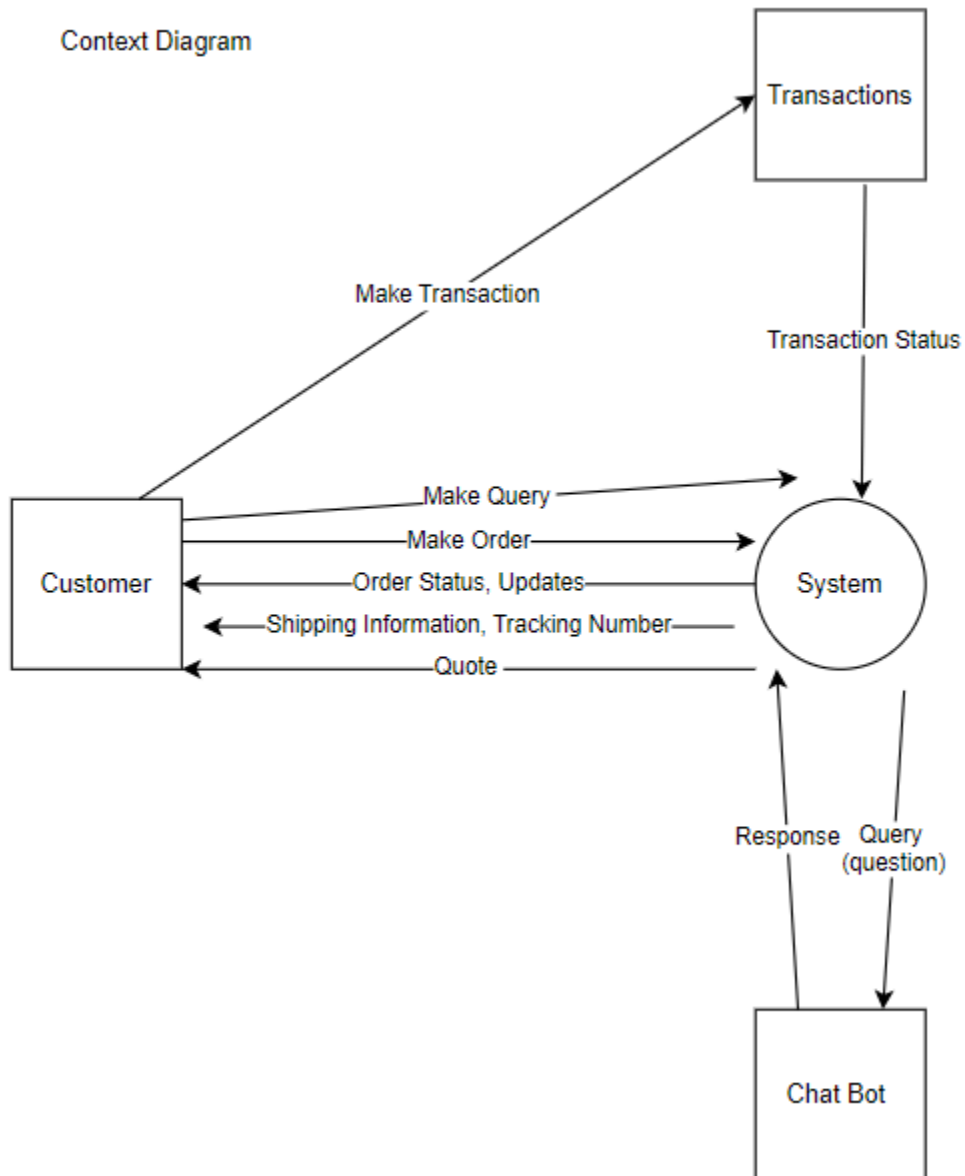


Figure I - Context Diagram

V Domain Model

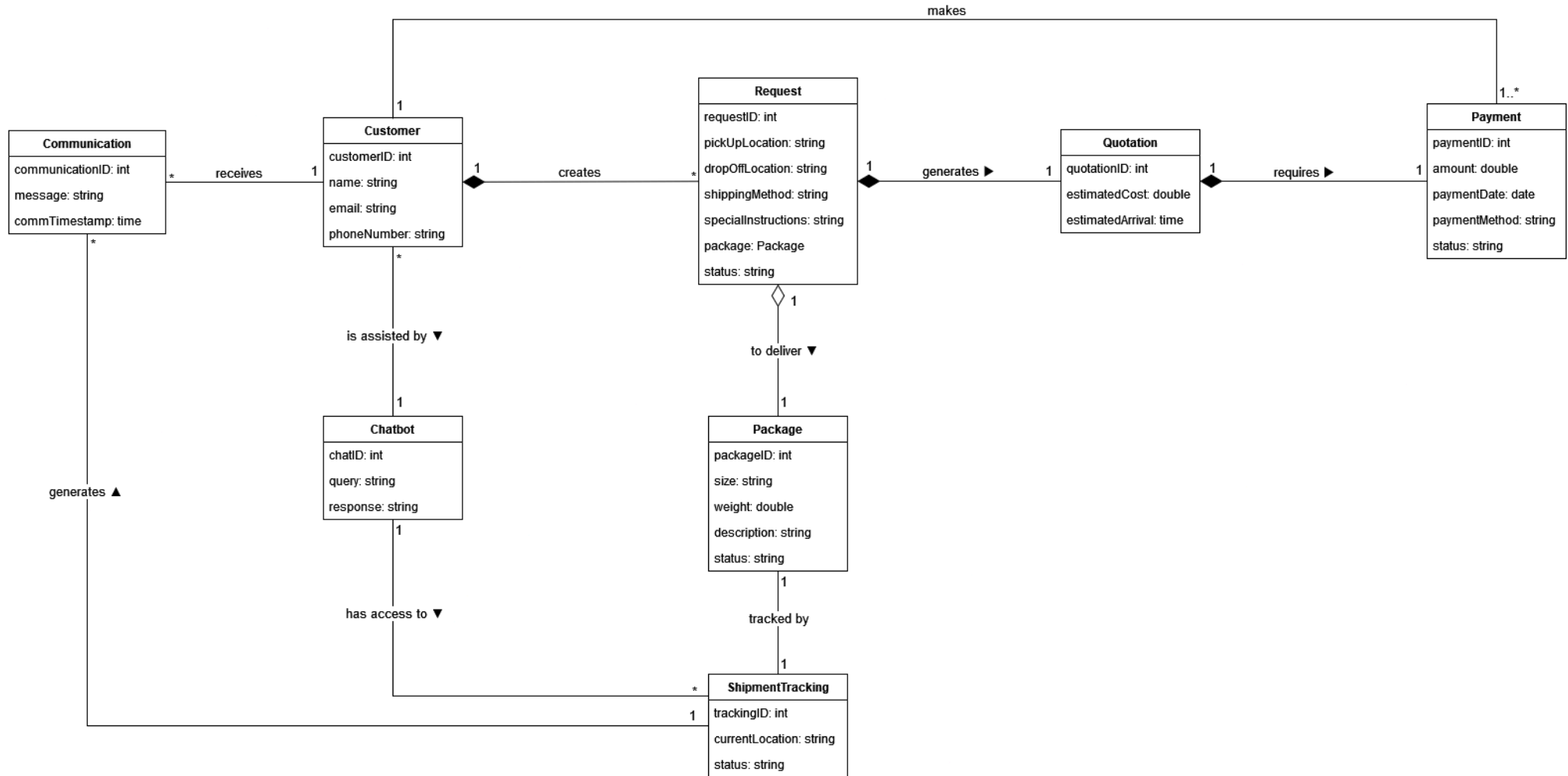


Figure 2 - Domain Model

VI Mockup

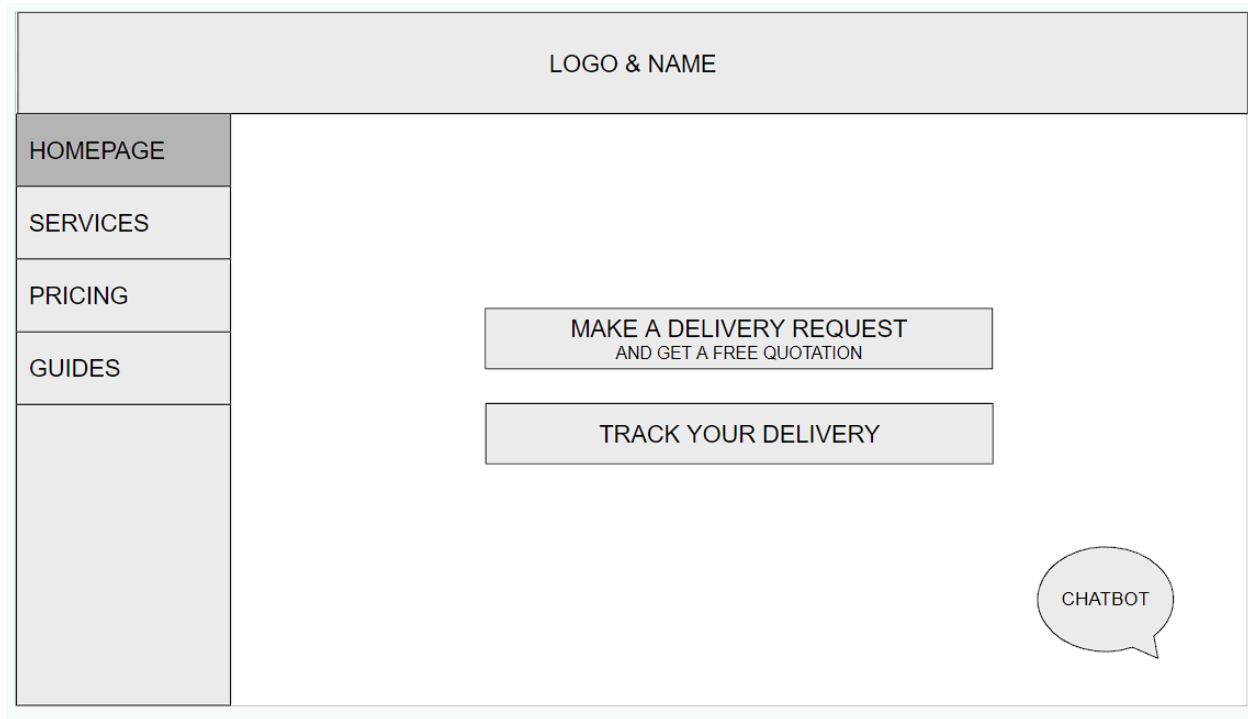


Figure 3 - Conceptual Mockup Using Draw.io

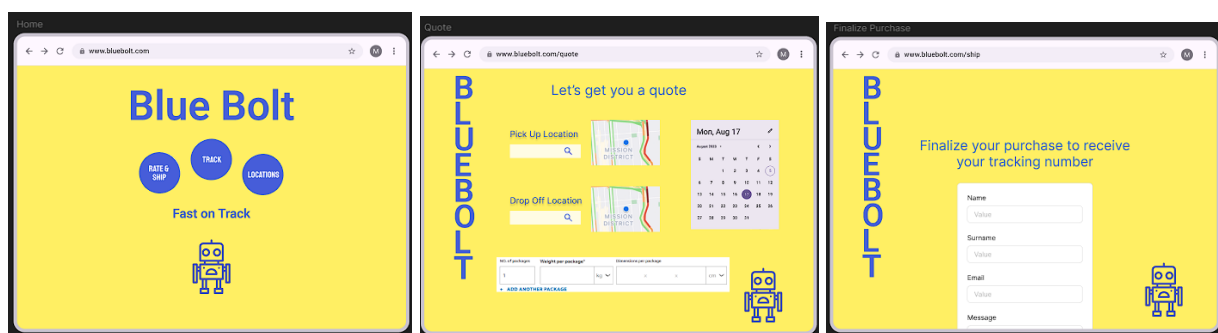


Figure 4 - Design Mockup Using Figma

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- [2] FedEx, “System down,” FedEx, <https://www.fedex.com/en-ca/home.html#> (accessed Sep. 20, 2024).
- [3] GeeksforGeeks, “Mern stack,” GeeksforGeeks, <https://www.geeksforgeeks.org/mern-stack/> (accessed Sep. 19, 2024).