Deliverable Techoney: Sharing economy platform

Task4.4 Blockchain-based marketplace.
Task leader: UTM,
Participants:LIGM (M06-M36).
Goal: develop A platform for sharing equipment/expertise in the Honey sector (Sharing economy)

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TECHONEY

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Executive Summary

The digital transformation of traditional markets has created unprecedented opportunities for direct producer-consumer interactions. Techoney represents a transformative approach to fostering sustainable and community-driven trade within the honey industry. By creating a digital ecosystem where beekeepers, distributors, retailers, and consumers can seamlessly connect, the platform enhances transparency, efficiency, and trust in honey-related transactions.

The sharing economy model adopted by Techoney ensures that resources are utilized more effectively, reducing waste and promoting fair access to high-quality honey products and services. At its core, Techoney Sharing Economy Platform empowers beekeepers and local producers by providing them with direct access to a broader market, eliminating traditional intermediaries that often reduce profit margins. For consumers, the platform guarantees traceability and authenticity, allowing them to support ethical beekeeping practices while receiving premium products.

Beyond commerce, Techoney Sharing Economy Platform fosters collaboration through integrated communication tools, enabling real-time interactions between buyers and sellers. The built-in review system ensures accountability, incentivizing high standards across the platform. By digitizing and streamlining honey trade, Techoney Sharing Economy Platform not only supports economic growth but also contributes to environmental sustainability by encouraging responsible production and consumption. This platform stands as a vital tool in modernizing the honey industry while preserving its artisanal and ecological values.

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1. Introduction

The global honey industry has long been constrained by fragmented supply chains, opaque pricing, and limited access to markets for small producers. Techoney addresses these challenges by introducing a digital ecosystem where beekeepers, distributors, retailers, and consumers can interact seamlessly. It solves problems such as the lack of visibility for providers, difficulty in finding trusted partners, and the absence of a centralized system for managing transactions, reviews, and communication. The platform is engineered as a full-stack web application, utilizing Next.js for the frontend and NestJS for the backend, ensuring scalability, security, and an intuitive user experience.

The platform's comprehensive feature set includes product listings, order management, real-time communication, and reputation systems, all designed to foster long-term relationships between stakeholders in the honey ecosystem. Whether it’s a beekeeper listing his services or a consumer searching for organic products, the platform streamlines transactions while fostering trust through transparency and accountability.

2. Platform Overview

Techoney Sharing Economy Platform is not just a marketplace, it is a dynamic and multi-actor platform where each user can assume the role of provider or demander depending on their needs and expertise. The architecture is designed to support a wide spectrum of interactions, from simple product listings to complex service requests and real-time communication. The platform’s interface is intuitive and responsive, adapting gracefully to all devices and screen sizes, which is crucial for a user base that spans different regions and technological backgrounds. Security is woven into every layer of the system, with robust authentication and authorization mechanisms ensuring that sensitive features are accessible only to authorized users. This careful balance of accessibility and protection is what makes Techoney a trusted environment for all stakeholders in the honey industry.

2.1 The use case

At its core, Techoney Sharing Economy Platform addresses the need for a unified platform where honey producers, distributors, retailers, and consumers can interact efficiently and transparently. The use case revolves around enabling providers to list their products and services, while demanders can browse, request, and review these offerings. The platform also accommodates specialized roles, such as bee health specialists, who can offer consultancy and support services. This flexible interaction model not only streamlines the exchange of goods and services but also promotes innovation and best practices within the community. By centralizing these interactions, the platform reduces friction, increases visibility for providers, and empowers demanders to make informed choices.

2.2 User Experience & Authentication

User experience is a cornerstone of Techoney platform’s design philosophy. From the moment users land on the welcome page, they are guided through a clear and engaging journey. The user journey begins at a clean and informative welcome page, where visitors are

introduced to the platform's mission and prompted to register or log in. The registration process is comprehensive, requiring essential details:

- Contact details (full name, email, phone number)
- User type (beekeeper, distributor, retailer, consumer, beekeeper association, bee health specialist, and citizen).
- Role (provider/demander) to tailor dashboard access.
- Location
- Password (with real-time validation)

Each field is validated in real time, ensuring data integrity and reducing user frustration. Upon successful authentication, a JSON Web Token (JWT) is issued, granting secure access to role-specific dashboards. Users who attempt to access protected areas without proper authentication are promptly redirected to the login page, accompanied by a clear message emphasizing the necessity of logging in. This mechanism ensures that sensitive features remain accessible only to authorized users, thereby maintaining the integrity and security of the platform. The entire authentication process is fortified with encryption and role-based access controls to prevent unauthorized actions. Here are the welcome page, login, and registration interfaces:

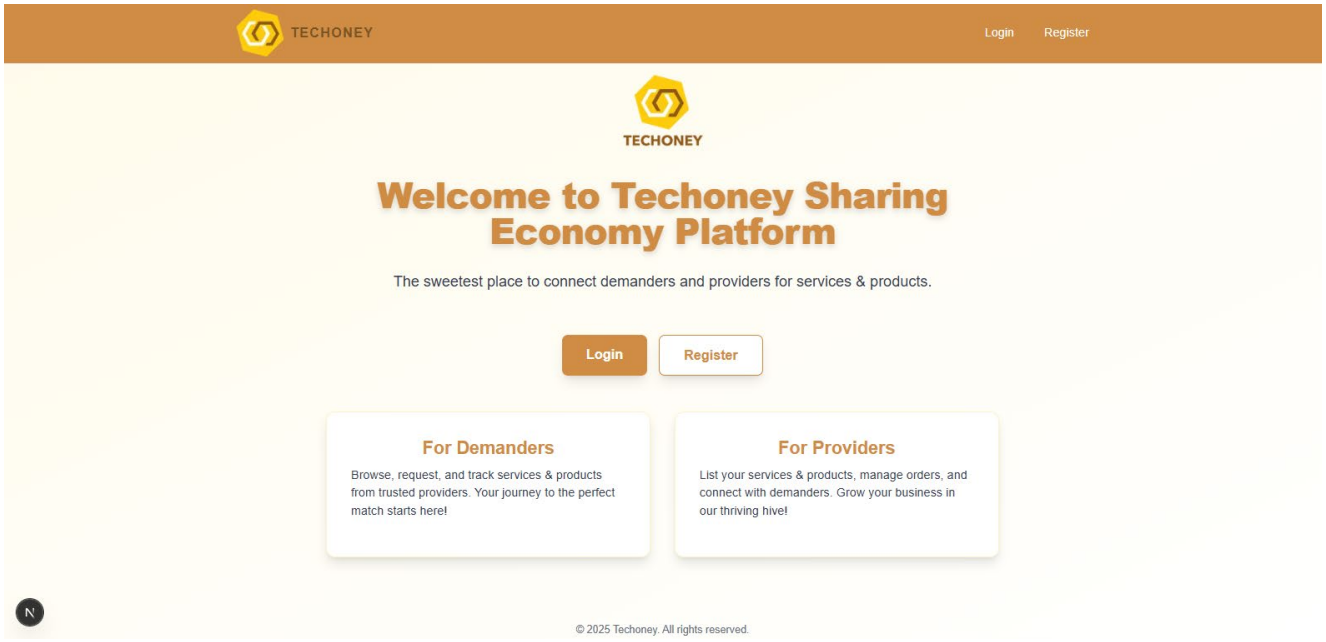

Figure 1: Welcome page

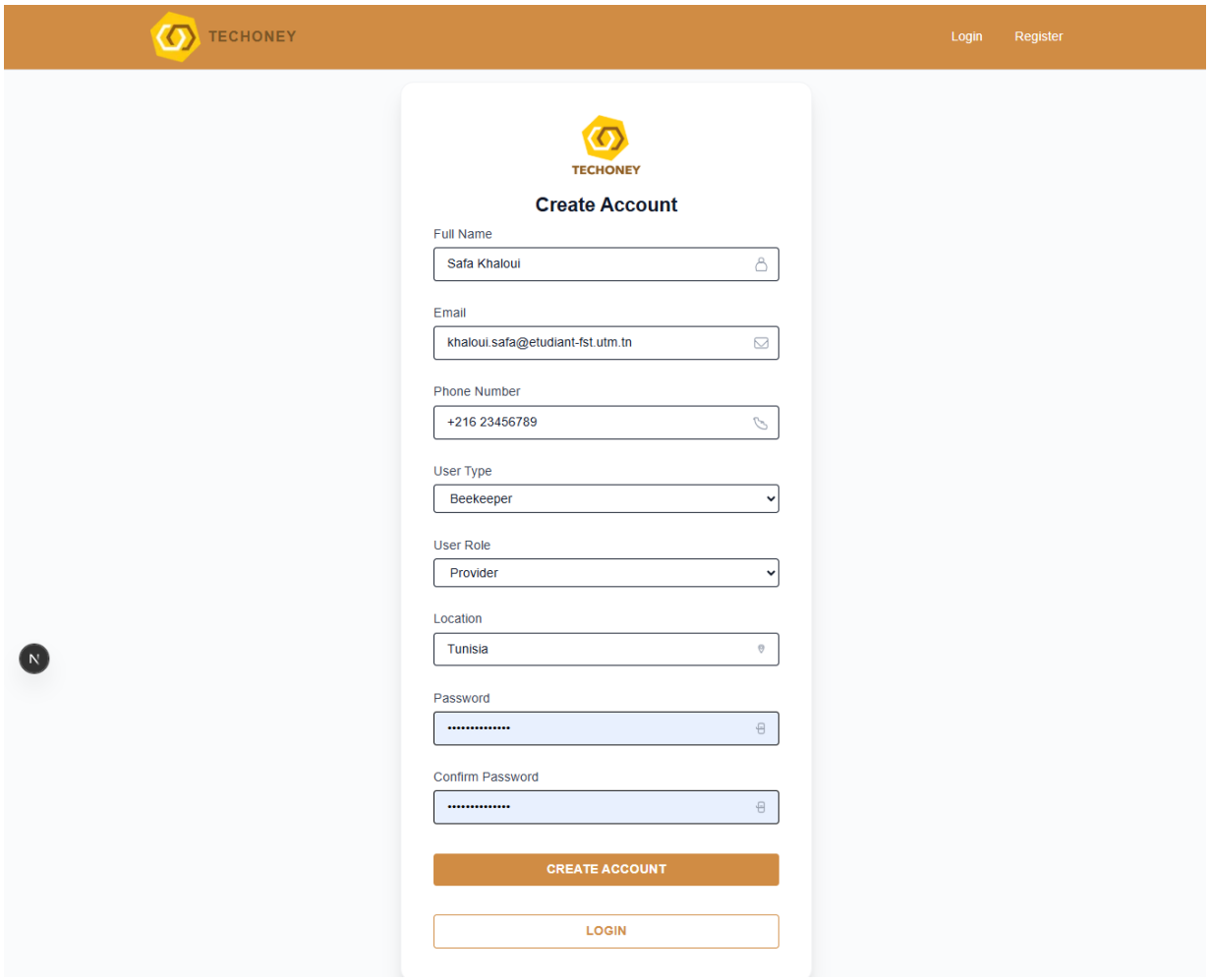

Figure 2: Registration page

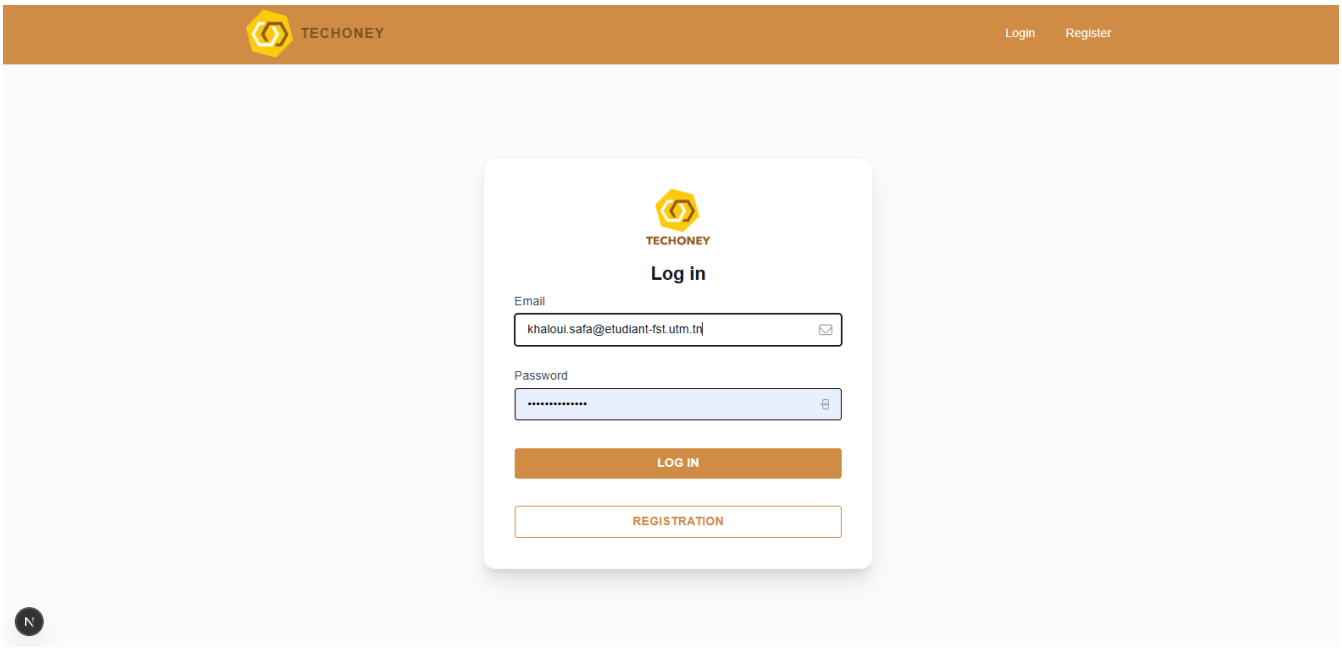

Figure 3: Login page

2.3 Core Functionalities

The core functionalities of Techoney Sharing Economy Platform are thoughtfully designed to cater to both providers and demanders, reflecting the dual nature of the sharing economy. Once authenticated, users experience personalized onboarding flows tailored to their roles, reflecting the dual nature of the sharing economy.

Providers are directed to a dashboard where they can create rich listings of services and products with detailed descriptions and transparent pricing structures, manage their offerings including intuitive dashboards for adding, editing, and deleting products and services., and communicate with potential clients through a responsive dashboard.

Demanders, on the other hand, gain access to a browsing interface where they can browse available services and products, initiate requests, monitor order statuses, and engage in real-time communication with providers.

Communication is facilitated through a robust chat system, which is a central feature of the platform that enables seamless and secure exchanges, always displaying the name of the other participant to avoid confusion and foster genuine connections. Reviews and ratings are integrated into the workflow, enabling demanders to provide feedback and helping providers build their reputation. Every interface is fully responsive, with horizontal scrolling and adaptive layouts that ensure a consistent experience across all devices and screen sizes. These features are not isolated, they are interconnected, creating a cohesive ecosystem where every action and interaction contributes to the overall value of the platform.

3. System Design & Workflows

The design of Techoney Sharing Economy Platform is grounded in a set of well-defined entities and relationships that reflect the real-world dynamics of the honey industry. The backend manages business logic, data validation, and security, while the frontend delivers a dynamic and interactive user experience. Communication between the two layers is secured via RESTful APIs, with JWT tokens ensuring that only authenticated users can access sensitive features. The system is modular, with each component responsible for a specific domain, such as authentication, user management, products, services, requests, messages, and reviews. This modularity not only enhances scalability and maintainability but also allows for the seamless integration of new features as the platform evolves.

3.1 General System Description

The general system architecture is composed of several core entities: User, Service, Product, Request, Message, and Review. Each entity is associated with specific roles and permissions, ensuring that users can only access and modify data relevant to their role. For example, providers can manage their own listings and respond to requests, while demanders can browse offerings and initiate requests. The relationships between these entities are carefully mapped to reflect the workflows of the platform. For instance, a Request links a Demander to a specific Service or Product, and a Review is associated with both the provider and the demander involved in a transaction. This clear delineation of responsibilities and relationships is what enables Techoney to support complex workflows while maintaining data integrity and security.

3.2 Class diagram

The following figure provides a detailed class diagram view of the primary data structures and their associations within the platform:

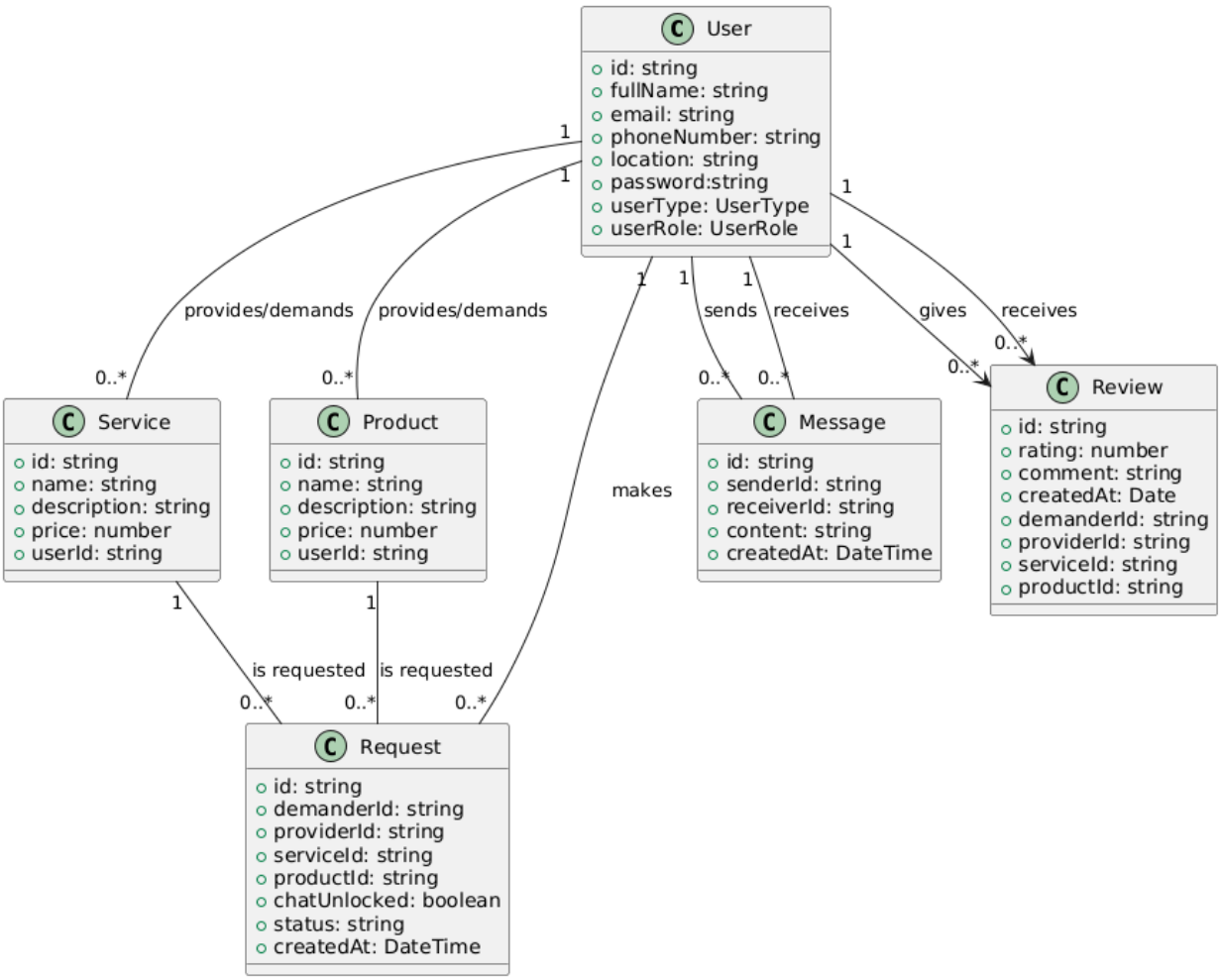

Figure 4: Class diagram

3.3 General sequence diagram

The general workflow of the platform, from authentication to service request and fulfillment, is illustrated in the following sequence diagram:

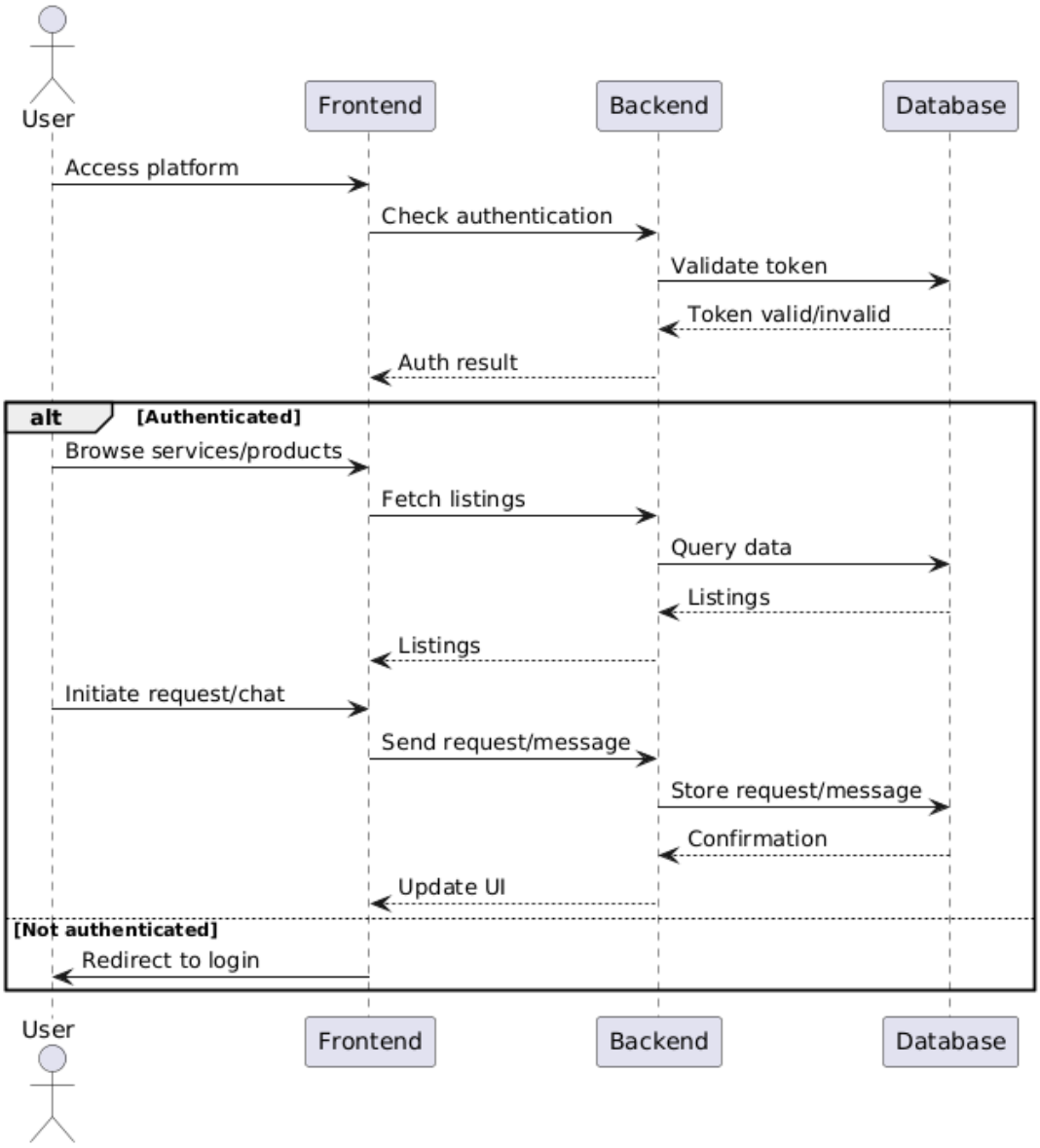

Figure 5: General sequence diagram

4. Provider Interfaces & Functionality

Providers are equipped with a comprehensive suite of tools that streamline the management of their offerings and interactions with demanders. The provider dashboard serves as the central hub, offering quick access to service and product management, order tracking, and analytics. Providers can add new services or products through user-friendly forms, edit existing listings, and remove outdated offerings. Incoming requests are displayed in a dedicated section, where providers can review details, accept or reject requests, and unlock chat functionality for direct communication. The chat interface is fully integrated, allowing providers to respond to inquiries and coordinate with demanders in real time. Notifications and status updates ensure that providers are always informed of new activity, enhancing responsiveness and customer satisfaction. The provider's experience is further enriched by analytics and feedback mechanisms, which help them understand their performance and identify opportunities for improvement.

4.1 Provider Workflow

The typical workflow for a provider begins with logging into the platform and accessing the dashboard. From there, the provider can manage their listings, monitor incoming requests, and engage in conversations with demanders. When a new request is received, the provider reviews the details and decides whether to accept or reject it. Upon acceptance, the chat feature is unlocked, enabling direct communication. Once the service or product has been delivered, the provider can mark the request as completed, prompting the demander to leave a review. This workflow is designed to be intuitive and efficient, minimizing administrative overhead and allowing providers to focus on delivering value to their clients.

4.2 Detailed Sequence Diagram of Provider

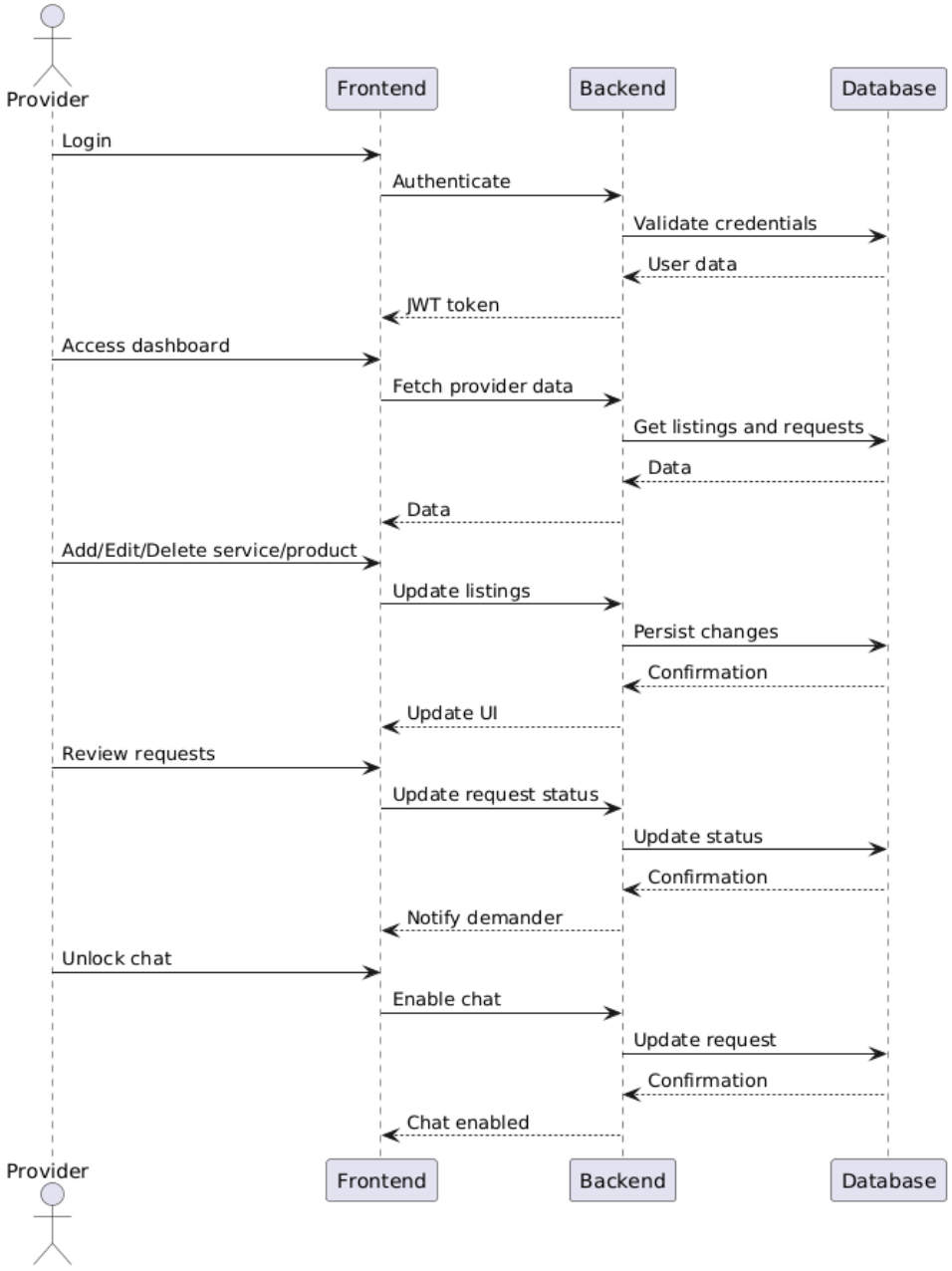

Figure 6: Detailed Sequence diagram of the provider workflow

4.3 Provider Interfaces

The provider interfaces are designed for efficiency and clarity. The dashboard presents a summary of active listings and pending requests. Forms for adding or editing services and products are concise, with validation to prevent errors. The order management section provides detailed information on each request, including demander details, requested items, and current status. The chat window is integrated directly into the dashboard, ensuring that providers can manage all interactions from a single location. All interfaces are fully responsive, adapting to various screen sizes and devices, and are designed to minimize cognitive load, allowing providers to focus on their core activities. The following figures present the provider's interfaces:

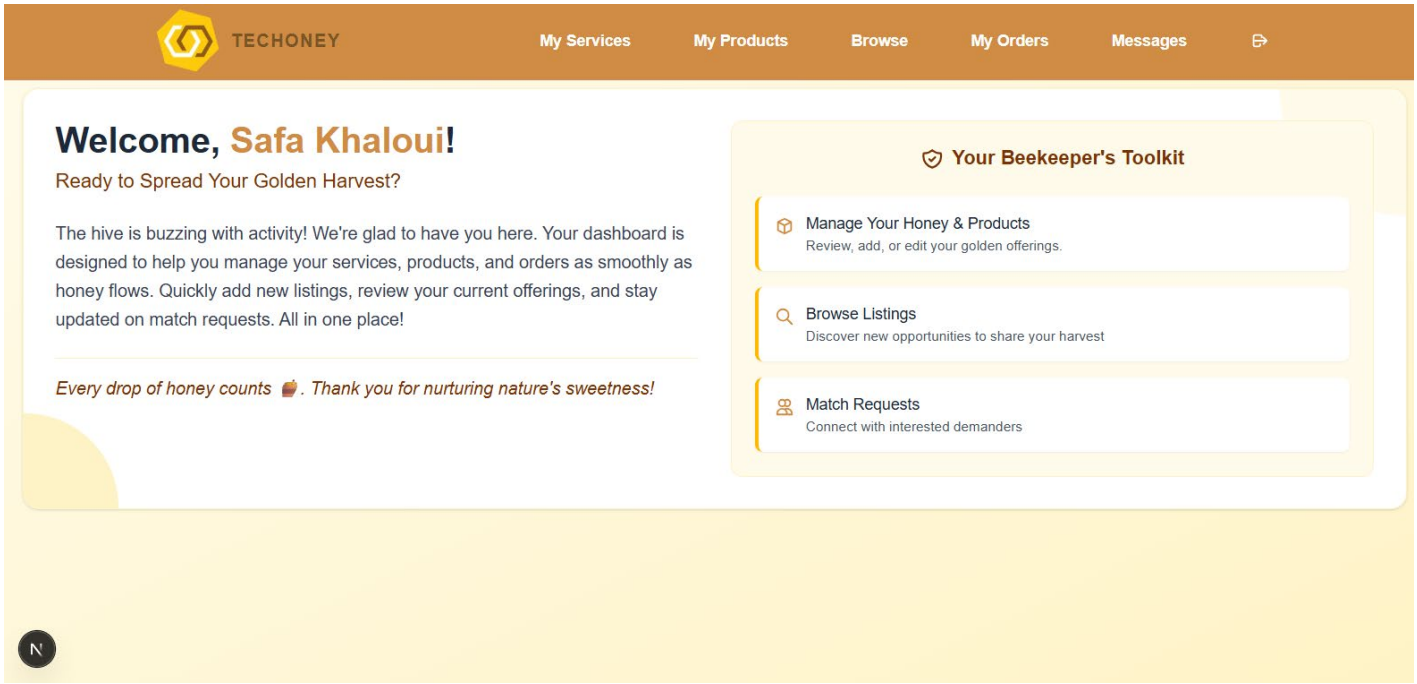

Figure 7: Provider's welcome page

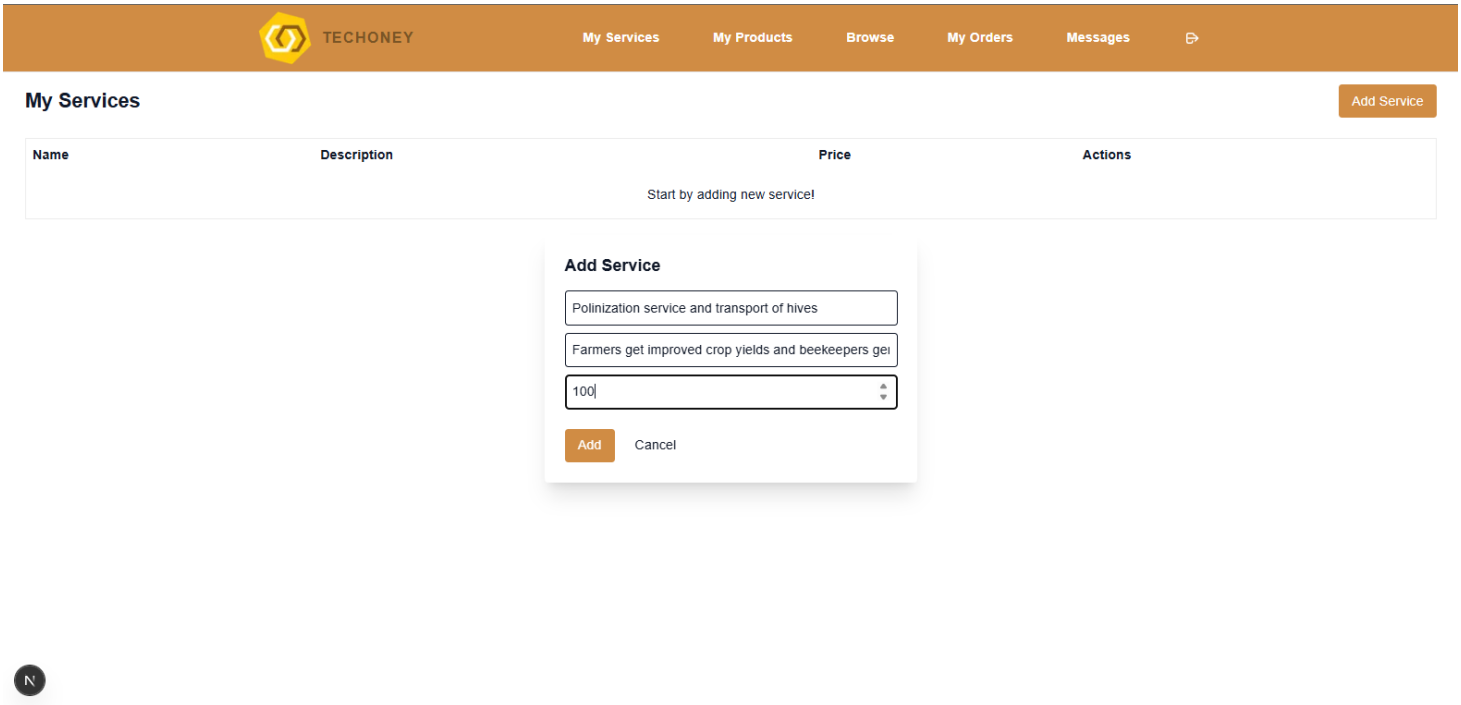

Figure 8: Providre's "My services" page

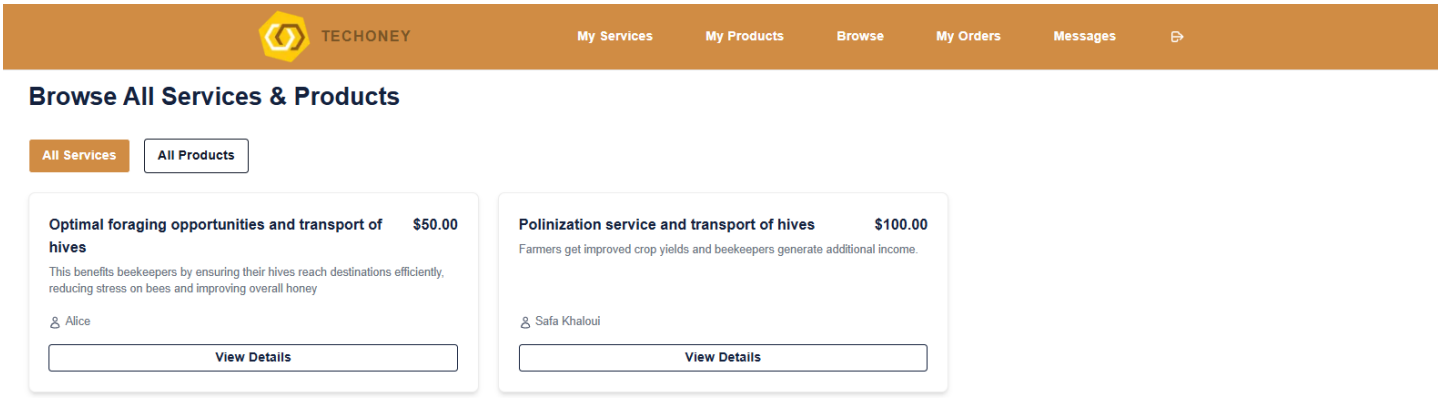

Figure 9: Provider's "Browse" page

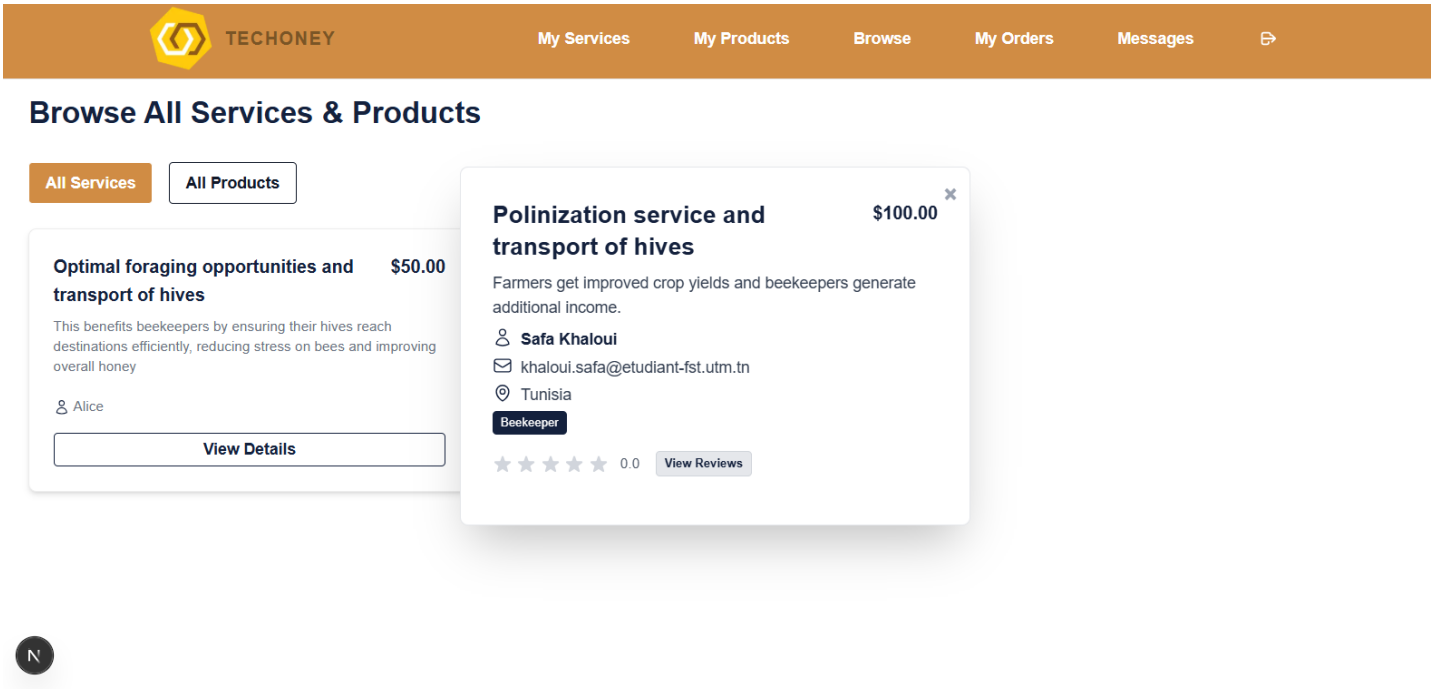

Figure 10: Provider's "View Details" popup

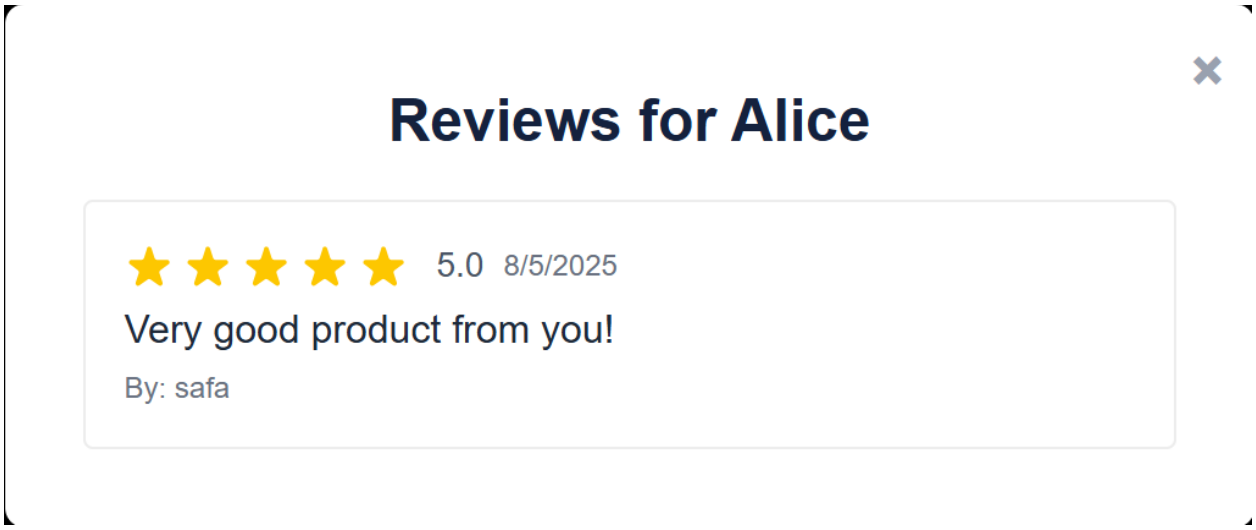

Figure 11: Provider's "View Reviews" popup

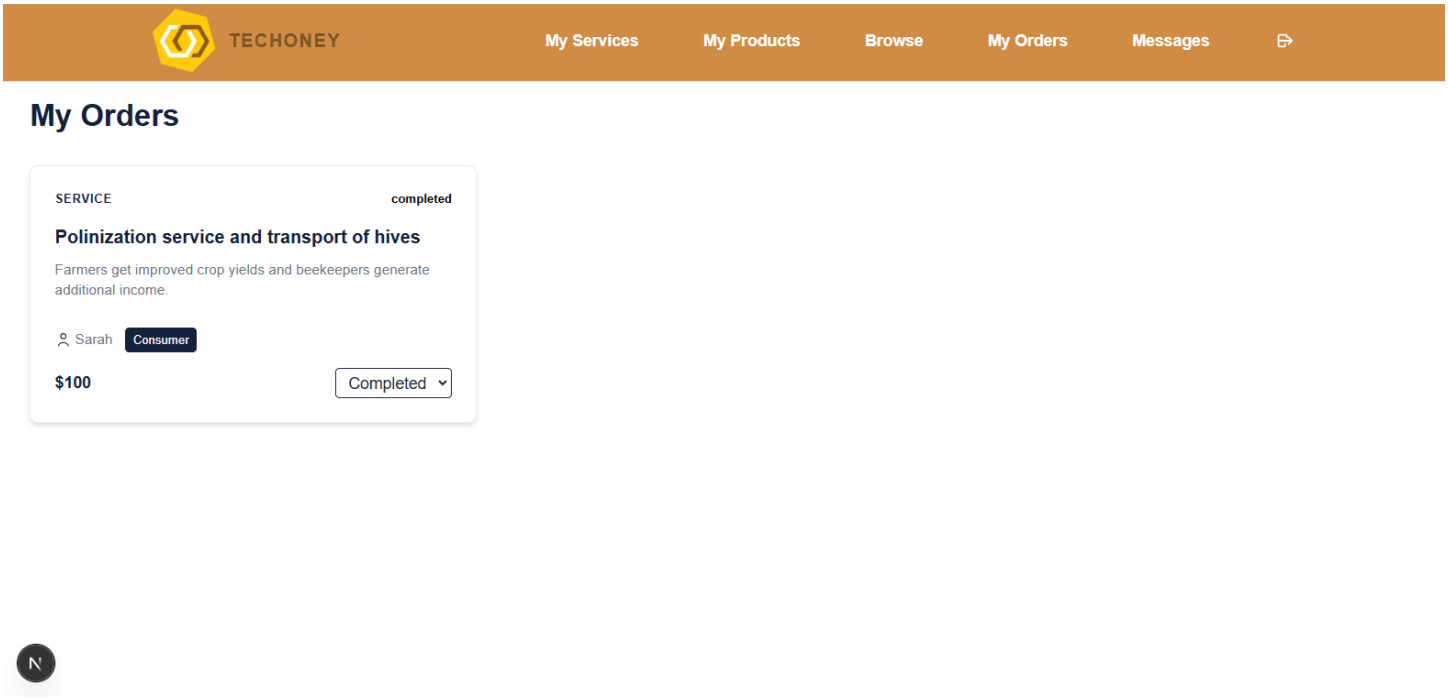

Figure 12: Provider's "My orders" page

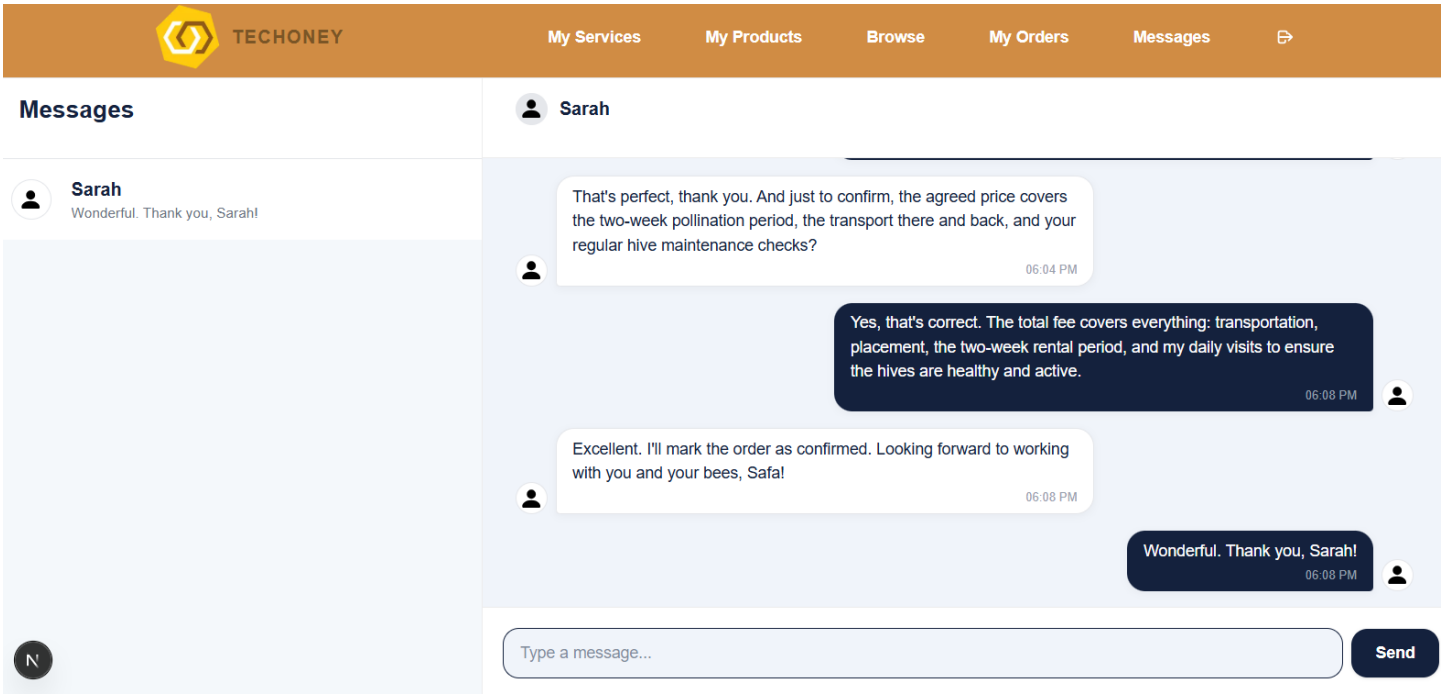

Figure 13: Provider's "Messages" page

5. Demander Interfaces & Functionality

Demanders benefit from a streamlined experience focused on discovery, request initiation, and communication. The demander dashboard offers quick access to browse available services and products. Upon selecting an offering, demanders can view detailed information, including provider ratings and reviews. Requests are initiated through a simple process, and demanders can track the status of their requests in real time. The chat system allows for direct

communication with providers once a request is accepted, facilitating coordination and clarification. After the completion of a transaction, demanders are prompted to leave a review, contributing to the platform's reputation system. The demander's journey is designed to be as frictionless as possible, with clear calls to action and feedback at every step.

5.1 Demander Workflow

The demander's journey begins with authentication, followed by browsing the platform's offerings. After identifying a suitable service or product, the demander submits a request, which is then reviewed by the provider. If accepted, the chat feature is enabled, allowing for direct communication. The demander can monitor the progress of their request through the dashboard and, upon completion, provide feedback in the form of a review and rating. This workflow ensures that demanders are always informed and empowered to make decisions that best suit their needs.

5.2 Detailed Sequence Diagram of Demander

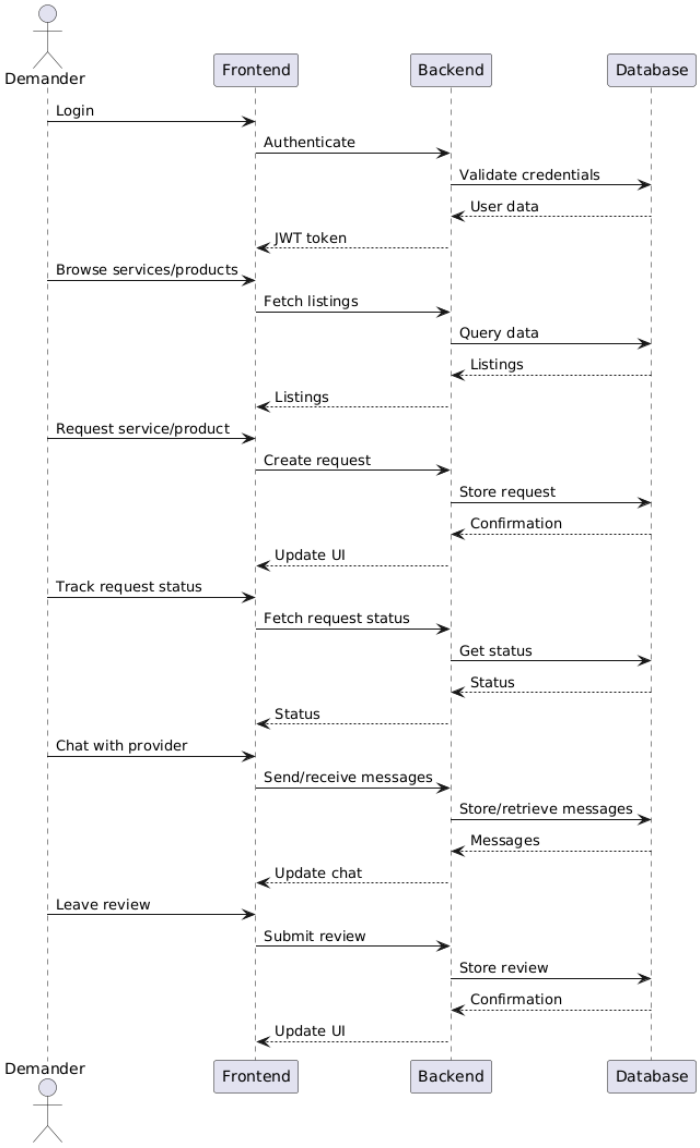

Figure 14: Detailed Sequence diagram of the demander workflow

5.3 Demander Interfaces

The demander interfaces prioritize ease of use and clarity. The browse page features a grid layout with cards for each service or product, displaying key information at a glance. Detailed views provide comprehensive information, including provider profiles and ratings. The request process is streamlined, with clear calls to action and feedback at each step. The order tracking section allows demanders to monitor the status of their requests, while the chat window facilitates direct communication with providers. The review modal is accessible upon completion of a transaction, encouraging demanders to contribute to the platform's reputation system. All interfaces are optimized for responsiveness and accessibility, ensuring a consistent experience across all devices.

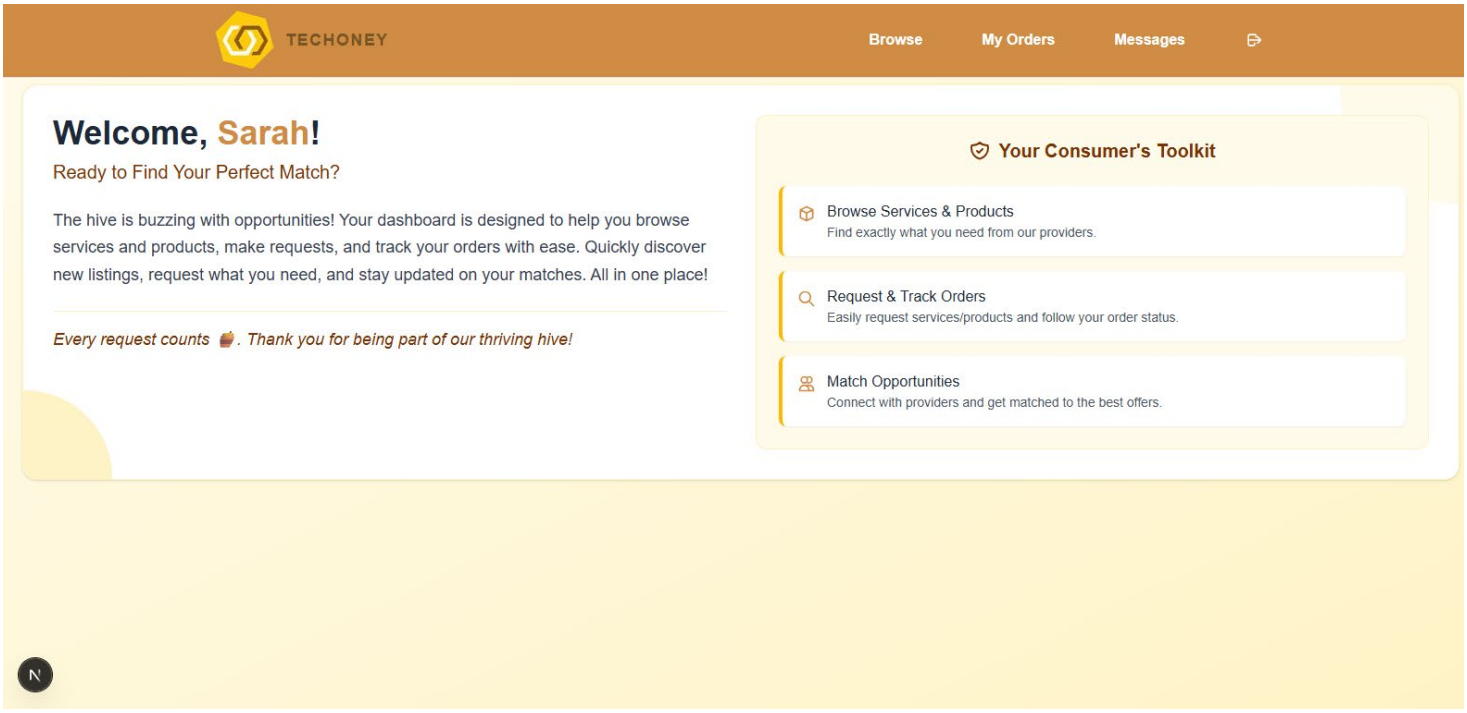

Figure 15: Demander's welcome page

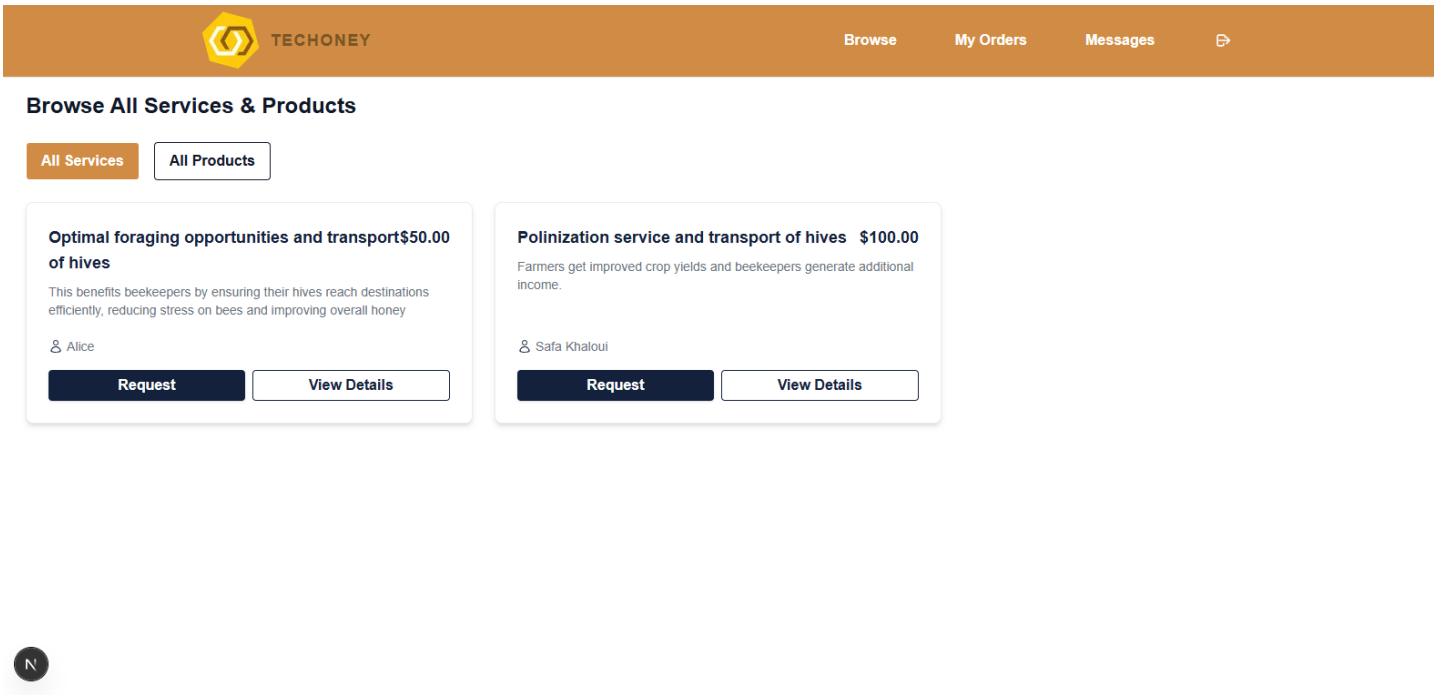

Figure 16: Demander's "Browse" page

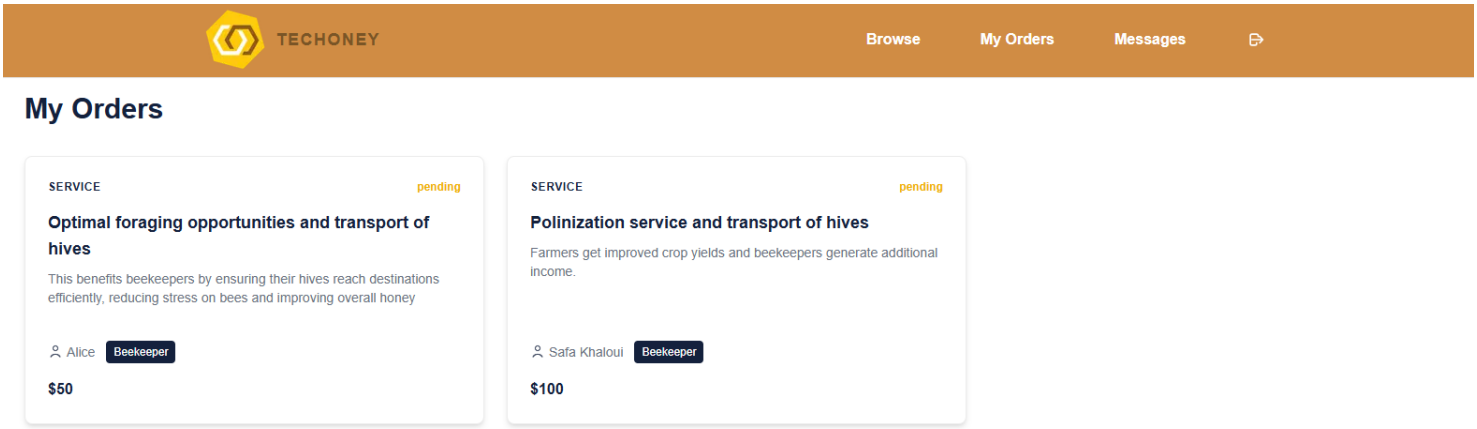

Figure 17: Demander's "My orders" page

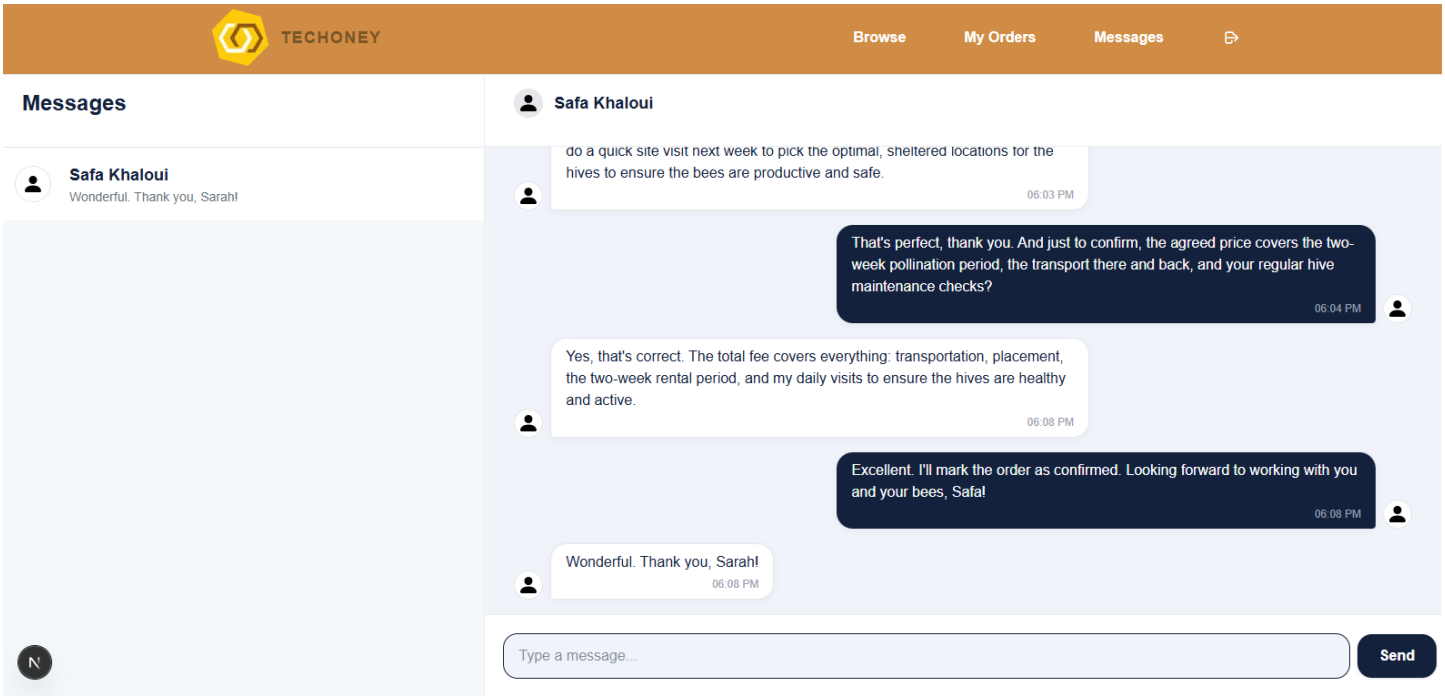

Figure 18: Demander's "Messages" page

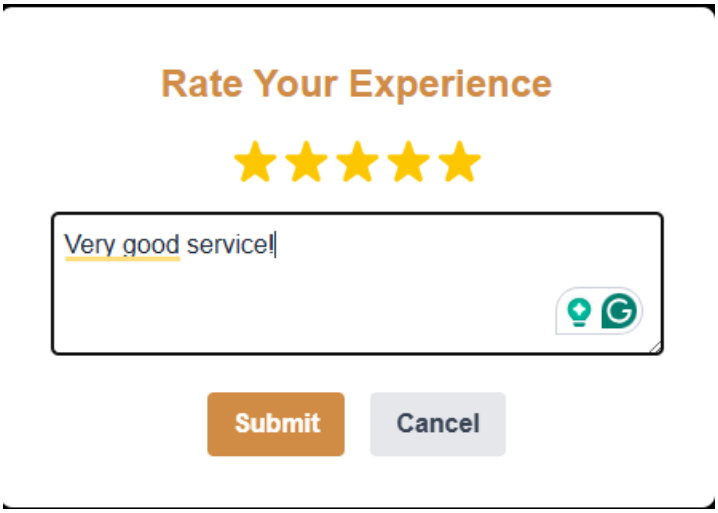

Figure 19: Demander's "Rate" page

6. Technologies and Languages Used & Code Architecture

Techoney Sharing Economy platform is built using a modern technology stack that ensures performance, scalability, and maintainability.

The frontend is developed with Next.js, leveraging React and TypeScript for type safety and component-based architecture. TailwindCSS is used for styling, enabling rapid development of responsive and consistent interfaces.

The backend is powered by NestJS, a progressive Node.js framework that brings structure and modularity to server-side development. Data is managed through a relational database, with entities mapped using an ORM for seamless integration.

Communication between the frontend and backend is secured via RESTful APIs, with JWT tokens providing authentication and authorization. The codebase is organized into modules and components that reflect the main domains of the platform. For example, the user module handles registration, authentication, and profile management; the product and service modules manage listings; the request module tracks orders; the chat module enables real-time messaging; and the review module manages ratings and feedback. Each module is encapsulated, promoting maintainability and scalability. This architecture not only supports the current functionalities but also allows for the seamless integration of new features as the platform evolves, such as payment gateways or third-party analytics.

7. Conclusion and Key Limits and Perspectives

The Techoney Sharing Economy Platform represents a significant advancement in the digital transformation of the honey industry. By providing a secure, user-friendly, and feature-rich environment, the platform empowers users to connect, share, and thrive in a collaborative ecosystem. Its robust architecture and thoughtful design ensure that it can scale to meet the needs of a growing user base.

However, as with any complex system, there are areas for further improvement. Future perspectives include the integration of advanced search and filtering capabilities, enhanced analytics for providers, support for additional languages, and the incorporation of blockchain technology for traceability and transparency. By remaining responsive to user needs and technological advancements, Techoney is well-positioned to drive innovation and foster sustainable growth in the honey sector and beyond..

References

https://github.com/techoney-project/techoney-project