



National University of Computer and Emerging Sciences, Lahore



## VendorSphere: Revolutionizing Retail Partnerships

Muhammad Hassan Raza 20L-1361 BS(SE)

Taimoor Rashid 20L-1303 BS(SE)

Muhammad Umer Farooq 20L-1317 BS(SE)

Supervisor: Mr. Muhammad Usama Hassan Alvi

External Supervisor: Mr. Muhammad Hamid Raza, Arrivy Inc.

Final Year Project

December 28, 2023



## **Anti-Plagiarism Declaration**

This is to declare that the above publication was produced under the:

**Title: VendorSphere: Revolutionizing Retail Partnerships**

is the sole contribution of the author(s), and no part hereof has been reproduced as it is the basis (cut and paste) that can be considered Plagiarism. All referenced parts have been used to argue the idea and cited properly. I/We will be responsible and liable for any consequence if a violation of this declaration is determined.

Date: .....

Name: Muhammad Hassan Raza

Signature: *M. Hassan*

Name: Taimoor Rashid

Signature: *T. Rashid*

Name: Muhammad Umer Farooq

Signature: *M. Umer*

---

## **Author's Declaration**

This states the Authors' declaration that the work presented in the report is their own, and has not been submitted/presented previously to any other institution or organization.

## **Abstract**

VendorSphere is a revolutionary web application being built for today. Its purpose is to address the struggles faced by online vendors and physical store owners. Online vendors have a hard time reaching people who want to see their products in person. While physical stores underutilize their space. What VendorSphere does is allow both of these parties to collaborate on a commission basis. Online vendors can show off their stuff while physical store owners get more visibility from online shoppers. Getting more eyes means a greater chance of selling in business. Both parties also get the benefit of keeping track of inventory and important details about running a business in real-time, this includes customer insights as well. When people only think about digital advertising for the most part, VendorSphere takes a different approach to how the two should work together rather than against each other. It's supported by helping small businesses grow and form partnerships so they can access new opportunities in the market.

## **Executive Summary**

In an era characterized by digital connectivity, the commerce landscape is undergoing a significant transformation and posing new challenges for both online vendors and physical store owners. VendorSphere is a web application designed to overcome these challenges.

The problem encountered is that many online vendors are providing quality products but still missing potential customers because some customers want to see the product in person, and similarly, many physical store owners have underutilized shop space. So VendorSphere is a web-based application created to solve this problem.

VendorSphere is providing them with a state-of-the-art platform that recognizes the problem encountered and mitigates it by allowing online vendors and physical store owners to collaborate on a commission-based model. VendorSphere has two stakeholders one is an online vendor who can display their products on our platform for physical shop owners to see, while the other stakeholder is the physical store owner who can upload his store for online vendors to see, both stakeholders then can collaborate in which the online vendor will be providing the products to physical store owner, then the store owner would get commission on each project sold. Both online vendors and physical store owners then can take advantage of ERP services which include real-time inventory management and business insights (current sales and revenues).

In addition to the project goals, the main Sustainable Development Goal(SDG) for our project is aligned with SDG 8 and is to promote economic growth and foster inclusive partnerships between online vendors and physical store owners, enhancing access to market opportunities. The major constraints currently are online vendor product quality testing, store verification, and barcode generation for the product. which VendorSphere actively addresses through measures like store and product reviews, and QR Codes which can be scanned using phones.

The research work in our project is less however related organizations are doing similar work to increase market utilization of their online vendors. what makes VendorSphere different is that it aims to increase market utilization for both online vendors and physical store owners.

Moreover, all the important list of features, and functional and non-functional requirements are mentioned. The graphical user interface of this application has been provided to give a mature yet gentle look. All major use cases of the application have been mentioned in the form tables and the analysis of the risk is done to identify the risks that can be encountered in our application.

Finally, Team VendorSphere has made significant progress in the architectural and use case departments. The requirements have been refined and the System has started to take a specific shape. The architectural

breakdown of our system makes it easier to visualize all the moving parts of our system. Similarly, the user cases will greatly help the development team in translating formal requirements into implementable code. This milestone will also help with use-case coverage metrics to inform the stakeholders regarding the accurate progress of the project.

# Table of Contents

|   |            |
|---|------------|
| <b>List of Figures</b>  | <b>x</b>   |
| <b>List of Tables</b>   | <b>xii</b> |
| <b>1 Introduction</b>   | <b>1</b>   |
| 1.1 Purpose of this Document . . . . .                            | 1          |
| 1.2 Intended Audience . . . . .                                   | 2          |
| 1.3 Definitions, Acronyms, and Abbreviations . . . . .            | 2          |
| 1.4 At the End of Introduction Chapter . . . . .                  | 2          |
| <b>2 Project Vision</b>   | <b>3</b>   |
| 2.1 Problem Domain Overview . . . . .                             | 3          |
| 2.2 Problem Statement . . . . .                                   | 3          |
| 2.3 Problem Elaboration . . . . .                                 | 4          |
| 2.4 Goals and Objectives . . . . .                                | 5          |
| 2.5 Project Scope . . . . .                                       | 5          |
| 2.6 Sustainable Development Goal (SDG) . . . . .                  | 6          |
| 2.7 Constraints . . . . .   | 8          |
| 2.8 Business Opportunity . . . . .                                | 8          |
| 2.9 Stakeholders Description/ User Characteristics . . . . .      | 8          |
| 2.9.1 Stakeholders Summary . . . . .                              | 9          |
| 2.9.2 Key High-Level Goals and Problems of Stakeholders . . . . . | 9          |
| <b>3 Literature Review / Related Work</b>                         | <b>10</b>  |
| 3.1 Definitions, Acronyms, and Abbreviations . . . . .            | 10         |
| 3.2 Detailed Literature Review . . . . .                          | 10         |
| 3.2.1 Related Research Work 1 . . . . .                           | 10         |
| 3.2.2 Related Research Work 2 . . . . .                           | 11         |
| 3.2.3 Related Research Work 3 . . . . .                           | 12         |

|          |  |           |
|----------|--|-----------|
| 3.2.4    | Related Research Work 4 . . . . .            | 13        |
| 3.2.5    | Related Research Work 5 . . . . .            | 14        |
| 3.2.6    | Related Research Work 6 . . . . .            | 16        |
| 3.3      | Literature Review Summary Table . . . . .    | 17        |
| 3.4      | Conclusion . . . . .                         | 18        |
| <b>4</b> | <b>Software Requirement Specifications</b>   | <b>19</b> |
| 4.1      | List of Features . . . . .                   | 19        |
| 4.2      | Functional Requirements . . . . .            | 19        |
| 4.3      | Quality Attributes . . . . .                 | 21        |
| 4.4      | Non-Functional Requirements . . . . .        | 22        |
| 4.5      | Assumptions . . . . .                        | 22        |
| 4.6      | Use Cases . . . . .                          | 22        |
| 4.7      | Hardware and Software Requirements . . . . . | 40        |
| 4.7.1    | Hardware Requirements . . . . .              | 40        |
| 4.7.2    | Software Requirements . . . . .              | 41        |
| 4.8      | Graphical User Interface . . . . .           | 41        |
| 4.9      | Database Design . . . . .                    | 47        |
| 4.9.1    | ER Diagram . . . . .                         | 47        |
| 4.9.2    | Data Dictionary . . . . .                    | 47        |
| 4.10     | Risk Analysis . . . . .                      | 50        |
| <b>5</b> | <b>High-Level and Low-Level Design</b>       | <b>52</b> |
| 5.1      | System Overview . . . . .                    | 52        |
| 5.2      | Design Considerations . . . . .              | 52        |
| 5.2.1    | Assumptions and Dependencies . . . . .       | 52        |
| 5.2.2    | General Constraints . . . . .                | 52        |
| 5.2.3    | Goals and Guidelines . . . . .               | 54        |
| 5.2.4    | Development Methods . . . . .                | 54        |
| 5.3      | System Architecture . . . . .                | 55        |
| 5.3.1    | Subsystem Architecture . . . . .             | 56        |
| 5.4      | Architectural Strategies . . . . .           | 58        |
| 5.4.1    | Reuse of existing product . . . . .          | 59        |
| 5.4.2    | User-Interface Paradigm . . . . .            | 59        |
| 5.4.3    | Error detection and Recovery . . . . .       | 59        |

|          |  |           |
|----------|--|-----------|
| 5.4.4    | Concurrency and Synchronization . . . . .                        | 59        |
| 5.4.5    | Memory Management Policies . . . . .                             | 59        |
| 5.4.6    | Use of Programming language . . . . .                            | 59        |
| 5.5      | Domain Model/Class Diagram . . . . .                             | 60        |
| 5.6      | Sequence Diagrams . . . . .                                      | 61        |
| 5.7      | Policies and Tactics . . . . .                                   | 83        |
| 5.7.1    | Conventions . . . . .  | 83        |
| 5.7.2    | Development Tools . . . . .                                      | 83        |
| 5.7.3    | Project Management Tools . . . . .                               | 83        |
| 5.7.4    | Coding Guidelines . . . . .                                      | 84        |
| 5.7.5    | Testing the Software . . . . .                                   | 84        |
| 5.7.6    | Maintenance of Software . . . . .                                | 84        |
| 5.7.7    | Vulnerability Check . . . . .                                    | 84        |
| 5.7.8    | Plans for ensuring requirements traceability . . . . .           | 84        |
| 5.7.9    | End User Interface . . . . .                                     | 84        |
| 5.7.10   | Hierarchical Organization of Source Code to Components . . . . . | 85        |
| <b>6</b> | <b>Description of Prototype</b>                                  | <b>86</b> |
| <b>7</b> | <b>Conclusions</b>   | <b>88</b> |

# List of Figures

|   |    |
|---|----|
| <b>2.1 Sustainable Development Goal . . . . .</b>     | 7  |
| <b>4.1 Login Page of VendorSphere . . . . .</b>       | 41 |
| <b>4.2 Signup Page of VendorSphere . . . . .</b>      | 42 |
| <b>4.3 Homepage of VendorSphere . . . . .</b>         | 43 |
| <b>4.4 Store Page of VendorSphere . . . . .</b>       | 44 |
| <b>4.5 Product Page of VendorSphere . . . . .</b>     | 45 |
| <b>4.6 Catalog Page of VendorSphere . . . . .</b>     | 46 |
| <b>4.7 ER Diagram of our Database . . . . .</b>       | 47 |
| <b>5.1 Architecture Diagram . . . . .</b>             | 55 |
| <b>5.2 Admin component Diagram . . . . .</b>          | 56 |
| <b>5.3 Product Vendor component Diagram . . . . .</b> | 57 |
| <b>5.4 Shop Owner component Diagram . . . . .</b>     | 58 |
| <b>5.5 VendorSphere Class Diagram . . . . .</b>       | 60 |
| <b>5.6 Login . . . . .</b>                            | 61 |
| <b>5.7 Contact Vendor . . . . .</b>                   | 61 |
| <b>5.8 Sign up . . . . .</b>                          | 62 |
| <b>5.9 Verify Transaction . . . . .</b>               | 62 |
| <b>5.10 Change Password . . . . .</b>                 | 63 |
| <b>5.11 Feature Product . . . . .</b>                 | 63 |
| <b>5.12 Register Store . . . . .</b>                  | 64 |
| <b>5.13 Delete Account . . . . .</b>                  | 65 |
| <b>5.14 Delete Product . . . . .</b>                  | 66 |
| <b>5.15 Edit Online Store Information . . . . .</b>   | 67 |
| <b>5.16 Block Account . . . . .</b>                   | 68 |
| <b>5.17 Display Metrics . . . . .</b>                 | 69 |
| <b>5.18 Delete Store . . . . .</b>                    | 70 |
| <b>5.19 Edit Product . . . . .</b>                    | 71 |

|  |    |
|--|----|
| 5.20 <b>Feature store</b> . . . . .    | 72 |
| 5.21 <b>Inventory Update</b> . . . . . | 73 |
| 5.22 <b>My Stores</b> . . . . .        | 74 |
| 5.23 <b>Report Account</b> . . . . .   | 75 |
| 5.24 <b>Review</b> . . . . .           | 76 |
| 5.25 <b>Search</b> . . . . .           | 77 |
| 5.26 <b>Sign Out</b> . . . . .         | 78 |
| 5.27 <b>Upload Products</b> . . . . .  | 79 |
| 5.28 <b>View Earnings</b> . . . . .    | 80 |
| 5.29 <b>View Store</b> . . . . .       | 81 |
| 5.30 <b>View Product</b> . . . . .     | 82 |
| 5.31 <b>Reset Password</b> . . . . .   | 83 |

# List of Tables

|      |  |    |
|------|--|----|
| 3.1  | <b>Literature Review Summary Table</b> | 18 |
| 4.1  | <b>Login</b>                           | 23 |
| 4.2  | <b>MyStores</b>                        | 23 |
| 4.3  | <b>SignUp</b>                          | 24 |
| 4.4  | <b>View Physical Store/Product</b>     | 24 |
| 4.5  | <b>SignOut</b>                         | 25 |
| 4.6  | <b>Delete Account</b>                  | 25 |
| 4.7  | <b>Edit Online Store Information</b>   | 26 |
| 4.8  | <b>View Metrics</b>                    | 26 |
| 4.9  | <b>Edit Physical Store Information</b> | 27 |
| 4.10 | <b>Upload Products</b>                 | 28 |
| 4.11 | <b>Edit Products</b>                   | 29 |
| 4.12 | <b>Delete Products</b>                 | 30 |
| 4.13 | <b>Register Stores</b>                 | 31 |
| 4.14 | <b>Delete Store</b>                    | 31 |
| 4.15 | <b>Store Review</b>                    | 32 |
| 4.16 | <b>Reset Password</b>                  | 33 |
| 4.17 | <b>Report Physical Shop</b>            | 34 |
| 4.18 | <b>Block Physical Shop</b>             | 34 |
| 4.19 | <b>Online Support</b>                  | 35 |
| 4.20 | <b>Feature Store/Product</b>           | 36 |
| 4.21 | <b>Verify Transaction</b>              | 37 |
| 4.22 | <b>Contact Shop/Online Vendor</b>      | 37 |
| 4.23 | <b>Search Store</b>                    | 38 |
| 4.24 | <b>View Earnings</b>                   | 38 |
| 4.25 | <b>Inventory Update</b>                | 39 |
| 4.26 | <b>Reset password</b>                  | 40 |

|                                      |    |
|--------------------------------------|----|
| 4.27 Data Dictionary Table . . . . . | 47 |
|--------------------------------------|----|

## Chapter 1 Introduction

VendorSphere introduces an innovative platform that reshapes retail dynamics for the modern era. Addressing the gap between product vendors devoid of physical retail presence and shop owners with surplus space, the project facilitates seamless collaboration. VendorSphere will allow purely online-focused vendors to negotiate with shop owners in such a way that the vendors can place their products in the underutilized space inside the shop owner's physical retail front. Vendors benefit from streamlined sign-ups, real-time stock updates, and efficient vendor discovery through filters based on location, cost, and ratings. The platform fosters negotiation, contract creation, billing management, and responsive customer engagement. Shop owners can optimize underutilized space by connecting with vendors, negotiating pricing, and managing inventory. The platform also accommodates contract creation, logistics planning, and prompt customer service. Analytics-driven insights enhance the ecosystem, offering paid suggestions for product offerings and manufacturing partnerships. Administrators maintain control through an intuitive panel, overseeing user management, analytics, contracts, and reviews. VendorSphere redefines retail interactions, offering a dynamic space where vendors and shop owners thrive synergistically.

### 1.1 Purpose of this Document

The purpose of this document is to present the design, implementation, and evaluation of our Final Year Project VendorSphere which aims to develop a web-based application for vendors who aren't able to reach customers as effectively as they were in person and for shop owners who want to utilize their extra space. VendorSphere is a web platform that was created to address this issue. Using it, vendors without a physical store can connect with shop owners who do have extra space. This aims to bridge the gap between online and physical shopping. The project has three main goals: streamline collaboration, offer efficient tools like real-time inventory updates and contract negotiations, and use data-driven insights. To do this VendorSphere tailors itself towards three types of people: admins, shop owners, and product vendors. It does this by focusing on user experience through responsive design and how it handles data. The team behind it hopes that VendorSphere will be able to reshape retail partnerships, benefiting everyone involved, while also creating a more interconnected commercial landscape that thrives off that cooperation. The research question we aim to answer is: Can we develop a web-based application that can help both online vendors and physical store owners earn extra revenue from our commission-based model? This report will present the methodology, design, implementation, testing, and evaluation of our project, as well as the limitations and future work."

## 1.2 Intended Audience

The project's intended audience includes:

- **Online Vendors:**
  - Those willing to move their products into physical stores.
  - And expanding where they sell.
- **Physical Store Owners:**
  - Owners who have empty spaces in their shops.
  - Wanting to make more money through commission-based sales.
  - Open to new partnerships with online vendors.

## 1.3 Definitions, Acronyms, and Abbreviations

**SDG:** Sustainable Development Goal

**FYP:** Final Year Project

**MVP:** Minimum Viable Product

**UI:** User Interface

**UX:** User Experience

**REST:** Representational State Transfer

**CRUD:** Create, Read, Update, Delete

**API:** Application Programming Interface

## 1.4 At the End of Introduction Chapter

This report includes a total of four chapters. The second chapter is project vision in which we discuss the problem overview and elaborate how our website can serve as a solution. The third chapter discusses previously developed work which is based on similar work to the work we want to do. The fourth chapter is an SRS document for VendorSphere which discusses an in-depth analysis of our web application.

## Chapter 2 Project Vision

VendorSphere is a state-of-the-art platform built to facilitate seamless collaboration between online stores and physical store owners. This innovative solution aims to empower small businesses by increasing their sales reach while providing physical stores the opportunity to make productive use of their available space, all based on a commission model. Our vision is to foster a unified community where businesses can thrive by working together for mutual benefit.

### 2.1 Problem Domain Overview

The core issue we are addressing is the disparity in sales between online shop owners and physical shop owners. Online shops often struggle because customers prefer to see products in person, while physical stores have underutilized space that could generate more revenue by showcasing products from different online stores.

VendorSphere acts as a bridge between these two types of business owners, offering a user-friendly platform for collaboration. If you have an online store, you can easily list your products on VendorSphere for physical store owners to discover. Similarly, if you own a physical store, you can showcase your shop's details for online store owners to find.

One standout feature is the ability to check ratings and reviews, providing valuable insights to make informed partnership decisions. When both parties see potential in collaborating, they can establish partnerships based on their mutual goals.

Additionally, VendorSphere offers Enterprise Resource Planning (ERP) services, which streamline inventory management. This simplifies the process, making it even more convenient for businesses to work together effectively and efficiently.

### 2.2 Problem Statement

Currently, there is a disconnection between countless online store owners and physical shop owners. The current lack of an efficient platform makes it difficult for them to connect and collaborate effectively. This results in missed opportunities for both sides, hindering their potential for sales growth and resource optimization.

## 2.3 Problem Elaboration

The primary problem at hand pertains to the limitations faced by both online stores and physical store owners. Online stores lack physical spaces for customers to inspect products in person, while physical store owners have underutilized space in their shops. To address this overarching issue, we can break it down into several sub-problems that need to be addressed:

1. **Platform Creation:** Our initial objective is the development of a user-friendly platform that seamlessly bridges the virtual and physical realms. This platform should serve as a virtual nexus where both online store owners and physical storekeepers can convene, interact, and forge collaborations.
2. **Ratings and Reviews:** In our quest for informed decision-making, our second challenge centers on the implementation of a robust system of ratings and reviews. Store owners must possess a clear understanding of the reputation and credibility of potential partners. The bedrock of trust-building lies in thorough vendor verification.
3. **Vendor Verification:** Establishing trust is paramount, and to accomplish this, we need to institute a Stringent vendor verification process. This process should leave no room for compromise, ensuring that all participants on the platform meet the highest standards.
4. **Real-time Inventory Management:** A marketplace would be incomplete without efficient inventory management. We must delve into creating real-time inventory management tools, enabling store owners to monitor their stock and guarantee product availability precisely when and where needed.
5. **Marketplace Promotion:** We can also not overlook the challenge of promoting our shop owners. We will be providing them with facilities to feature their products and stores
6. **User Experience Enhancement:** Continuous refinement is our overarching goal. We will employ feedback mechanisms and data analytics to perpetually enhance the platform's user-friendliness.
7. **Payment and Transaction Smoothness:** Payments and transactions should be secure and frictionless. Our task is to build a system that ensures this, alongside addressing issues such as fees and dispute resolution.
8. **Customer Support:** Lastly, maintaining trust and resolving issues between users necessitates top-notch customer support and conflict resolution mechanisms.

## 2.4 Goals and Objectives

**Innovative Retail Platform:** VendorSphere aims to create an innovative and user-friendly web application that transforms the way retail interactions occur. This involves the development of a cutting-edge digital platform that facilitates seamless collaboration between online-focused vendors and physical shop owners. The innovation lies in creating a space where these two distinct retail worlds can converge, leveraging the advantages of both the online and physical retail realms.

**Enhanced Collaboration:** The project seeks to bridge the gap between product vendors who primarily operate online and shop owners with underutilized physical retail space. By doing so, VendorSphere fosters more productive and mutually beneficial partnerships. This collaboration goes beyond simple co-location; it's about creating a synergy where vendors and shop owners work together to optimize space, inventory, and customer engagement.

**Efficiency Tools:** VendorSphere offers a suite of efficiency tools designed to simplify the retail collaboration process. These tools include real-time inventory updates, allowing vendors and shop owners to stay informed about product availability. Additionally, the platform streamlines contract creation, making it easier for parties to negotiate and formalize agreements. This efficiency not only saves time but also reduces the chances of misunderstandings or disputes.

**Digital Space for Vendors:** VendorSphere creates a dedicated digital space where vendors can efficiently negotiate contracts with shop owners. This digital hub serves as a secure and user-friendly environment where vendors can showcase their products, discuss terms with shop owners, and manage their presence in physical retail spaces. It offers a virtual meeting place where the details of partnerships are established and maintained.

**Data-Driven Insights:** VendorSphere leverages advanced analytics to provide valuable insights to both vendors and shop owners. These insights include suggestions for optimal products to offer and potential partners for more successful collaborations. The platform's data-driven approach uses historical and real-time data to inform decision-making, helping vendors and shop owners make informed choices about their product offerings and partnerships. Adopting a data-driven approach has the potential to result in heightened sales, enhanced customer satisfaction, and improved overall business performance.

## 2.5 Project Scope

The VendorSphere project aims to create a web-based platform that fosters collaboration between online product vendors and physical shop owners in the retail sector, driving economic growth. The platform will offer core functionalities such as user registration, product registration, store registration, real-time

inventory updates, contract management, and advanced analytics. The project will utilize the following technology stack:

- Frontend: React.js Library
- Backend: Django Framework
- Cloud Services: Google Cloud SDK
- Hardware:
  - Intel Core i3 or AMD Ryzen 5 5600, or better
  - 8 GB of DDR4 RAM, or better
  - Nvidia GTX 1650, or better (Optional)
- Software Tools:
  - Stable Web Browser: Google Chrome or Mozilla Firefox
  - Integrated Development Environment: Visual Studio Code or JetBrains PyCharm
  - Programming Language: Python 3.x

VendorSphere will provide user-friendly features such as user registration, product placement, real-time inventory tracking, contract management, customer engagement, and advanced analytics.

Upon completion, the VendorSphere project will deliver:

1. A fully functional web-based platform that facilitates collaboration between online vendors and shop owners, driving economic growth.
2. User documentation for platform usage and features.
3. Comprehensive documentation detailing the design, implementation, and testing process.

The project scope excludes the following:

- Providing hosting or server infrastructure, as it will be independently hosted.
- Developing mobile applications (iOS or Android), focusing solely on the web-based platform.
- Integrating the platform with third-party services or APIs beyond the initial scope.

## 2.6 Sustainable Development Goal (SDG)

**Goal:** To promote economic growth and foster inclusive partnerships between online businesses and physical store owners, enhancing access to markets and opportunities.

**Target:** To facilitate collaborative partnerships between online businesses and physical shop owners, resulting in the placement of online vendors' products in physical stores, thus creating economic opportunities for both parties.

**Explanation:** This SDG aligns with the broader goal of promoting economic growth (SDG 8) by facilitating partnerships that benefit both online businesses and physical shop owners. It supports inclusive economic growth by providing opportunities for online businesses to expand their reach into physical markets while enabling physical shop owners to diversify their offerings and earn commissions. Additionally, it encourages sustainable consumption and production by optimizing the use of physical retail space and reducing waste through better product placement strategies



**Figure 2.1: Sustainable Development Goal**

*This figure represents the SDG-8 that is the main focus of our application*

## 2.7 Constraints

One major constraint of our application is that the barcode generation for each product is the responsibility of the product vendors. This means that the vendor, when adding a new product to their catalog, will have to provide a barcode/QR code of some kind. This feature is required since it is essential in providing the feature of real-time inventory updates to both the vendor as well as the shop owner. Furthermore, the users will not be cross-checked the first time they sign up. Anyone can sign up as a vendor or shop owner. Admins can easily ban any parties involved in any scams. For instance, we cannot check if the product vendor has enough product to fulfill their contract. Neither can we verify the quality of the products on offer by the vendor. Similarly, we cannot verify if the shop owner indeed owns the shop that they claim to do so.

## 2.8 Business Opportunity

This product will provide a great business opportunity for all the stakeholders. Firstly, the product vendor will get a chance to put their product from the online sphere out in the real world. This means that they have a higher chance of moving their inventory since the customers have a higher trust in products they can touch rather than form their small online pages. Secondly, the shop owner who has some empty shelves gets populated with actual products. This means that the wasted space is now being utilized to diversify their portfolio as well as generate sizable income on the side. Lastly, everything on the managerial and operation side of things will be managed by us. This leaves us plenty of room to extract margins from both types of users of our product.

## 2.9 Stakeholders Description/ User Characteristics

The first type of user will be the product vendor. They can create a catalog of products that they will provide to shop owners based on a legal contract. The second type of user will be the shop owner. They can choose to browse through the catalogs of the product vendors and negotiate with them to display their items in their physical storefronts. The third and final type of user is admin. They are the ones in charge of managing the daily operations of the site, managing user reports, tracking user analytics as well and ensuring the smooth running of the processes. The admins will ban any shop owners and product vendors who are found to violate the Terms of Service.

### 2.9.1 Stakeholders Summary

Our system will have 3 main stakeholders. The first one will be the product vendor who can display their items in VendorSphere and get contracts with shop owners to display the items in an actual shop. Secondly, we have shop owners who can put up their shop on VendorSphere and negotiate a contract with the product vendors if they find any products that they would like to display in their storefronts. Lastly, we will have admin(s) who will keep track of everything and will perform several tasks such as managing user reports, data analytics, as well as daily operations of the website.

### 2.9.2 Key High-Level Goals and Problems of Stakeholders

The most crucial goal of VendorSphere is to provide a platform to product vendors that will allow them to put their products on physical storefronts along with their small social media pages. This will greatly increase the sales of their products as well as increase the trust of customers in their products.

Key problems that the stakeholders could face are:

- The shop owner may get the inventory delivered from the product vendor and then perform an exit scam. This is especially critical if the shop owner built up a good reputation over a long period and then just disappeared with a large inventory. However, these users will be blocked after one reported instance of such violating behavior.
- The product vendor may scam the shop owner by providing low-quality items that are different from the initial samples provided by the vendor. This could lead to the shop owner getting negative reviews from the customers and damage their reputation. However, these users will be blocked after one reported instance of such violating behavior.

To conclude, the main problem is to connect a trustworthy shop owner with a trustworthy product vendor, such that they come to an agreement and flourish under a mutually beneficial business model. These problems, however, are just high-level descriptions and don't cover every single scenario that may occur. VendorSphere aims to mitigate those problems as well in such a way that positively benefits all the stakeholders.

## Chapter 3 Literature Review / Related Work

This chapter delves into prior research pertinent to our project, exploring the methodologies employed in these studies. Currently, many websites cater the physical shop owners to sell online however there is no platform for online vendors to sell their products on physical stores.

### 3.1 Definitions, Acronyms, and Abbreviations

**UUID** : Universally Unique Identifier

**ULID** : Unique Lexicographically Sortable Identifier

**SEO** : Search Engine Optimization

### 3.2 Detailed Literature Review

Following is the detailed literature review relevant to our project

#### 3.2.1 Related Research Work 1

Nike, Inc. is a multinational corporation with its headquarters located in Beaverton, Oregon, USA. Recognized as one of the largest and most prominent brands in sportswear and athletic footwear globally, Nike has achieved widespread acclaim. Nike has been working on blending its online and offline channels by offering services like "Buy Online, Pick Up In-Store" and using technology to enhance the in-store experience

##### 3.2.1.1 Summary of the research item

Nike, a global leader in athletic footwear and apparel, has made some significant strides in implementing an omnichannel retail strategy aimed at seamlessly blending its online and offline shopping experiences. Nike realized that its customers not only wanted shoes of premium quality but also wanted the option to purchase online from the comfort of home but could also pick the product from the store after buying it online.

Nike's "Buy Online, Pick Up In-Store" initiative from 2017 allows buyers to purchase online and visit their retail stores to pick items to ensure topmost quality or if buyers don't want to wait for delivery but want to reserve products as soon as they are released.

### **3.2.1.2 Critical analysis of the research item (Strengths and Weaknesses)**

Nike's approach to improving both online and physical stores' strength is that by marketing themselves catering to both channel customers Nike has reached a wider global audience with their sales revenue increased by 19.08 percent in 2021 and by 9.16 percent in 2023.

While Nike has made substantial progress, maintaining a consistent customer experience throughout remains a complex task as customers can become angry to find products that were not reserved despite being ordered online.

### **3.2.1.3 Relationship to the proposed research work**

The research on Nike's omnichannel strategy is highly relevant to the proposed research work, as VendorSphere itself aims to take advantage of the gap, Nike's approach involves seamlessly blending online and offline channels, while VendorSphere connects vendors and shop owners to optimize physical retail spaces. Both aim to create a more holistic and efficient retail ecosystem.

## **3.2.2 Related Research Work 2**

Mulwi Shopping Feeds Connect your store to the world's major marketplaces allowing sellers to broaden their customer reach.

### **3.2.2.1 Summary of the research item**

Mulwi Shopping Feeds allows online store users to connect their stores with other marketplaces all over the world to expand their product reach and gain more potential customers which in return generates more revenue.

Mulwi with access to a vast array of product feeds and 200+ marketplaces, has an easy onboarding for Shopify shop owners to integrate their stores and become ready to sell other products in their stores.

### **3.2.2.2 Critical analysis of the research item (Strengths and Weaknesses)**

Mulwi strength is that its model enables expanded reach, increased sales opportunities, and market diversity, which is why top brands such as STYLESERVER, ASCOPHARM, and BEEWISE have integrated their stores with Mulwi.

Although Mulwi is doing well in the online sector currently it has not made any effort to unify online and physical store owners to connect.

### **3.2.2.3 Relationship to the proposed research work**

Mulwi's current way of allowing users to post and sell products will allow VendorSphere to onboard online vendors and shop owners by creating an account and then a feed(predefined template for users to set up their stores) to upload their products or stores.

## **3.2.3 Related Research Work 3**

Amazon stands as one of the largest and most impactful e-commerce enterprises globally, established by Jeff Bezos in 1994. Initially starting as an online bookstore, it has transformed into a worldwide marketplace providing an extensive array of products and services. These include e-commerce, cloud computing through Amazon Web Services, streaming services such as Amazon Prime Video, and various other offerings.

### **3.2.3.1 Summary of the research item**

Amazon was founded by Jeff Bezos in 1994. Amazon's customer-centric approach, extensive product selection, and efficient delivery services have made it a dominant force in online retail, with a significant impact on traditional brick-and-mortar stores.

One of the major reasons for the success of Amazon is that it keeps its UI simple and responsive, ensuring a consistent experience across devices, including desktops, tablets, and mobile phones. This consistency allows users to get a similar experience on any device. Other than that Amazon has a strong emphasis on security prioritizing data security and encryption to protect user information and transactions.

### **3.2.3.2 Critical analysis of the research item (Strengths and Weaknesses)**

Amazon's interface design focuses on user-friendliness, featuring a clean and intuitive layout for effortless product searches, navigation, and purchases. The platform's personalization algorithms provide tailored product recommendations based on individual user histories, enhancing the overall shopping experience. Detailed product listings, complete with high-quality images, specifications, and customer reviews, empower customers to make well-informed purchase decisions. Additionally, Amazon's responsive design ensures a consistent user experience across various devices, from desktops to mobile phones.

On the security front, Amazon employs robust data encryption to safeguard sensitive customer information, particularly during online transactions. The platform also offers multi-factor authentication options, fraud detection systems, and secure payment processing methods, all contributing to a secure and trustworthy online shopping environment.

Currently, we aren't aware if this User Interface is sufficient to allow the user to fully utilize the platform as well as fulfill their needs.

### **3.2.3.3 Relationship to the proposed research work**

Amazon's UI design and security practices can serve as valuable references and benchmarks for VendorSphere as it seeks to develop and enhance its platform for connecting vendors and shop owners. VendorSphere can make a responsive UI with detailed product listings and store listings. Implementing fraud detection systems can help identify and prevent fraudulent activities or misuse of the platform, ensuring the safety and integrity of transactions.

## **3.2.4 Related Research Work 4**

Shopify Inc. is a Canadian multinational e-commerce company with its headquarters situated in Ottawa, Ontario. It is one of the world's largest providers of Online Store Infrastructure as well as retail point-of-sale systems. Shopify is known for providing easy-to-set-up online retail stores for the less tech-savvy. They also manage the payments and inventory systems so a novice user can set up a store within a day at the latest.

### **3.2.4.1 Summary of the research item**

Shopify was founded by Tobias Lütke in 2006. Shopify's focus on accessibility, ease of use as well and low bar of entry made it quickly shoot up the ranks of similar services in that era. One of the major reasons Shopify has found such a resounding success, despite not spending exuberant amounts on marketing, is word of mouth. Many early adopters, who used Shopify to set up their small online stores talked about their experience to their acquaintances who in turn also ended up using Shopify's service. This community grew quickly and soon setting up Shopify stores became a rather commonplace for people willing to earn something on the side.

### **3.2.4.2 Critical analysis of the research item (Strengths and Weaknesses)**

Shopify's greatest advantage is that they have a monolithic architecture instead of multiple instances of distributed computing. Therefore, they can uniformly apply policies and changes to their architecture and not have to worry about concurrency issues. Despite the industry trend of serverless instances, Shopify has maintained its position on in-house hardware, allowing it extreme control over its whole operations. Furthermore, the scalability of Shopify makes it an extremely enticing option for vendors who just want to get started with exponential growth in the future.

However, the downsides of Shopify include SEO limitations, limited product options as well and limited payment options. This means that, while Shopify has a strong foothold in the current market, its lead might wither if they don't innovate and expand upon its business model, and new competitors may arise to eat away at their market share. These competitors include WooCommerce, Magento as well as BigCommerce to name a few.

### **3.2.4.3 Relationship to the proposed research work**

Shopify's strategy for managing Database transactions using Idempotency keys is highly relevant to VendorSphere. They were initially using UUID (Universally Unique Identifier) to map unique identifiers to individual records inside their monolithic database. However, over time these random string identifiers started to cause issues. These issues included but were not limited to, API timeouts, duplicate API calls, and a myriad of other issues. However, they resolved this issue using ULID (Unique Lexicographically Sortable Identifier) instead of UUIDs. VendorSphere aims to learn from this innovative approach to optimize database transaction times since we will be operating on a monolithic architecture as well.

## **3.2.5 Related Research Work 5**

Netflix is a media giant that was the end result of an innovative idea by American businessmen Reed Hastings and Marc Randolph. They founded Netflix in 1997, with the headquarters based in Los Gatos, California.

Originally, Netflix started as a DVD-by-mail service. The inspiration came when Hastings was charged a late fee for a movie rental. Fast forward to today, and Netflix has transformed into a global entertainment sensation. It's not just about renting movies anymore; Netflix creates original programming that captivates audiences worldwide.

As of September 26, 2023, Netflix boasts a whopping 238.39 million paid memberships. These members are spread across more than 190 countries, enjoying films and television shows from various genres. The journey of Netflix since its humble beginnings is quite telling of its innovative business ideas and technical ingenuity.

### **3.2.5.1 Summary of the research item**

Netflix's popularity can be attributed to several factors. One of the main reasons is its original and exclusive content. Countless original and exclusive content has been funded by Netflix over the years. Many of these shows and movies have won critical acclaim and major awards, making this unique content a big draw for viewers.

Another reason for Netflix's popularity is its international appeal. Greater than  $\frac{3}{4}^{th}$  of the new sign-ups in the previous calendar year came from outside the US and Canada. Netflix shows are increasingly penetrating international audiences, which means they're reaching a global audience.

Netflix also prioritizes subscribers' needs. They're always innovating and transforming to create a better experience for their subscribers. This customer-centric approach has been key to their success.

Finally, Netflix's financial success has played a significant role in its popularity. Netflix currently boasts more than a quarter of a Million paid members. This financial success allows Netflix to invest in more original content and technology to improve the user experience.

So, in a nutshell, Netflix's popularity boils down to its original content, international appeal, customer-centric approach, and financial success. It's like they've cracked the code on how to keep us glued to our screens.

### **3.2.5.2 Critical analysis of the research item (Strengths and Weaknesses)**

Netflix has two major factors going for it. One of those factors is exponential growth. Netflix has penetrated deep into many markets all across the globe. unlike other major services like Disney+ or Amazon Prime, Netflix heavily focuses on even smaller market segments and tries to squeeze as many paying customers as possible. This led them to create a customer base in low-wage areas such as Pakistan, India, and even some South African Nations. Secondly, Netflix has built an almost impregnable brand reputation over the years. Netflix's slogan "*Netflix and Chill*" has become a household statement, which shows the popularity and loyalty of their customers. Loyalty is extremely hard to curate in this day and age where customers are happy to jump the boat as soon as they see a marginally more enticing offer from a competitor.

However, Netflix also has many growing business pains. One of those is the growing debt they have incurred over the decade since the beginning of their operations. Netflix has always competed on price. This meant that they had to present Netflix (the streaming service) as a loss leader. However, to subsidize the costs of their service, they had to do heavy borrowing from equity funds as well as their shareholders. Secondly, Netflix faces a copyright crisis at the hands of major studios such as Walt Disney, Paramount, and Universal to name a few. These corporations charge Netflix a hefty amount to make their content available for streaming, thus deepening the crisis of Netflix.

All in all, Netflix, while achieving the largest customer base as well as a prestigious Brand recognition faces severe challenges at their own hands as well as many external factors. They must revamp their business model if they want to attain sustainable growth with profitability.

### 3.2.5.3 Relationship to the proposed research work

Netflix, like many other major corporations, has wholly adopted the Continuous Delivery paradigm to deploy their builds. However, their key advantage over other companies is that they developed their tool from the ground up. This tool called **Spinnaker**, has brought Netflix from the brink of extreme software glitches to near 0 downtime. This approach of tooling their infrastructure isn't without risks. They went against the norm of using tried and trusted services like Jenkins and GitLab, not only increasing their initial setup costs but also delivery lead times. However, once they were done, they had an in-house solution that they could mold into whatever use case they needed at the time. This gave them a unique edge over their competitors and greatly improved their quality of service, increasing the trust of customers and consequently increasing their revenue.

VendorSphere, while not deeply invested in the CI/CD paradigm, majorly due to costs incurred, can learn greatly from Netflix's approach. We can focus on pushing out thoroughly tested builds to the customers and covering all the test cases. This is a better approach than just covering the *happy path* and later having to push hotfixes to the production build when bugs eventually show up.

## 3.2.6 Related Research Work 6

Newegg Commerce, Inc. operates as an e-commerce platform specializing in electronics, encompassing a wide range from computer hardware to personal use gadgets. The company is headquartered in the City of Industry, California, and was established in 2001. A majority stake in Newegg Commerce, Inc. is owned by Liaison Interactive, which is a multinational conglomerate.

### 3.2.6.1 Summary of the research item

Newegg is a tech enthusiast's paradise. It was founded in 2001 by Fred Chang and this American online retailer has since become a go-to destination for all things related to computer hardware and consumer electronics. Since their humble beginnings in California, Newegg has grown to serve customers worldwide.

However, it might seem that Newegg is hyper-focused on its niche of computer electronics. This isn't entirely the case as they've expanded their offerings to include gaming peripherals, home appliances, and automotive technology to mention a few. Along with the consumer market, they even seem to have carved out their share in the B2B market.

New hope for e-commerce emerged with Newegg during a period when businesses specializing in the e-commerce sector were facing significant challenges.. So whether you're building a PC from scratch, upgrading your gaming setup, or looking for the latest gadgets, Newegg has got you covered. It's like a

tech wonderland right at your fingertips.

### **3.2.6.2 Critical analysis of the research item (Strengths and Weaknesses)**

Newegg has several key strengths. It is a major player in tech e-commerce, with a focus on technology products. The company has been profitable every year since its inception in 20011. In 2021, it generated a revenue of \$2.38 billion and a net income of \$36.3 million. Newegg's growth is also impressive, with the company providing a 2021 top-line guidance of \$2.4 billion, up from its 2020 net sales of \$2.11 billion.

Moreover, Newegg has extensive supply chains slowly built over two decades of operating history as a private company. This network allows it to source high demand but scarce items such as computer graphics cards.

However, Newegg also has its weaknesses. The company's stock has been volatile and was affected by market-wide retreats from high-priced growth stocks. There was no fundamental basis for the run-up in its shares, and having them return to earth rather quickly was to be expected. Presently, Newegg is making substantial investments in future growth opportunities. These investments may not immediately impact revenue, but the associated setup costs are affecting the company's bottom line.

### **3.2.6.3 Relationship to the proposed research work**

Newegg has been plagued with issues related to managing returns of faulty products over the years. They even went through a class action lawsuit when it was discovered that their faulty return process caused loss to many honest customers. However, they emerged strong from this difficult time and revamped their returns process to greatly favor the customers and consequently improved their satisfaction rate.

VendorSphere could learn greatly from this experience of Newegg since Pakistan as a country is plagued with low-quality products and high return rates. If VendorSphere were to handle the return process for the vendors and the shop owners, we would do good to learn from the mistakes made by Newegg.

However, at the current moment, VendorSphere has no intention of handling the returns and shipment process on behalf of its users, given the complexity involved.

## **3.3 Literature Review Summary Table**

The table below provides a compact summary of your literature review as provided in the table 3.1, for the development project.

**Table 3.1: Literature Review Summary Table**

| <b>Application</b>       | <b>Features</b>                              | <b>Relevance to Application</b>  | <b>Limitations</b>  |
|--------------------------|--|--|---|
| Nike [1]                 | Business Logic                               | Provides the back-end logic on how to collaborate with shop owners and online vendor   | Limited to product management, less focused on physical store owners              |
| Mulwi shopping feeds [2] | Business Logic                               | Provides the back-end logic on how to collaborate with shop owners and online vendor and how to manage multiple collaborations | Limited to online vendors   |
| Amazon [3]               | UI/ UX                                       | Gives starting point on how to make UI responsive and accessible   | Currently built n online vendors and direct customers                             |
| Shopify [4]              | Database Design                              | Reduction in Database Transaction Time and Query Optimization  | Mostly applies to a monolithic architecture                                       |
| Netflix [5]              | Continuous Integration/- Continuous Delivery | Reduction in downtime as well as improved software experience  | Applies to applications at scale and may not be suitable for small scale projects |
| Newegg [6]               | Returns Management                           | Improving customer experience by better product returns management   | Can be difficult to manage without proper delivery infrastructure                 |

### 3.4 Conclusion

The literature review highlights crucial insights from relevant sources (Amazon, Nike, Newegg, Shopify, Netflix, and Mulwi Shopping Feeds). Nike employs an omnichannel approach to merge online and offline experiences, widening its global reach and revenue. Mulwi Shopping Feeds excels in online product reach but lacks integration with physical stores. Amazon's UI/UX focuses on simplicity and security, providing a solid foundation for the VendorSphere platform. However, its applicability to fully meet user needs remains uncertain. Leveraging these insights, VendorSphere aims to bridge the gap by seamlessly blending online and physical retail, ensuring efficiency and improved customer experiences.

## Chapter 4 Software Requirement Specifications

There are many requirements that our software must fulfill such as a product vendor should be able to add products, a shop owner should be able to browse and negotiate with product vendors. Moreover, there are many features of our projects such as recommendations of likely matches, etc. All the requirements, features, and designs are given in the sub-sections below.

### 4.1 List of Features

The major features of our website are given below.

- The VendorSphere platform will seamlessly integrate online and physical retail experiences to provide a hybrid shopping solution for customers.
- It will ensure real-time synchronization of inventory, offering up-to-date information on product availability for customers and aiding store owners in effective inventory management.
- The platform will offer an intuitive interface for collaborative efforts between vendors and store owners, facilitating smooth negotiation on contracts, pricing, and logistics for online products available in physical stores.
- VendorSphere will prioritize a customer-centric design, focusing on an easy-to-use interface that enhances the shopping experience for customers, allowing them to access and inspect online-only products in nearby physical stores.
- The application will leverage advanced analytics to deliver data-driven insights to vendors and shop owners, enabling informed decision-making concerning product offerings, partnerships, and overall retail strategies.

### 4.2 Functional Requirements

The functional requirements of the system are given below.

- The system shall allow the vendor to create an account with given provided a valid email address and maintain it.
- The system shall allow the vendor to log in to an already registered account using a valid email and password.
- The system shall allow the vendor to edit their profile and update their personal information.
- The system shall allow the vendor to change their current password.

- The system shall allow the vendor to reset their password in case they forget it.
- The system shall allow the vendor to add new products to the catalog.
- The system shall allow the vendor to edit the details of existing products in their store.
- The system shall allow the vendor to delete products from their catalog.
- The system shall allow the vendor to delete his/her account permanently.
- The system shall allow the vendor to disable their account temporarily.
- The system shall allow the vendor to leave reviews for physical store owners.
- The system shall allow the vendor to contact the VendorSphere team for support and queries.
- The system shall allow the vendor to report other vendors as well as physical stores.
- The system shall allow the vendor to block a physical store or another vendor.
- The system shall allow the vendor to search the website for other vendors and store owners.
- The system shall allow the vendor to view their earnings per various time frames.
- The system shall allow the vendor to view the stores that they are currently in business with.
- The system shall allow the vendor to view the amount of product they currently have in physical stores.
- The system shall allow the store owner to create an account with a valid email address and maintain it.
- The system shall allow the store owner to log in to an already registered account using a valid email and password.
- The system shall allow the vendor to edit their profile and update their personal information.
- The system shall allow the store owner to change their password.
- The system shall allow the store owner to reset their password in case they forget.
- The system shall allow the store owner to delete their account permanently.
- The system shall allow the store owner to disable their account for a temporary period.
- The system shall allow the store owner to leave reviews for product vendors.
- The system shall allow the store owner to contact the VendorSphere team for support and queries.
- The system shall allow the store owner to report other vendors as well as physical stores.

- The system shall allow the store owner to block a product vendor or another store owner.
- The system shall allow the store owner to search the website for other stores and product vendors.
- The system shall allow the store owner to view their earnings per various time frames.
- The system shall allow the admin to log into an already registered account using a valid email.
- The system shall allow the admin to change their password.
- The system shall allow the admin to view the user reports.
- The system shall allow the admin to reject a newly created product catalog.
- The system shall allow the admin to reject a newly created storefront.
- The system shall allow the admin to block a product vendor.
- The system shall allow the admin to block a storefront owner.
- The system shall allow the admin to send an email to shop owners.
- The system shall allow the admin to send an email to product vendors.
- The system shall allow the admin to view the reviewers whose deadlines are near and notify them.
- The system shall allow the admin to block a shop owner.
- The system shall allow the admin to block a product vendor.

### 4.3 Quality Attributes

The stated quality attributes of our system define the measures on which the performance of the software is judged. It is a checklist of the things that help in assessing the quality of software. The quality attributes of our VendorSphere platform are as follows:

- The system shall be easy to use.
- The system shall be functionally correct complete and free from errors.
- The system shall be testable and will be made in such a way that finding bugs will be easy.
- The system will be easily maintainable as it will be constructed in modules and will be easily modifiable.
- The system shall be reusable and will be made in modules that can be reused.
- The system shall be made available and it will be designed in a way that every request gets handled.

## 4.4 Non-Functional Requirements

The non-functional requirements of VendorSphere are provided below.

- The system shall ensure a response time of under 2 seconds for any user interaction, maintaining optimal performance.
- The system shall be compatible with all major web browsers, such as Chrome, Firefox, Edge, Brave, and Safari.
- The system shall implement secure user authentication and authorization mechanisms, complying with industry standards and regulations.
- The system shall be designed to handle a minimum of 500 simultaneous users at peak load without degradation of performance.
- The system shall maintain an uptime of 99.9% minimum to ensure continuous availability and reliability.
- The system shall provide a structured and well-documented API for seamless integration with third-party systems and services.

## 4.5 Assumptions

The assumptions we made while developing VendorSphere are listed below:

- We do not have a way to verify if the shop owner owns the shop they're claiming to own since we are not doing any background checks.
- We are assuming that all the stakeholders and end users have a fundamental understanding of how to use a computer system as well as using internet connection to access a website.

## 4.6 Use Cases

The following are the use cases for this project:

**Table 4.1: Login**

| <b>Name</b>                 | Login  |                        |  |
|-----------------------------|--|------------------------|--|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor   |                        |  |
| <b>Summary</b>              | The user will provide his/her email and password to the form, after successful verification of user, he/her will be redirected to their home page. |                        |  |
| <b>Pre-Conditions</b>       | The user should exist in database records and must not already be logged in.   |                        |  |
| <b>Post-Conditions</b>      | The user is redirected to the home page.   |                        |  |
| <b>Special Requirements</b> | None   |                        |  |
| <b>Basic Flow</b>           |  |                        |  |
| <b>Actor Action</b>         |  | <b>System Response</b> |  |
| 1                           | The user clicks on the login page.   | 2                      | The login page is displayed, prompting the user to enter their verification details. |
| 3                           | The user enters a valid email and password.  | 4                      | The system verifies all the details and redirects the user to the relevant home page |
| <b>Alternative Flow</b>     |  |                        |  |
| 3                           | The user enters invalid details  | 4-A                    | Prompt with error message "Incorrect email or password entered." is displayed.       |

**Table 4.2: MyStores**

| <b>Name</b>                 | My Stores   |                        |   |
|-----------------------------|---|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner                                 |                        |   |
| <b>Summary</b>              | The user can see their list of stores registered. |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in and on the home page.  |                        |   |
| <b>Post-Conditions</b>      | My Stores page is displayed.                      |                        |   |
| <b>Special Requirements</b> | None  |                        |   |
| <b>Basic Flow</b>           |   |                        |   |
| <b>Actor Action</b>         |   | <b>System Response</b> |   |
| 1                           | The user clicks on My Stores.                     | 2                      | The page containing a list of user's stores is displayed. |
| 3                           | The user clicks on registered store.              | 4                      | The system shows details of the selected store.           |
| <b>No Alternative Flow</b>  |   |                        |   |

**Table 4.3: SignUp**

| <b>Name</b>                 | Signup  |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Shop Owner, Online Vendor   |                        |  |
| <b>Summary</b>              | The user shall provide their personal information, including their store name, to register as a user. |                        |  |
| <b>Pre-Conditions</b>       | The user should not have an account.  |                        |  |
| <b>Post-Conditions</b>      | The user's account is successfully created.   |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks create account.   | 2                      | The system displays the registration form, requesting the user's personal information and store name and account type. |
| 3                           | The user enters all the required information  | 4                      | The system validates the entered information, and creates the account and stores the data in database                  |
| <b>Alternative Flow</b>     |   |                        |  |
| 3                           | The user enters invalid information or misses field.  | 4-A                    | Prompt with error message "Enter valid details and fill valid fields." is displayed.                                   |
| 3-B                         | The user enters details of already registered store.  | 4-B                    | Prompt with error message "Store already is registered." is displayed.   |

**Table 4.4: View Physical Store/Product**

| <b>Name</b>                 | View Physical Store/Product                               |                        |   |
|-----------------------------|---|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor                          |                        |   |
| <b>Summary</b>              | The user can view physical stores or online vendors.      |                        |   |
| <b>Pre-Conditions</b>       | The user is logged in and on the Home page or search page |                        |   |
| <b>Post-Conditions</b>      | None.   |                        |   |
| <b>Special Requirements</b> | None  |                        |   |
| <b>Basic Flow</b>           |   |                        |   |
| <b>Actor Action</b>         |   | <b>System Response</b> |   |
| 1                           | The user clicks store/product tile.                       | 2                      | The system displays store/product details page. |
| <b>No Alternative Flow</b>  |   |                        |   |

**Table 4.5: SignOut**

| <b>Name</b>                 | SignOut  |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor   |                        |   |
| <b>Summary</b>              | The user, initiates the sign-out process, which will then terminate their current session and logs them out of the system. |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in.  |                        |   |
| <b>Post-Conditions</b>      | The user's session is successfully terminated, and they are logged out of the system.                                      |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks SignOut.   | 2                      | The system prompts "Are you sure?".                                   |
| 3                           | The user clicks on "yes" button.   | 4                      | The system terminates the current session and navigates to login page |
| <b>Alternative Flow</b>     |  |                        |   |
| 3                           | The user clicks "No" button.   | 4-A                    | System terminates signout request.                                    |

**Table 4.6: Delete Account**

| <b>Name</b>                 | Delete Account  |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Shop Owner, Online Vendor   |                        |  |
| <b>Summary</b>              | The user initiates the account deletion process, which permanently removes their account and associated data from the system. |                        |  |
| <b>Pre-Conditions</b>       | The user must have an account, must be logged in, and must be on account settings.  |                        |  |
| <b>Post-Conditions</b>      | The user's account and all information associated with it is deleted.   |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks Delete Account.   | 2                      | The system prompts "Are you sure?".  |
| 3                           | The user clicks on "yes" button.  | 4                      | The system deletes all data associated with account and navigates to signup page |
| <b>Alternative Flow</b>     |   |                        |  |
| 3                           | The user clicks "No" button.  | 4-A                    | System terminates delete request.  |

**Table 4.7: Edit Online Store Information**

| <b>Name</b>                 | Edit Online Store Information  |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Online Vendor  |                        |   |
| <b>Summary</b>              | The online store owner can edit and update their online store's information, including details such as the store name and description. |                        |   |
| <b>Pre-Conditions</b>       | The user must have an online store account, must be logged in, and must be on store settings.  |                        |   |
| <b>Post-Conditions</b>      | The user store information is updated.   |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks Edit Store.  | 2                      | The system displays store information.  |
| 3                           | The user edits information.  | 4                      | The system saves the new information in database.   |
|                             |  | 5                      | System displays "Information saved successfully".   |
| <b>Alternative Flow</b>     |  |                        |   |
| 3                           | The user enters invalid information.   | 4-A                    | The system responds with an error message "Please provide valid information for all required fields". |

**Table 4.8: View Metrics**

| <b>Name</b>                 | View Metrics  |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Shop Owner, Online Vendor   |                        |  |
| <b>Summary</b>              | The user can view their metrics.  |                        |  |
| <b>Pre-Conditions</b>       | The user must be logged in and on my Stores/products page and there is at least one store/product registered. |                        |  |
| <b>Post-Conditions</b>      | None.   |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks on the metrics button.  | 2                      | The system displays store/product metrics. |
| <b>No Alternative Flow</b>  |   |                        |  |

**Table 4.9: Edit Physical Store Information**

| <b>Name</b>                 | Edit Physical Store Information   |                        |   |
|-----------------------------|---|------------------------|---|
| <b>Actors</b>               | Shop Owner  |                        |   |
| <b>Summary</b>              | The shop owner can edit and update their store's information, including details such as the store name, description and location. |                        |   |
| <b>Pre-Conditions</b>       | The user must have a shop owner store account, must be logged in , and must be on store settings.                                 |                        |   |
| <b>Post-Conditions</b>      | The user store information is updated   |                        |   |
| <b>Special Requirements</b> | None  |                        |   |
| <b>Basic Flow</b>           |   |                        |   |
| <b>Actor Action</b>         |   | <b>System Response</b> |   |
| 1                           | The user clicks Edit Store.   | 2                      | The system displays store information.  |
| 3                           | The user edits information.   | 4                      | The system saves the new information in database.   |
|                             |   | 5                      | System displays "Information saved successfully".   |
| <b>Alternative Flow</b>     |   |                        |   |
| 3                           | The user enters invalid information.  | 4-A                    | The system responds with an error message"Please provide valid information for all required fields ". |

**Table 4.10: Upload Products**

| <b>Name</b>                 | Upload Products  |                        |  |
|-----------------------------|--|------------------------|--|
| <b>Actors</b>               | Online Vendor  |                        |  |
| <b>Summary</b>              | The online vendor, can upload and add new products to their store inventory.                         |                        |  |
| <b>Pre-Conditions</b>       | The user must have an online owner store account, must be logged in and must be on the product page. |                        |  |
| <b>Post-Conditions</b>      | The new products are successfully added to the store's inventory.                                    |                        |  |
| <b>Special Requirements</b> | None   |                        |  |
| <b>Basic Flow</b>           |  |                        |  |
| <b>Actor Action</b>         |  | <b>System Response</b> |  |
| 1                           | The user clicks "Upload Products".   | 2                      | The system displays the product upload form, prompting the store owner to enter product details                |
| 3                           | The user enters details.   | 4                      | The system saves the new product in database.  |
|                             |  | 5                      | System displays "Product saved successfully".  |
| <b>Alternative Flow</b>     |  |                        |  |
| 3                           | The user enters invalid or incomplete details.   | 4-A                    | The system responds with an error message "Please provide valid and complete details for all required fields". |

**Table 4.11: Edit Products**

| <b>Name</b>                 | Edit Products  |                        |  |
|-----------------------------|--|------------------------|--|
| <b>Actors</b>               | Online Vendor  |                        |  |
| <b>Summary</b>              | The online store owner, can edit and update the information of existing products in their store inventory, including details such as the product name, description, price, and images. |                        |  |
| <b>Pre-Conditions</b>       | The user must have an online owner store account, must be logged in , and must be on the product page.   |                        |  |
| <b>Post-Conditions</b>      | The edited product information is successfully updated in the store inventory and is reflected for customers to view and purchase.   |                        |  |
| <b>Special Requirements</b> | None   |                        |  |
| <b>Basic Flow</b>           |  |                        |  |
| <b>Actor Action</b>         |  | <b>System Response</b> |  |
| 1                           | The user clicks "Edit Products".   | 2                      | The system displays a list of existing products in the store inventory.  |
| 3                           | The user selects product.  | 4                      | The system opens product details.  |
| 5                           | The user updates product details.  | 6                      | System updates new details in the database.  |
|                             |  | 7                      | System displays "Product updated successfully".  |
| <b>Alternative Flow</b>     |  |                        |  |
| 3                           | The user enters invalid or incomplete details.   | 4-A                    | The system responds with an error message"Please provide complete and valid details for all required fields ". |

**Table 4.12: Delete Products**

| <b>Name</b>                 | Delete Products  |                        |  |
|-----------------------------|--|------------------------|--|
| <b>Actors</b>               | Online Vendor  |                        |  |
| <b>Summary</b>              | The online vendor owner, can initiate the process of deleting product from their store's inventory.    |                        |  |
| <b>Pre-Conditions</b>       | The user must have an online owner store account, must be logged in , and must be on the product page. |                        |  |
| <b>Post-Conditions</b>      | The product is deleted from inventory.   |                        |  |
| <b>Special Requirements</b> | None   |                        |  |
| <b>Basic Flow</b>           |  |                        |  |
| <b>Actor Action</b>         |  | <b>System Response</b> |  |
| 1                           | The user clicks "Delete Product".  | 2                      | The system prompts "Are You Sure?".        |
| 3                           | The user selects "yes".  | 4                      | The system deletes product from inventory. |
| 5                           | The user updates product details.  | 6                      | System displays"Product deleted".          |
| <b>Alternative Flow</b>     |  |                        |  |
| 3                           | The user clicks "No".  | 4-A                    | The system terminates delete process.      |

**Table 4.13: Register Stores**

| <b>Name</b>                 | Register Stores   |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Online Vendor, Shop Owners  |                        |  |
| <b>Summary</b>              | The store owners, can initiate the process of registering more stores with the system, providing essential store information for setup. |                        |  |
| <b>Pre-Conditions</b>       | The user must have a store account and must be logged in.   |                        |  |
| <b>Post-Conditions</b>      | Store is successfully registered  |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks "Add Stores".   | 2                      | The system displays store registration form.   |
| 3                           | The user provides store details.  | 4                      | The system saves the new store in database.  |
|                             |   | 5                      | System displays "Store added successfully".  |
| <b>Alternative Flow</b>     |   |                        |  |
| 3                           | The user enters invalid or incomplete details.  | 4-A                    | The system responds with an error message "Please provide complete and valid details for all required fields". |

**Table 4.14: Delete Store**

| <b>Name</b>                 | Delete Store   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Shop Owners  |                        |   |
| <b>Summary</b>              | The store owners can initiate the process of deleting a store from the database. |                        |   |
| <b>Pre-Conditions</b>       | The user must have a store account and must be logged in.                        |                        |   |
| <b>Post-Conditions</b>      | Store is deleted   |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks "Delete Store".  | 2                      | The system prompts "Are You Sure?"          |
| 3                           | The user selects "yes".  | 4                      | The system deletes the store from database. |
|                             |  | 5                      | System displays "Store Deleted".            |
| <b>Alternative Flow</b>     |  |                        |   |
| 3                           | The user selects "No".   | 4-A                    | The system terminates delete process.       |

**Table 4.15: Store Review**

| <b>Name</b>                 | Store Review  |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Online Vendor, Shop Owners  |                        |  |
| <b>Summary</b>              | The store owners can write a review for stores they are working with or have worked with to share their feedback and experiences with others. |                        |  |
| <b>Pre-Conditions</b>       | The user must have a store account, must be logged in, and must have worked with the other store.   |                        |  |
| <b>Post-Conditions</b>      | Store review is posted  |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks "Review Store".   | 2                      | The system verifies and provides the review form.                  |
| 3                           | The user fills out the review form.   | 4                      | The system posts the review.                                       |
|                             |   | 5                      | The system displays "Review Posted".                               |
| <b>Alternative Flow</b>     |   |                        |  |
| 2                           | The user has not worked with the store.   | 2-A                    | The system prompts "Review not allowed".                           |
| 2-B                         | The user has not filled out the review form.  | 2-B                    | The system displays an error message: "Review form is incomplete." |

**Table 4.16: Reset Password**

| <b>Name</b>                 | Reset Password   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Shop Owner, Online Vendor  |                        |   |
| <b>Summary</b>              | The user will provide an answer to the specified question and enter a new password and confirm the new password. |                        |   |
| <b>Pre-Conditions</b>       | The user must be registered before and exist in the database.  |                        |   |
| <b>Post-Conditions</b>      | The user's password should be changed and the new password is updated in the database.                           |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks on the forgot password button from the login page.   | 2                      | The reset password popup is displayed.                                    |
| 3                           | The user provides an answer to the specified question.   | 4                      | The system verifies the answer.   |
| 5                           | The user provides their new password and confirms the password.  | 6                      | The new password is changed and updated in the database.                  |
|                             |  | 7                      | Prompt with a message <i>your password has been reseted</i> is displayed. |
| <b>Alternative Flow</b>     |  |                        |   |
| 3                           | The user provides an incorrect answer to the question.   | 4-A                    | Prompt with error message <i>Incorrect answer</i> is displayed.           |

**Table 4.17: Report Physical Shop**

| <b>Name</b>                 | Report Physical Shop   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor   |                        |   |
| <b>Summary</b>              | The user shall provide a reason/proof for the report, and the admin then keeps a record of it. |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in and there exists a contract between the user and shop owner.        |                        |   |
| <b>Post-Conditions</b>      | The account is reported successfully.  |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks on the report account button.  | 2                      | The report account popup is displayed.                            |
| 3                           | The user provides a reason/proof for the report.   | 4                      | The system verifies the reason and asks for the contract details. |
| 5                           | The user provides their contract details.  | 6                      | The contract details are verified and suspended successfully.     |
| <b>No Alternative Flow</b>  |  |                        |   |

**Table 4.18: Block Physical Shop**

| <b>Name</b>                 | Block Physical Shop  |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Admin  |                        |   |
| <b>Summary</b>              | If the report count is greater than 3 then the account is blocked. |                        |   |
| <b>Pre-Conditions</b>       | Account to be blocked is active.                                   |                        |   |
| <b>Post-Conditions</b>      | The account is blocked successfully.                               |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks on block account.                                  | 2                      | Confirmation popup is displayed.  |
| 3                           | The user confirms the request.                                     | 4                      | The system verifies report count and changes state of account from active to blocked. |
| <b>Alternative Flow</b>     |  |                        |   |
| 3                           | The user cancels the request.                                      | 4-A                    | Home page is displayed.   |

**Table 4.19: Online Support**

| <b>Name</b>                 | Online Support   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor   |                        |   |
| <b>Summary</b>              | The user can see frequently asked questions and can ask for further queries. |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in.  |                        |   |
| <b>Post-Conditions</b>      | User's query is submitted successfully.                                      |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks on the online support.                                       | 2                      | The online support page is displayed.                           |
| 3                           | The user provides their query in the input field and press submit.           | 4                      | The system sends a query to the admin.                          |
|                             |  | 5                      | The system displays message <i>query submitted successfully</i> |
| <b>No Alternative Flow</b>  |  |                        |   |

**Table 4.20: Feature Store/Product**

| <b>Name</b>                 | Feature Store/Product   |                        |   |
|-----------------------------|---|------------------------|---|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor  |                        |   |
| <b>Summary</b>              | The user can get their store or product featured.                               |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in and on the My Stores page.                           |                        |   |
| <b>Post-Conditions</b>      | User's store or product is featured.  |                        |   |
| <b>Special Requirements</b> | None  |                        |   |
| <b>Basic Flow</b>           |   |                        |   |
| <b>Actor Action</b>         |   | <b>System Response</b> |   |
| 1                           | The user clicks on the feature store/product button.                            | 2                      | The system displays a feature product/store page.                                   |
| 3                           | The user fills in the details and selects the package.                          | 4                      | The system generates a receipt and asks for payment.                                |
| 5                           | User selects the payment method and attaches the screenshot of the transaction. | 6                      | The system sends transaction screenshots to the admin for verification.             |
|                             |   | 7                      | The system displays a message that <i>your store/product will be featured soon.</i> |
| <b>No Alternative Flow</b>  |   |                        |   |

**Table 4.21: Verify Transaction**

| <b>Name</b>                 | Verify Transaction   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Admin  |                        |   |
| <b>Summary</b>              | The user can verify transactions made by store owners or online vendors. |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in and on the home page.                         |                        |   |
| <b>Post-Conditions</b>      | Transaction is verified.   |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user clicks verify transactions button from sidebar.                 | 2                      | Pending verifications page is displayed.  |
| 3                           | The user verifies transaction request and confirms transaction.          | 4                      | The system features the store/ product.   |
|                             |  | 5                      | The system sends a notification to the shop owner/online vendor of successful verification. |
| <b>No Alternative Flow</b>  |  |                        |   |

**Table 4.22: Contact Shop/Online Vendor**

| <b>Name</b>                 | Contact Shop Owner/online vendor                                  |                        |  |
|-----------------------------|---|------------------------|--|
| <b>Actors</b>               | Shop Owner, Online Vendor   |                        |  |
| <b>Summary</b>              | The user can contact the shop owner/online vendor.                |                        |  |
| <b>Pre-Conditions</b>       | The user must be logged in and on the store/product details page. |                        |  |
| <b>Post-Conditions</b>      | None.   |                        |  |
| <b>Special Requirements</b> | None  |                        |  |
| <b>Basic Flow</b>           |   |                        |  |
| <b>Actor Action</b>         |   | <b>System Response</b> |  |
| 1                           | The user clicks on contact button.                                | 2                      | The system displays a contact page.  |
| 3                           | The user types message and presses send.                          | 4                      | The system sends that message to the shop owner/online vendor through gmail.       |
|                             |   | 6                      | The system displays a message that your <i>message has been sent successfully.</i> |
| <b>No Alternative Flow</b>  |   |                        |  |

**Table 4.23: Search Store**

| <b>Name</b>                 | Search Store   |                 |  |
|-----------------------------|--|-----------------|--|
| <b>Actors</b>               | Admin, Shop Owner, Online Vendor                       |                 |  |
| <b>Summary</b>              | The user can search for a particular store or product. |                 |  |
| <b>Pre-Conditions</b>       | The user must be logged in and on the Home page.       |                 |  |
| <b>Post-Conditions</b>      | Search results should appear.                          |                 |  |
| <b>Special Requirements</b> | None   |                 |  |
| <b>Basic Flow</b>           |  |                 |  |
| Actor Action                |  | System Response |  |
| 1                           | The user clicks on search bar.                         | 2               | The system displays top trending searches. |
| 3                           | The user types in search bar.                          | 4               | The system shows the search results.       |
| <b>Alternative Flow</b>     |  |                 |  |
| 3                           | The user clicks on suggested search.                   | 4-A             | The system shows the search results.       |

**Table 4.24: View Earnings**

| <b>Name</b>                 | View Earnings  |                 |  |
|-----------------------------|--|-----------------|--|
| <b>Actors</b>               | Shop Owner   |                 |  |
| <b>Summary</b>              | The user can view their earnings on a product.                                       |                 |  |
| <b>Pre-Conditions</b>       | The user must be logged in, on the My Stores page and at least one store registered. |                 |  |
| <b>Post-Conditions</b>      | None.  |                 |  |
| <b>Special Requirements</b> | None   |                 |  |
| <b>Basic Flow</b>           |  |                 |  |
| Actor Action                |  | System Response |  |
| 1                           | The user clicks on earnings.   | 2               | The system displays a store/product earning details. |
| <b>No Alternative Flow</b>  |  |                 |  |

**Table 4.25: Inventory Update**

| <b>Name</b>                 | Inventory Update   |                        |   |
|-----------------------------|--|------------------------|---|
| <b>Actors</b>               | Shop Owner, Online Vendor                                    |                        |   |
| <b>Summary</b>              | The user can view their real time inventory updates.         |                        |   |
| <b>Pre-Conditions</b>       | The user must be logged in and on the manage inventory page. |                        |   |
| <b>Post-Conditions</b>      | Inventory updated successfully.                              |                        |   |
| <b>Special Requirements</b> | None   |                        |   |
| <b>Basic Flow</b>           |  |                        |   |
| <b>Actor Action</b>         |  | <b>System Response</b> |   |
| 1                           | The user scans QRcode of the product.                        | 2                      | The system displays product inventory details.                        |
| 3                           | The user inputs quantity of the product to be sold.          | 4                      | The system verifies if a product is available and generates receipts. |
| 5                           | The user confirms payment.                                   | 6                      | The system bill status is paid and updates the inventory.             |
| <b>Alternative Flow</b>     |  |                        |   |
| 5                           | The user cancels the request.                                | 6-A                    | The system redirects to the home page.                                |

**Table 4.26: Reset password**

| <b>Name</b>                 | Reset Password  |                        |   |
|-----------------------------|---|------------------------|---|
| <b>Actors</b>               | Shop Owner, Online Vendor   |                        |   |
| <b>Summary</b>              | The user shall provide an answer to the specified question and enter a new password and confirm the new password. |                        |   |
| <b>Pre-Conditions</b>       | The user must be registered before and exist in the database.   |                        |   |
| <b>Post-Conditions</b>      | The user's password should be changed and the new password is updated in the database.                            |                        |   |
| <b>Special Requirements</b> | None  |                        |   |
| <b>Basic Flow</b>           |   |                        |   |
| <b>Actor Action</b>         |   | <b>System Response</b> |   |
| 1                           | The user clicks on the forgot password button from the login page.  | 2                      | The reset password popup is displayed.                                    |
| 3                           | The user provides an answer to the specified question.  | 4                      | The system verifies the answer.   |
| 5                           | The user provides their new password and confirms the password.   | 6                      | The new password is changed and updated in the database.                  |
|                             |   | 7                      | Prompt with a message <i>your password has been reseted</i> is displayed. |
| <b>Alternative Flow</b>     |   |                        |   |
| 3                           | The user provides an incorrect answer to the question.  | 4-A                    | Prompt with error message <i>Incorrect answer</i> is displayed.           |

## 4.7 Hardware and Software Requirements

Hardware and software requirements that need to be met for the project to get developed and deployed are provided in the sub-sections given below.

### 4.7.1 Hardware Requirements

A computer system is required to develop this website. The computer system must have the following specifications.

- Intel Core i3 or AMD Ryzen 5 5600, or better
- 8 GB of DDR4 RAM, or better

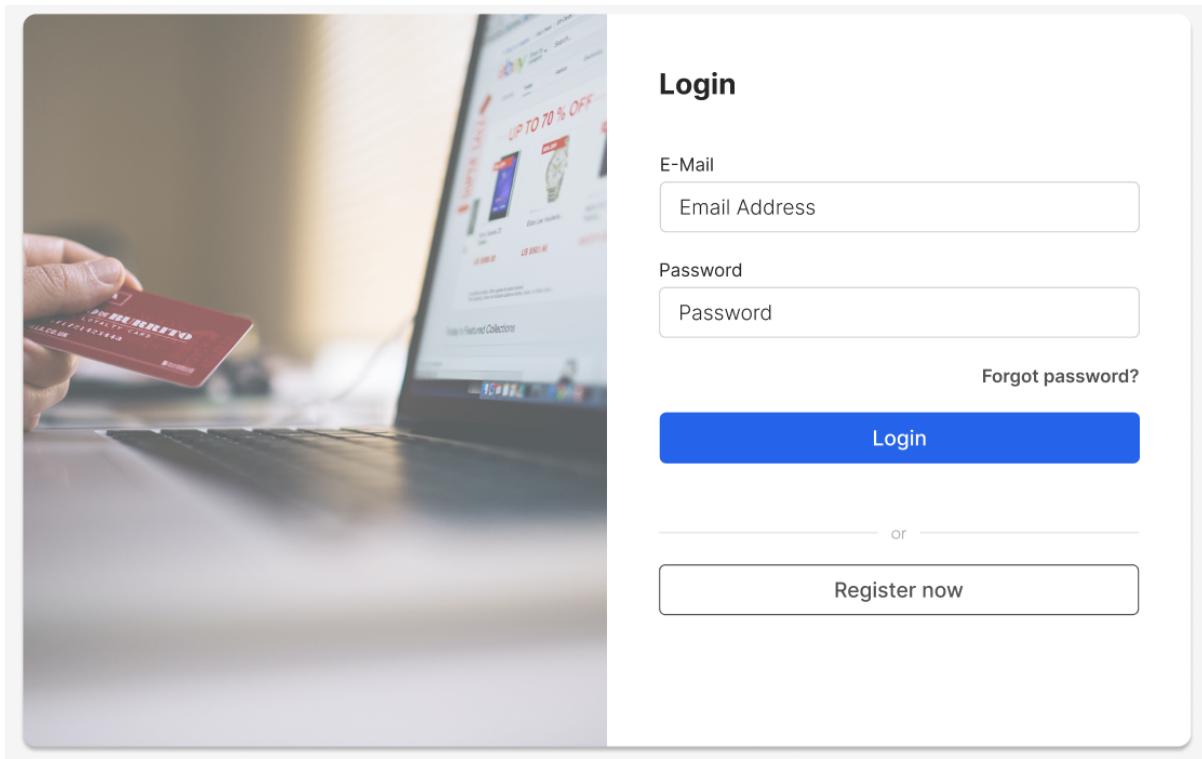
- Nvidia GTX 1650, or better (Optional)

#### 4.7.2 Software Requirements

VendorSphere's list of software requirements can be found below.

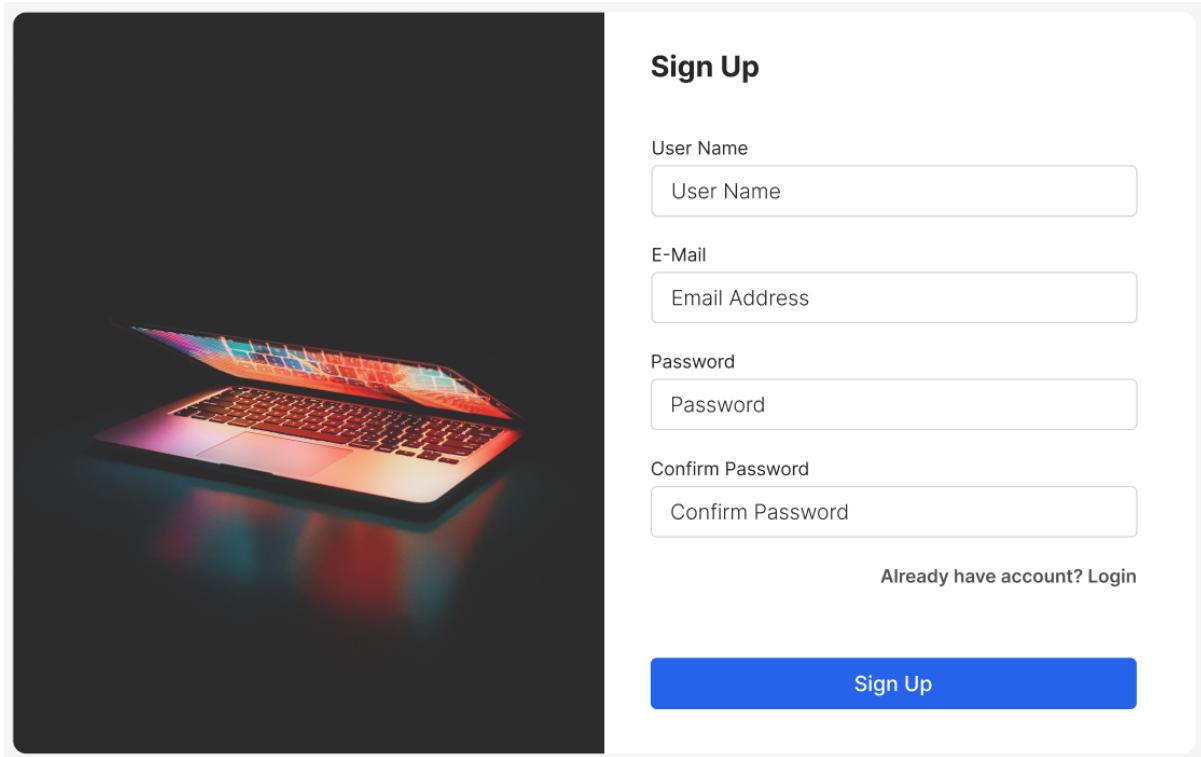
- React.JS Library
- Django Framework
- Google Cloud SDK
- Stable Build of a web browser: Google Chrome or Mozilla Firefox
- An IDE: Visual Studio Code or Jetbrains Pycharm
- Python 3.x

### 4.8 Graphical User Interface



**Figure 4.1: Login Page of VendorSphere**

*This figure represents the Login Page for VendorSphere*



**Figure 4.2: Signup Page of VendorSphere**

*SignUp Page of VendorSphere*

The screenshot displays the homepage of VendorSphere. At the top, there is a navigation bar with the logo "VendorSphere", a search bar, and links for "Profile", "Contact us", "Analytics", and "My Stores". Below the header, a large blue banner features the text "An easy way to send requests to all online vendors" and "Send request to all online vendors for product inquiry with just one click." To the right of the banner is a form titled "Send quote to online Vendors" with fields for "What item you need?", "Type more details", "Quantity", and "Send Inquiry" button.

**Recommended Stores:**

- Hush Puppies - Popular Shoes market place
- Purple Jane - Café with great ambiance and food
- Saleem Fabrics - Market place for textile industry
- Homsstore - Offer a wide range of home decorative items
- One Degree - Popular Shoes market place

**Recommended Products:**

- Nike Air Max - Ultimate comfort and style with Nike Air Max
- Pots - Personalized flower pots
- Home Rugs - Hand woven Area rugs
- Loafers - Custom Loafers
- Frames - Customized Date Frames

**Our extra services:**

- Search for Vendors around you
- Create your store on VendorSphere
- Add your product on VendorSphere
- View Analytics of your item

**Suppliers by Area:**

|                                |                           |                                |                       |                                 |
|--------------------------------|---------------------------|--------------------------------|-----------------------|---------------------------------|
| Arabic Emirates<br>shopname.ae | Australia<br>shopname.ae  | United States<br>shopname.ae   | Russia<br>shopname.ru | Italy<br>shopname.it            |
| Denmark<br>denmark.com.dk      | France<br>shopname.com.fr | Arabic Emirates<br>shopname.ae | China<br>shopname.ae  | Great Britain<br>shopname.co.uk |

**Subscribe on our newsletter:**  
Get daily news on upcoming offers from many suppliers all over the world

Email

**Figure 4.3: Homepage of VendorSphere***Home Page of VendorSphere*

Home > Recommend Stores > Hush Puppies'

Verified  
**Hush Puppies - Casual Shoes, Boots & Dress Shoes**

★ ★ ★ ★ 9.3 • 10 reviews • 15 contracts

Save for later

|                          |                  |
|--------------------------|------------------|
| Selling Type:            | Commission Based |
| Display Type:            | Shelves          |
| No of Shelves Available: | 5                |
| Commission Percentage:   | 4%               |
| Platform Commission:     | 3%               |

**T** Mr. Tufail Azam  
Shop Owner

Lahore, Pakistan  
Verified Shop Owner  
Shan Plaza, Cream Block Market

Send Email

Contact Info

**Description**   **Reviews**   **About company**

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.

|             |                     |
|-------------|---------------------|
| Model       | #8786867            |
| Style       | Classic style       |
| Certificate | ISO-898921212       |
| Size        | 34mm x 450mm x 19mm |
| Memory      | 36GB RAM            |

- ✓ Some great feature name here
- ✓ Lorem ipsum dolor sit amet, consectetur
- ✓ Duis aute irure dolor in reprehenderit
- ✓ Some great feature name here

**Related Stores**

**Hush Puppies**  
Popular Shoes market place

**Purple Jane**  
Cafe with great ambiance and food

**Saleem Fabrics**  
Market place for textile industry

**Homsstore**  
Offer a wide range of home decorative items

**One Degree**  
Popular Shoes market place

10% Discount on Store verification. Get your store verified.
Verify Store

Lack of Reach for your product? No worriers, get your product Featured and always be on top.
Feature Product

**VendorSphere**

Best information about the company lies here.  
Follow for information.

© 2023 Ecommerce.

English ▾

**Figure 4.4: Store Page of VendorSphere**

*Store Page of VendorSphere*

**VendorSphere**

Search
Search
Profile
Contact us
Analytics
My Stores

Home > Recommend Products > Nike Air Max



**Nike - Air Max Excee**

★★★★★ 9.3 • 10 reviews • 15 contracts

Save for later

|                              |                               |                            |
|------------------------------|-------------------------------|----------------------------|
| <b>\$98.00</b><br>50-100 pcs | <b>\$90.00</b><br>100-700 pcs | <b>\$78.00</b><br>700+ pcs |
|------------------------------|-------------------------------|----------------------------|

Product Type: Joggers  
Category: Gym Wear  
Quantity Available: 500  
Platform Commission: 3%

T Mr. Taimoor Rashid  
Online Vendor

Lahore, Pakistan  
Verified Product Owner

Send Email

Contact Info

Description
Reviews

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.

|             |                     |
|-------------|---------------------|
| Model       | #8786867            |
| Style       | Classic style       |
| Certificate | ISO-898921212       |
| Size        | 34mm x 450mm x 19mm |
| Memory      | 36GB RAM            |

- ✓ Some great feature name here
- ✓ Lorem ipsum dolor sit amet, consectetur
- ✓ Duis aute irure dolor in reprehenderit
- ✓ Some great feature name here

Related Products



Nike Air Max  
Ultimate comfort and style with Nike Air Max



Pots  
Personalized flower pots



Home Rugs  
Hand woven Area rugs



Loafers  
Custom Loafers



Frames  
Customized Date Frames

10% Discount on Store verification. Get your store verified.

Verify Store

Lack of Reach for your product? No worriers, get your product Featured and always be on top.

Feature Product

VendorSphere
Best information about the company lies here.  
Follow for information.

© 2023 Ecommerce.
English ▾

**Figure 4.5: Product Page of VendorSphere**

*This figure represents the Product page of VendorSphere*

**VendorSphere**

Search  Search

Profile Contact us Analytics My Stores

### My Products (3)

| Product Image | Product Name         | Category    | Total Added | Sold |
|---------------|----------------------|-------------|-------------|------|
|               | Nike - Air Max Excee | Men's Shoes | 500         | 124  |
|               | Nike - Air Max Excee | Men's Shoes | 500         | 124  |
|               | Nike - Air Max Excee | Men's Shoes | 500         | 124  |

Total Sold: 372  
Platform Deduction: \$1,093.0  
Owner Commission: \$1,458.2

Total Earnings: \$33,904.8 [View Details](#)

[← Back to Home](#) [Remove all](#)

### Related Products

|  |  |  |                                  |  |                                   |  |                           |  |                                  |
|--|--|--|----------------------------------|--|-----------------------------------|--|---------------------------|--|----------------------------------|
|  | Nike Air Max<br>Ultimate comfort and style with Nike Air Max |  | Pots<br>Personalized flower pots |  | Home Rugs<br>Hand woven Area rugs |  | Loafers<br>Custom Loafers |  | Frames<br>Customized Date Frames |
|--|--|--|----------------------------------|--|-----------------------------------|--|---------------------------|--|----------------------------------|

10% Discount on Store verification. Get your store verified. [Verify Store](#)

Lack of Reach for your product? No worriers, get your product Featured and always be on top. [Feature Product](#)

**VendorSphere** Best information about the company lies here. Follow for information. [f](#) [t](#) [in](#) [g](#)

© 2023 Ecommerce. [English](#)

**Figure 4.6: Catalog Page of VendorSphere***This figure represents the Catalog Page of VendorSphere*

## 4.9 Database Design

### 4.9.1 ER Diagram

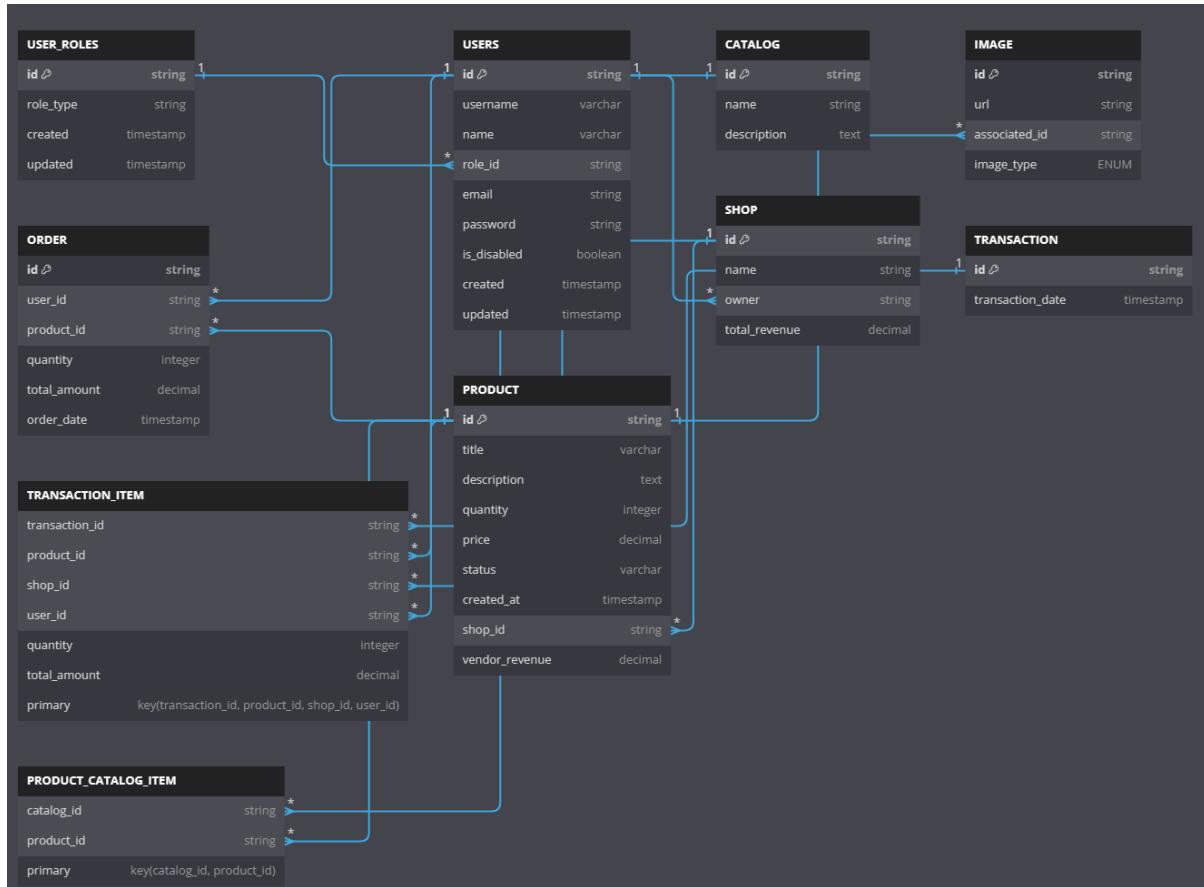


Figure 4.7: ER Diagram of our Database

This figure represents the ER Diagram of VendorSphere's Database

### 4.9.2 Data Dictionary

Table 4.27: Data Dictionary Table

The given table provides details of the tables in the database.

| Entity     | Attribute | Data Type | Relation To | Nullable | Description                |
|------------|-----------|-----------|-------------|----------|----------------------------|
| USER_ROLES | id        | String    |             | No       | ID of Role (PK)            |
|            | role_type | String    |             | No       | Name of the Role           |
|            | created   | Timestamp |             | No       | When the entry was created |

Continued on next page

Table 4.27 continued from previous page

| Entity                 | Attribute     | Data Type | Relation To  | Nullable | Description                                   |
|------------------------|---------------|-----------|--------------|----------|---|
|                        | updated       | Timestamp |              | No       | When the entry was updated                    |
| USERS                  | id            | String    | USER_ROLES   | No       | User ID (PK)                                  |
|                        | username      | varchar   |              | No       | Unique Username                               |
|                        | name          | String    |              | No       | Name of the User                              |
|                        | role_id       | String    |              | No       | ID of role (FK)                               |
|                        | email         | String    |              | No       | Email of the User                             |
|                        | password      | String    |              | No       | Password of the user                          |
|                        | is_disabled   | Boolean   |              | No       | Shows if the user's account is enabled or not |
|                        | created       | Timestamp |              | No       | When the entry was created                    |
|                        | updated       | Timestamp |              | No       | When the entry was created                    |
| CATALOG                | id            | String    |              | No       | Primary key                                   |
|                        | name          | String    |              | Yes      |   |
|                        | description   | text      |              | Yes      |   |
| PRODUCT_CATALOG_ITEM   | catalog_id    | String    | CATALOG      | No       | Foreign key to CATALOG                        |
|                        | product_id    | String    | PRODUCT      | No       | Foreign key to PRODUCT                        |
| IMAGE                  | id            | String    |              | No       | ID of the uploaded image (PK)                 |
|                        | URL           | String    |              | No       | Link to the hosted image                      |
|                        | associated_id | String    | PRODUCT/SHOP | No       | Does it belong to Product or Shop (FK)        |
| Continued on next page |               |           |              |          |   |

Table 4.27 continued from previous page

| Entity  | Attribute      | Data Type | Relation To | Nullable | Description                               |
|---------|----------------|-----------|-------------|----------|---|
|         | image_type     | ENUM      |             | No       | Type of image                             |
| ORDER   | id             | String    | USERS       | No       | Order ID (PK)                             |
|         | user_id        | String    |             | No       | Which shop made the order (FK)            |
|         | product_id     | String    |             | No       | Foreign key to PRODUCT                    |
|         | quantity       | Int       |             | Yes      | Quantity of products                      |
|         | total_amount   | Float     |             | No       | Total amount of the items                 |
|         | order_date     | Timestamp |             | No       | When was the order placed                 |
| PRODUCT | id             | String    | SHOP        | No       | Primary key                               |
|         | title          | String    |             | Yes      | Name of the product                       |
|         | description    | text      |             | Yes      | Specifications of the product             |
|         | quantity       | Int       |             | No       | Current Quantity of product in inventory  |
|         | price          | Float     |             | No       | Price of Item                             |
|         | status         | String    |             | Yes      | Is the product In-Stock or not            |
|         | created_at     | Timestamp |             | No       | When was the product added                |
|         | vendor_id      | String    |             | No       | Which vendor added the product            |
|         | vendor_revenue | Float     |             | Yes      | Computed field for product vendor revenue |
|         |                |           |             |          | Continued on next page                    |

Table 4.27 continued from previous page

| Entity           | Attribute        | Data Type | Relation To | Nullable | Description                           |
|------------------|------------------|-----------|-------------|----------|---------------------------------------|
| SHOP             | id               | String    |             | No       | ID of the Shop (PK)                   |
|                  | name             | String    |             | No       | Name of the Shop                      |
|                  | owner            | String    | USERS       | No       | Foreign key to USERS                  |
|                  | total_revenue    | Float     |             |          | Computed field for shop total revenue |
| TRANSACTION      | id               | String    |             | No       | Transaction ID (PK)                   |
|                  | transaction_date | Timestamp |             | No       | Date and Time of the Transaction      |
| TRANSACTION_ITEM | transaction_id   | String    | TRANSACTION | No       | Foreign key to TRANSACTION            |
|                  | product_id       | String    | PRODUCT     | No       | Foreign key to PRODUCT                |
|                  | shop_id          | String    | SHOP        | No       | Foreign key to SHOP                   |
|                  | user_id          | String    | USERS       | No       | Foreign key to USERS                  |
|                  | quantity         | Int       |             | No       | Quantity of items in the transaction  |
|                  | total_amount     | Float     |             | No       | Total amount of the transaction made  |

## 4.10 Risk Analysis

The current UI design draws inspiration from Amazon, which primarily serves direct customers and online vendors. However, VendorSphere's distinctive focus on facilitating collaboration between online vendors and physical shop owners may result in potential UI limitations or design gaps. While Amazon's UI is optimized for its specific customer base, it may not fully address the unique requirements and expectations of VendorSphere's users. To mitigate this risk, continuous user feedback and iterative UI improvements are essential to ensure that the design effectively caters to the specific needs and dynam-

ics of VendorSphere's target user base, which includes both online vendors and physical shop owners. Secondly, real-time inventory management relies on QR codes, and any issues with their generation, placement, or scanning may disrupt tracking, leading to operational inefficiencies. Rigorous quality control, vendor education, and regular audits will help address this risk. Additionally, competition from physical retail shifting to the online collaboration market poses a threat. Continuous monitoring of the competitive landscape and a focus on differentiation will be crucial. Lastly, as a digital platform, VendorSphere is exposed to cyber-security threats, including data breaches. Robust cyber-security measures, training, and incident response plans are vital to safeguarding the project's integrity and user data.

## Chapter 5 High-Level and Low-Level Design

The exhaustive list of details for the high-level and low-level design of the system we are building are provided in this chapter.

### 5.1 System Overview

In the ongoing development of the VendorSphere system, user interactions are initiated through the user interface (UI), facilitating seamless engagement for online vendors, shop owners, and administrators. The process begins with collaboration requests from online vendors and shop owners, transferred to the application layer for negotiations, contract creation, and billing management. For online vendors, the UI serves as a digital space for efficient negotiations and real-time stock updates. Shop owners leverage the UI for space optimization, negotiating with vendors, and managing inventory. Administrators control the system through an intuitive panel, overseeing user management, analytics, and contract oversight. VendorSphere integrates analytics-driven insights, suggesting optimal products and partnerships. In summary, VendorSphere redefines retail interactions by efficiently managing negotiations, contracts, and collaborations, fostering a more interconnected and prosperous commercial environment.

### 5.2 Design Considerations

The sub-sections below provide the specifics of issues that require attention or resolution before initiating the formulation process of comprehensive design solutions.

#### 5.2.1 Assumptions and Dependencies

These may concern such issues as:

- Reliance on stable internet connectivity for seamless interactions.
- Users have access to standard web browsers (Google Chrome, Mozilla Firefox).
- Platform's functionality may evolve based on user feedback and industry trends.
- User has a basic knowledge of how to access general websites.

#### 5.2.2 General Constraints

The following subsections list the worldwide constraints and constraints that have a major influence on the software design of the system.

**5.2.2.1 Hardware or Software Environment:**

- Users should operate on a system with an operating system equivalent to or more advanced than Windows 7, OS X 10.8 or later, with a minimum RAM of 2GB.
- A stable internet connection is essential for optimal system performance.

**5.2.2.2 End-user Environment:**

- The application is optimized for browsers like Chrome, Firefox, Safari, and Edge.
- End-users are expected to have basic knowledge of website navigation.

**5.2.2.3 Availability or Volatility of Resources:**

- Users are assumed to have all the necessary resources to run the application.
- An internet connection is a prerequisite for accessing and using the website.

**5.2.2.4 Standards Compliance:**

- Development will be done using VS Code and PyCharm.
- BigQuery will serve as the database.

**5.2.2.5 Interface/Protocol Requirements:**

- Reactive interface using React.JS.
- Compatibility with any browser supporting JavaScript.
- Secure communication through HTTPS.

**5.2.2.6 Data Repository and Distribution Requirements:**

- BigQuery will be the primary data repository.

**5.2.2.7 Security Requirements:**

- Implementation of strong password protocols.
- Regular data backups for security.
- Transport Layer-Level security using HTTPS protocol.

**5.2.2.8 Memory and Other Capacity Limitations:**

- Minimum requirements for optimized performance that is 2GB RAM, 32 GB Storage (SSD Preferred), core i3 or higher

**5.2.2.9 Performance Requirements:**

- Stable internet connection for smooth performance.
- Code optimization for enhanced efficiency.

**5.2.2.10 Network Communications:**

- Hypertext Transfer Protocol Secure (HTTPS) for network communications.

**5.2.3 Goals and Guidelines**

The objectives upon which our design will be based are listed below, along with recommendations for achieving them and their relative importance.

**5.2.3.1 Modifiability**

The design of the Vendorsphere system adheres to the KISS principle ("Keep It Simple Stupid"), emphasizing simplicity to enhance modifiability and code readability. This approach ensures that the system remains easily adaptable and maintainable.

**5.2.3.2 Performance**

The system prioritizes high-speed operation and efficient memory utilization. It is engineered to operate swiftly without consuming unnecessary memory space. Additionally, the system is designed to refrain from prompting users to download extraneous documents.

**5.2.3.3 User-Friendly**

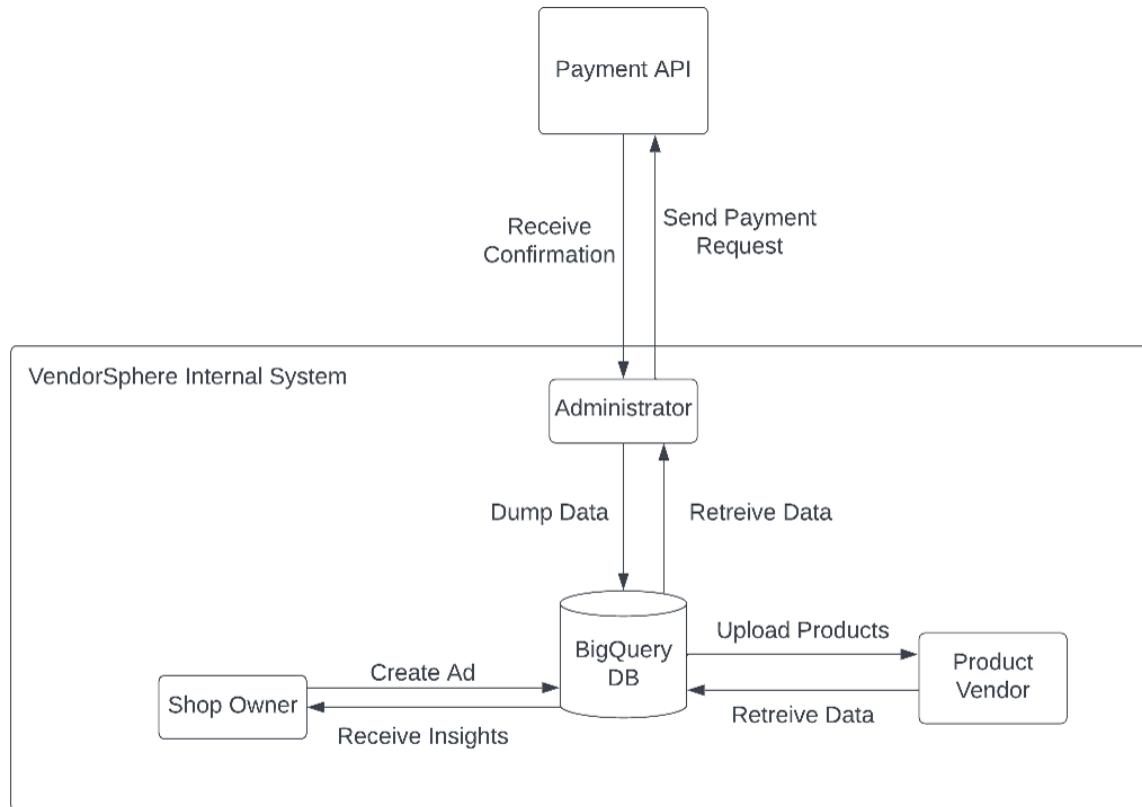
Vendorsphere is crafted with a user-friendly interface, incorporating color schemes that are easy on the eyes for enhanced user interaction. The design also supports global usability by accommodating English language speakers, contributing to a more inclusive user experience.

**5.2.4 Development Methods**

The software design of Vendorsphere follows an Agile development process. This methodology facilitates flexible and iterative development, accommodating modifications and improvements throughout

the project. Agile approaches encourage teamwork, flexibility, and client input to make sure the software design keeps up with changing needs. Agile was chosen because it has a track record of success in dynamic project environments that promote efficient delivery and ongoing improvement.

### 5.3 System Architecture

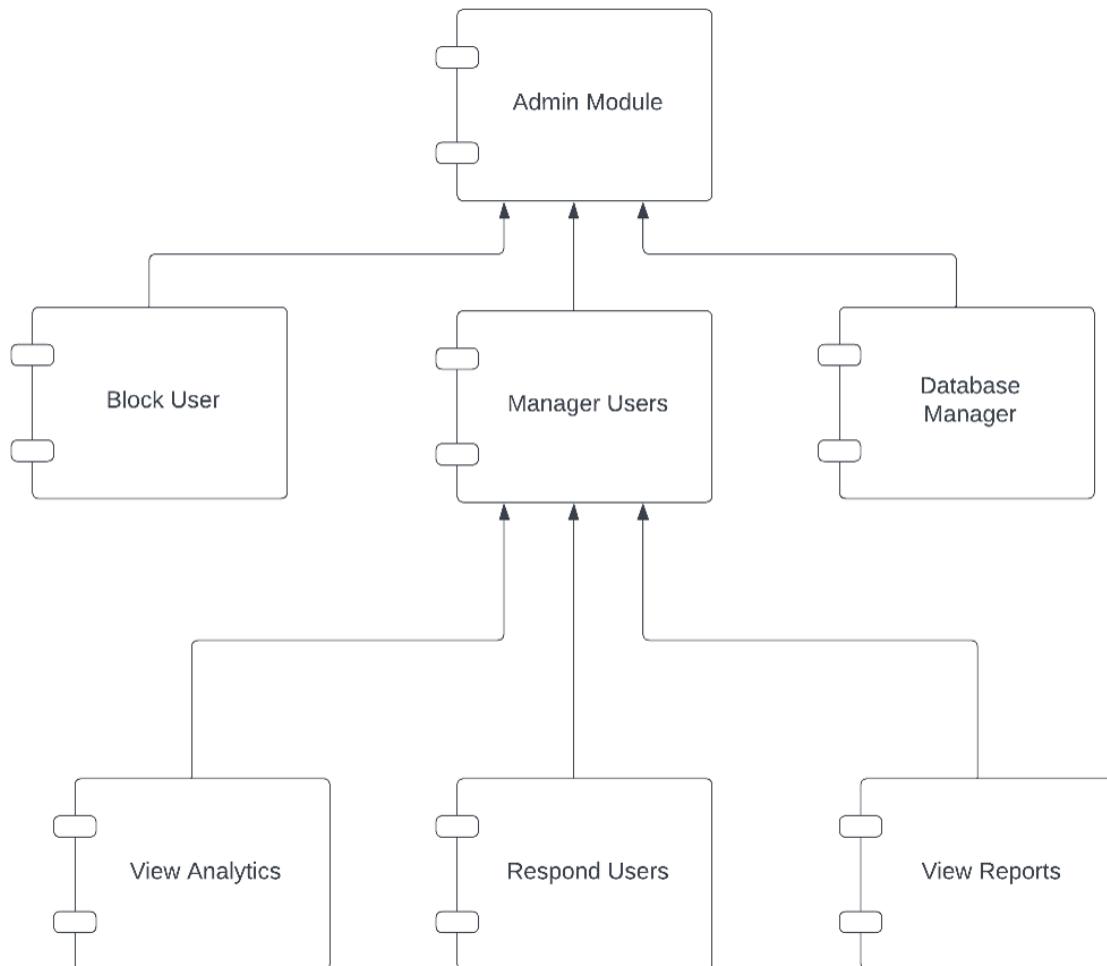


**Figure 5.1: Architecture Diagram**

*The high-level diagram of the system*

As shown in the above figure, VendorSPhere has 4 major components. The system has 3 main clients that are Admin, Shop Owners, and Product Vendors. Both the Product Vendor as well as the Shop Owner will sign up to the system, and login into the system using the operation of data retrieval and data insertion into the Database. Along with the basic authentication, both these users will extensively rely on the API calls to the database to use the platform as they intend to. The payment API is an external system that will facilitate the transactional side of things for VendorSPhere. This will allow us to offload an extremely critical module, monetary management, to a trusted third party.

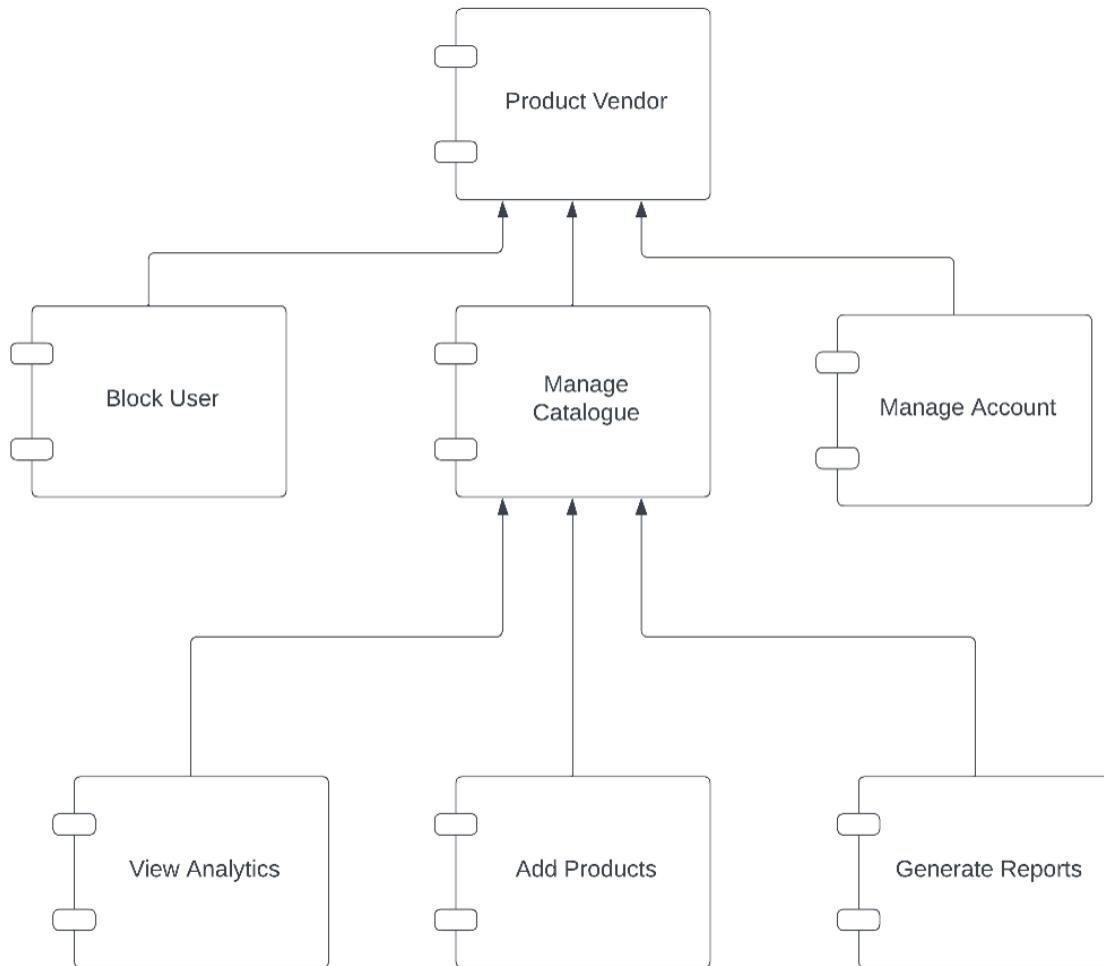
### 5.3.1 Subsystem Architecture



**Figure 5.2: Admin component Diagram**

*The internal view of the admin component is given above*

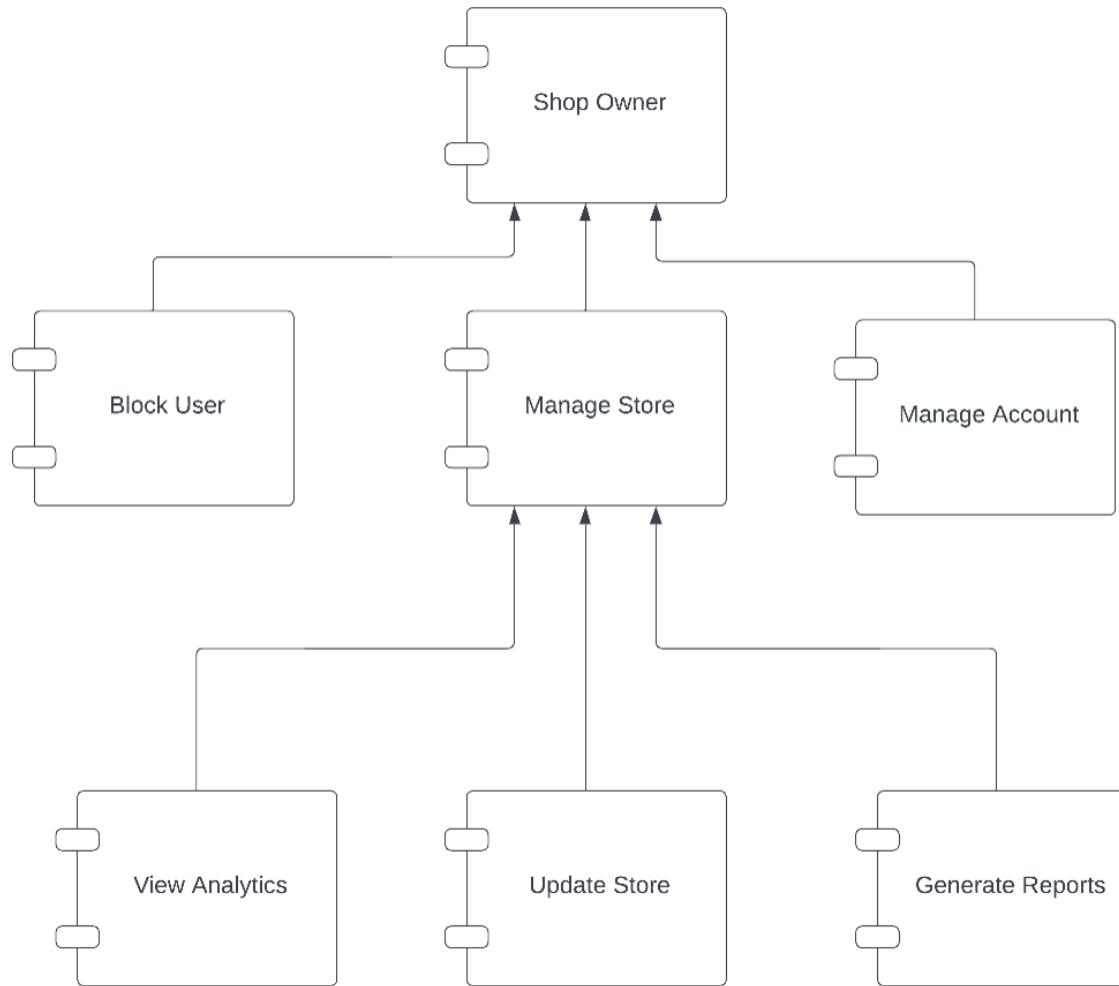
The admin can block a user. Furthermore, their role is to manage the Database at all times. This is to ensure concurrency and integrity of data so that the users enjoy a seamless and **true** experience without any discrepancies. Furthermore, they will be overseeing reported users, viewing and tracking website analytics, as well as respond to user queries.



**Figure 5.3: Product Vendor component Diagram**

*The internal view of the Product Vendor component is given above*

The Product vendor can block a user. Furthermore, they can perform multiple operations on their product catalogs. These operations range from creating the catalog to updating the catalog, and finally removing the catalog entirely if they deem it necessary. Along with the store operations, they can view revenue and other statistics as well as generate reports to aid in financial decision-making.



**Figure 5.4: Shop Owner component Diagram**

*The internal view of the Shop Owner component is given above*

The Shop owner can block a user from their account. Furthermore, they can perform multiple operations on their stores. These operations range from creating the store to updating the store, and finally removing the store if they deem it necessary. Along with the store operations, they can view revenue and other statistics as well as generate reports to aid in financial decision-making.

## 5.4 Architectural Strategies

The architectural strategies that we used for the design of this architecture are provided in the subsections below.

#### **5.4.1 Reuse of existing product**

VendorSphere will use existing products such as an API for managing the payments such as Stripe or Square. This API will reduce the workload on VendorSphere internal architecture by offloading one of the most critical modules to a trusted party that specializes in the aforementioned domain.

#### **5.4.2 User-Interface Paradigm**

VendorSphere aims to be an accessible platform for its users so that they don't require any specific training or user manuals to be able to use our system. The strategies Vendor aims to **actively** employ include Fitt's Law, Miller's Law of Short-Term Memory Load, and Jakob's Law.

#### **5.4.3 Error detection and Recovery**

Whenever the Shop Owner tries to add an item with incomplete information, an error message will be displayed to urge the user to provide the missing fields. Similarly, if the Shop Owner creates a store without correct details, the System will prevent the user from proceeding further unless the error has been rectified.

#### **5.4.4 Concurrency and Synchronization**

To allow users to communicate with the web application while the system is working on any time-consuming activities like web API queries, we will be employing asynchronous operations on the front end so that the system does not hinder the things that user wants to do on our system.

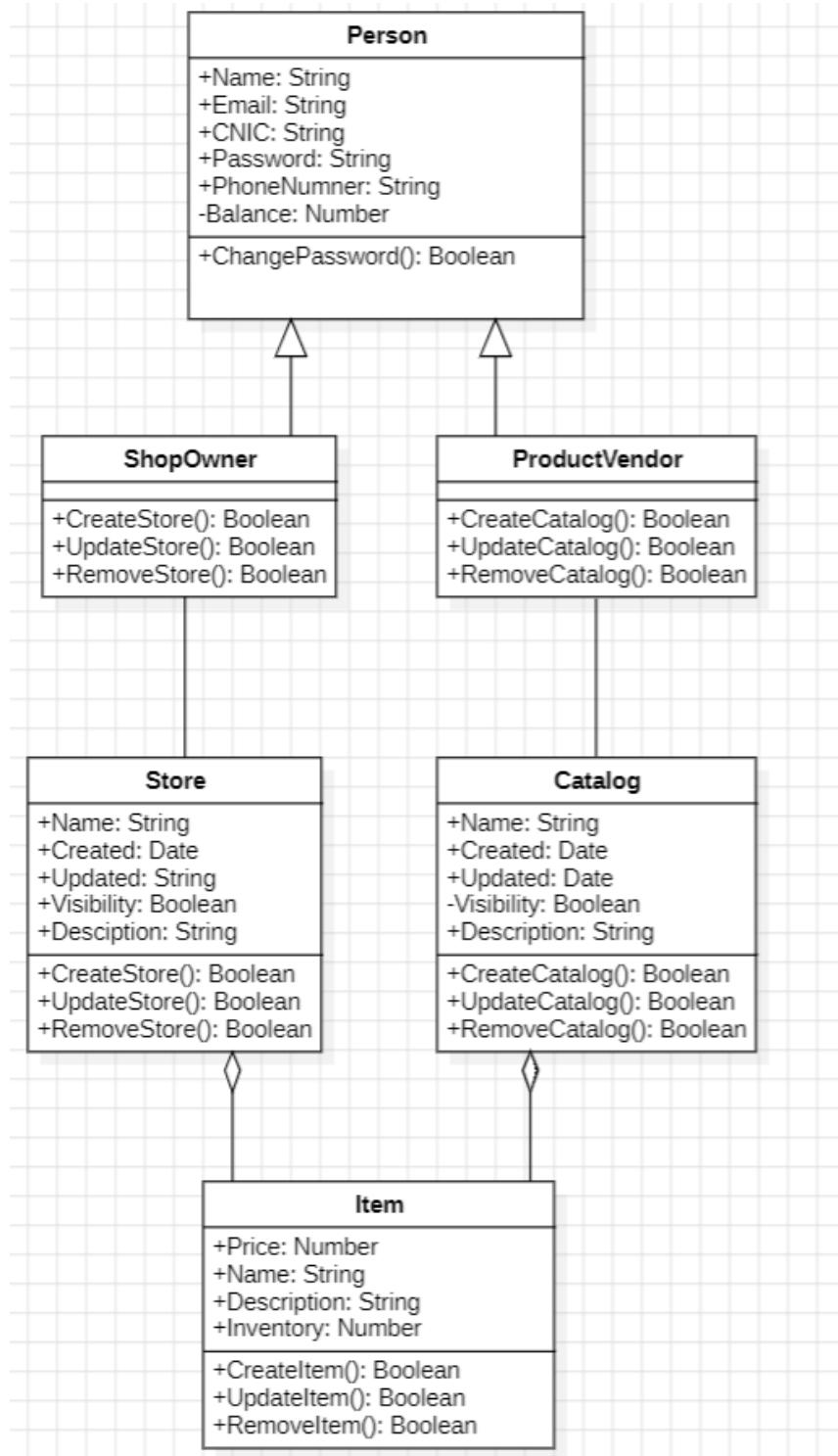
#### **5.4.5 Memory Management Policies**

VendorSphere will be built upon very lightweight frameworks which should be extremely easy to run on even cheaper consumer-grade hardware. The memory requirement will be quite low to ensure that even users with low-end machines can browse and use our platform with ease.

#### **5.4.6 Use of Programming language**

Front-end of the system will be built in React JS, back end in Django. For data storage, we will use BigQuery which reduces the cost/query. The choice for picking these peculiar tools is to ensure that VendorSphere is tailor-made to be as efficient, as fast, and as resource-light as possible. Furthermore, these are widely adopted tools with significant market shares, which will make expanding VendorSphere even easier.

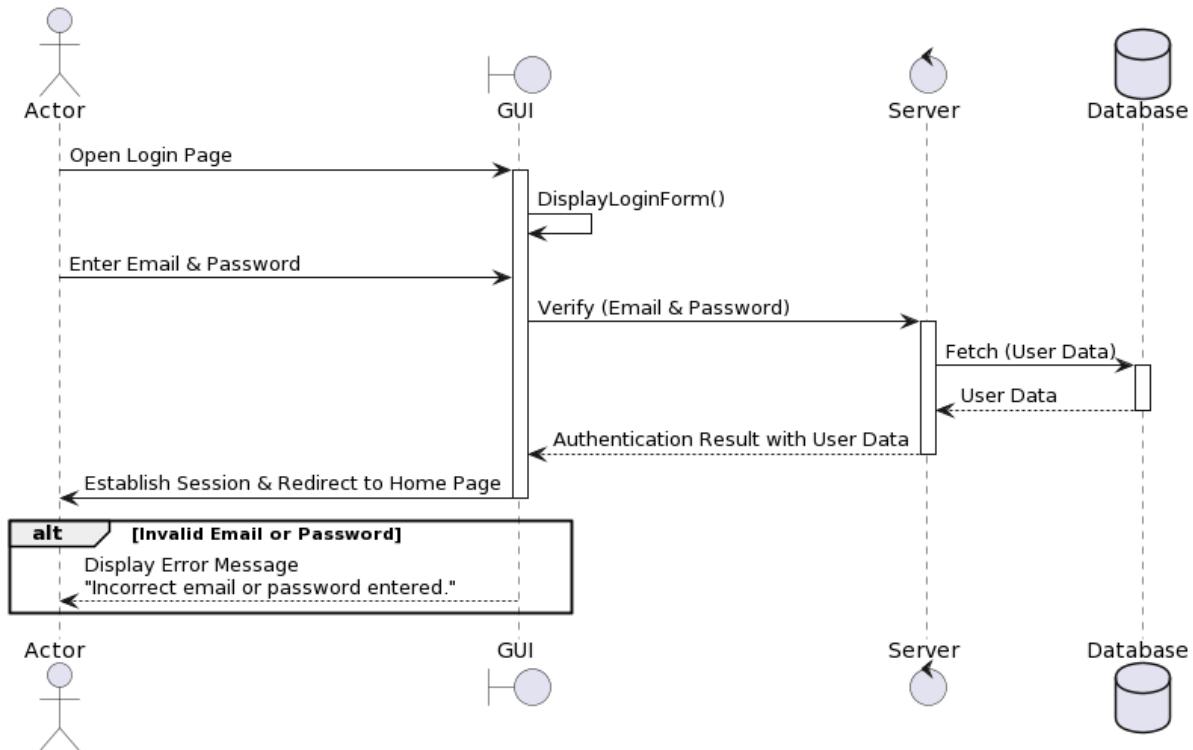
## 5.5 Domain Model/Class Diagram



**Figure 5.5: VendorSphere Class Diagram**

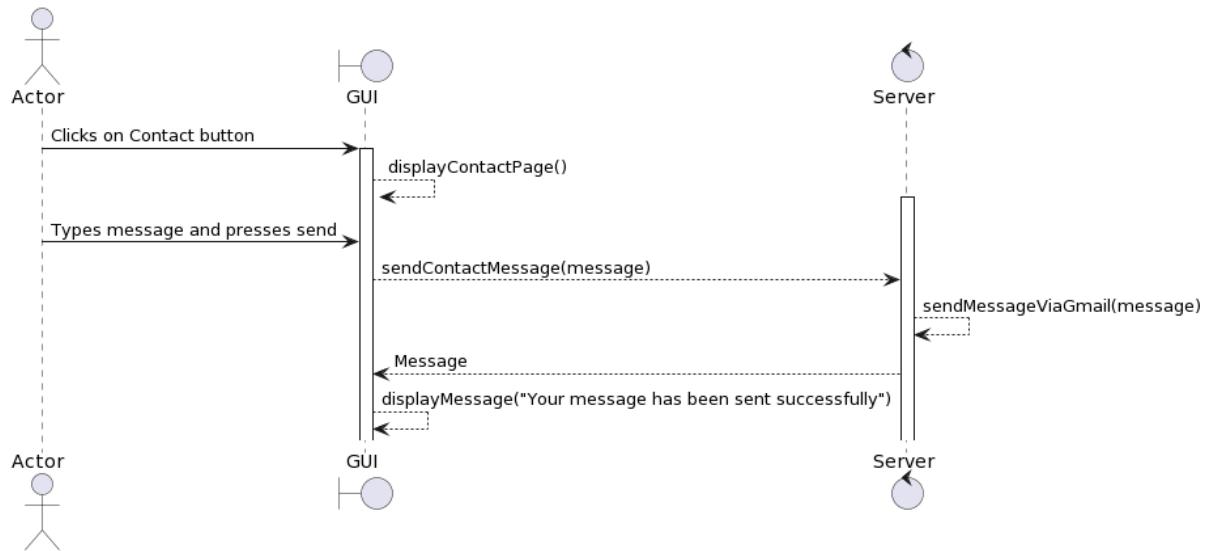
*The class diagram of the whole system is given above*

## 5.6 Sequence Diagrams



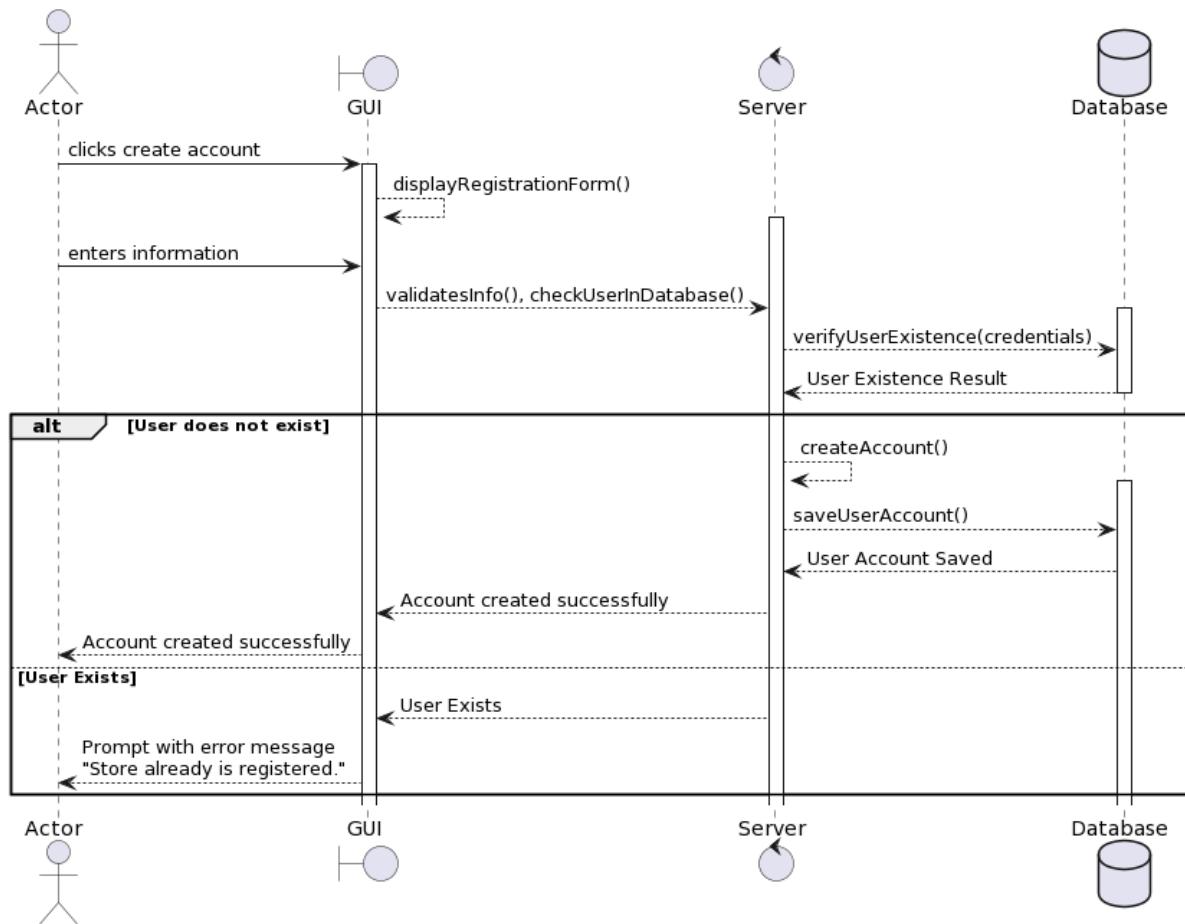
**Figure 5.6: Login**

*This figure represents the Login sequence for VendorSphere*

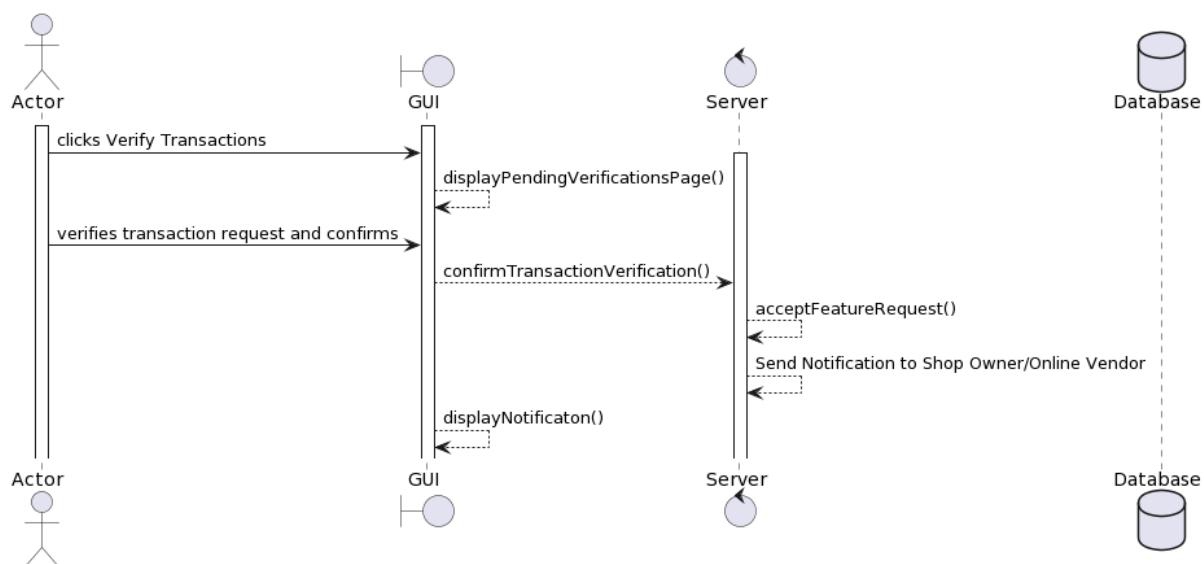


**Figure 5.7: Contact Vendor**

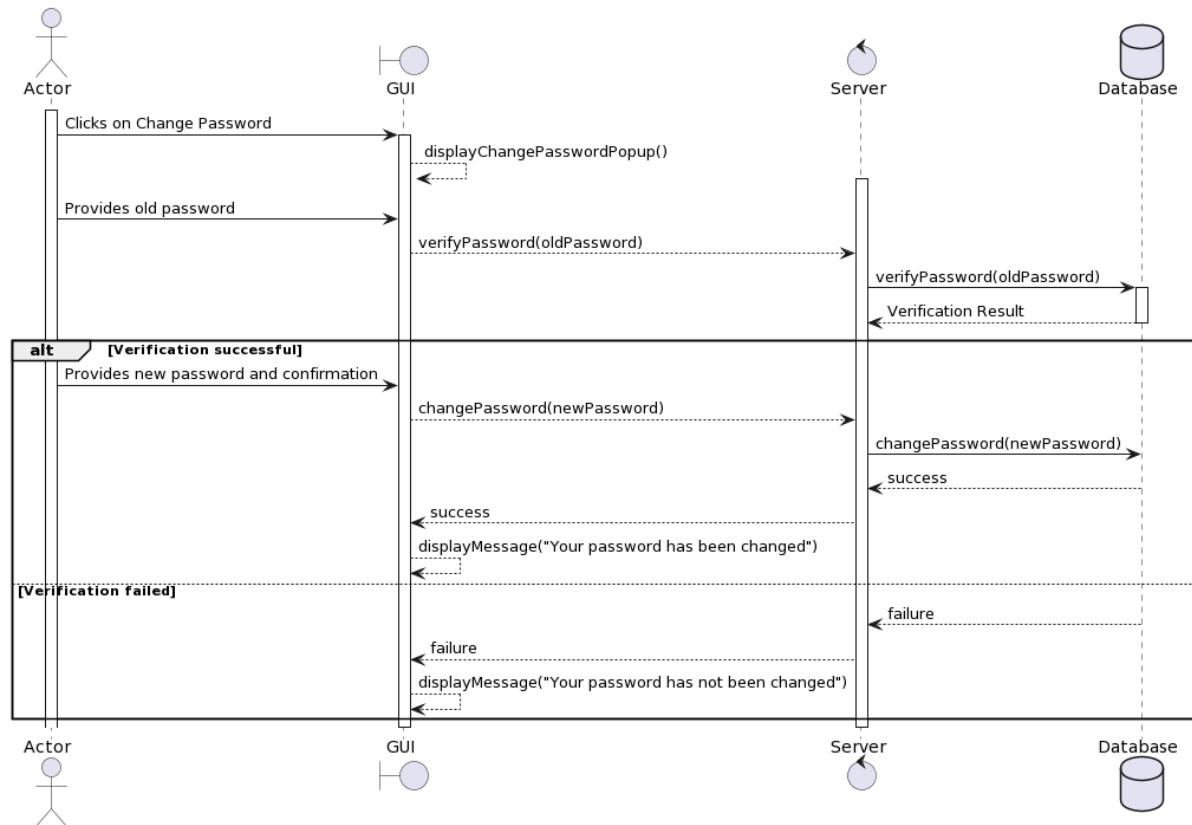
*This figure represents the contact vendor sequence for VendorSphere*

**Figure 5.8: Sign up**

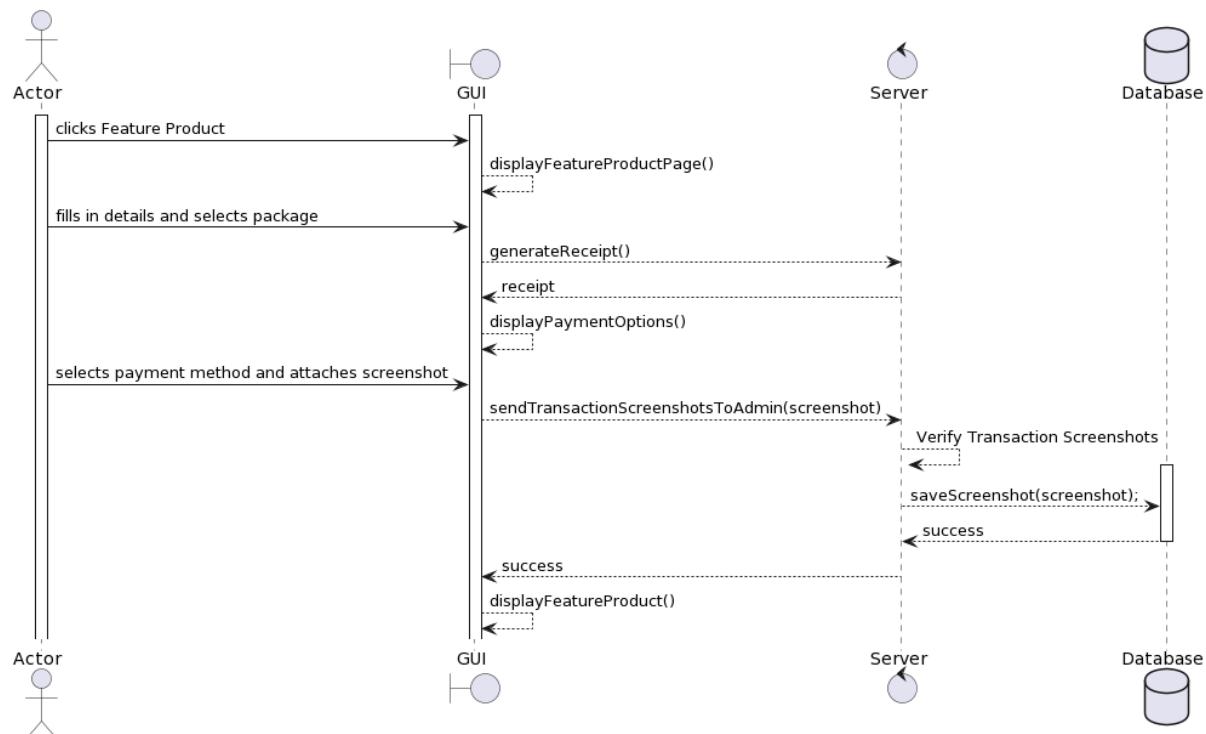
*This figure represents the Sign-Up sequence for VendorSphere*

**Figure 5.9: Verify Transaction**

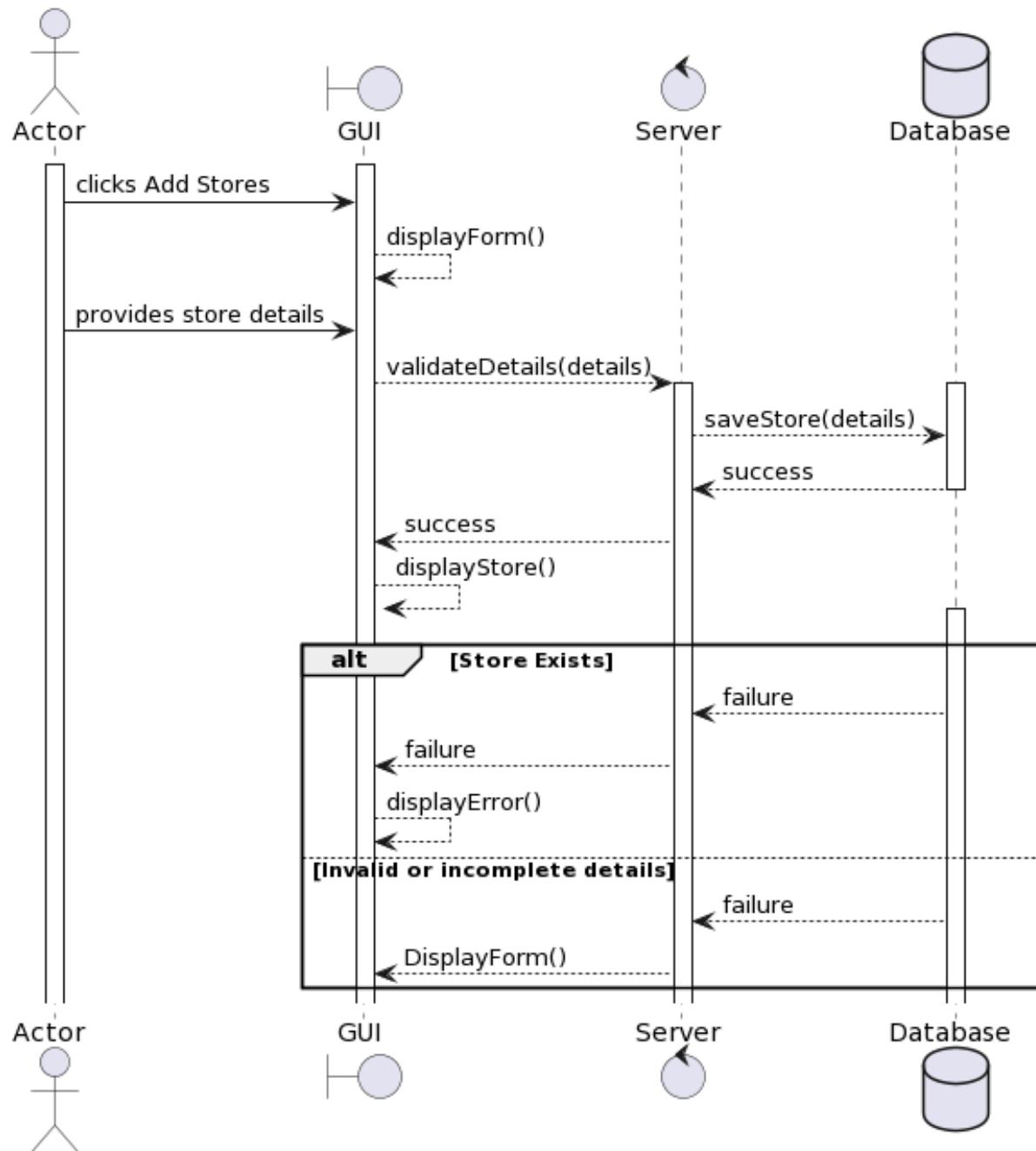
*This figure represents the verified transaction sequence for VendorSphere*

**Figure 5.10: Change Password**

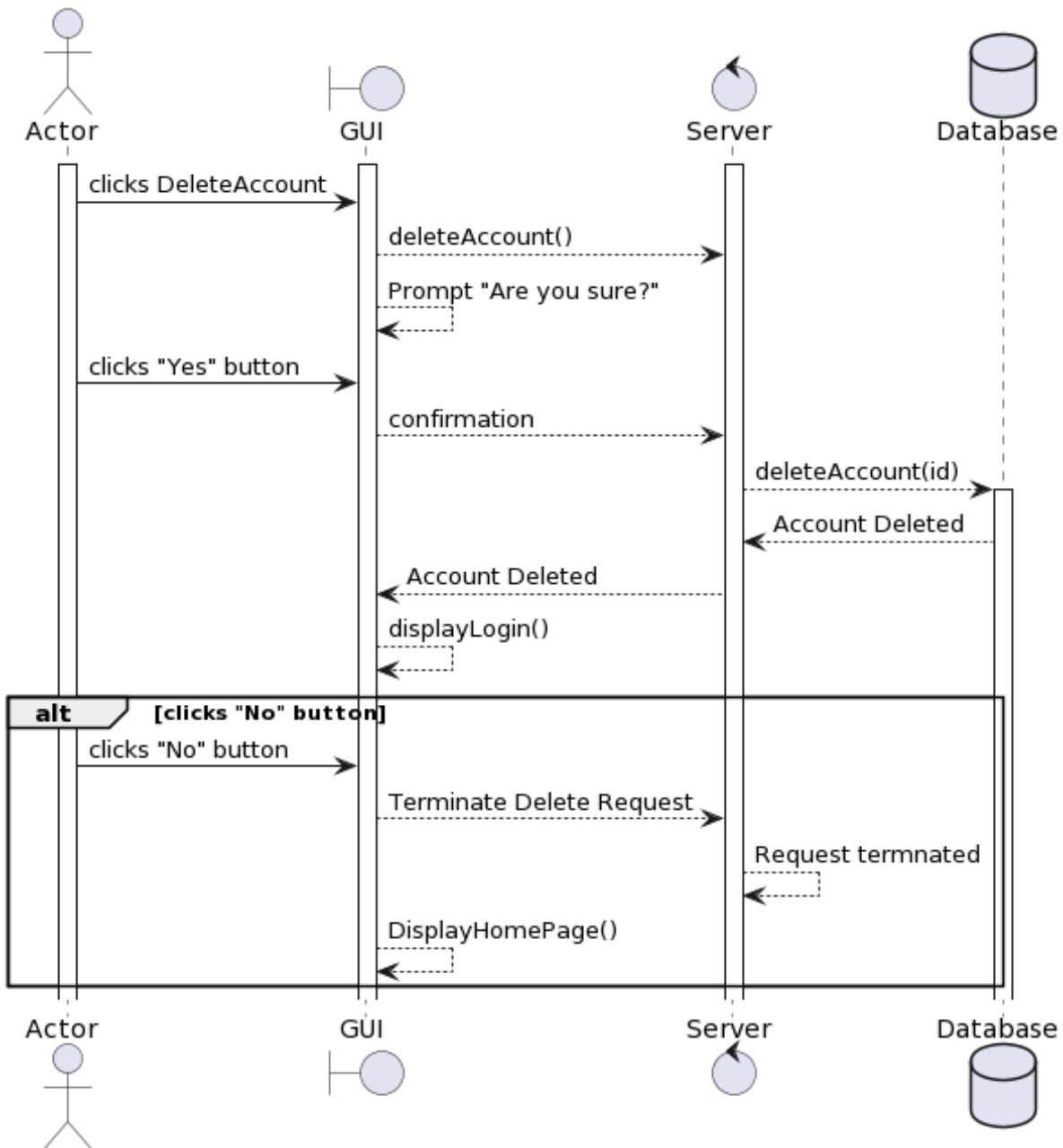
*This figure represents the change password sequence for VendorSphere*

**Figure 5.11: Feature Product**

*This figure represents the feature product sequence for VendorSphere*

**Figure 5.12: Register Store**

*This figure represents the register store sequence for VendorSphere*

**Figure 5.13: Delete Account**

*This figure represents the delete account sequence for VendorSphere*

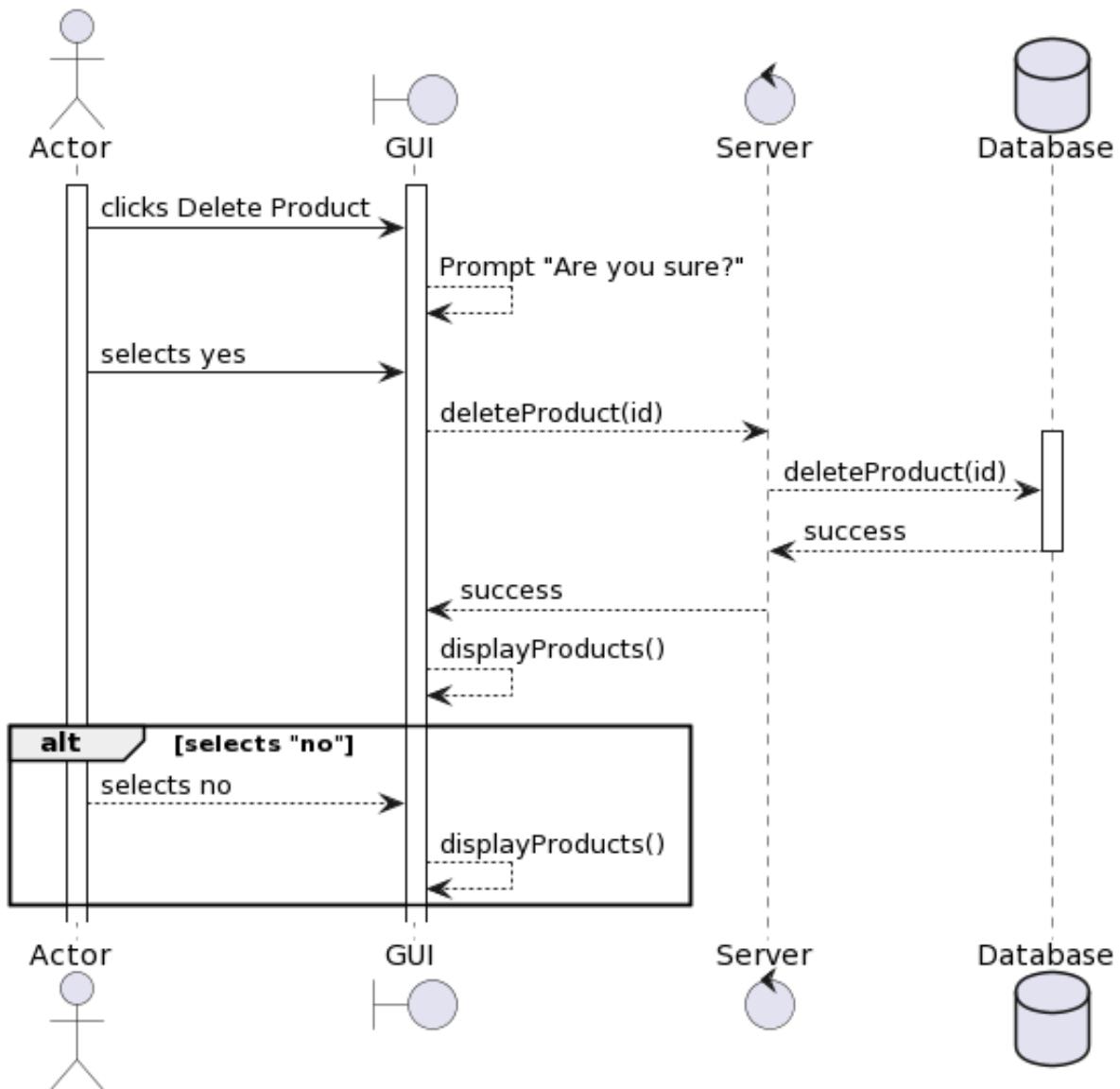
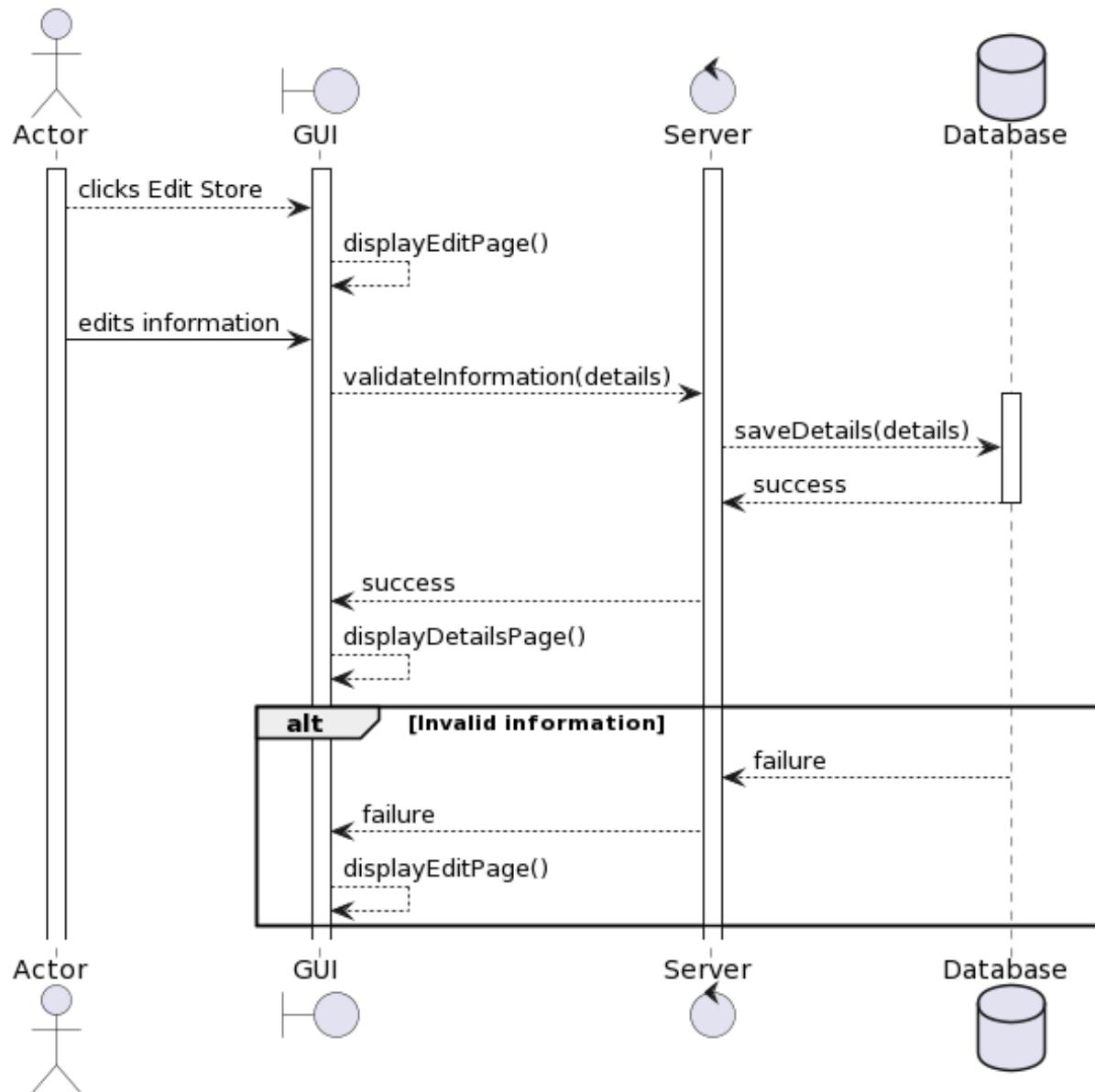


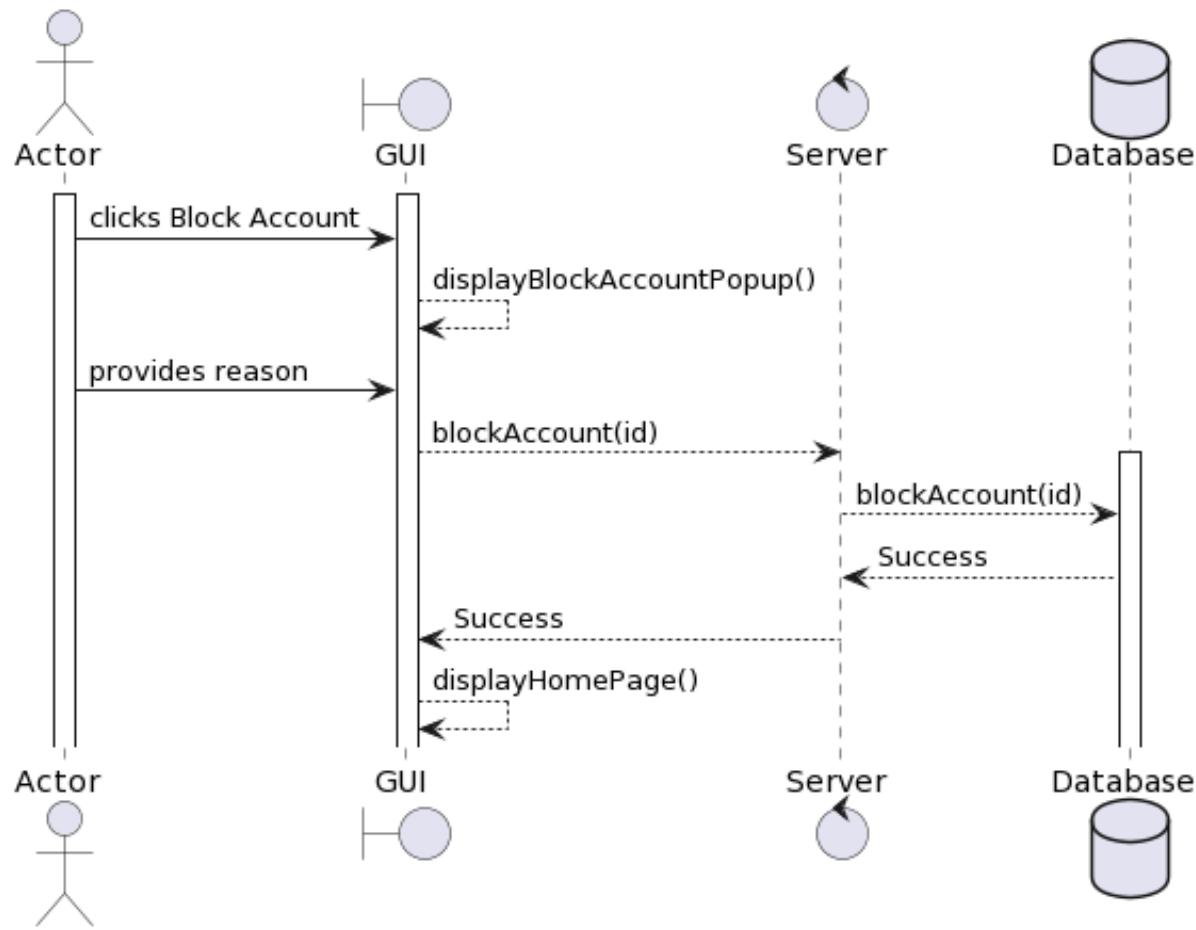
Figure 5.14: Delete Product

*This figure represents the contact vendor sequence for VendorSphere*



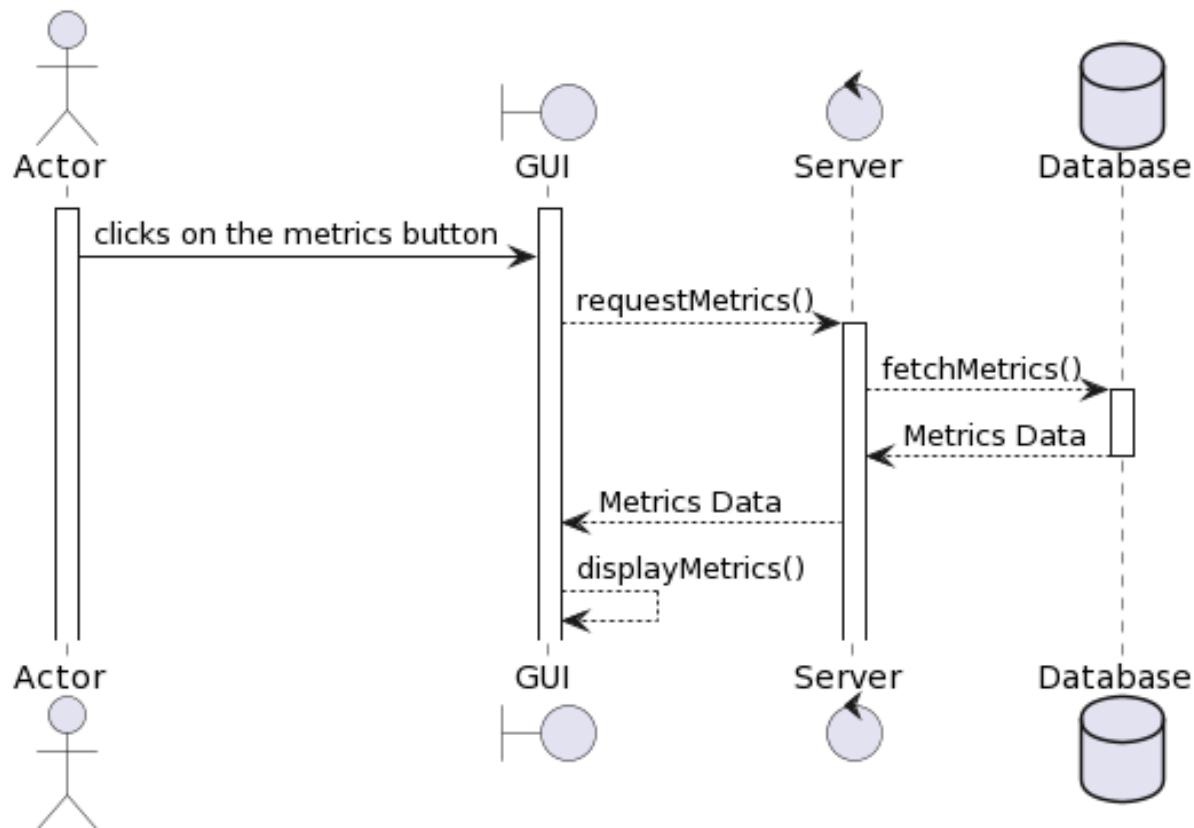
**Figure 5.15: Edit Online Store Information**

*This figure represents the edit online store information sequence for VendorSphere*



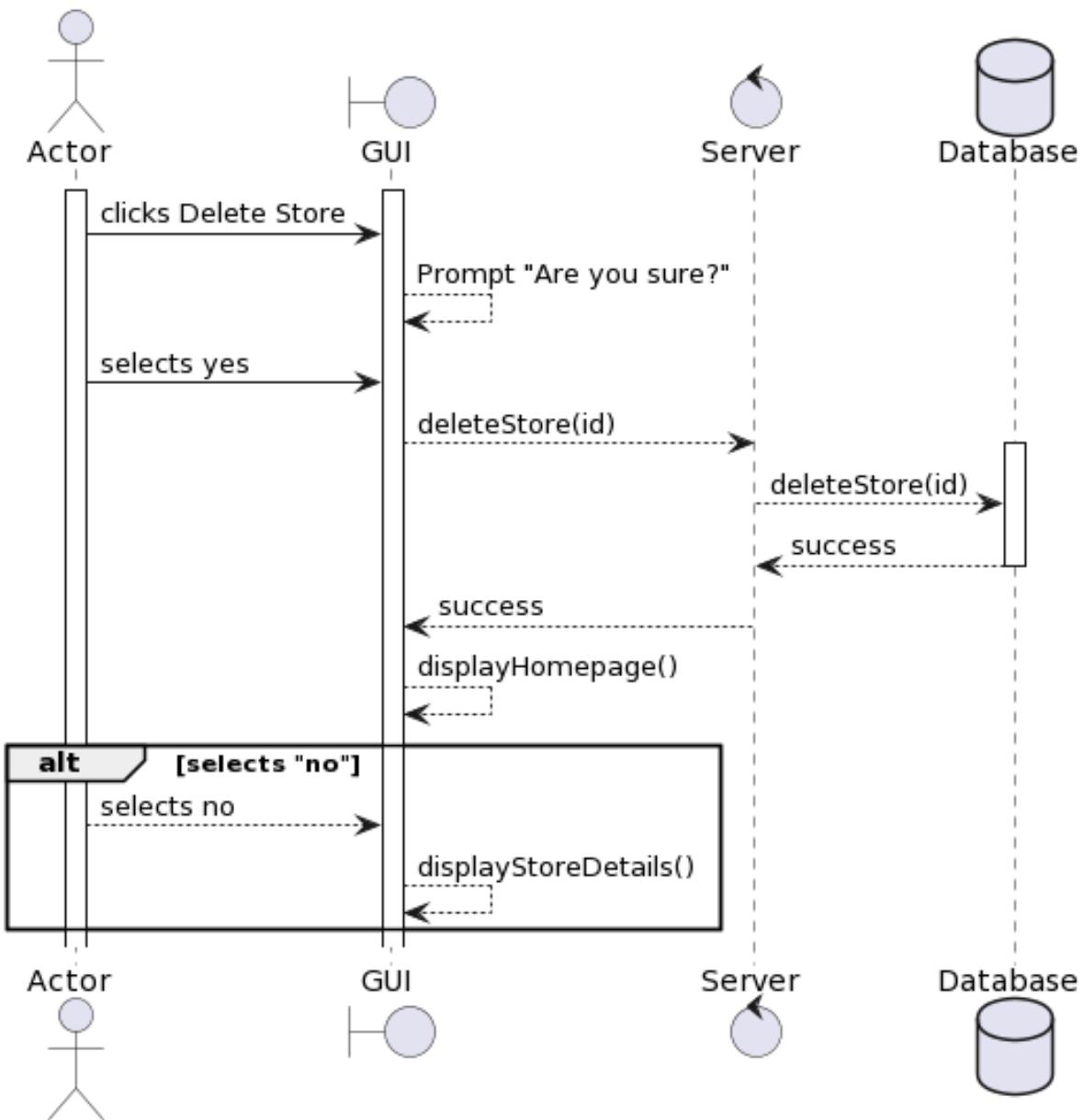
**Figure 5.16: Block Account**

*This figure represents the block account sequence for VendorSphere*

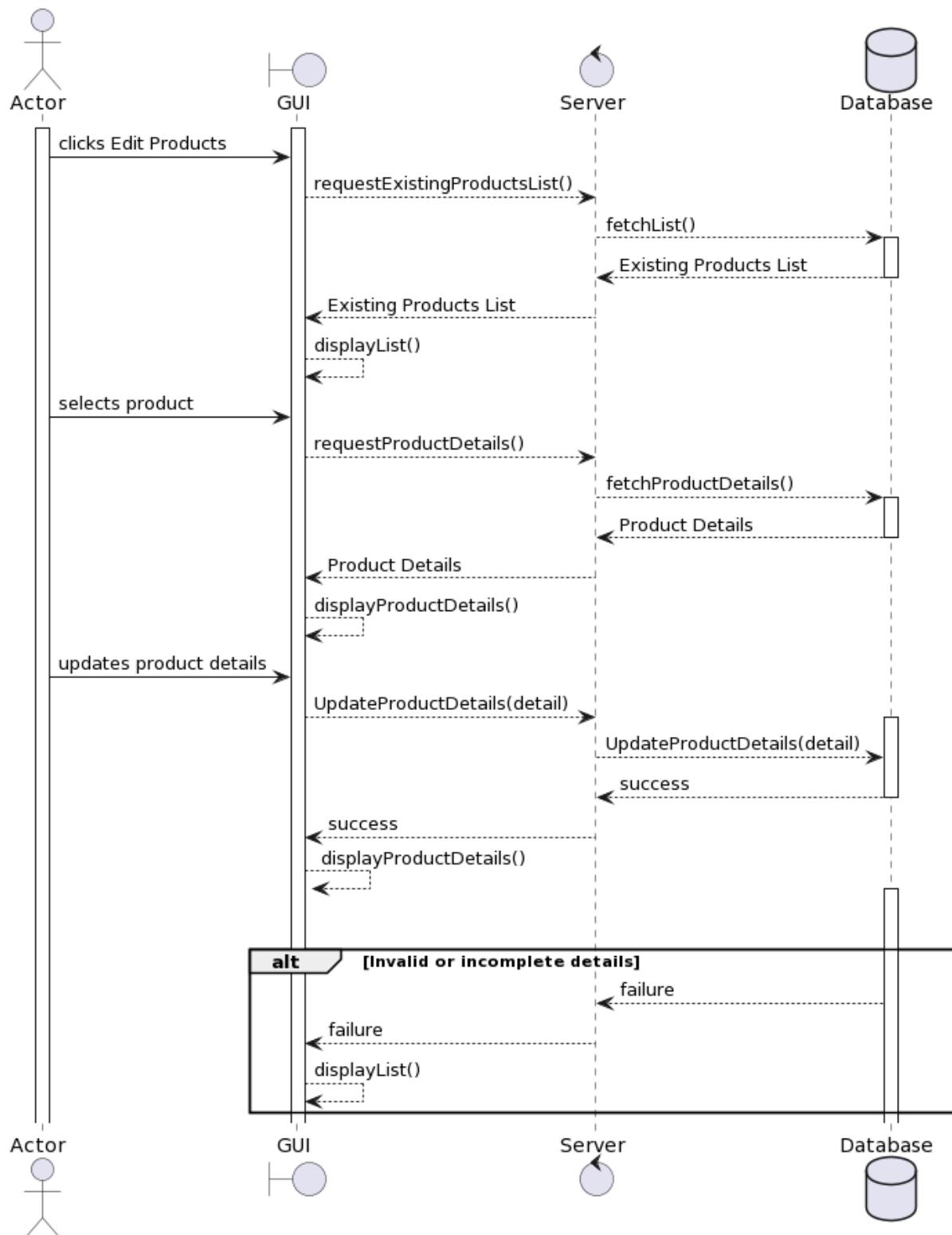


**Figure 5.17: Display Metrics**

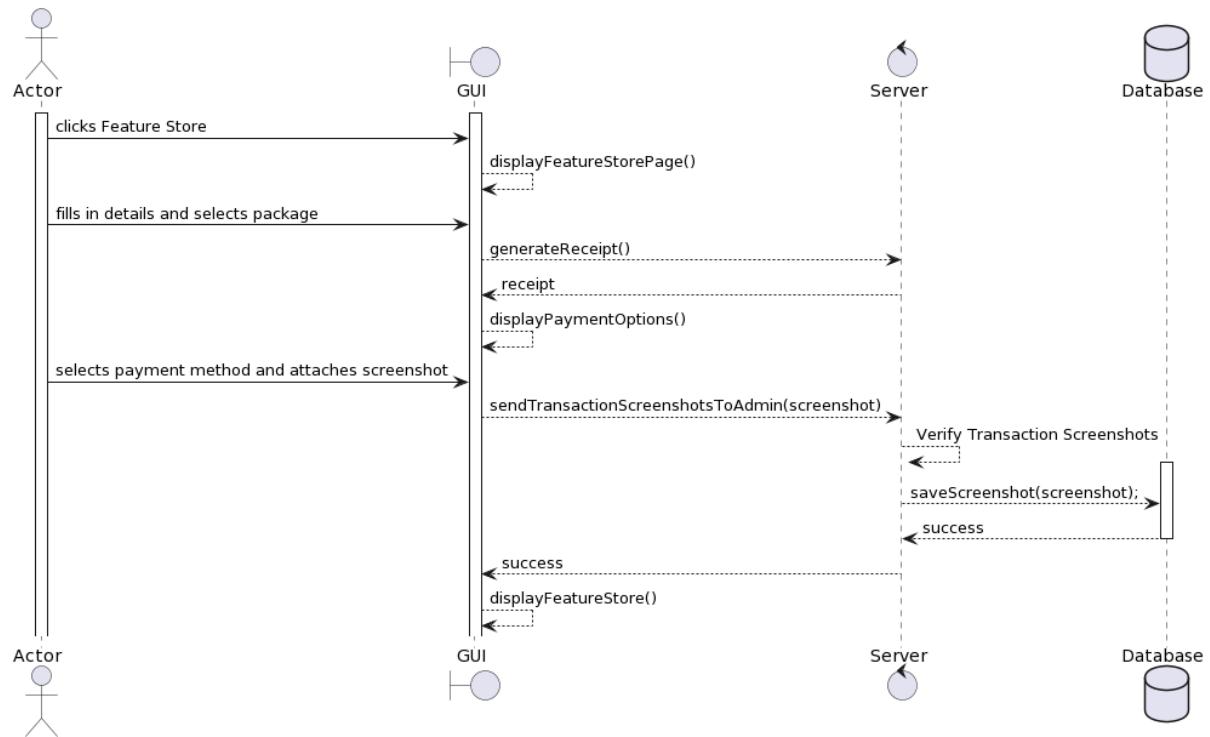
*This figure represents the display metrics sequence for VendorSphere*

**Figure 5.18: Delete Store**

*This figure represents the delete store sequence for VendorSphere*

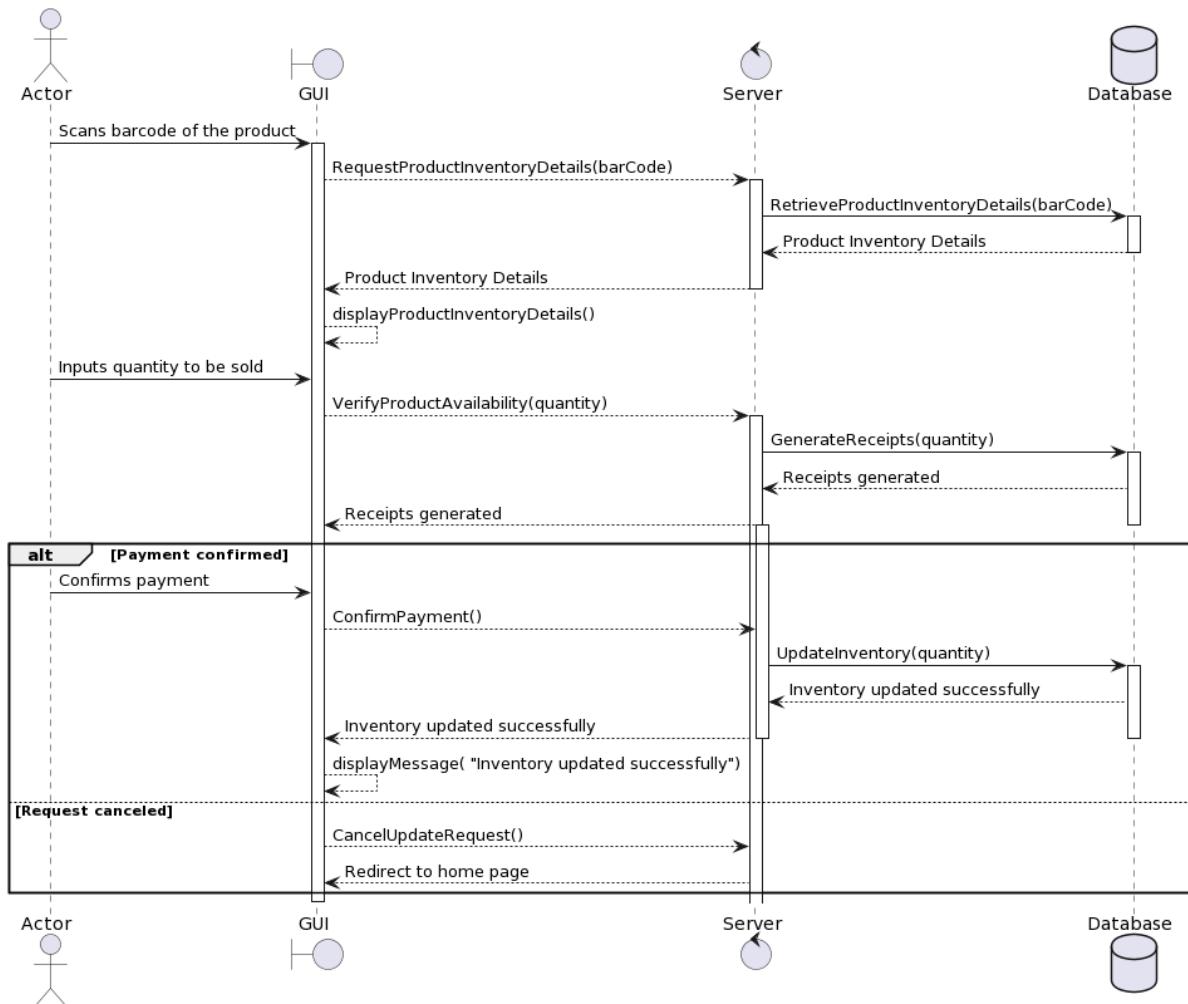
**Figure 5.19: Edit Product**

*This figure represents the edit product sequence for VendorSphere*

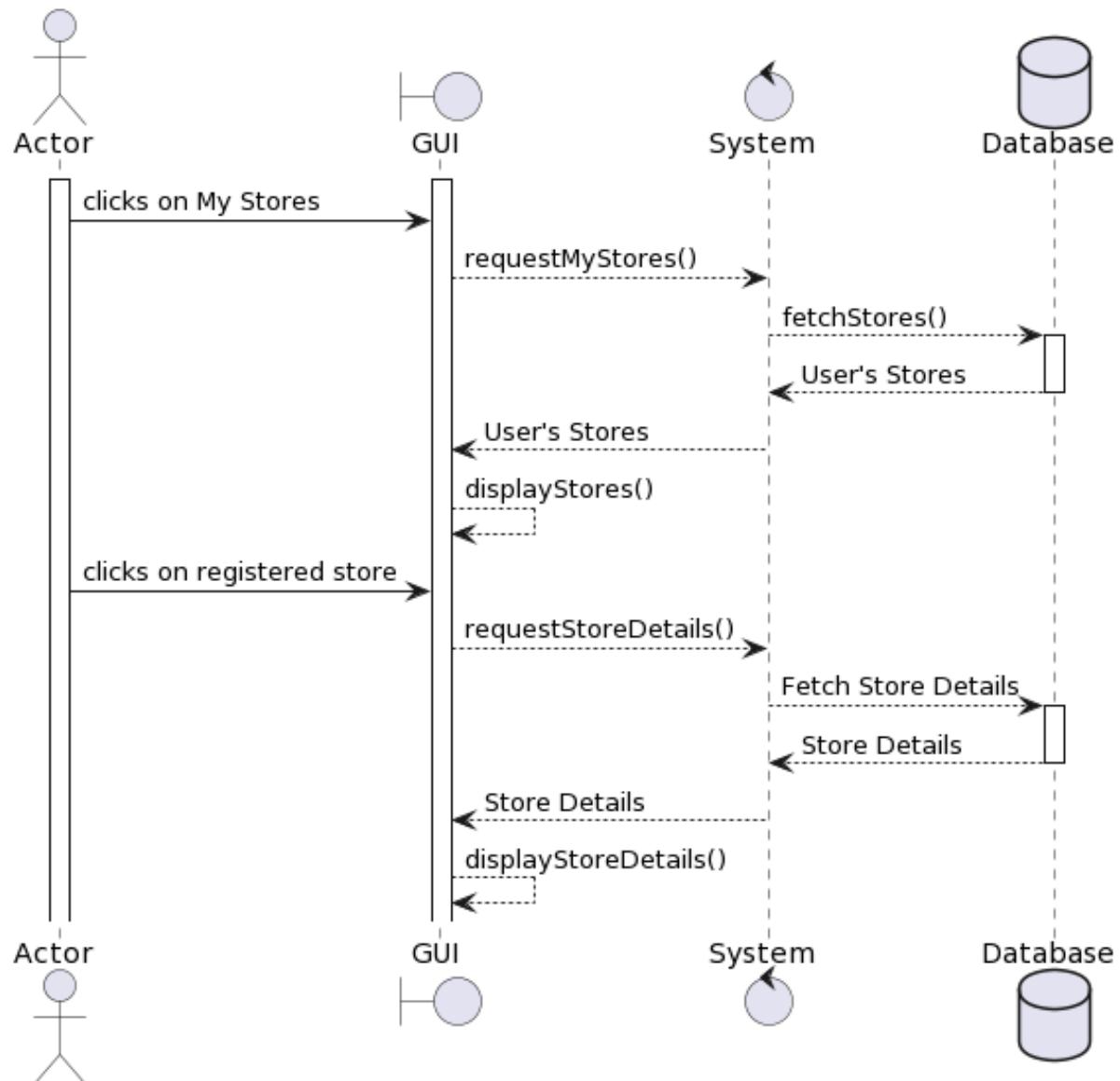


**Figure 5.20: Feature store**

*This figure represents the feature store sequence for VendorSphere*

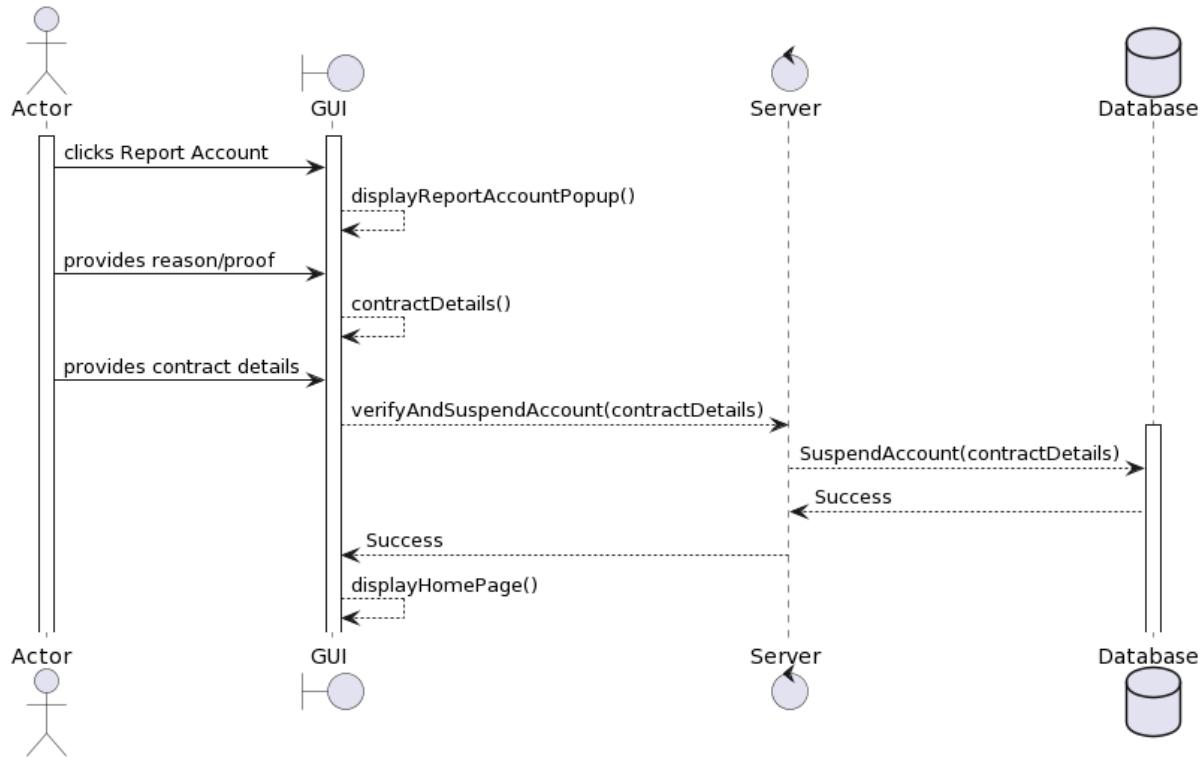
**Figure 5.21: Inventory Update**

*This figure represents the inventory update sequence for VendorSphere*



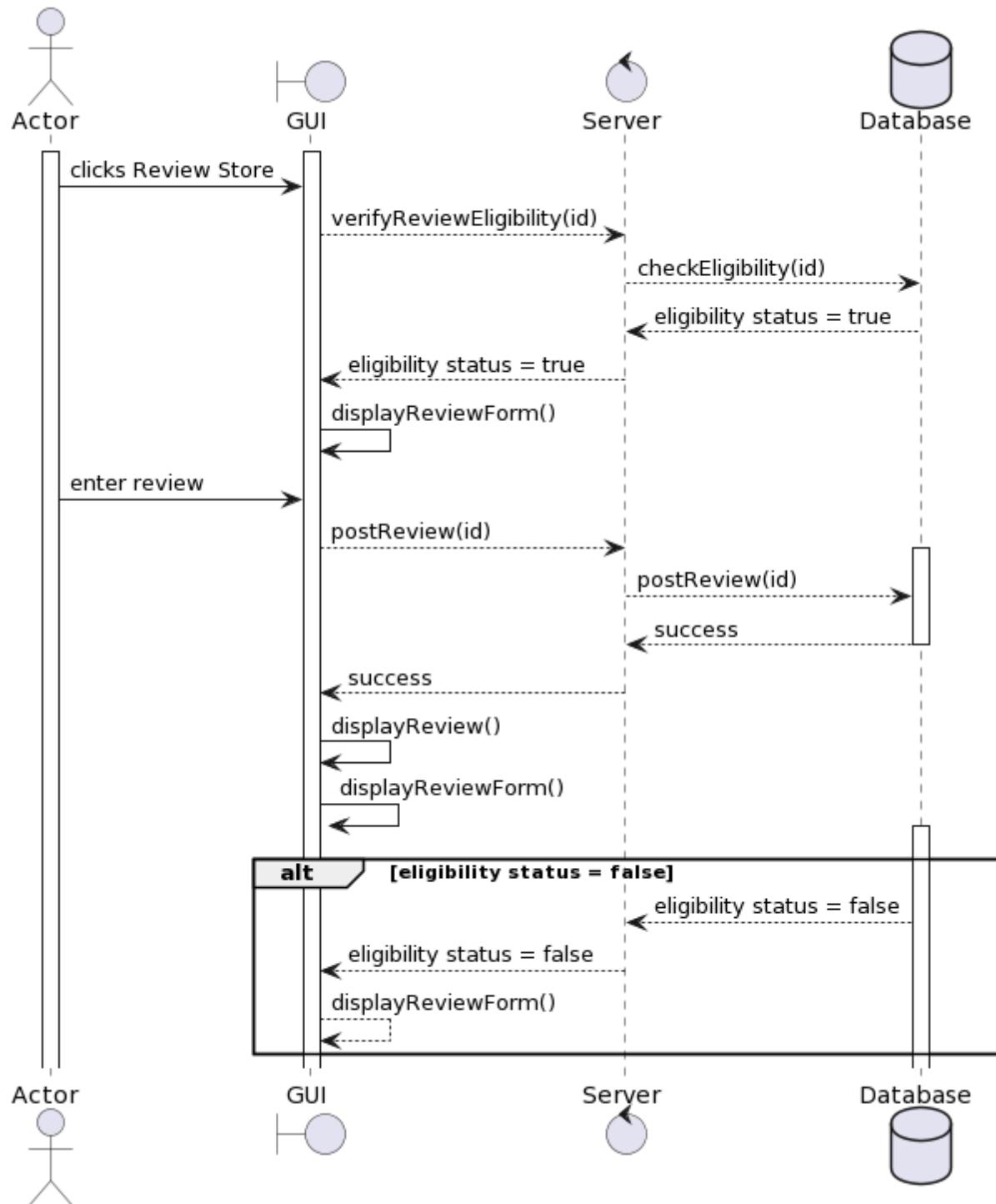
**Figure 5.22: My Stores**

*This figure represents my store's sequence for VendorSphere*

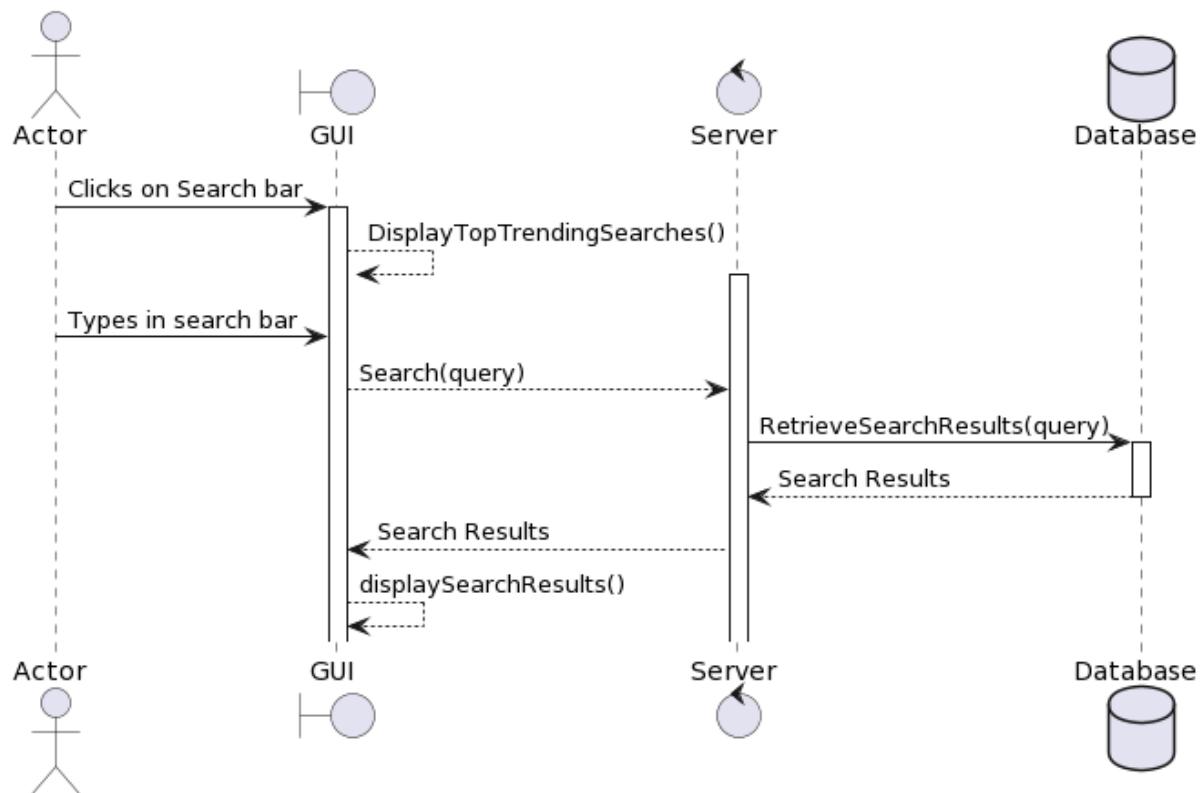


**Figure 5.23: Report Account**

*This figure represents the report account sequence for VendorSphere*

**Figure 5.24: Review**

*This figure represents the review sequence for VendorSphere*



**Figure 5.25: Search**

*This figure represents the search sequence for VendorSphere*

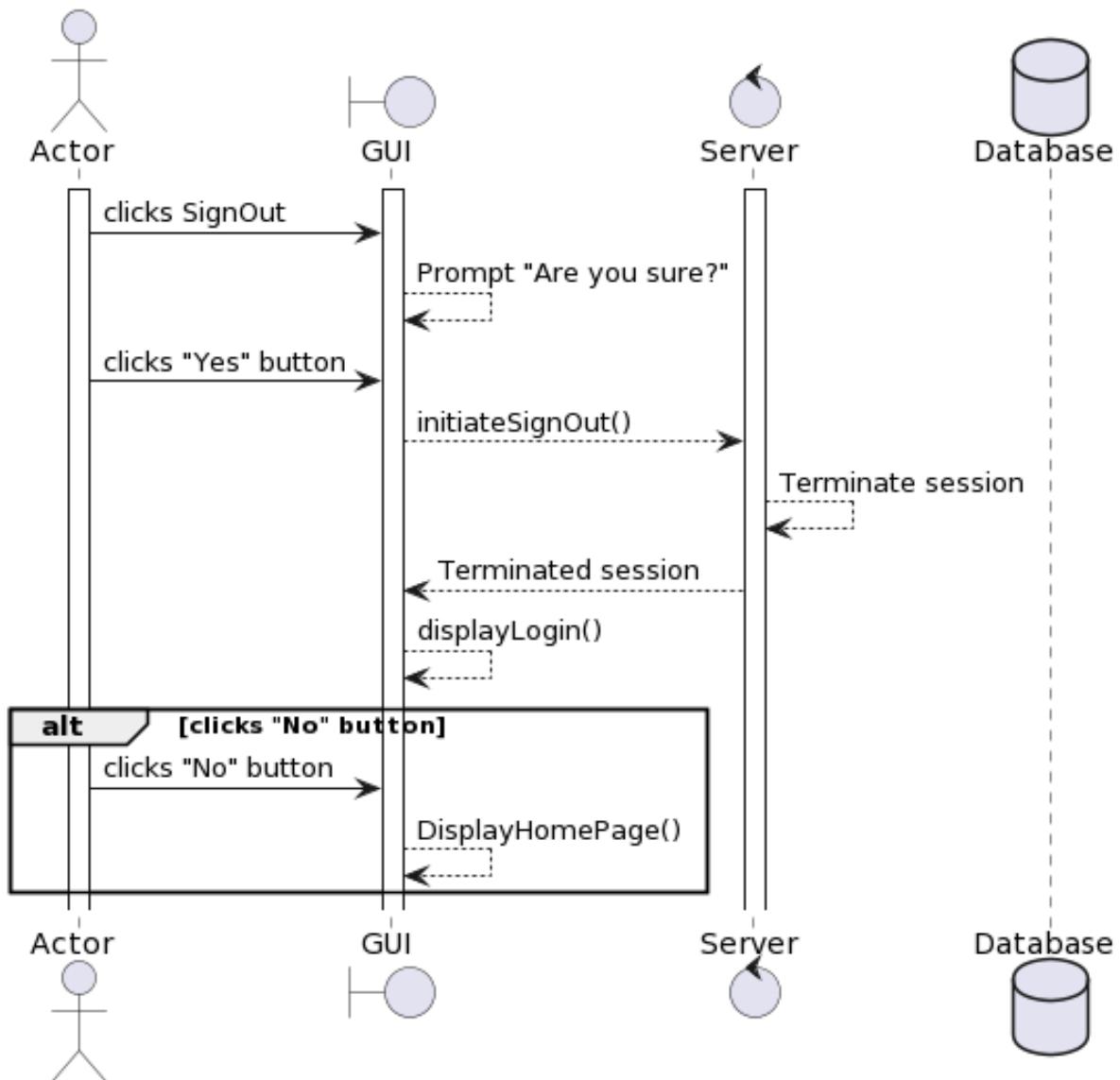
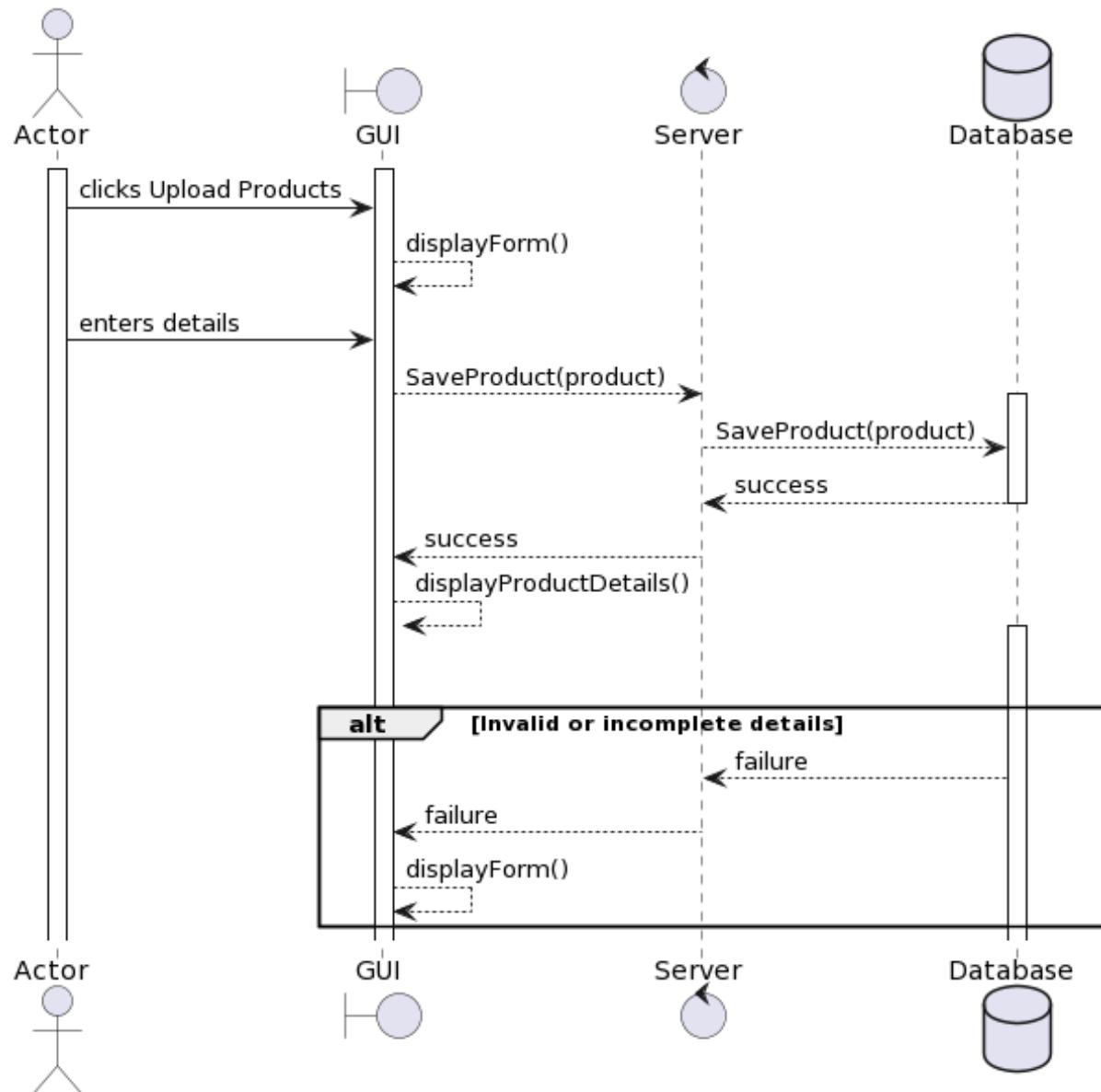


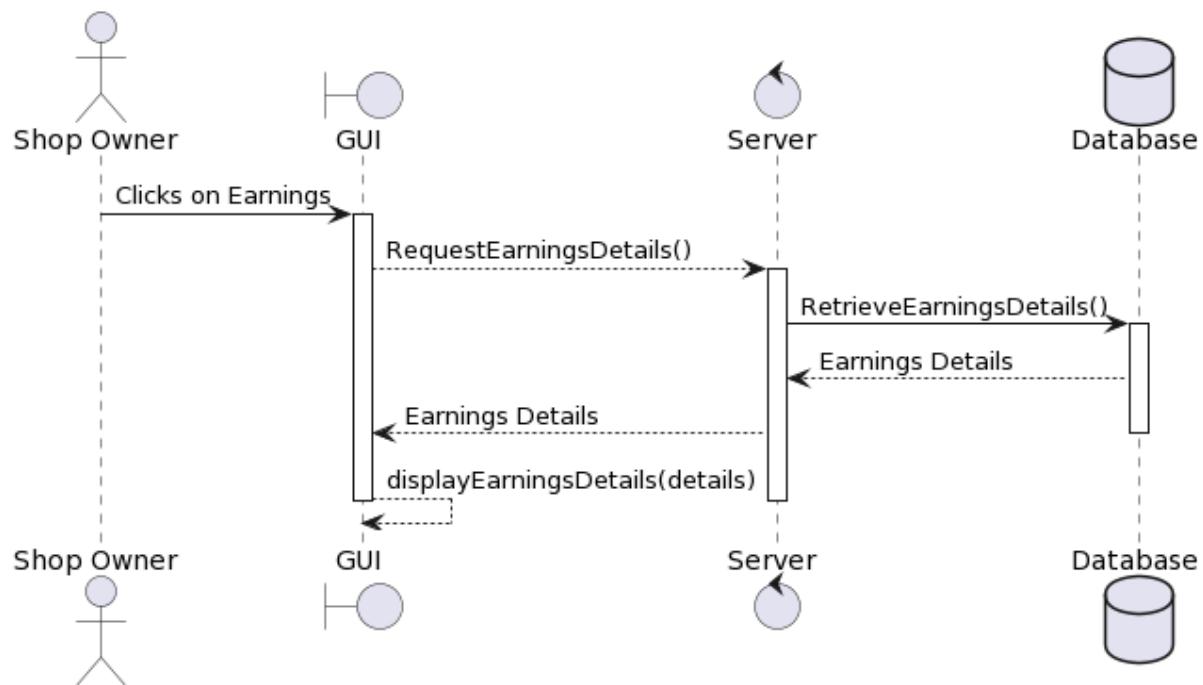
Figure 5.26: Sign Out

*This figure represents the sign-out sequence for VendorSphere*



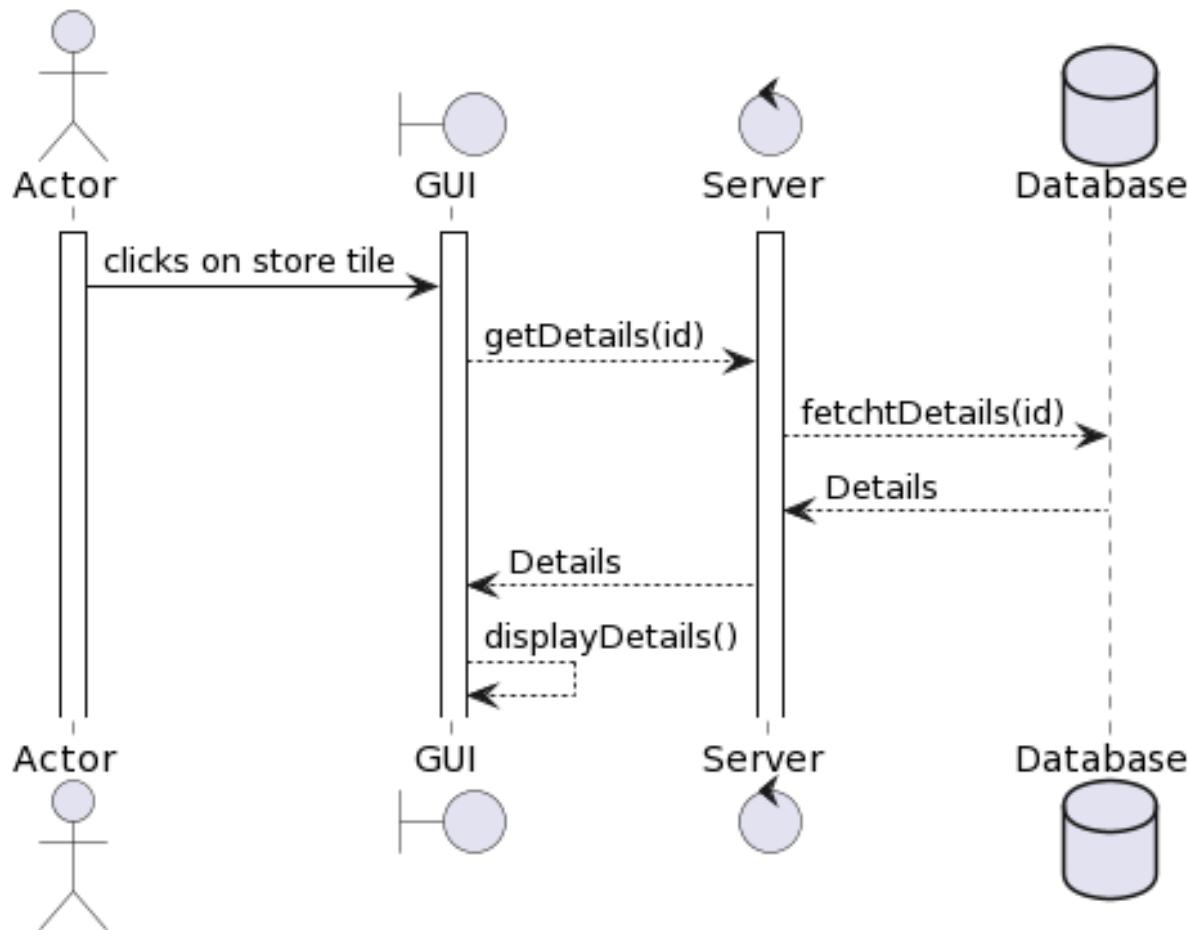
**Figure 5.27: Upload Products**

*This figure represents the upload product sequence for VendorSphere*



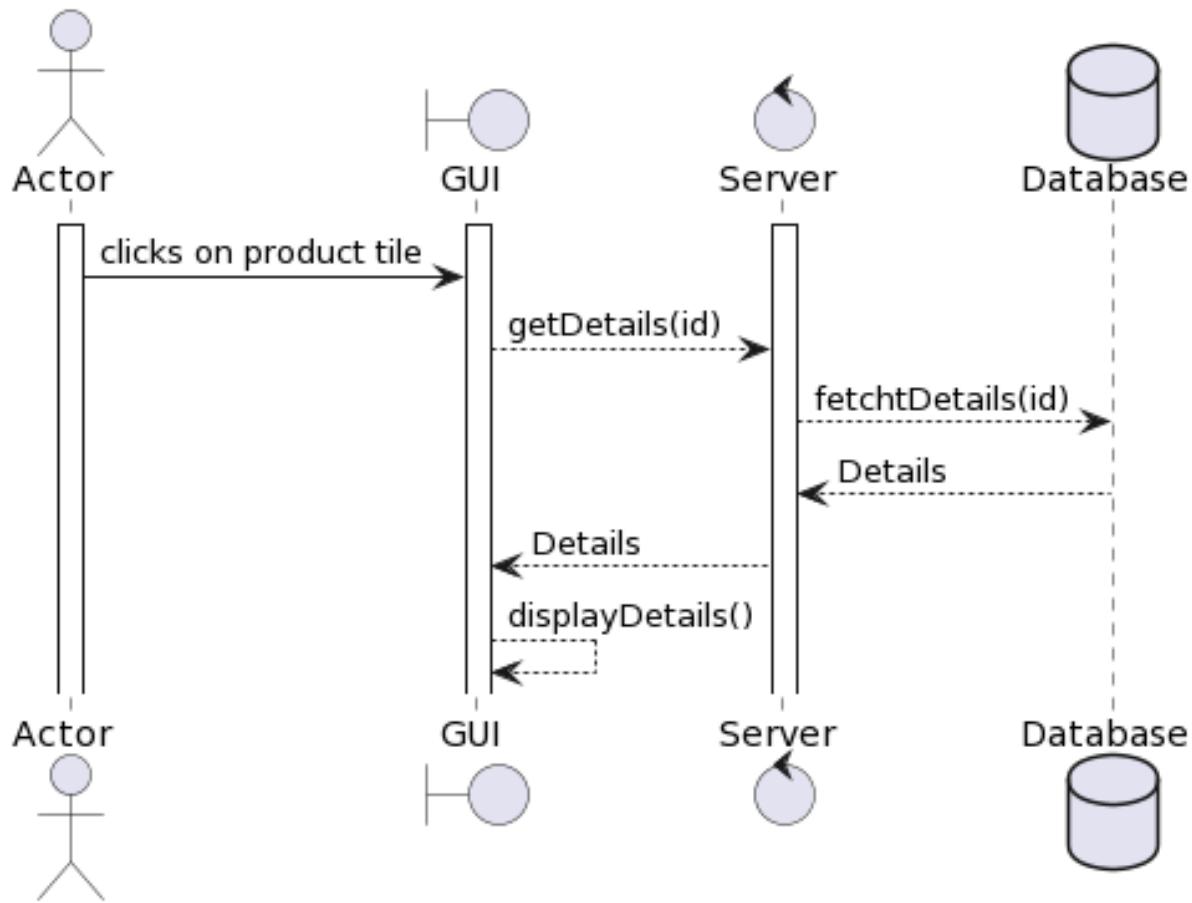
**Figure 5.28: View Earnings**

*This figure represents the view earnings sequence for VendorSphere*



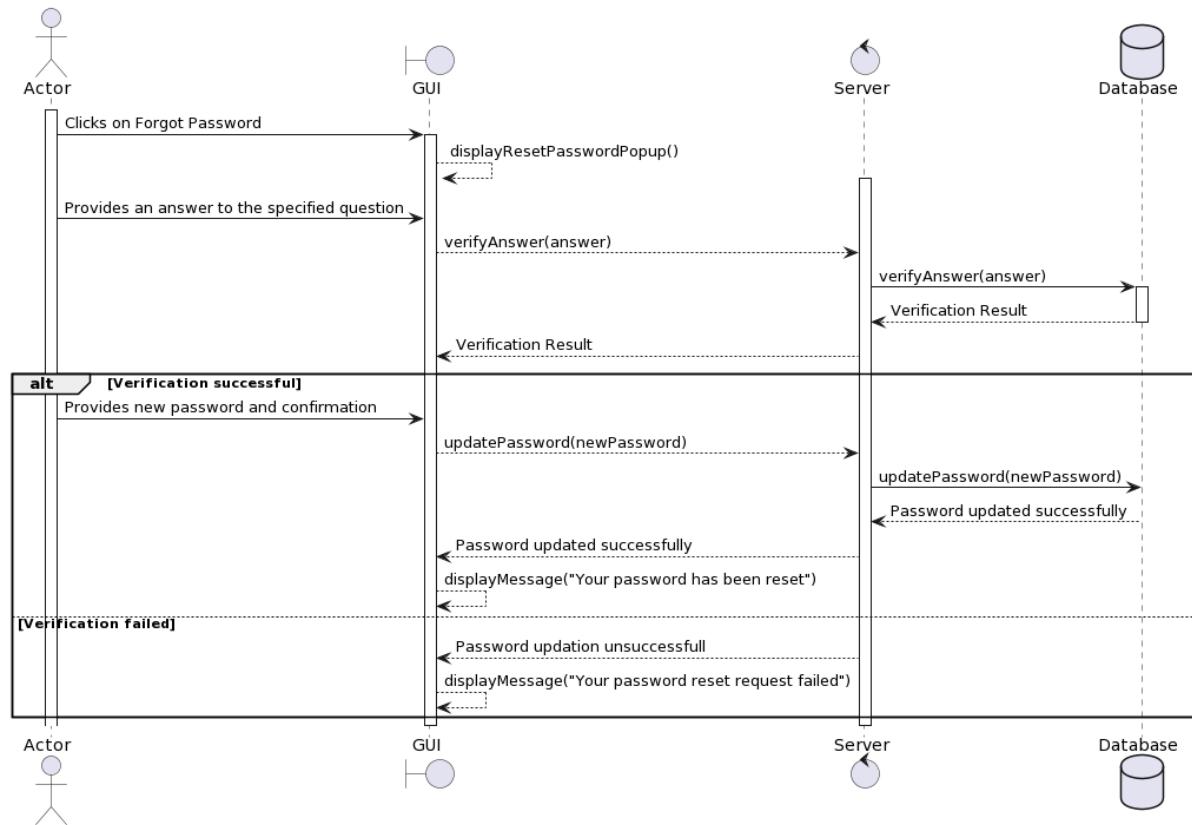
**Figure 5.29: View Store**

*This figure represents the view store sequence for VendorSphere*



**Figure 5.30: View Product**

*This figure represents the view product sequence for VendorSphere*

**Figure 5.31: Reset Password**

*This figure represents the reset password sequence for VendorSphere*

## 5.7 Policies and Tactics

### 5.7.1 Conventions

We will be using REACT for front-end and Django for back-end and BigQuery for the database and Google Cloud Platform for deployment. Every aspect of the code will be tested using testing tools such as selenium.

### 5.7.2 Development Tools

Visual studio code along with PyCharm will be used for the development phase as it is lightweight, can be customized, and also supports a ton of extensions. GitHub will be used for collaboration and integration, this ensures consistent development and reduces compatibility issues.

### 5.7.3 Project Management Tools

We will be using Trello to help streamline project management, by using its boards, lists, and cards to represent tasks and their status visually. This makes it easy for team members to understand the

overall project status at a glance, which provides us with a uniform approach to our project planning, management, and execution to facilitate transparency and efficient management of our workflow.

#### **5.7.4 Coding Guidelines**

We will be using a standard coding convention in which indentation will be of a tab space and commenting will be done to enhance the code to allow others to understand the code and increase the code's overall quality. To make sure conventions and coding guidelines are followed we will be using ESLint to ensure that our code adheres to best practices, catches potential issues early in the development process, and maintains a high level of code quality.

#### **5.7.5 Testing the Software**

We will be using both white box and black box testing for testing different modules of our software. Every aspect will be tested thoroughly to avoid any errors. Lastly, the Whole system will be tested to ensure the best quality.

#### **5.7.6 Maintenance of Software**

The software will be developed in such a way that it can be updated regularly and more functionalities can be added to the requirement. Any reported issues or bugs can also be resolved. Lastly, regular interval updates will allow additional functionalities to ensure the best performance.

#### **5.7.7 Vulnerability Check**

All the vulnerabilities can be checked from a pip feature called safety. It checks the vulnerabilities and notifies if the current version of dependencies has any vulnerabilities. It can be fixed by using the (pip install –upgrade (pip freeze — awk -F'=='' )) command which updates the version to the nearest one that is patched up.

#### **5.7.8 Plans for ensuring requirements traceability**

Requirements traceability will be done using a traceability matrix, which ensures that each requirement is tested and validated, promoting transparency and accountability between our team during the development life cycle.

#### **5.7.9 End User Interface**

Our web application will consist of 3 interfaces, one for the Online Store Owner, second for the Physical Store Owner, and third for the Admin, our interface will be responsive to any device it is accessed on. It

can be viewed from a mobile, laptop, or even tablet without any difficulty

### **5.7.10 Hierarchical Organization of Source Code to Components**

The hierarchical organization of the source code means that our files and directories all will be saved logically. Implementing this approach, all related code will be grouped as files into directories, reflecting the modular design of the software which will enable easier navigation.

As a conclusion to this chapter, our design is based on assumptions such as internet availability, etc. Moving on, constraints such as network communication can affect the design of our system. Moreover, goals like modifiability, etc. are achieved through our design. The development method that we used in our system is SCRUM. It also provides a system architecture diagram and architecture of components of the system. Furthermore, it also mentions the architectural strategies of the system, a class diagram of the system, and sequence diagrams of different operations that different users will perform is also given. Lastly, it also covers policies and tactics that changed the interface of the system

## Chapter 6 Description of Prototype

Our VendorSphere prototype is built from the ground up with a sturdy tech stack. It's got a user-friendly design that's all thanks to the prowess of ReactJS Functional Components. This not only makes the interface smooth and responsive but also amps up the user experience. Plus, the modular setup of these components makes our codebase easy to manage and scale, making development a frictionless experience.

We've organized our files and folders in an optimized structure, following the best practices in software architecture. This clear division of components, styles, and utilities makes navigating and maintaining the code a trivial task. Furthermore, extending the codebase in the future would be a simple experience due to this design decision.

What's more, we've smartly used environment variables to boost configurability and security. This means all the sensitive stuff, like API keys or configuration settings, are kept safe and sound, and can be easily managed across different deployment environments.

At the heart of our prototype's functionality is a RESTful API architecture. This allows the front-end and back-end components to communicate seamlessly. The API endpoints are designed to handle a variety of features, from user authentication during sign-up and login to managing data related to ad posting, communication, and performance tracking.

To keep the user experience secure and reliable, we've integrated top-notch authentication mechanisms into the prototype. We use technologies like JSON Web Tokens (JWT) for secure user sessions, which helps protect user data and communications, adding to the overall security of the VendorSphere platform.

Our Prototype Flow is powered by asynchronous communication technologies like WebSockets, enabling real-time interactions between users. This comes to the fore in the Direct Communication and Collaboration phase, making the user experience more dynamic and engaging. A basic flow is provided below:

- User Registration and Login: Users register on the platform and create their profiles.
- Ad Posting and Browsing: Vendors post product ads, and shop owners post store ads. Users browse and search for products or stores based on their needs.
- Direct Communication and Collaboration: Users initiate contact and engage in direct communication through secure messaging channels.
- Partnership Agreement: Users negotiate commission rates and finalize agreements electronically.
- Product Display and Sales: Products are displayed in physical stores, and sales are generated

through the shop owners.

- Performance Tracking and Analysis: Users access their personalized dashboards to track their performance and gain valuable insights.

To conclude, the VendorSphere prototype is a perfect blend of user-centered design principles and state-of-the-art technologies, built through adopting the best practices from ReactJS, RESTful APIs, and secure authentication mechanisms. The technical implementation, including a modular folder structure and smart use of environment variables, clearly puts forth our vision of making VendorSphere a product for the future.

## Chapter 7 Conclusions

VendorSphere aims to increase enhanced collaboration between both online store owners and physical owners so that both vendors can benefit from each other. The project accomplishes this by providing a state-of-the-art web application that provides an intuitive, immersive, and universally accessible interface to our clients to help them discover each other and manage their partnerships. Our project not only shows its significance in technology but also contributes to the broader goal of promoting economic growth (SDG 8). VendorSphere goals and objectives as stated earlier, emphasized the creation of a web application that will cater to the needs of both our online store owner and physical store owner, our features such as efficient vendor discovery, real-time inventory updates, ratings and reviews and contract negotiation shows our commitment towards our goals of enhancing collaboration between our clients. The detailed analysis compares VendorSphere with other similar web –applications and proves that VendorSphere with its unique approach and sets of features makes our web application stand out from competitors. Furthermore, we dive into specific features and requirements for VendorSphere which address both the functional and non-functional requirements to ensure smooth operation. The functional requirements provide an in-depth review of the complexity of the project, ensuring every stated specific need is met. The non-functional and quality attributes show our commitment to deliver higher performance, usability, availability, sustainability, and reusability. These attributes contribute to the overall success of our web application, ensuring that we do not meet our current needs only but are also set for future developments. VendorSphere promotes enhanced collaboration between our clients (online store owner, physical store owner) but also contributes to the overall economic growth of our country.

The future roadmap for the development of VendorSphere encompasses many critical steps. First and foremost we will develop the front-end of our application using React for its flexibility and reusability and Tailwind CSS to streamline our styling process to ensure a responsive and visually appealing user interface for our clients. Concurrently we will be developing our backend using Django to create our required models, develop APIs, implement user authentication using the Django built-in system, create views and templates, and integrate functionalities to the front-end, ensuring security along with testing and optimization. For data management, we leveraged Google's BigQuery for its database setup, in which we will be setting up our dataset, designing schemas for tables, integration with Django, Query optimization, real-time analysis, data backup, and configuring access controls.

Furthermore, we will later be doing deployment on the Google Cloud Platform (GCP) ensuring scalability, reliability, and security. We will be leveraging GCP's infrastructure services, such as Google App Engine for our web-application hosting which will provide a solid foundation for the Vendorsphere platform. We will implement CI/CD pipeline, CNN for content delivery, and load balancing, configure

auto-scaling, set up a virtual machine, and enable necessary APIs. As our project evolves by implementing all stated above we will be easily able to tackle any challenges that arise in the future.

# References

- [1] D. Green, “Nike’s new, high-tech store takes a page out of walmart’s and target’s playbook,” business insider.” Available:<https://www.businessinsider.com/nike-store-curbside-pickup-like-walmart-and-target-2018-8> [Accessed: 05 October 2023].
- [2] “Mulwi shopping feeds docs.” Available:<https://mulwi.com/docs/> [Accessed: 6 October 2023].
- [3] “Welcome to amazon.” Available:<https://us.amazon.com/b?node=17867753011> [Accessed: 06 October 2023].
- [4] B. de Water, “Building resilient payment systems. shopify engineering.” Available:<https://shopify.engineering/building-resilient-payment-systems> [Accessed: 18 October 2023].
- [5] S. Bhartiya, “How netflix built spinnaker, a high-velocity continuous delivery platform. the new stack.” Available:<https://thenewstack.io/netflix-built-spinnaker-high-velocity-continuous-delivery-platform/> [Accessed: 18 October 2023].
- [6] PYMNTS, “Newegg masters the art of the pivot. pymnts.” Available:<https://www.pymnts.com/news/retail/2020/newegg-masters-the-art-of-the-pivot/> [Accessed: 18 October 2023].