



Final Year Project Long Proposal

B2B Platform for Warehouses

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Revision History

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1. Project Description

Aimed at solving fragmented logistics and inefficient storage utilization, a digital solution will connect global warehouse operators with e-commerce retailers, dropshippers, and SMEs. It will streamline order fulfillment and inventory management via real-time tracking, intelligent matching, and integrated shipment services. Featuring multi-currency invoicing, automated dispute resolution, and predictive analytics, the system will reduce operational expenses while boosting supply chain performance. The initiative will transform traditional warehousing by creating a dynamic digital marketplace that enables stakeholders to access storage options, optimize resource allocation, and drive sustainable growth. A reliable, scalable, and innovative logistics solution will address supply chain challenges with excellence.

Aimed at resolving fragmented logistics and inefficient storage utilization, the initiative connects warehouse operators with e-commerce retailers, dropshippers, and SMEs. Objectives include optimizing order fulfillment and inventory management through real-time tracking and intelligent matching, while offering multi-currency invoicing, automated dispute resolution, and predictive analytics that reduce expenses and enhance supply chain performance. The solution transforms traditional warehousing by establishing a dynamic digital marketplace, enabling stakeholders to access storage options, optimize resource allocation, and drive sustainable growth. A reliable, scalable, and innovative logistics system delivers measurable positive outcomes and improved operational efficiency. An integrated approach ensures efficiency and cost reduction remarkably.

A digital solution will connect global warehouse operators with e-commerce retailers, dropshippers, and SMEs by streamlining logistical operations and inventory management. Core functionalities will include user authentication, detailed warehouse registration, and intelligent matching algorithms that will align storage capacity with demand. Real-time inventory tracking, multi-currency invoicing, and automated dispute resolution will enhance operational efficiency. Integrated shipment services with carrier API connectivity will ensure seamless order fulfillment, while comprehensive reporting and analytics will enable data-driven decision-making. End-to-end encryption and compliance modules will guarantee secure transactions, and a mobile interface will support on-the-go management. Eco-friendly initiatives will optimize resource allocation and support sustainable growth, while robust architecture will guarantee reliability and efficiency.

2. Real World Problem

Many businesses, particularly SMEs and dropshippers, face challenges with disorganized logistics and a lack of real-time inventory tracking, which cause inefficiencies and hinder sales opportunities. They also struggle to find suitable and affordable warehouse

spaces, which impact their ability to scale and manage order fulfillment effectively. Without optimized order routing and warehouse selection, businesses incur high logistics costs and face delays in shipping. These challenges limit growth and profitability. Addressing these issues requires a solution that enhances visibility, streamlines logistics, and optimizes supply chain efficiency to reduce costs and improve performance. A modern approach provides tangible benefits across many industries.

Fragmented logistics and inefficient storage utilization will adversely affect key stakeholders. E-commerce retailers, dropshippers, and SMEs will encounter order fulfillment delays, higher operational expenses, and lower competitiveness due to inconsistent warehouse availability. Warehouse operators will experience underused capacity, which will result in lower revenue and service quality. Supply chain partners will face disruptions and inefficiencies that will lead to shipment delays and increased costs for consumers. Market performance will suffer as these challenges will spread through supply networks, which will emphasize an urgent need for an integrated digital solution to mitigate inefficiencies and optimize resource allocation.

A digital solution will align with mitigating fragmented logistics and inefficient storage utilization. It will connect warehouse operators with e-commerce retailers, dropshippers, and SMEs while streamlining order fulfillment and inventory management through real-time tracking, intelligent matching, and integrated shipment services. The system will incorporate multi-currency invoicing, automated dispute resolution, and predictive analytics to reduce operational expenses and enhance supply chain performance. End-to-end encryption and compliance modules will guarantee secure transactions, and a mobile interface will support on-the-go management. Eco-friendly initiatives will optimize resource allocation and support sustainable growth. The initiative will address supply chain challenges and deliver improvements in efficiency.

3. Project Stream

- | | |
|---|--|
| <input checked="" type="checkbox"/> Web-Based FYP | <input type="checkbox"/> Desktop Application |
| <input type="checkbox"/> Mobile App | <input type="checkbox"/> Game |
| <input type="checkbox"/> Hardware-Based | |

4. Modules

Table 1 provides a breakdown of project modules and assigned students based on deadlines, showcasing their roles and responsibilities.

Table 1: Module Breakdown and Assignment

Deadline	Modules	Student
P1 Mid	User Authentication	Ghulam Sarwar (2012212)
	Inventory Management System	Abdul Haseeb Khan (2112297)
	Warehouse Registration	M.Ahmed Rehan Chughtai (2112298)
P1 Final	Warehouse Matching	Ghulam Sarwar (2012212)
	Multi-Currency Payment	Abdul Haseeb Khan (2112297)
	Order Fulfillment	M.Ahmed Rehan Chughtai (2112298)
P2 Mid	Logistics API	Ghulam Sarwar (2012212)
	Business Analytics	Abdul Haseeb Khan (2112297)
	Customer Support	M.Ahmed Rehan Chughtai (2112298)
P2 Final	Security Module	Ghulam Sarwar (2012212)
	Sustainability	Abdul Haseeb Khan (2112297)
	Web App for Users	M.Ahmed Rehan Chughtai (2112298)

5. Names of existing similar FYPs (if repeated)

N/A

6. New Functionalities (main) to be added Features

None.

7. Development Environment

Tools: Visual Studio Code, Github, Node.js

DBMS: MongoDB

Platform:

8. Introduction

An innovative digital marketplace optimizes warehousing and logistics by linking warehouse operators from independent facilities, fulfillment centers, and third-party logistics providers with e-commerce retailers, dropshipping enterprises, and small to mid-sized businesses. By addressing challenges such as disjointed supply chains, limited storage options, and unreliable inventory monitoring, the system improves operational flow and reduces costs. With advanced features like artificial intelligence matching, real-time stock tracking, and seamless shipping integration, the solution remarkably enhances business performance and competitiveness. The offering holds significant relevance within the logistics and warehousing sectors, harnessing modern technology to satisfy the demands of expanding global commerce and trade.

A digital solution connects global warehouse operators with e-commerce retailers, dropshippers, and SMEs. It streamlines logistical operations and inventory management through real-time tracking, intelligent matching, and integrated shipment services. It reduces operational expenses and addresses fragmented logistics by ensuring efficient order fulfillment. It improves resource allocation and enhances supply chain performance through secure transactions and data-driven insights. It transforms traditional warehousing into a dynamic marketplace that empowers stakeholders, fosters competitiveness, and drives economic growth.

9. Application Review

A groundbreaking web solution transforms logistics and warehousing by linking global storage operators with online retailers, drop shippers, and small to medium businesses. It streamlines order fulfillment and inventory management through live tracking, smart matching, and integrated shipping services. Secure transactions, comprehensive reports, and a mobile interface enable management on the move. Users enjoy enhanced efficiency, optimized resource allocation, and reduced operating costs, while data-driven insights empower stakeholders to boost competitiveness and drive sustainable growth in supply chains.

ShipBob: It is a technology-driven third-party logistics provider that empowers online retailers with seamless fulfillment solutions. The company offers a comprehensive platform that integrates warehousing, order management, and shipping services into one unified system. Leveraging advanced data analytics and real-time tracking, ShipBob enables brands to monitor inventory, streamline order processing, and lower shipping expenses. A nationwide network of strategically located fulfillment centers guarantees fast and reliable delivery across the country. The platform easily connects with popular eCommerce tools, ensuring effortless synchronization and scalability. An emphasis on innovation and exceptional customer support distinguishes ShipBob from competitors. Its service transforms logistical challenges into efficient operations, driving business growth and enhancing the customer experience. With a strong commitment to refining technology and expanding its network, ShipBob provides scalable solutions that meet the needs of online brands and improve delivery performance on a global scale [1].

The main features of the Application are listed below:

- **Global Fulfillment Network:** ShipBob operates multiple fulfillment centers worldwide, ensuring efficient order processing by strategically positioning inventory closer to customers, reducing shipping times and logistics expenses.
- **Integrated Technology:** A centralized dashboard allows businesses to monitor real-time inventory levels, track shipments, and manage orders seamlessly, improving

supply chain efficiency and reducing the chances of stockouts.

- **Expedited Shipping Options:** ShipBob offers reliable two-day shipping for e-commerce businesses, helping them meet customer expectations for fast delivery, which can significantly enhance conversion rates and customer retention.
- **Customizable Packaging:** Businesses using ShipBob can opt for branded packaging, enhancing the unboxing experience and strengthening brand recognition, which is crucial for direct-to-consumer brands looking for customer loyalty.
- **Omnichannel Integration:** ShipBob seamlessly integrates with major e-commerce platforms, including Shopify, WooCommerce, and Amazon, ensuring a smooth fulfillment process across multiple sales channels without requiring manual intervention.

The limitations of the application are listed below:

- **Storage Fees:** ShipBob's storage fees can be significant for businesses with large inventories, as warehouse space is charged based on volume and duration, increasing costs for slow-moving products.
- **Minimum Shipment Requirements:** Small businesses may struggle with ShipBob's minimum order volume requirements, making it less ideal for startups or merchants that do not have consistent sales volumes.
- **Complex Pricing Structure:** ShipBob has various charges, including storage, fulfillment, and additional service fees, which can make cost prediction challenging and impact budgeting for businesses with fluctuating order volumes.
- **Customization Constraints:** Although ShipBob offers branded packaging, there may be limitations in terms of custom kitting, inserts, or complex order fulfillment needs that some businesses require for personalization.
- **On-Demand Warehousing Limitations:** ShipBob's warehousing solutions might not provide long-term stability for businesses needing consistent inventory storage, as fulfillment center availability may vary based on demand.

Ware2Go: It is a technology-driven third-party logistics provider that connects retail businesses and brands with a wide network of strategically positioned storage facilities. Its integrated platform employs advanced software and data analytics to optimize supply chain operations including order fulfillment, inventory management, and transportation. Companies benefit from the flexibility to scale without long-term capital investments while experiencing faster shipping and lower costs. Ware2Go places strong emphasis on reliability, precision, and customer satisfaction through streamlined operations that reduce shipping times and expenses. A commitment to innovation and excellence supports

efficient management of complex supply networks. The service offers dependable solutions that empower businesses to achieve growth and competitive advantages. With a focus on measurable results and operational efficiency, Ware2Go transforms supply chains into high-performance systems that drive success in a dynamic retail market. Trusted by a diverse range of satisfied clients globally [2].

The main features of the Application are listed below:

- **On-Demand Warehousing:** Ware2Go provides scalable warehousing solutions without long-term contracts, allowing businesses to expand or reduce their storage needs based on market demands, ensuring flexibility in logistics.
- **Nationwide 1-2 Day Delivery:** By strategically placing inventory across multiple fulfillment centers, Ware2Go ensures that businesses can offer fast one-to-two-day shipping, improving customer satisfaction and retention rates.
- **Seamless Integration:** Ware2Go integrates smoothly with leading e-commerce platforms and marketplaces, reducing the complexity of fulfillment and order processing for businesses using multiple sales channels.
- **Flexible Operations:** Businesses can quickly scale their fulfillment operations up or down in response to market fluctuations, enabling better management of seasonal demand and unexpected sales spikes.
- **UPS Backed:** Ware2Go is powered by UPS's extensive logistics network, ensuring reliable last-mile delivery services and reducing transit times by leveraging UPS's well-established infrastructure.

The limitations of the application are listed below:

- **Kitting Process Complexity:** The kitting process in Ware2Go can involve multiple steps, potentially increasing fulfillment time and making it more complex for businesses with highly customized packaging needs.
- **Order Tracking Limitations:** Some businesses report that Ware2Go's tracking features need improvement, as they do not always provide real-time updates or the level of detail required for precise inventory management.
- **Integration Challenges:** While Ware2Go offers seamless integration for many platforms, businesses with unique or legacy systems may face difficulties during the initial setup, requiring custom development efforts.
- **Service Variability:** The quality of Ware2Go's warehousing and fulfillment services can vary between locations, leading to inconsistencies in order accuracy, storage conditions, and shipping speeds.
- **Platform Commissions:** Ware2Go operates as an intermediary platform, and businesses may incur additional commission costs, increasing overall fulfillment expenses.

compared to working directly with warehouse providers.

Flexe: It is a pioneering technology company transforming warehousing and logistics by providing flexible, tech-enabled infrastructure. Founded in 2013 and headquartered in Seattle, Flexe connects businesses with a vast network of over 700 warehouse operators across North America. The platform employs advanced data analytics, real-time inventory tracking, and artificial intelligence to streamline eCommerce fulfillment, retail distribution, and capacity management. By eliminating the need for long-term leases and large capital investments, Flexe empowers companies to adjust quickly to market changes and optimize supply chains. Its innovative approach delivers scalable and cost-effective solutions that enhance operational efficiency and mitigate risk. Serving Fortune 500 enterprises and leading brands, Flexe has established itself as a technology leader in logistics, setting new standards in the industry. Commitment to customer success and continuous improvement drives its evolution in an ever-changing market. Flexe remains a trusted partner globally [3].

The main features of the Application are listed below:

- **Extensive Warehouse Network:** Flexe connects businesses with over 700 warehouse operators across North America, allowing companies to scale their storage and fulfillment operations without the need for long-term commitments or investments in infrastructure.
- **Flexible Storage Solutions:** Businesses can use Flexe's warehousing services on a pay-as-you-go basis, eliminating fixed costs. This model is particularly useful for seasonal businesses or those experiencing fluctuating inventory demands.
- **Data-Driven Insights:** With powerful analytics tools, Flexe enables companies to optimize their supply chain by identifying inefficiencies, reducing storage costs, and improving delivery times through actionable data insights.
- **Operational Support:** Flexe offers expert consultation and logistics support, helping businesses enhance their warehousing and fulfillment operations by providing industry knowledge and strategic guidance to improve efficiency.

The limitations of the application are listed below:

- **Integration Complexity:** Implementing Flexe's system may require significant effort to integrate with existing e-commerce platforms and ERP solutions, making the onboarding process time-consuming for businesses with complex supply chains.
- **Variable Service Quality:** Since Flexe relies on a network of third-party warehouses, service levels can differ across locations, leading to potential inconsistencies in storage conditions, order fulfillment speed, and customer satisfaction.

- **Limited Direct Control:** Businesses using Flexe must rely on third-party warehouses, which means they have reduced oversight over day-to-day operations, quality control, and adherence to specific fulfillment requirements.
- **Cost Considerations:** The pay-as-you-go model, while flexible, can become expensive during peak seasons when high storage demand leads to increased costs, making it less predictable than fixed warehouse solutions.
- **Long-Term Contracts:** Some businesses may face restrictions in switching between warehousing partners or optimizing costs due to agreements with certain fulfillment centers, limiting flexibility in sourcing alternatives.

Table 2 presents a comparative analysis of key features among three business warehouse tools: Flexe, ShipBob, Ware2Go. The comparison covers essential functionalities for inventory management, product sales and revenue calculation. The analysis highlights the unique features and limitations of each tool, emphasizing the comprehensive capabilities of the Proposed System in addressing inventory management and product sales technique challenges.

Table 2: Applications Comparison

Features	Applications			
	ShipBob [1]	Ware2Go [2]	Flexe [3]	Proposed System
Warehouse Registration Discovery	✗	✗	✓	✓
Real-Time Inventory Tracking	✗	✗	✓	✓
Automated Warehouse Matching	✗	✗	✗	✓
Custom logistics API Development	✓	✓	✗	✓
Multi-Currency Payment	✓	✗	✗	✓
Customer Support	✓	✗	✗	✓
Real-Time Order Tracking	✗	✓	✗	✓
Multi-Warehouse Support	✓	✗	✗	✓
Marketing	✗	✓	✗	✓
Custom Dashboard for Business Users	✗	✗	✗	✓

10. Problem Statement

Fragmented logistics and inefficient storage utilization cause significant disruptions across the supply chain. E-commerce retailers, dropshippers, and SMEs face prolonged

order fulfillment delays and incur higher operational costs, which reduce market competitiveness. Warehouse operators experience underutilized storage capacity, leading to decreased revenue and diminished service quality. Supply chain partners encounter bottlenecks and inefficiencies that drive up shipment delays and consumer expenses. The cumulative consequences affect the entire supply network, creating urgent demands for an integrated digital solution that addresses these challenges and optimizes resource allocation.

Fragmented logistics and inefficient storage utilization burden supply chains by causing order fulfillment delays, higher operational expenses, and reduced competitiveness. The digital solution addresses these issues by connecting warehouse operators with e-commerce retailers, dropshippers, and SMEs while streamlining processes through real-time tracking, intelligent matching, and integrated shipment services. It optimizes resource allocation, reduces costs, and enhances inventory management, thereby improving supply chain performance. The initiative aligns its objectives with stakeholder needs, ensuring efficient capacity utilization and timely deliveries that stabilize market performance and benefit every participant.

11. Scope

A digital solution connects global warehouse operators with e-commerce retailers, dropshippers, and SMEs by encompassing a comprehensive set of functionalities. It features user authentication, detailed warehouse registration, intelligent matching algorithms, real-time inventory tracking, multi-currency invoicing, integrated shipment services, reporting and analytics, and secure transaction modules. A mobile interface supports on-the-go management while eco-friendly initiatives and compliance measures optimize resource allocation. The initiative spans supply chain operations, delivering a scalable, secure, and efficient logistics system that reduces operational expenses and enhances performance.

Module: User Authentication

- OAuth and social login integration
- Role-Based Access Control
- Multi-Factor Authentication (MFA)
- Session timeout
- Activity tracking

Module: Inventory Management System

- Real-Time Stock Updates

- Barcode and QR Code Support
- Low-stock alerts and replenishment
- Bulk import/export of inventory
- Integration with external ERP systems

Module: Warehouse Registration

- Step-by-step registration wizard
- Document verification and approval
- Customizable warehouse profile
- Service offerings and pricing setup
- Geo-tagging and address validation

Module: Warehouse Matching

- Dynamic Search Filters
- Capacity and availability filtering
- Location based warehouse suggestions
- Booking optimization
- Price comparison for different warehouses

Module: Multi-Currency Payment

- Multi-Currency Support
- Automated Invoice Generation
- Tax Calculation and Compliance
- Secure Payment Gateways
- Payment reconciliation and reporting

Module: Order Fulfillment

- Automated Order Assignment
- Real-Time Order Tracking
- Pick, Pack and Ship Workflow
- Returns and Refund Management
- Bulk order management

Module: Logistics API

- Real-Time Shipment Tracking
- Automatic Shipping Cost Calculation
- Carrier comparison and selection
- Custom Label Printing
- Proof of delivery and e-signature capture

Module: Business Analytics

- Order and Revenue Insights
- Warehouse Utilization Reports
- Inventory Movement Analysis
- Custom Dashboard Reports
- Market trends and competitor analysis

Module: Customer Support

- Ticket-Based Support System
- Live Chat and Email Support
- Automated Dispute Escalation
- SLA-based issue resolution
- Knowledge base and FAQs

Module: Security Module

- End-to-End Encryption
- GDPR and Data Protection Compliance
- Access Logs and Audit Trails
- Two-Factor Authentication (2FA)
- DDoS protection and firewall setup

Module: Sustainability

- Eco-friendly warehousing
- Carbon Footprint Tracking
- Energy efficiency monitoring
- Energy Efficiency Reports
- Green logistics integration

Module: Web App for Users

- Responsive UI/UX for mobile and desktop
- Push Notifications and Alerts
- User-Friendly Dashboard
- Customizable User Preferences
- Seamless cross-platform experience

12. Significance

A digital solution will alleviate fragmented logistics and inefficient storage utilization by connecting global warehouse operators with e-commerce retailers, dropshippers, and SMEs. It will streamline order fulfillment and inventory management through real-time tracking, intelligent matching, and integrated shipment services. Warehouse operators will enjoy higher capacity utilization and increased revenue, while retailers and dropshippers will benefit from timely deliveries and reduced operational expenses. End-users will experience cost savings and reliable service, and community economic growth will thrive on efficient supply chains, secure transactions, and data-driven insights that will empower informed decision-making. A digital solution will deliver comprehensive transformation to logistics and warehousing. It will improve supply chain efficiency, reduce operational expenses, and enhance inventory management for all stakeholders. It will create an integrated marketplace that will connect warehouse operators with e-commerce retailers, dropshippers, and SMEs, leading to streamlined order fulfillment and optimized resource allocation. Users will experience empowerment through real-time tracking, secure transactions, and data-driven insights. Economic growth will be fostered, industry innovation will be driven, and competitiveness will be increased, resulting in positive societal impact.

13. Tools and Techniques

The proposed B2B Warehouse Platform will leverage cutting-edge tools and techniques to enhance warehouse management, order fulfillment, and logistics coordination. The system will integrate real-time inventory tracking, multi-currency transactions, and seamless logistics API connections to ensure a smooth and efficient supply chain. A centralized cloud-based infrastructure will provide scalability, security, and high availability, while automated invoicing and booking systems will streamline financial operations. The platform will support responsive web applications, ensuring optimal user experience and mobile accessibility. These tools and techniques will enhance efficiency, reduce operational complexities, and provide a scalable digital warehousing solution.

- **Front-End:** The front-end will be developed with React.js, which will deliver a fast, interactive interface that will feature inventory visualization, optimized rendering,

and SSR-enhanced performance and SEO. Simultaneously, Node.js with Express.js will power scalable APIs for secure data transactions, efficient request handling, user authentication, and robust payments.

- Database: MongoDB will be utilized to handle both structured and unstructured data with fast retrieval and real-time updates for warehouse transactions and inventory management, while cloud hosting via AWS, Google Cloud, or Azure will ensure scalable storage, global accessibility, and secure, high-performance computing for warehouse operations.
- Payment Logistics Integration: The integrated payment system will leverage robust Stripe and PayPal APIs to enable secure, seamless transactions. Simultaneously, DHL, FedEx, and UPS APIs will facilitate real-time shipment tracking and automated order fulfillment, and will ensure prompt deliveries and efficient logistics management for enhanced overall customer satisfaction.
- Version Control: The version control system will leverage Git and GitHub to streamline collaborative development through robust version tracking, seamless integration of CI/CD pipelines, and comprehensive automated testing. This workflow will enable efficient code management, iteration, and enhanced team productivity while ensuring consistent project quality.

References

- [1] Global Ecommerce Fulfillment Solution — ShipBob, ShipBob, Website URL: <https://www.shipbob.com> (Accessed: 15 Feb 2025)
- [2] On Demand Fulfillment and Warehousing — Ware2Go, Ware2Go, Website URL: <https://ware2go.co> (Accessed: 15 Feb 2025)
- [3] On-Demand Warehousing Fulfillment — Flexe, Flexe, Website URL: <https://www.flexe.com> (Accessed: 15 Feb 2025)