SLATE: FREIGHT MANAGEMENT CORE TRANSACTION 3 WITH SLA COMPLIANCE FORECASTING AND MONITORING SYSTEM USING TENSORFLOW

A Capstone
Presented to the Faculty of
The College of Computer Studies
Bestlink College of the Philippines

In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Information Technology

OLGA T. BERCASIO
KLYDE NASH FLORES
EARL JUSTINE P. LUSUNG
CAMMY MICKELLE B. TELAN
ROY E. VALLE

September 2025

APPROVAL SHEET

This capstone entitled **SLATE: FREIGHT MANAGEMENT CORE TRANSACTION 3 WITH SLA COMPLIANCE FORECASTING AND MONITORING SYSTEM USING TENSORFLOW,** prepared and submitted by **Olga T. Bercasio, Klyde Nash Flores, Earl Justine P. Lusung, Cammy Mickelle B. Telan, Roy E. Valle,** in partial fulfilment of the requirements for the degree of Bachelor of Science in Information Technology, has been examined and is recommended for acceptance and approval Oral Defense.

RICHELYN A. VILLASOR
Adviser

CAPSTONE REVIEW PANEL

Approved by the Committee on Oral Examination with a grade of

REYNANTE B. PONAY, CpE
Member

VINCENT CARLO T. GARADOS
Member

ROMMEL J. CONSTANTINO, DIT
Chairperson

Accepted and approved in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology.

ROSICAR E. ESCOBER, Ph. D
Dean, College of Computer Studies

Date of Final Defense:

ACKNOWLEDGEMENT

The researchers would like to express their heartfelt thanks and gratitude to the following persons who, in one way or another, has contributed much, and extended willingness and support needed to make this research possible:

Dr. Maria M. Vicente, President/CEO, Bestlink College of the Philippines, for her generosity and kind heart in establishing this institution and giving opportunities to those less fortunate students to continue their studies and pursue their dreams;

Ms. Edith M. Vicente, Executive Vice President, for providing the needed information to complete this research;

Dr. Charlie I. Cariño, Vice President for Academic Affairs, for his support and encouragement to make this thesis writing possible;

Engr. Diosdado T. Lleno, Vice President for Administration and Finance, for his words of encouragement and motivation;

Dr. Joy Evelyn A. Ignacio, College Associate Research Head, for her good heart to extend her help needed by the researchers.

Dr. Rosicar E. Escober, Dean, College of Computer Studies of Bestlink College of the Philippines, for providing a guideline documentation in capstone project.

Dr. Rommel J. Constantino, Program Head, Bachelor of Science in Information Technology, for the constant supervision as well as providing necessary information regarding the project and also for his support in completing this project

Ms. Richelyn A. Villasor, Research Coordinator, for helping us in improving our research and guiding us in completing this project.

Ms. Richelyn A. Villasor, Capstone Adviser, for giving us suggestions and ideas to improve our research and guiding us in completing this project.

Panelists, **Mr. Vincent Carlo T. Garados, Engr. Reynante B. Ponay**, and **Dr. Rommel J. Constantino**, who extended their effort and time to be able to constructively criticize this thesis and share their knowledge with them to deepen and widen their needed information.

Families and Friends, for all the financial and moral support that have enabled the researchers to triumph all the challenges, especially during the lowest time that served as their inspiration to complete this study; and

Above all, to the **Almighty God**, for the strength and knowledge that were used for the accomplishment of this research journey.

THE RESEARCHERS

DEDICATION

This business research study is wholeheartedly dedicated first and foremost to the researchers, for executing dedication, time, effort, motivation, sacrifice, and courage to make this conducting study a fruitful and successful piece of work.

To our beloved parents who have been our inspiration and gave us strength when we thought of giving up, which continually provide their moral, spiritual, emotional and financial support.

To each sibling and circle of friends who shared their words of advice and encouragement to finish this study.

To the research advisers and professors, for extending help by giving guidance, supervision, time and wisdom to the researchers in conducting this business research study.

And lastly, above all, to our Almighty God, for giving guidance, strength, power of mind, protection, skills and for giving us a healthy life. All of these we offer to you.

THE RESEARCHERS

ABSTRACT

Title: **SLATE: FREIGHT MANAGEMENT CORE TRANSACTION 3 WITH SLA COMPLIANCE FORECASTING AND MONITORING SYSTEM USING TENSORFLOW**

Authors: **OLGA T. BERCASIO**
KLYDE NASH FLORES
EARL JUSTINE P. LUSUNG
CAMMY MICKELLE B. TELAN
ROY E. VALLE

Degree: **Bachelor of Science of Information Technology**

Major: **Information Management, Information Security, Network Administrative**

Date of Completion:

The freight and logistics industry is rapidly changing and increasingly requires systems that go beyond basic tracking of shipments. There is a growing demand for tools that can predict delays, monitor service-level agreements (SLAs), and manage multiple transactions efficiently. The capstone project **SLATE: Freight Management Core Transaction 3 with SLA Compliance Forecasting and Monitoring System Using TensorFlow** was developed to address these challenges. This project focuses on creating a freight management system that

integrates core transaction processes, applies machine learning to forecast SLA violations, and provides logistics teams with clear operational insights.

The system was designed using a microservice-based approach to ensure flexibility and scalability. Independent modules such as shipment routing, SLA monitoring, document compliance, and customer notifications communicate through an API gateway. This structure allows for easier updates, secure operations, and improved reliability. TensorFlow was applied to train machine learning models using historical freight data to forecast SLA issues, detect delays, and generate recommendations for mitigation before problems escalate.

Agile Scrum methodology was adopted throughout the development process. Tasks were divided into sprints, and DevOps practices were applied to speed up testing and deployment. Security features such as role-based access control, multi-factor authentication, and secure data handling were implemented to safeguard information. A responsive analytics dashboard was created to display real-time metrics, SLA performance, and alerts for anomalies.

Although this project is currently at the prototype stage, the system demonstrates how freight companies can benefit from combining

automation, prediction, and compliance monitoring in one platform. This approach is expected to reduce missed deadlines, improve customer satisfaction, and enhance operational efficiency. The study also contributes to local research by demonstrating how microservices and TensorFlow can be applied to the Philippine logistics industry. Overall, the project shows the potential of developing smarter freight management systems that integrate technology and practical solutions for real-world logistics challenges.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Capstone Project

The freight and logistics industry is undergoing a significant digital transformation due to the increasing demand for real-time, efficient, and intelligent transport systems. As businesses grow more dependent on time-sensitive deliveries and accurate tracking mechanisms, the importance of robust freight management systems becomes more critical. In today's logistics landscape, enterprises can no longer rely on traditional manual processes to manage core transactions such as shipment booking, routing, billing, and delivery coordination. Modern logistics operations require intelligent automation that ensures efficiency, accuracy, and compliance with contractual obligations like Service-Level Agreements (SLAs). These standards are increasingly difficult to maintain due to high shipment volumes, disconnected systems, and delayed insights into operational data.

In response to these challenges, the proposed capstone project *SLATE: Freight Management Core Transaction 3 with SLA Compliance Forecasting and Monitoring System Using TensorFlow*

aims to develop a microservice-based freight management system capable of predicting and monitoring SLA violations using machine learning. The system will incorporate forecasting methods to identify delays, optimize transaction workflows, and improve SLA compliance across multiple logistics functions. The innovation lies in integrating TensorFlow-based prediction models directly into daily operations, converting a traditional transactional freight system into a smart, adaptive solution capable of anticipating risks before they occur.

The motivation behind SLATE originates from persistent inefficiencies experienced by logistics companies in handling core processes like shipment booking, rate application, contract validation, and document management. When these tasks are not automated or accurately forecasted, the results often include missed delivery windows, SLA breaches, and dissatisfied clients. These operational gaps create a pressing need for proactive systems that can support logistics providers in anticipating failures and making data-informed decisions in real time.

The project adopts a microservices architecture to support modular development and integration with other subsystems such as CRM, E-Documentation, Business Intelligence, and Rate

Management. This structure allows each service, such as shipment tracking, SLA compliance monitoring, and document validation to operate independently while communicating seamlessly through APIs. This approach not only promotes flexibility and scalability but also ensures that the system remains resilient, even when individual services are updated or temporarily taken offline. It also simplifies the continuous improvement and maintenance process, a crucial benefit in rapidly evolving logistics environments.

To enable predictive capabilities, the project uses *TensorFlow,* an open-source machine learning library that provides the tools to build, train, and deploy models capable of learning from historical freight data. With this foundation, SLATE can generate accurate forecasts, deliver timely alerts, and provide actionable insights, allowing logistics teams to mitigate potential disruptions early and enhance decision-making effectiveness.

Freight management today involves far more than tracking the physical location of goods. It requires orchestrating a complex sequence of operations, including shipment creation, contract matching, route planning, documentation validation, tariff computation, and SLA monitoring. Any delay or error in these

components can trigger contractual penalties or degrade customer satisfaction. The goal of SLATE is to streamline these processes while embedding predictive analytics that detect early warning signs of potential issues, whether they stem from delayed pickups, route inefficiencies, or system bottlenecks. SLATE will also play a critical role in identifying patterns across operational data, such as cycle times, peak bottlenecks, and customer complaint frequencies. By training its models on both historical and live data, the system will be able to predict future shipment delays, route conflicts, or SLA breaches, giving logistics managers the ability to act before a problem escalates. These predictive tools will also enable SLATE to go beyond flagging risks, it will offer recommendations for mitigation, such as rerouting shipments, notifying supervisors, or rescheduling delivery windows to minimize service disruption. The project directly addresses long-standing integration issues found in many legacy logistics systems. Monolithic system structures often suffer from bottlenecks, where a single failure can paralyze the entire platform. SLATE's microservice design separates responsibilities into lightweight, focused components, allowing independent scaling, troubleshooting, and deployment. This architecture is particularly advantageous in today's agile

development environments, where rapid iteration, continuous delivery, and system resilience are essential.

The development of SLATE seeks to resolve logistical inefficiencies by delivering a modular, forecasting-driven freight management system that promotes SLA compliance. Through the use of predictive analytics, real-time data intelligence, and scalable service architecture, SLATE empowers logistics providers to deliver on-time, data-informed services in an increasingly complex operational landscape. In an industry where time is money and reputation is tied to delivery performance, this project stands as a timely and necessary innovation in the modernization of freight systems.

1.2 Context and Scope

The increasing complexity of freight logistics operations in the Philippines, especially in high-volume logistics hubs, has driven the demand for intelligent systems capable of streamlining transactional processes, improving delivery predictability, and meeting service-level commitments. In this fast-paced industry, organizations face the continuous challenge of managing numerous deliveries, contracts, rates, and SLA agreements, often

across multiple platforms and departments. This results in fragmented processes and inconsistent monitoring of critical logistics KPIs.

To address these operational gaps, the research team proposes the development of SLATE: Freight Management Core Transaction 3 with SLA Compliance Forecasting and Monitoring System Using TensorFlow, a microservice-based freight system designed to consolidate core freight transactions while incorporating machine learning capabilities for SLA prediction. The system is intended for freight and logistics companies that struggle with timely deliveries, SLA violations, and disconnected tracking of routing, billing, compliance, and analytics.

SLATE will operate in a multi-department environment typically composed of shipment routing teams, contract & pricing analysts, customer service representatives, compliance officers, and business intelligence units. This distributed architecture enables integration with various subsystems such as Contract and SLA Monitoring, E-Documentation & Compliance Manager, Business Intelligence & Freight Analytics, CRM, and Customer Notification Hub. The central use of TensorFlow enables the

forecasting of SLA breaches based on historical freight data, route patterns, shipment delays, and external conditions.

The project aligns with industry trends that emphasize the importance of intelligent SLA compliance tools. As shippers are investing more in freight visibility systems that not only monitor delivery movement, but also anticipate whether service-level agreements will be met before failure occurs. Therefore, SLATE is positioned not just as a transactional system but as a predictive operational assistant that enhances logistics performance using modern AI technologies.

The **scope of the study** is limited to the design, development, and partial deployment (prototype level) of a microservice-based freight core transaction system with SLA compliance forecasting capabilities. The system will focus on the core transaction process (the third major process in the freight lifecycle), which includes delivery order placement, route assignment, document compliance validation, billing, and SLA tracking.

The system will be composed of the following integrated modules:

- **Core Transaction 3 Module** – For handling delivery routing, shipment file processing, and linking related billing and service agreements.
- **SLA Monitoring and Forecasting Engine** – Using TensorFlow to predict potential SLA violations based on delivery patterns and delays.
- **Contract & Pricing Module** – For applying correct rates and identifying service-level terms per shipment.
- **Document & Compliance Manager** – Ensuring required documents (e.g., waybills, compliance certifications) are attached to each shipment.
- **Customer Portal** – Allowing clients to track shipments, view SLA status, and receive proactive alerts.
- **Analytics Dashboard** – For visualizing forecast results, SLA compliance performance, and operational summaries.

The machine learning model will be trained using sample or simulated freight data and tested within the system interface. The use of TensorFlow is scoped specifically for time-series forecasting, anomaly detection, and classification of SLA risk levels.

Excluded from the scope are full enterprise deployment, third-party logistics integrations, and real-time GPS-based tracking.

These features are considered outside the project's timeframe and academic limitations. Additionally, external interviews, system testing with clients, and production server deployment will occur in later phases, after initial prototype development and faculty approval.

This system will be built with PHP, MySQL, TensorFlow, HTML, and Tailwind CSS, structured as a container-ready microservice system suitable for scaling in a logistics environment.

1.3 Problem Statement

In the freight and logistics industry, the ability to efficiently manage delivery transactions while ensuring compliance with service-level agreements (SLAs) is essential to maintaining customer trust and operational success. However, many logistics providers still rely on traditional systems that are often disconnected, manual, and lacking predictive capabilities. This results in delays, missed SLA commitments, disorganized documentation, and inaccurate pricing applications, all of which contribute to client dissatisfaction and business losses. In most cases, logistics personnel struggle to track whether SLAs are being followed, especially when multiple systems are used for

contracts, routing, billing, and performance analysis. Without an integrated system that not only manages transactions but also forecasts possible failures, companies face operational blind spots that limit their ability to take proactive measures. Therefore, there is a critical need for a centralized, intelligent, and scalable microservice-based system that can handle core freight transactions and monitor SLA compliance through data-driven forecasting. This study aims to design and develop such a solution to address the recurring inefficiencies found in existing freight operations.

The following are the specific problems observed:

1. Disconnected systems across departments make it difficult to track SLA compliance in real time.
2. Manual delivery routing and billing processes result in delays and frequent pricing errors.
3. Absence of predictive tools prevents early identification of possible SLA violations.
4. Lack of centralized documentation leads to missing or mismatched compliance files.
5. Inaccessible analytics limit management’s ability to make informed operational decisions

1.4 Objectives and Goals

The objectives of this capstone project are divided into **general** and **specific** goals.

General Objective

- To design and develop a freight management system that integrates SLA compliance forecasting and monitoring using TensorFlow, thereby enhancing operational efficiency and customer trust.

Specific Objectives

- To analyze the requirements of freight transactions and SLA compliance in logistics enterprises.
- To design a system architecture based on microservices and TOGAF principles, ensuring scalability and enterprise alignment
- To develop predictive models using TensorFlow that can forecast SLA compliance risks.
- To implement an Agile Scrum methodology for iterative development, ensuring collaborative project progress.
- To deploy DevOps practices for continuous integration and continuous deployment (CI/CD) of the system.

- To evaluate the system's accuracy in SLA compliance forecasting and its usability in a logistics enterprise environment.

Long-term Goals

- To contribute to the digital transformation of the logistics sector by promoting intelligent, predictive freight management systems.
- To reduce SLA violations and enhance customer satisfaction in logistics operations.
- To establish a scalable prototype that could be expanded into a full-scale enterprise solution.

1.5 Significance and Relevance

The development of *SLATE: Freight Management Core Transaction 3 with SLA Compliance Forecasting and Monitoring System Using TensorFlow* holds significant value in addressing the common challenges faced by freight and logistics companies in the Philippines. In a rapidly growing economy where logistics plays a crucial role in supporting trade, e-commerce, and nationwide distribution, delays, miscommunication, and SLA violations continue to affect the performance and reputation of many service providers. Through this capstone project, the researchers aim to

contribute a modern solution that aligns with current technological trends and the operational needs of the logistics industry.

This system, designed as a microservice-based freight management platform, is intended to help organizations handle multiple delivery transactions more efficiently, ensure accurate compliance with service-level agreements, and utilize machine learning to forecast delays or risks that could affect client satisfaction. By integrating shipment, contract, documentation, and analytics functionalities into a single ecosystem, the project offers a more adaptive and scalable approach compared to outdated, siloed systems.

This study is conducted by students from Bestlink College of the Philippines, and the project is intended not only to serve as an academic requirement but also as a real-world solution that can benefit various stakeholders within the logistics industry. The significance of this research extends to the following groups:

Freight and Logistics Companies: They can benefit from improved operational efficiency, reduced SLA breaches, and better forecasting capabilities.

Clients and Customers: They will experience more reliable delivery services and improved communication through real-time tracking and status monitoring.

IT Professionals and System Developers: The project showcases how modern tools like TensorFlow can be applied in operational logistics, encouraging innovation in local software development.

Academic Community: This study contributes to the growing field of smart logistics and machine learning applications, especially within Philippine-based research.

Future Researchers: The findings, structure, and technologies used in this project may serve as a foundation for related studies in automation, predictive analytics, and supply chain systems.

By grounding this study in the context of the Philippine logistics landscape and educational innovation, the project hopes to leave a lasting impact both in the academe and in the professional field.

1.6 Structure of the Document

This capstone report is systematically structured to provide a clear and comprehensive narrative of the project, from its conception and planning through to its execution, evaluation, and conclusions. The document is organized into the following chapters:

Chapter 1: Introduction - This chapter establishes the project's foundation. It presents the background and context that motivated the project's inception, defines its scope and boundaries, articulates a clear and concise problem statement, and lists the specific objectives and goals. It concludes by explaining the project's significance to stakeholders and the industry and provides this overview of the report's structure.

Chapter 2: Review of Related Literature and Studies - This chapter provides the theoretical and research foundation that informs the project's approach. It includes an overview of the Agile Scrum methodology, key concepts in Enterprise Architecture (including the TOGAF framework), the principles of Microservices Architecture, and the practices of DevOps and CI/CD. It also synthesizes relevant previous studies and discusses the

challenges and methods of integrating information systems in an enterprise environment.

Chapter 3: Methodology and Project Management - This chapter details the practical framework and processes used to manage and execute the project. It explains the application of the Agile Scrum methodology, including the defined roles, artifacts, and sprint cycles. Furthermore, it describes the requirements engineering process and the technical implementation strategies for DevOps, continuous integration, and continuous deployment (CI/CD).

Chapter 4: System Design and Architecture - This chapter presents the comprehensive architectural blueprint of the developed system, structured around the four domains of the TOGAF framework. It covers the Business Architecture (process diagrams and improvements), Application Architecture (microservices design and integration), Data Architecture (data models and flow), and Technology Architecture (technology stack and infrastructure design).

Chapter 5: Implementation, Testing, and Deployment - This chapter describes the practical realization of the system

design. It covers key implementation details, challenges encountered, and solutions developed. It also provides a thorough account of the testing strategies employed, including test cases, results, and quality assurance measures, concluding with the process of deploying the system to a live environment.

Chapter 6: Results, Evaluation, and Conclusion - This final chapter presents the outcomes of the project. It evaluates the final system against the original objectives and goals, incorporates feedback from stakeholders and users, and discusses the project's limitations. The report concludes with a summary of key achievements, lessons learned, and a set of concrete recommendations for future work and enhancements.

References - A complete list of all academic literature, articles, books, standards, and online resources cited throughout the report.

Appendices - This section contains supplementary materials that support the main content of the report, including detailed technical documentation, full project management artifacts, comprehensive research data, and access details to the source code and live demonstration.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Agile Scrum Methodology Overview

The agile methodology is a project management framework that emphasizes adaptability, collaboration, and iterative progress. Unlike traditional linear approaches, agile promotes flexibility by breaking large projects into smaller, manageable increments that can be developed, tested, and refined continuously. This methodology prioritizes customer satisfaction through frequent delivery of functional components and incorporates stakeholder feedback throughout the development cycle. Scrum, a widely adopted agile framework, provides structure by organizing work into fixed-length iterations known as sprints, typically lasting two to four weeks. Each sprint focuses on delivering a usable product increment, ensuring consistent progress while maintaining the capacity to adapt to changing requirements. Scrum is guided by defined roles such as the product owner, who prioritizes tasks and represents stakeholder interests; the scrum master, who facilitates the process and resolves impediments; and the development team, which is responsible for delivering the actual product. By fostering transparency, inspection, and adaptation, Scrum creates an

environment that promotes accountability and team collaboration. The approach is particularly effective in dynamic environments where requirements evolve rapidly, making it a preferred methodology for software development and information systems projects.

2.1.1 Agile Scrum Related Studies And Research

The research highlights how Agile Scrum has evolved into a leading methodology for managing projects through flexibility, collaboration, and iterative development. Studies emphasize its role in improving efficiency, addressing risks, and supporting innovation across education, software development, and business contexts. The following works provide insights into its principles, applications, and challenges.

1. **Alhammad, M., & Moreno, A. (2022)** discussed the integration of Lean UX into Scrum in their experience report titled Integrating User Experience into Agile. The study highlighted the academic gap in combining Agile development with user-centered design, particularly in educational settings. Through a graduate course, the researchers outlined six lessons learned, including the complexity of managing UX activities within short sprints and the difficulty in

formulating testable hypotheses. Their insights offer valuable implications for institutions aiming to incorporate Agile and UX principles simultaneously. (DOI: 10.48550/arXiv.2204.11329) [https://arxiv.org/abs/2204.11329]

2. **Saint-Denis, L. (2025)** examined Agile project management in the Software as a Service (SaaS) sector. Her chapter emphasized how Agile practices support automation, scalability, and continuous innovation, which are vital for customer growth and retention. Agile was presented as a strategic tool for product development and business agility, especially within business-to-business software startups.(DOI:10.1007/978-3-031-84017-3_9) [https://link.springer.com/chapter/10.1007/978-3-031-84017-3_9]
3. **Tobiloba, A. S., Falope, S., & Fang, W.-C. (2025)** conducted a comparative study titled Risk Management in Agile and Waterfall Methodology. This research explored how each methodology addresses risk, highlighting Agile's adaptive risk response through continuous feedback loops. In contrast, Waterfall emphasized pre-planned, documentation-heavy strategies. The study stressed the need to match project methodologies with contextual risk factors, offering valuable guidance for project managers and engineers. [https://www.researchgate.net/publication/393443757_RISK_MAN

AGEMENT_IN_AGILE_AND_WATERFALL_METHODOLOGY_A_COMPARATIVE_STUDY]

4. **Schwaber, K., & Sutherland, J. (2023)** presented the foundational principles and structure of Scrum in The 2023 Scrum Guide. This official guide defines the roles, events, and artifacts of Scrum, providing clear instructions for implementation in various project scenarios. The document is widely used in both industry and academia. [https://scrumguides.org/scrum-guide.html]
5. **Atlassian (2024)** offered a comprehensive explanation of Scrum practices on their Agile resource page. It outlines the core values, principles, and practical steps to adopt Scrum, highlighting the importance of transparency, inspection, and adaptation in iterative development. [https://www.atlassian.com/agile/scrum]
6. **Agile Alliance (2024)** provided an accessible glossary and detailed breakdown of Scrum concepts. Their resource helps practitioners understand key terms and practices within Agile methodologies and supports consistent application across teams and industries. [https://www.agilealliance.org/agile101/scrum]

2.2 Enterprise Architecture Concepts

Enterprise Architecture (EA) serves as a strategic framework that connects technology decisions with business objectives, ensuring that systems development remains aligned with organizational goals. Several recent studies emphasize how EA principles are applied in logistics, cloud computing, and information systems.

For example, **Kim and Chang (2024)** highlighted the impact of digital transformation on logistics by developing a deep learning-based freight recommendation system for brokerage platforms. Their model used Autoencoders and Graph Neural Networks to analyze customer behavior, improving the efficiency of freight matching. Beyond its technical contribution, the study reinforced that enterprise architecture is essential for ensuring technology adoption stays connected to business priorities and service reliability.

In a broader software context, **Lauber (2024)** stressed the importance of choosing the right architectural style to match organizational needs. His work introduced the Microservice Architecture Design Framework, which assists decision-makers in

evaluating design alternatives based on quality metrics such as performance, scalability, and maintainability. This study illustrates how enterprise architecture can function as a strategic decision-making tool, not just a technical blueprint, ensuring that technology structures support business processes effectively.

Looking specifically at transportation, **Kurganov, Dorofeev, and Nastasyak (2019)** proposed a transport and logistics enterprise architecture model. Their approach mapped the interaction between IT infrastructure, business processes, and organizational structures, showing how digital transformation affects logistics operations. By applying tools like ER-diagrams and business motivation models, they demonstrated how enterprise architecture can create cohesion between digital initiatives and existing organizational frameworks, a key consideration for freight management systems.

Similarly, **Hermawan and Sumitra (2019)** showcased the value of the TOGAF framework by applying its Architecture Development Method (ADM) to a school data reporting system. Their work highlighted how TOGAF's phases such as developing an architectural vision, creating business models, and structuring information systems that can provide organizations with a

structured methodology. This suggests that TOGAF can serve as a repeatable model for aligning enterprise strategy with system development, even outside logistics.

More recently, **Ravva (2025)** introduced an integrated framework for the AI-BI cloud ecosystem, which merges enterprise cloud platforms with artificial intelligence and business intelligence tools under governance policies. His work identified how modern architectural choices, including data lakes and containerization, shape not only system efficiency but also compliance and ethical considerations. This indicates that contemporary enterprise architecture is expanding beyond performance to also include data governance, security, and sustainability, which are crucial for industries handling sensitive logistics and freight data.

These studies underline the strategic role of enterprise architecture in modern organizations. Whether applied in logistics, education, or cloud ecosystems, EA ensures that technological innovation does not occur in isolation but is systematically aligned with business goals, governance structures, and long-term sustainability.

2.3 Microservices Architecture

Microservices architecture is a software design approach where a system is divided into small, independent services that work together as one application. Each service has its own specific task and can run on its own without depending too much on others. This design pattern is now widely used because it is easier to maintain, scale, and update compared to monolithic systems. In the freight and logistics industry, where different modules such as shipment tracking, SLA monitoring, and customer management work together, this architecture is highly useful. Microservices make it possible to develop and update each module independently, which fits the needs of a flexible freight management system. In *SLATE: Freight Management Core Transaction 3 with SLA Compliance Forecasting and Monitoring System,* using microservices allows faster updates for features like contract monitoring or notifications without affecting the whole system. According to GeeksforGeeks.org, Microservices are independent services that communicate with each other using well-defined APIs. They also explain that It increases fault isolation as a failure in one service does not necessarily bring the whole system down. This type of structure improves performance and ensures

that one failed part does not stop the entire system from running. It supports a scalable, maintainable, and responsive system, which is needed in managing dynamic freight operations.

2.4 DevOps and CI/CD

DevOps is a modern approach that combines software development and operations to improve speed, collaboration, and system reliability. It helps software teams work together more closely and solve problems faster. CI/CD stands for Continuous Integration and Continuous Delivery. These practices are important because they allow developers to test, build, and deploy code automatically. In a freight system like SLATE, which deals with real-time deliveries, contracts, and compliance monitoring, applying DevOps and CI/CD makes the system more stable and quicker to update. Whenever changes are made to the core transaction system or SLA monitoring tools, CI/CD helps push those updates without breaking the system. DevOps also improves communication between the development team and the operations team, which helps prevent delays and system failures. According to Microsoft Azure (2024), DevOps is the union of people, process, and products to enable continuous delivery of value to end users. In addition, Atlassian (2024) explained that CI/CD introduces

ongoing automation and continuous monitoring throughout the lifecycle of apps. These practices allow the SLATE system to support business goals more efficiently, especially when dealing with clients, freight orders, and service agreements. The faster updates and fewer bugs lead to a better experience for both users and administrators of the freight platform.

2.5 Relevant Studies and Research

Foreign Studies

Recent studies emphasize the growing importance of integrating advanced machine learning, data analytics, and real-time monitoring technologies into logistics and freight management. This shift is largely driven by the increasing complexity of supply chains and the demand for faster, more reliable decision-making.

One significant study by **Aloini et al. (2024)** proposed a machine learning-based forecasting and alerting system designed specifically for real-time decision-making in warehouses. The researchers focused on predicting order picking delays in a shuttle-based storage system, using warehouse management data to develop accurate forecasting models. Their results showed that machine learning (ML) techniques could significantly reduce peak

cycle times, enhancing overall warehouse efficiency. This highlights how real-time predictive analytics can transform operational planning, particularly in environments with high demand variability.

Another study by **Shen et al. (2023)** introduced a decentralized federated learning model to forecast freight traffic speeds in urban regions. This approach allowed multiple participants to collaborate without the need for centralized data storage, improving prediction accuracy while preserving data privacy. Their spatial–temporal transformer network achieved better performance than traditional models, providing meaningful insights for regional traffic management. This type of modeling is especially relevant in logistics planning where traffic unpredictability can heavily impact delivery schedules.

Lechtenberg and Hellingrath (2025) explored the barriers and enablers of machine learning implementation in road freight transport. Their work focused on providing a practical guideline to help logistics companies adopt ML for operational planning. Despite having access to data, many logistics practitioners struggle with identifying appropriate ML use cases. The proposed guideline addresses this gap by offering a structured framework,

making the transition from data collection to ML deployment more feasible.

Gao et al. (2024) demonstrated how big data and computer vision technologies can be integrated into trade logistics to enable intelligent monitoring systems. By using real-time sensor data and image recognition, their system was able to monitor vehicle conditions and cargo status during transportation. This combination of technologies proved beneficial in detecting anomalies and improving response times, which is crucial for ensuring the safety and efficiency of logistics operations.

In the context of rail freight, **Kumar et al. (2025)** developed a hybrid model combining Graph Convolutional Networks (GCN), Long Short-Term Memory (LSTM) networks, and Kalman Filters (KF). Their model was capable of estimating dynamic travel times with high accuracy, outperforming traditional models used by Indian Railways. By integrating real-time data, the model allowed for continuous updates to train schedules, enabling better planning and congestion management.

Forecasting in maritime logistics was tackled by **Yin et al. (2024)**, who developed a real-time multi-step forecasting system

for the China Containerized Freight Index (CCFI). Their three-stage preprocessing strategy addressed common challenges such as outliers and concept drift. The system showed strong robustness and adaptability, making it suitable for use in rapidly changing market conditions. This kind of dynamic forecasting is becoming increasingly essential in containerized freight operations where delays and fluctuations in demand can significantly affect profitability.

On a broader level, deep learning is proving to be a game-changer in time series forecasting. **Alonge and Isreal (2025)** reviewed how architectures like LSTM, GRU, and Transformers are redefining predictive analytics. These models can handle multivariate and non-linear time series data, which are common in freight systems. They also support probabilistic forecasting, allowing logistics managers to plan under uncertainty more effectively.

Supporting these advancements, **Iruela et al. (2021)** showed how TensorFlow and neural networks can accelerate energy consumption forecasts, which are transferable to other time-sensitive forecasting tasks such as freight demand prediction. Their divide-and-conquer strategy optimized performance and

reduced training time, showing promise for large-scale deployment in logistics.

Giedra and Matuzevičius (2024) studied how TensorFlow Lite models perform across different edge devices, particularly focusing on convolutional layers. Their results are useful for logistics systems that rely on edge computing, where quick and lightweight model inference is needed for on-the-go decision-making.

All of these studies underline a consistent theme: as logistics becomes more digitalized, the ability to forecast accurately and act swiftly becomes a strategic advantage. From road to rail, and from ports to warehouses, predictive models, real-time data, and advanced computational techniques are reshaping how freight systems operate and plan for the future.

Local Studies

The adoption of agile methodologies and logistics optimization practices in the Philippines continues to evolve in both academic and industrial settings. Several studies have emphasized the relevance of modern development frameworks,

economic factors affecting freight transport, and the systemic performance of logistics providers in the country. These findings align with the foundation of the SLATE system, which focuses on integrating SLA forecasting and monitoring within core freight management operations.

Ng (2018), in his study *"A Study of an Agile Methodology with Scrum Approach to the Filipino Company-Sponsored I.T. Capstone Program,"* analyzed the integration of Agile Scrum in the development of capstone projects for Information Technology students. By implementing sprints in collaboration with real company clients, Ng revealed that proper sprint duration, clear communication, and client feedback were key contributors to successful project development. The study's results emphasized that despite the academic load and pressure, students could deliver quality software solutions when using structured Agile techniques. This study supports the SLATE system's development methodology, which similarly relies on Agile Scrum for managing iterative development phases and client collaboration in designing freight forecasting modules.

Del Prado, Manfoste, and Rosete (2024) explored the economic dimensions affecting the freight industry through their

research titled *“Analyzing the Impact of Freight Transport, GDP, and Peso – Baht Exchange Rate on Philippine Trade in Desiccated Coconut Using the Gravity Model of International Trade.”* The study indicated that among all factors, freight transport inefficiencies had the most significant effect on trade volume. Though GDP and exchange rate were statistically insignificant, logistics emerged as a primary influencer. The authors recommended addressing transportation delays and improving logistics processes as a means of enhancing trade performance. This insight justifies the need for predictive and SLA-compliant logistics systems like SLATE, which aim to reduce delays by monitoring service-level performance and forecasting compliance issues before they impact trade.

Banomyong (2024), through his research titled *“From Freight to Future: Enhancing Philippines Logistics for Economic Competitiveness,”* investigated the performance metrics of logistics service providers in the Philippines. Utilizing data from 126 freight forwarders, the study revealed critical bottlenecks such as customs delays, unreliable delivery timelines, and underdeveloped infrastructure. Compared to other ASEAN countries, the Philippines lagged in logistics reliability and human resource

readiness. The study further highlighted the need for better tracking systems, data-driven forecasting, and streamlined freight workflows to elevate national competitiveness. The SLATE system's objective to utilize machine learning (TensorFlow) for SLA forecasting directly aligns with these recommendations, proposing automation and intelligent analytics to address such logistical inefficiencies.

The *"System-wide Study of the Logistics Industry in the Greater Capital Region"* conducted by **Fillone et al. (2015)** under the Philippine Institute for Development Studies (PIDS) provided macro-level insights into logistics infrastructure, industry trends, and operational challenges. The study highlighted the fragmentation of the logistics sector, limited data integration, and inefficiencies in cross-functional processes between customs, transport, and warehousing systems. Their findings validate the concept of a unified freight management core transaction system like SLATE, which integrates multiple logistics modules (e.g., SLA monitoring, shipment routing, and rate management) to improve end-to-end supply chain visibility.

These local studies emphasize the necessity of systems that combine agile development strategies, data analytics, and

logistics process optimization. The SLATE system's goal to integrate forecasting and monitoring functions within a freight management framework is directly inspired by these challenges and solutions found within the Philippine context. By aligning with agile methodologies and responding to freight inefficiencies identified in local research, SLATE offers a data-driven, SLA-compliant freight solution suitable for both private logistics firms and government-supported trade operations.

Table 1. Comparison of Foreign and Local Studies

This table compares key foreign and local studies relevant to the SLATE system. It summarizes authors, context, focus, methods, key findings, and their relevance to the project.

Author(s) / Year	Country / Context	Focus of the Study	Method / Model Used	Key Findings	Relevance to SLATE System
Aloini et al. (2024)	Europe (Warehouse Logistics)	ML-based forecasting and alerting in warehouses	Predictive models using warehouse management data	Reduced peak cycle times, improved order picking efficiency	Shows how predictive analytics can reduce delays in logistics operations

					; supports SLATE's SLA forecasting engine
Shen et al. (2023)	Urban Freight (China)	Decentralized federated learning for freight traffic speeds	Spatial–temporal transformer network	Improved prediction accuracy, preserved data privacy	Demonstrates federated models; aligns with SLATE's emphasis on data privacy and traffic-aware forecasting
Lechtenberg & Hellingrath (2025)	Road Freight (Europe)	Barriers and enablers of ML in road freight	Practitioner guideline framework	Identified practical steps for ML adoption	Helps SLATE by offering a roadmap for integrating ML into operational planning
Gao et al.	Trade	Big Data +	Real-time	Detected	Relevant

(2024)	Logistics (China)	Computer Vision for monitoring	sensor and image recognition	anomalies and improved response time	to SLATE's monitoring and alerting modules
Kumar et al. (2025)	Rail Freight (India)	Hybrid travel time estimation	GCN + LSTM + Kalman Filter	Dynamic travel time estimation outperformed traditional models	Inspires SLATE to integrate multiple models for accuracy
Yin et al. (2024)	Maritime Logistics (China)	Multi-step forecasting of container freight index	Three-stage preprocessing strategy	Robustness against outliers and concept drift	Shows SLATE how to handle volatile demand and outlier data
Alonge & Isreal (2025)	General (Time Series Forecasting)	Deep learning architectures (LSTM, GRU, Transforme	Literature review	Models handle multivariate, non-linear time	Guides SLATE's choice of deep learning architectur

		rs)		series	es
Iruela et al. (2021)	Energy Forecasting (Spain)	TensorFlow divide-and-conquer strategy	Neural networks for time series	Reduced training time, scalable forecasting	Confirms TensorFlow's capability for freight demand prediction
Giedra & Matuzevičius (2024)	Edge Devices	TensorFlow Lite model performance	Benchmarked convolutional layers on edge devices	Lightweight, quick inference	Supports SLATE's potential for edge computing or mobile modules
Ng (2018)	Philippines	Agile Scrum in IT Capstone Programs	Academic action research	Identified factors for successful Agile implementation	Validates SLATE's Agile Scrum methodology for iterative development
Del Prado, Manfoste & Rosete	Philippines (Desiccated	Impact of freight transport inefficiency	Gravity Model of International Trade	Freight inefficiencies had highest	Justifies SLATE's predictive SLA

(2024)	Coconut Trade)	on trade		impact on trade volume	system to minimize delays
Banomyong (2024)	Philippines	Enhancing logistics competitiveness	Survey of 126 freight forwarders	Customs delays, unreliable timelines, infrastructure gaps	SLATE directly addresses these through machine learning SLA forecasting and monitoring
Fillone et al. (2015)	Philippines (Greater Capital Region)	Macro-level logistics study	PIDS system-wide study	Fragmented sector, limited data integration	Supports SLATE's unified, microservice-based freight platform

Table no.1 Comparison of Study

2.6 Integration of Information Systems in Enterprise Environment

Integrating various information systems within enterprises helps improve the overall functionality, performance, and real-time

decision-making of businesses. In the logistics and freight sector, the use of predictive analytics and machine learning allows companies to act proactively rather than just reacting to risks. **Pindi (2025)** discussed that predictive analytics is now being applied in Transportation Management Systems (TMS) to forecast possible delays, improve route planning, and enhance supply chain coordination. This approach helps companies respond faster and recover more effectively from unexpected events.

AI and the Internet of Things (IoT) are being combined to track shipments in real time. According to **Dachepalli and Scholar (2025)**, the integration of AI with IoT sensors improves transparency in logistics by giving companies real-time access to their shipment's status. This also reduces risks such as cargo theft and late deliveries. The study uses a hybrid approach supported by the COPRAS method to rank and evaluate performance, showing strong results in improving customer satisfaction and operational efficiency.

Multi-cloud environments present new challenges in ensuring SLA (Service Level Agreement) compliance. **Simpson et al. (2025)** proposed a smart monitoring framework that uses machine learning to automatically track SLA violations and ensure

compliance. Their intelligent system uses predictive analytics to detect service degradation early and take action before users experience issues. This innovation helps reduce downtime and builds trust between clients and service providers.

On the business side, Customer Relationship Management (CRM) systems are now enhanced with AI tools to help sales teams work more efficiently. **Saha (2025)** highlighted how CRM platforms use machine learning to analyze customer behavior, helping companies improve lead conversion and client retention. This integration supports smarter decision-making and gives better insights into the needs and habits of customers, which is essential in competitive industries.

These studies confirm that integrating AI, predictive analytics, CRM, IoT, and cloud-based tools into enterprise systems helps improve operations across various industries. These technologies support better forecasting, monitoring, and customer interaction. However, challenges like data consistency, system compatibility, and maintaining real-time accuracy are still ongoing areas of improvement for full-scale integration.

Chapter 3

METHODOLOGY

3.1 Agile Scrum Methodology in the Project

The project used the Agile Scrum methodology as the development framework because it supports flexibility and adaptability, which are important in modern software development. Scrum made it possible to break the system into smaller parts instead of building everything at once. Development was done in short cycles, where new features were added and improvements were made based on feedback.

Since the project involved complex areas like freight transactions, SLA compliance, and machine learning, Scrum was a good fit because it encourages teamwork, allows for quick changes, and supports continuous development. It helped the team stay focused on goals, adjust to new requirements when needed, and track progress through scheduled reports.

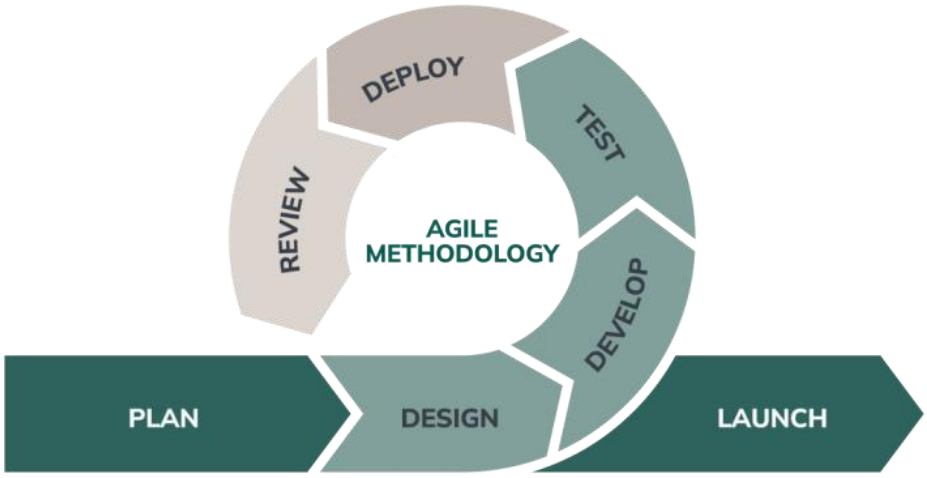

Figure no. 1 Agile Scrum Framework

Plan – The team identifies the project goals, gathers requirements, and divides the work into smaller tasks.

Design – Simple designs or mockups are created to guide the development process.

Develop – Developers write code and build the planned features.

Test – The developed features are tested to check for bugs or issues.

Deploy – Completed and tested features are released for use or further evaluation.

Review – The team reflects on the sprint, gathers feedback, and discusses improvements.

Launch – Once the system is ready and stable, it is officially released to users.

3.2 Roles and Responsibilities

The key duties and responsibilities of each project member are presented in the table below, along with their assigned roles throughout the project development:

Name	Role	Responsibilities
Ms. Richelyn Villasor	Research Adviser	Provides academic guidance, ensures research integrity, reviews project progress, and advises on methodology and technical aspects.
	Product Owner	Defines project vision and goals, prioritizes features, aligns deliverables with stakeholder needs, and ensures that the output meets requirements.
Olga T. Bercasio	Project Manager	Oversees project planning, scheduling, and coordination; manages resources; monitors progress; and ensures timely completion of project milestones.

Earl Justine P. Lusung	Developer/Lead Programmer	Designs and develops system modules, writes clean and efficient code, integrates components, and leads the programming team.
Cammy Mickelle B. Telan	QA Tester	Conducts system testing, identifies bugs and errors, validates system performance, and ensures product quality before deployment.
Klyde Nash Flores	Documentation Specialist	Prepares and maintains project documentation, writes user manuals and technical reports, and ensures accuracy and completeness of records. .
Roy E. Valle	Security Lead	Ensures data and system security, implements security measures, monitors vulnerabilities, and safeguards the project from potential threats.

Table no.2 Roles and Responsibilities

3.3 Sprint Cycles

The project followed Agile Scrum sprint cycles to divide the workload into manageable phases. Each sprint had a specific

focus and set of key tasks to ensure steady progress in both documentation and system development.

To Do	In Progress	Done
		Sprint 1 Gathering Requirements • Define project scope • Identify stakeholders • Determine data sources
		Sprint 2 Data Preparation • Collect freight management data • Clean and preprocess data • Conduct exploratory analysis
	Sprint 3 Model Building • Develop SLA compliance forecasting model using TensorFlow • Train on historical data	

	Sprint 4 **Deployment** • Integrate model with system • Set up monitoring environment	
Sprint 5 **Forecasting & Insights** • Use the model to forecast SLA compliance • Analyze results • Provide actionable recommendations		
Sprint 6 Testing & Launch • Perform system testing • Iterate on feedback • Finalize deployment		

Table no. 3 Scrum Board

3.4 Scrum Artifacts

3.4.1 Product Backlog (User Stories)

User Story No.	Features/ Task	User Stories	Priority	Status
CUSTOMER RELATIONSHIP MANAGEMENT				
F1	Customer Profile Management	As an admin, I want to manage customer profiles to ensure accurate data.	High	Planned
F2	Communication Log	As a user, I want to see all customer interactions in one place.	Medium	Backlog
CONTRACT AND SLA MONITORING				
F3	SLA Forecasting Engine	As a manager, I want to forecast SLA breaches to prevent delays.	High	In Progress
F4	Contract Validation	As an admin, I want to verify contract details automatically .	High	Planned

E-DOCUMENTATION AND COMPLIANCE MANAGER				
F5	Upload Required Documents	As a staff member, I want to upload compliance files per shipment.	High	Planned
F6	Automated Compliance Check	As a compliance officer, I want to validate documents automatically.	High	Backlog
BUSINESS INTELLIGENCE AND FREIGHT ANALYTICS				
F7	KPI Dashboard	As a manager, I want to see real-time SLA metrics.	High	Planned
F8	Analytics Reports	As an analyst, I want to download freight analytics reports.	Medium	Backlog
CUSTOMER PORTAL AND NOTIFICATION HUB				
F9	Real-time Tracking	As a customer, I want to track my shipments live.	High	In Progress

F10	Notifications	As a customer, I want to receive proactive alerts.	High	Planned

Table no. 4 Product Backlog

3.4.2 Product Backlog for EIS Information Security

EIS No.	EIS User Stories	EIS IS Priority	Revision Priority	Status
IS-1	As a developer, I want to implement role-based access control so only authorized users can access sensitive modules.	1	1	Planned
IS-2	As a developer, I want to integrate multi-factor authentication (MFA) to strengthen system login security.	1	2	Backlog

IS-3	As a developer, I want to develop real-time intrusion detection and alerting features to detect threats immediately.	1	2	In Progress
IS-4	As a developer, I want to encrypt all stored and transmitted data so that sensitive information is protected.	1	1	Planned
IS-5	As a developer, I want to implement automated security audit logs so system activities are tracked and can be reviewed.	1	2	Backlog
IS-6	As a developer, I want to build a secure API gateway with	1	2	Planned

	token-based authentication to prevent unauthorized access to internal services.			
IS-7	As a developer, I want to perform regular vulnerability scanning and patch management so security risks are mitigated before deployment.	1	2	Backlog

Table no. 5 Product Backlog for EIS Information Security

3.4.3 Product Backlog for EIS Standards

3.4.3.1 UI/UX (Icons, Color, etc…)

EIS Standard No.	EIS Standard User Stories	EIS Standard Priority	Revision Priority	Status
UI-1	As a developer, I want to standardize the	1	1	In Progress

	color palette across all modules so the system looks consistent and professional.			
UI-2	As a developer, I want to design and implement consistent icons for key actions (add, edit, delete, view) to improve user recognition.	1	2	In Progress
UI-3	As a developer, I want to create a responsive UI template (mobile, tablet, desktop) to ensure accessibility and usability on all devices.	1	2	In Progress
UI-4	As a developer, I want to apply consistent typography (font families, sizes,	1	1	In Progress

	and spacing) to improve readability across the application.			
UI-5	As a developer, I want to implement standardized button styles (hover, active, disabled states) so interactions are predictable and uniform.	1	2	In Progress
UI-6	As a developer, I want to build a reusable UI component library (cards, modals, alerts) to speed up development and ensure design consistency.	1	2	In Progress
UI-7	As a developer, I want to integrate accessibility standards	1	2	In Progress

	(contrast ratio, alt-text for images, ARIAL labels) so the system is inclusive and compliant.			

Table no. 6 Product Backlog for EIS Standards

3.4.4 Product Backlog for EIS Integration

EIS Integration No.	EIS Integration User Stories	EIS Integration Priority	Revision Priority	Status
INT-1	As a developer, I want to integrate the EIS authentication system with the main application so users can log in seamlessly using one account.	1	1	In Progress
INT-2	As a developer, I want to connect EIS to the SLA Monitoring Module so	1	2	In Progress

	compliance data can flow automatically between systems.			
INT-3	As a developer, I want to create secure API endpoints between EIS and the Freight Management System to ensure reliable data transfer.	1	2	In Progress
INT-4	As a developer, I want to synchronize EIS user roles with the main application's access control so permissions remain consistent.	1	1	In Progress
INT-5	As a developer, I want to implement real-	1	2	In Progress

	time data exchange between EIS and the Analytics Dashboard to enable up-to-date reporting.			
INT-6	As a developer, I want to integrate EIS with the Notification/Email Service so alerts and updates can be sent automatically to users.	1	2	In Progress

Table no. 7 Product Backlog for EIS Integration

3.4.5 Product Backlog for Analytics

3.4.5.1 Application System Analytics

EIS Integration No.	EIS Integration User Stories	EIS Integration Priority	Revision Priority	Status
ASA-1	As a developer, I want to create a	1	1	Planned

	real-time analytics dashboard so stakeholders can monitor key freight KPIs at a glance.			
ASA-2	As a developer, I want to implement data visualization tools (charts, graphs, and maps) to present analytics results clearly.	1	2	In Progress
ASA-3	As a developer, I want to integrate predictive	1	2	In Progress

	analytics to forecast SLA compliance and freight demand trends.			
ASA-4	As a developer, I want to set up automated data pipelines from operational modules to the analytics engine to ensure fresh data.	1	2	In Progress
ASA-5	As a developer, I want to build custom analytics filters (date, region,	1	2	In Progress

	shipment type) so users can refine their reports.			
ASA-6	As a developer, I want to integrate anomaly detection in analytics to identify irregular patterns in freight operations.	1	1	Backlog

Table no. 8 Product Backlog for Analytics

3.4.5.2 EIS Analytics

EIS Analytics No.	EIS Analytics Stories	EIS Analytics Priority	Revision Priority	Status
EA-1	As a developer, I want to integrate	1	1	Planned

	EIS data sources into the analytics module so consolidated reporting is available across systems.			
EA-2	As a developer, I want to implement automated EIS performance dashboards (security, access logs, SLA compliance) to track system health.	1	2	In Progress
EA-3	As a developer, I want to	1	2	Backlog

	develop an EIS audit analytics feature to visualize security incidents and compliance trends over time.			
EA-4	As a developer, I want to build predictive models within EIS Analytics to forecast potential security breaches and system risks.	1	2	In Progress
EA-5	As a developer, I want to	1	1	Planned

	integrate anomaly detection in EIS Analytics to identify unusual patterns in access or data usage.			
EA-6	As a developer, I want to enable real-time alerts from EIS Analytics when thresholds or unusual activities are detected.	1	2	In Progress

Table no.9 EIS Analytics

3.4.6 Sprint Backlog (User Stories)

Task No.	User Story No.	User Stories	Tasks	Timeline	Responsible Team Member/s
SPRINT 1					
S1_1	IS-1	Role-based access control	Requirements gathering & planning	8 hrs	Olga T. Bercasio (PM), Roy Valle (Security)
S1_2	IS-2	Multi-factor authentication	Requirements gathering & design outline	10hrs	Roy Valle (Security), Earl Justine Lusung (Dev)
S1_3	F1	Customer profile management	Draft user stories & define data fields	6hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
S1_4	F2	Communication log	Collect requirements & workflow mapping	6hrs	Olga Bercasio (PM), Klyde Flores (Docs)
S1_5	F3	SLA forecasting engine	Identify KPIs & data sources	12hrs	Earl Justine Lusung (Dev), Olga Bercasio (PM)

SPRINT 2					
S2_1	IS-3	Real-time intrusion detection	Data preparation & security rules design	15hrs	Roy Valle (Security), Earl Justine Lusung (Dev)
S2_2	IS-4	Encrypt all stored and transmitted data	Encryption setup & test environment	12hrs	Roy Valle (Security)
S2_3	F4	Contract validation	Data mapping for contract module	8hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
S2_4	F5	Upload required documents	Prepare upload interface mockups	8hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
S2_5	F6	Automated compliance check	Draft validation rules	10hrs	Earl Justine Lusung (Dev), Roy Valle (Security)
SPRINT 3					
S3_1	ASA-3	Predictive analytics	Build model architecture	15hrs	Earl Justine Lusung (Dev)
S3_2	EA-4	Predictive models in EIS	Train predictive	20hrs	Earl Justine Lusung

		Analytics	model		(Dev), Roy Valle (Security)
S3_3	F7	KPI dashboard	Code initial dashboard layout	12hrs	Earl Justine Lusung (Dev)
S3_4	F8	Freight analytics reports	Develop report download function	12hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
SPRINT 4					
S4_1	INT-1	EIS authentication integration	Deploy authentication module	15hrs	Earl Justine Lusung (Dev), Roy Valle (Security)
S4_2	INT-2	Connect EIS to SLA module	API connection setup	10hrs	Earl Justine Lusung (Dev)
S4_3	INT-3	Secure API endpoints	Build & secure endpoints	15hrs	Roy Valle (Security), Earl Justine Lusung (Dev)
S4_4	INT-4	Sync user roles	Test role synchronization	8hrs	Earl Justine Lusung (Dev), Roy Valle (Security)

S4_5	INT-5	Data exchange to Analytics Dashboard	Integrate data pipeline	12hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
SPRINT 5					
S5_1	EA-1	EIS data sources in analytics	Connect EIS data sources	10hrs	Earl Justine Lusung (Dev)
S5_2	EA-2	EIS performance dashboards	Develop dashboard visuals	12hrs	Earl Justine Lusung (Dev), Klyde Flores (Docs)
S5_3	ASA-5	Custom analytics filters	Add custom filters to reports	8hrs	Earl Justine Lusung (Dev)
S5_4	ASA-6	Anomaly detection in analytics	Implement anomaly detection logic	15hrs	Earl Justine Lusung (Dev), Roy Valle (Security)
SPRINT 6					
S6_1	UI-1 to UI-7	Standardize UI	Conduct final UI/UX testing	8hrs	Cammy Telan (QA), Earl Justine Lusung (Dev)
S6_2	F9	Real-time tracking module	Final testing of tracking module	8hrs	Cammy Telan (QA), Earl Justine

					Lusung (Dev)
S6_3	F10	Notifications	Test notification delivery	6hrs	Cammy Telan (QA),
S6_4	IS-7	Vulnerability scanning & patching	Security testing & patching	10hrs	Roy Valle (Security), Cammy Telan (QA)
S6_5	INT-6	EIS Notification/Email integration	Final integration check	8hrs	Earl Justine Lusung (Dev), Cammy Telan (QA)
S6_6	EA-6	Real-time EIS Analytics alerts	Configure alert thresholds	10hrs	Earl Justine Lusung (Dev), Roy Valle (Security)

Table no. 10 Sprint Backlog (User Stories)

3.4.7. Increment

Sprint No.	Increment / Feature Delivered	User Story / Backlog Reference	Definition of Done (DoD) Criteria	Status	Remarks
Sprint 1	Role-Based Access Control & Multi-Factor	IS-1, IS-2	– User roles created and managed in system	In Progress	Final testing of MFA underway; security

	Authentication Setup		– MFA setup functional and tested – Security documentation updated		guidelines being documented
Sprint 1	Customer Profile Management & Communication Log Schema	F1,F2	– Customer profile schema designed and implemented – Communication log fields mapped – Initial UI mockups created	In Progress	Back-end completed; waiting for UI integration
Sprint 2	Contract Validation & Document Upload Module UI	F4, F5	– Contract validation rules implemented – Upload module UI built and tested – Documentation updated	In Progress	User feedback pending for upload flow
Sprint 2	Automated Compliance Check	F6	– Automated compliance rules implemented – Valida	In Progress	Security testing scheduled next sprint

			tion runs success fully – Logs and error handling in place		
Sprint 3	Predictive Analytics Model & KPI Dashboard	ASA-3, F7	– Predictive model trained on sample data – KPI dashboard visualizations functional – Model performance metrics documented	Planned	Development to start after Sprint 2 completion
Sprint 4	API Integration & Secure Endpoints (EIS ↔ SLA Module)	INT-1, INT-3, INT-4	– API endpoints built and secured – Authenti cation tested – Data exchange verified between EIS and SLA	Planned	Security audit scheduled before go-live
Sprint 5	EIS Performance Dashboards	EA-2, ASA-6	– Dashboards connected to live data	Planned	Will undergo joint QA with Sprint 6

	& Anomaly Detection		– Anomaly detection rules implemented – Alerts configured and tested		
Sprint 6	Final UI/UX Testing, Vulnerability Scanning & Launch Prep	UI-1 to UI-7, IS-7	– UI standardized – Vulnerability scanning complete – Final integration tests passed	Planned	Launch-ready after QA approval

Table no. 11 Increment

3.5 Microservices Architecture

The SLATE system is architected using a microservices framework to address the complex, scalable demands of modern freight management. This approach decomposes the application into small, autonomous services, each encapsulating a specific business function such as shipment tracking, SLA monitoring, or compliance documentation. By adopting this architecture, the system achieves enhanced agility, resilience, and technological flexibility. Each microservice operates independently, with its own dedicated database, enabling teams to develop, deploy, and scale

components without interdependencies. The integration of TensorFlow for SLA forecasting is seamlessly embedded within this structure, allowing real-time data processing and machine learning inferences to occur within dedicated services. Communication between services is facilitated through well-defined APIs and asynchronous messaging, ensuring loose coupling and high cohesion. This design not only supports the dynamic nature of freight transactions but also provides a robust foundation for continuous integration, delivery, and future expansion.

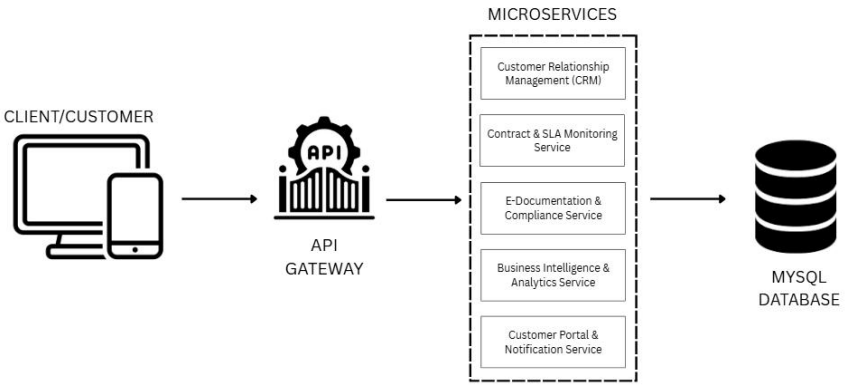

Figure no. 2 Microservices Diagram

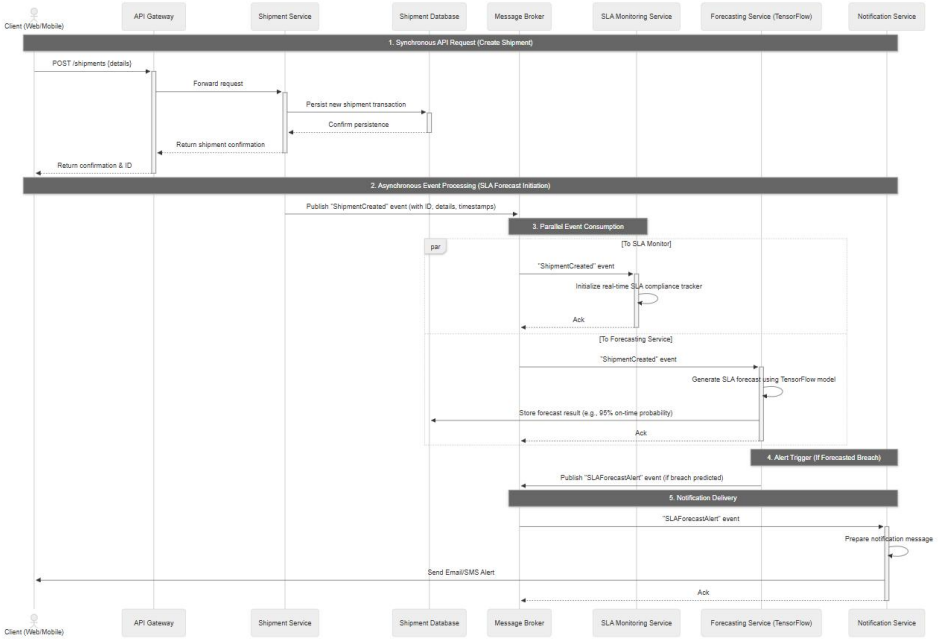

Figure no. 3 Communication Pattern for Microservices

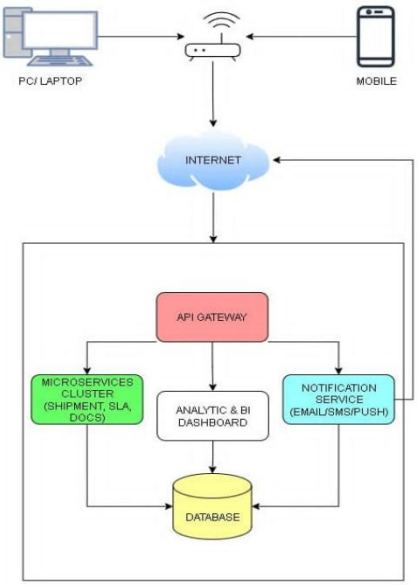

Figure no. 4 System's Networking Diagram

3.6 DevOps Implementation

DevOps is both a way of working and a mindset that brings together software development (Dev) and IT operations (Ops), which were once treated as separate areas. Instead of working in silos, DevOps encourages collaboration, communication, and shared responsibility. It makes use of practices, tools, and automation pipelines that help teams deliver applications and services more quickly and efficiently. With this approach, organizations can release updates faster, with fewer errors, and provide better value to users while staying competitive.

The core of this implementation is the CI/CD pipeline, supported by foundational practices like Infrastructure as Code (IaC) and continuous Monitoring & Alerting.

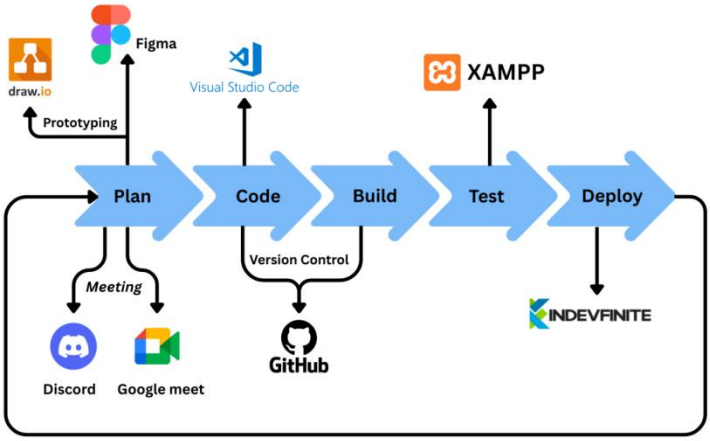

Figure no. 5 CI/CD Pipeline

The CI/CD (Continuous Integration/Continuous Deployment) pipeline automates the steps from code commit to production deployment, ensuring consistency and efficiency.

1. **Version Control**: Utilize systems such as Git to manage and track changes in the codebase, ensuring a structured approach to version updates and collaboration.

2. **Plan**: Establish a clear outline of the project's goals, required features, and overall scope to guide the development process effectively.

3. **Code**: Involve the creation of the application's features, logic, and functionality through the writing and structuring of the source code.

4. **Build**: Convert the written code into a deployable format by addressing dependencies, compiling the source, and generating executable files or container images.

5. **Test**: Conduct evaluations to verify that the application operates correctly and adheres to established quality criteria.

6. **Deploy**: Release the application to a production or alternative environment (such as staging or testing), enabling access for end users.

Infrastructure (IaC)

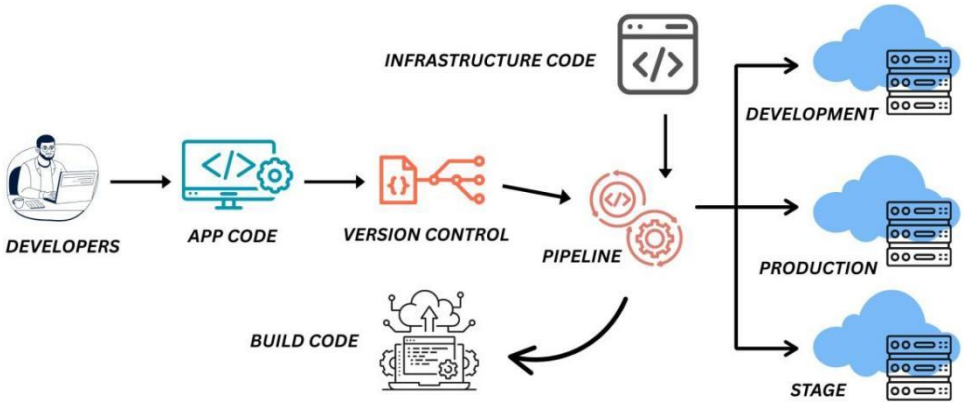

Figure no. 6 Infrastructure as a Code (IaC)

This diagram illustrates the core principle of Infrastructure as Code (IaC): empowering developers. Instead of filing a ticket and waiting for an operations team to manually configure servers and networks, developers can now write code to define the very infrastructure their application needs to run. This code is then stored and version-controlled just like their application code, allowing for collaboration, review, and a clear history of changes. A automated pipeline takes this code and automatically translates it into a real, staged environment. In essence, IaC turns infrastructure into a shared, self-service resource that teams can build reliably and instantly, together.

Monitoring & Alerting

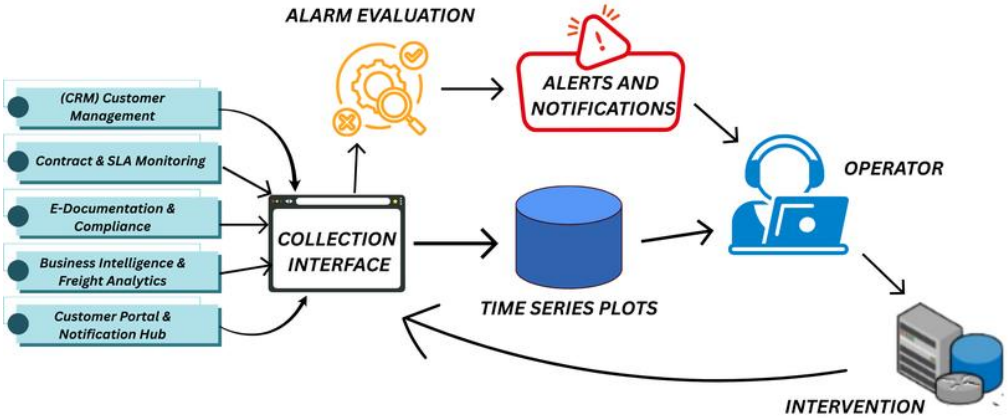

Figure no. 7 Monitoring and Alerting

This figure shows how our monitoring system acts as a central nervous system for the business, moving from raw data to intelligent action. It constantly collects information from every critical function from customer contracts and shipping analytics to system performance. This data is then evaluated not just for technical glitches, but for business health, ensuring we meet our service promises (SLAs) and compliance needs. Instead of overwhelming our team with raw data, it translates this analysis into clear, actionable alerts and visual dashboards. This allows a human operator to quickly understand what's wrong and why, enabling smart intervention to solve problems before our customers are even affected. It’s a proactive guardian that keeps everything running smoothly.

3.7 Integration Approach for Information Systems

The integration approach for information systems in this project emphasizes creating a unified platform where diverse modules can interact effectively without sacrificing performance or security. A layered communication framework is applied to manage how different services exchange data, ensuring consistency and minimizing duplication across the system. Standardized interfaces are used to facilitate interoperability between components, making it easier to connect new services in the future while keeping existing ones stable. A key consideration in this integration strategy is reliability, as the system is designed to handle user requests with minimal downtime and efficient load distribution. Equally important is security, where centralized control mechanisms regulate access and safeguard sensitive information while maintaining seamless usability for end-users. By mapping business processes across different levels of detail, the integration approach ensures that workflows are well-structured, transparent, and adaptable. The overall outcome is a cohesive environment that balances technical precision with operational efficiency, creating a system architecture that is both maintainable and scalable.

Innovation Integration

Innovation integration in this project is approached as a continuous enhancement process, where new technologies and methods are embedded into the system to improve efficiency and adaptability. Automation plays a central role, streamlining repetitive operations while reducing the likelihood of human error. By breaking down organizational processes into progressively detailed layers, opportunities for optimization are made visible, allowing the system to evolve as requirements change. An important feature of this integration is role-based interaction, where distinct responsibilities for administrators and users are carefully designed to improve functionality, oversight, and security. This separation not only ensures more efficient workflows but also supports accountability and transparency in system operations. Flexibility is another innovative element, as the architecture is designed to easily incorporate additional services or third-party tools without causing major disruptions. Taken together, these aspects highlight a forward-looking design philosophy in which innovation is not an add-on, but an integral part of system development and growth.

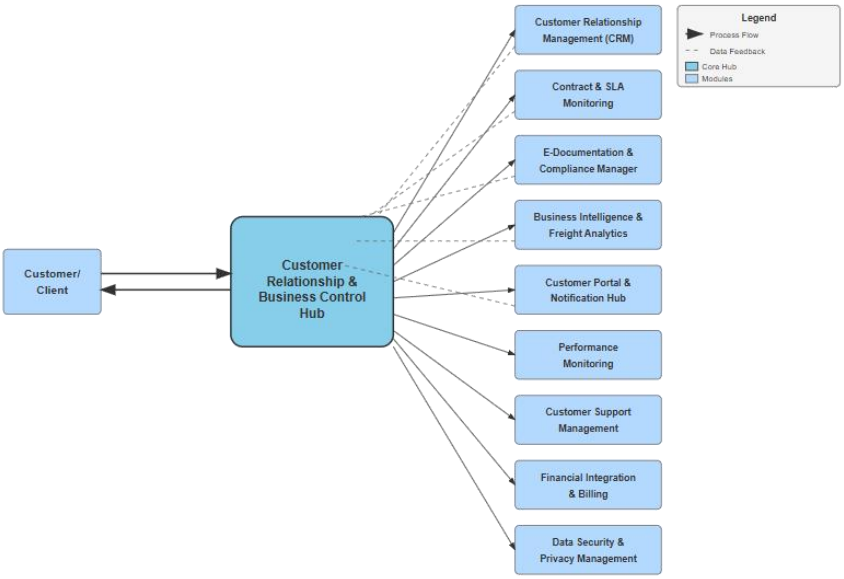

Figure no. 8 Business Process Architecture Level1

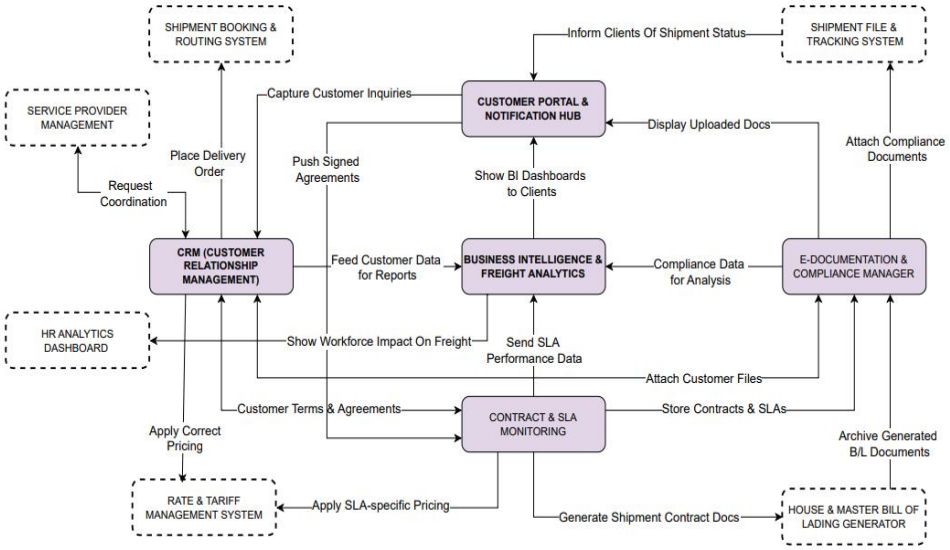

Figure no. 9 Business Process Architecture Level 2

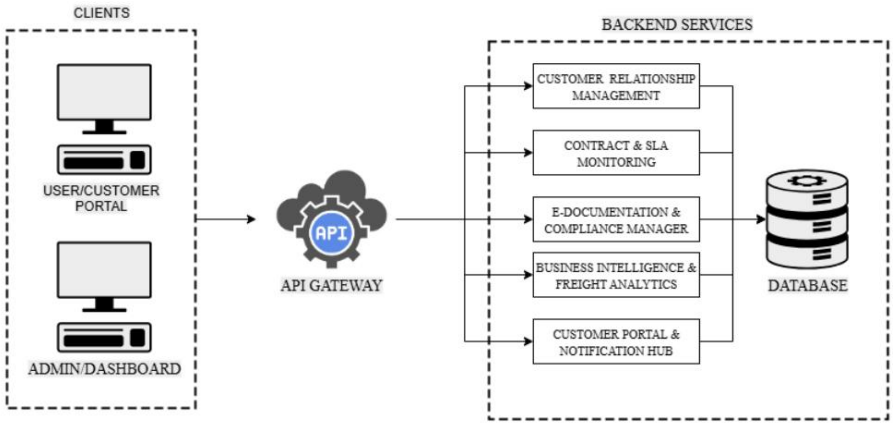

Figure no. 10 API Gateway

The API Gateway acts as a unified entry point, efficiently routing requests from clients (Customer Portal and Admin Dashboard) to appropriate backend services. It ensures secure, streamlined communication while handling authentication, load balancing, and rate limiting. By decoupling clients from complex microservices, like CRM, Contract Monitoring, and Freight Analytics, it enhances scalability, simplifies maintenance, and improves performance. The gateway also centralizes logging, monitoring, and error handling, providing a robust and manageable architecture for the entire freight management system. This design optimizes both user experience and backend efficiency.

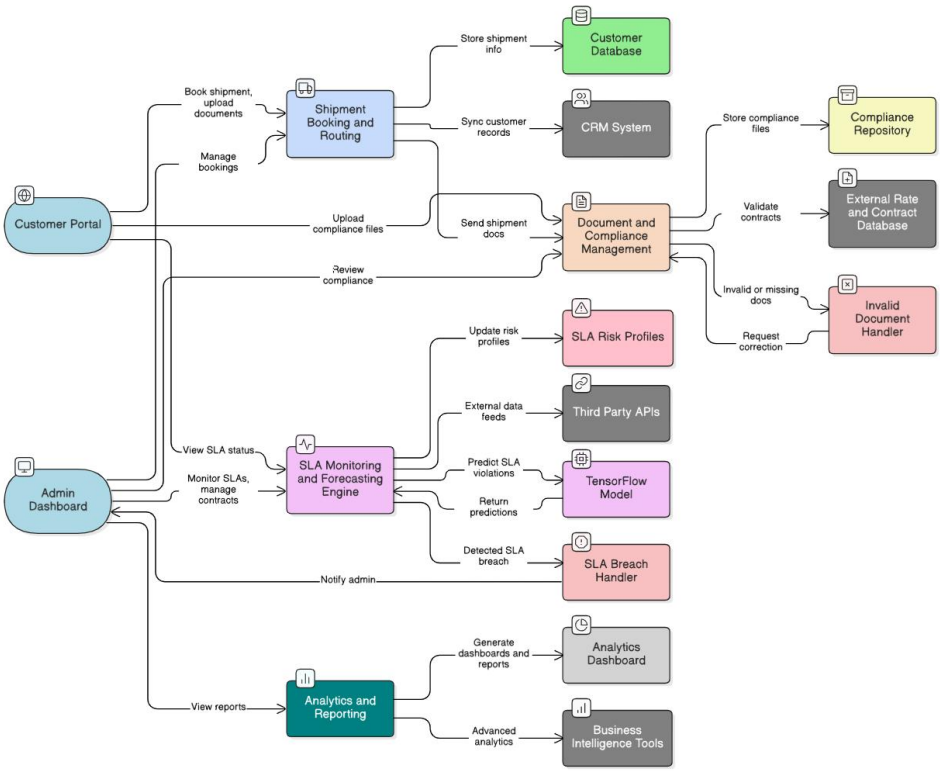

Figure no. 11 Data Flow Diagram Level 1

The Data Flow Diagram Level 1 illustrates the internal processes and data movements within the freight management system. Customers initiate the flow by booking shipments and uploading compliance documents through the Customer Portal, which interacts with the Document and Compliance Management module to review and store files. The Admin Dashboard allows administrators to monitor SLA status and contracts, leveraging the SLA Monitoring and Forecasting Engine supported by a TensorFlow model to predict and handle potential breaches. Data

is synchronized across the CRM System, Customer Database, Compliance Repository, and external contract databases via APIs, ensuring real-time accuracy. Invalid or missing documents are routed to an error handler, maintaining system integrity, while Business Intelligence Tools generate advanced analytics and reports for informed decision-making. This diagram emphasizes the seamless integration of user actions, data processing, and automated responses, creating a robust and efficient operational framework.

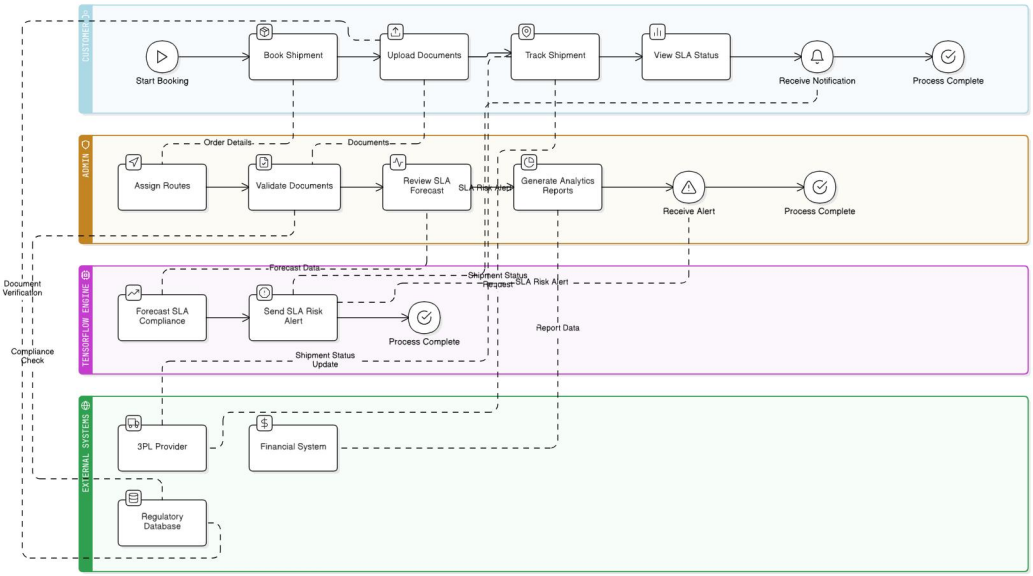

Figure no. 12 Business Process Modeling and Notation Diagram

This BPMN diagram maps the complete journey of a freight shipment, starting when a customer books and uploads required

documents. The system then automatically assigns optimal routes, checks paperwork, and evaluates potential delays using SLA forecasts. If risks arise, alerts are immediately sent to keep everyone informed. The process seamlessly coordinates tasks between people, software, and external partners like logistics providers ensuring transparency and timely updates. By visualizing each step, this model helps teams streamline operations, reduce errors, and deliver a smoother experience from booking to delivery.

Sequence Diagram

Admin

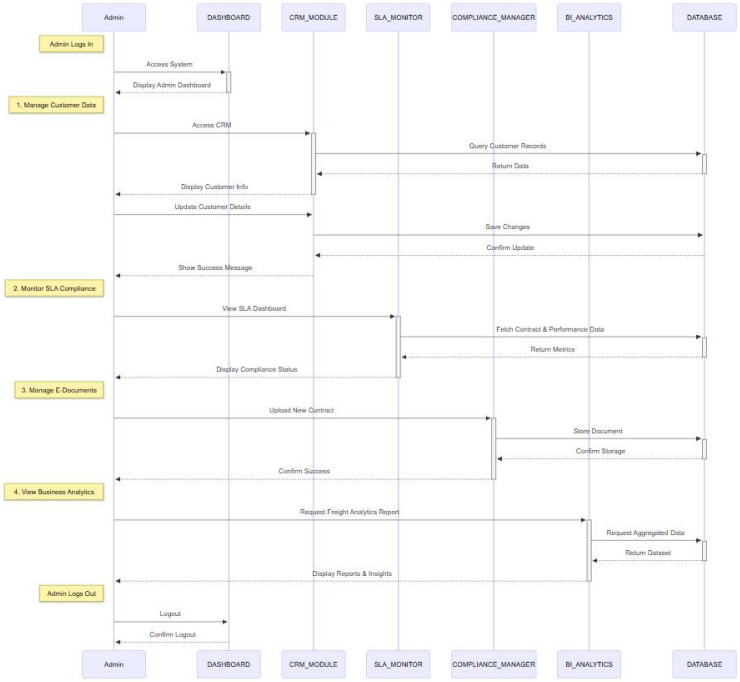

Figure no. 13 Sequence Diagram (Admin)

This diagram visualizes admin workflows: accessing CRM, updating customer data, generating contracts, and retrieving analytics. It shows sequential interactions between admin actions and system responses, ensuring logical execution, data integrity, and confirmation of operations like compliance checks and report generation.

User

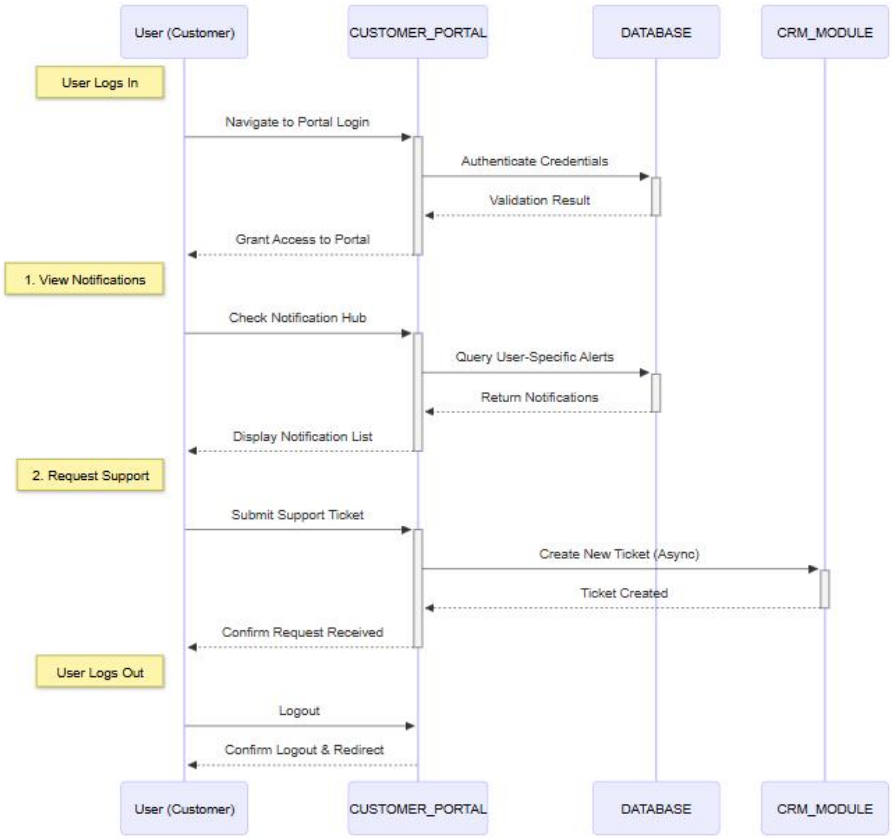

Figure no. 14 Sequence Diagram (User)

This diagram illustrates the customer/users journey: logging into the portal, viewing notifications, submitting support tickets, and logging out. It shows seamless interactions between the user, customer portal, notification hub, CRM, and database, ensuring real-time updates and confirmations at each step.

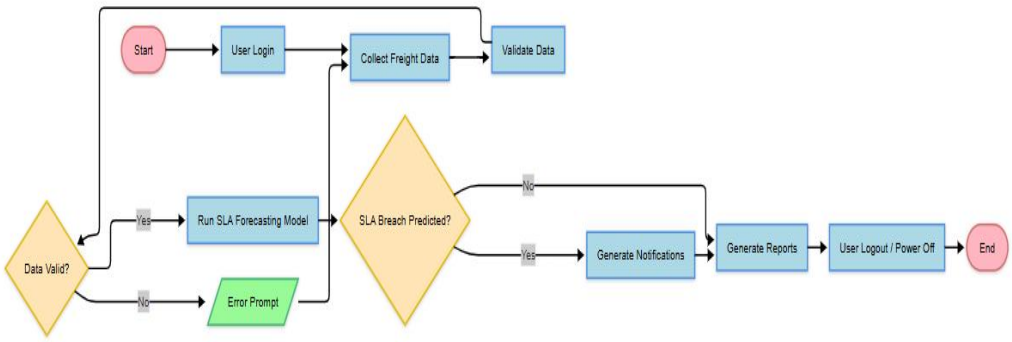

Figure no. 15 Flowchart

This flowchart visualizes the SLA monitoring process: from user login and data collection to validation, forecasting, and breach prediction. It includes error handling, automated notifications, report generation, and user logout, ensuring proactive freight management and compliance.

3.8 Introduction to TOGAF and the Four Architectural Domains

For this research, the Open Group Architecture Framework (TOGAF) has been selected as the main methodological guide. TOGAF is widely used in both professional and academic settings because it provides a clear way to connect business strategies with supporting information systems (The Open Group, 2018). Unlike some other frameworks that are more descriptive, TOGAF offers a structured and iterative process through the Architecture Development Method (ADM), making it suitable for practical application in this study.

The framework divides enterprise architecture into four connected domains, which together provide a holistic perspective:

1. **Business Architecture:** Looks at the organization's strategy, policies, and processes. In this research, it ensures that proposed IT solutions remain aligned with the overall goals of the business.
2. **Application Architecture:** Focuses on the software systems an organization uses and how they interact.

Methodologically, it allows the study to assess how new or modified systems will integrate with what is already in place.

3. **Data Architecture:** Deals with the management and structure of data. This is essential for ensuring that information is consistent, secure, and useful for decision-making, which directly supports the research objectives.
4. **Technology Architecture:** Defines the technical infrastructure such as networks, servers, and platforms. In this study, it provides the basis for evaluating whether proposed solutions are technically feasible and scalable.

The research avoids looking at problems in isolation and instead considers the business, applications, data, and technology as part of a single system. Other frameworks, such as Zachman or FEAF, were reviewed but not adopted because they are either more static in nature or better suited to government contexts. TOGAF was chosen because it offers both a practical method and a comprehensive structure, which makes it more adaptable for the aims of this research.

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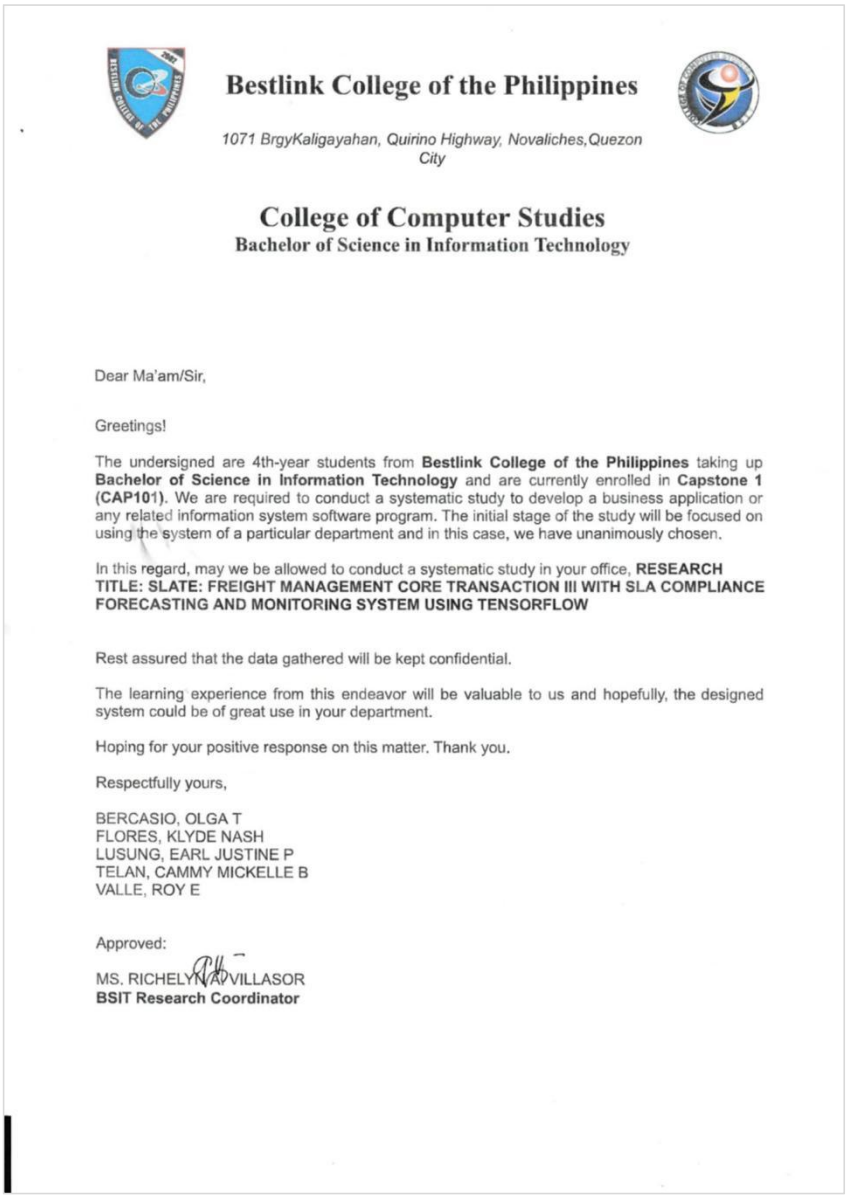
APPENDICES

Appendix A : Detailed Technical Documentation

1. System Architecture
2. Information Systems Integration
3. Application Design and Development
4. Database Schema and Data Management:
5. Network Configuration
6. Deployment and Infrastructure
7. Security Measures:
8. Testing and Quality Assurance
9. System Monitoring and Maintenance:
10. APIs and Integration Points:
11. User Documentation:
12. Known Issues and Troubleshooting
13. Version Control and Source Code Repository
14. DevOps and Continuous Integration/Continuous Deployment (CI/CD):
15. Licensing and Open Source Libraries:
16. Performance Metrics and Monitoring:

Appendix B : Documents/URLs

Interview Letter



Bestlink College of the Philippines

1071 BrgyKaligayahan, Quirino Highway, Novaliches,Quezon City

College of Computer Studies
Bachelor of Science in Information Technology

Dear Ma'am/Sir,

Greetings!

The undersigned are 4th-year students from **Bestlink College of the Philippines** taking up **Bachelor of Science in Information Technology** and are currently enrolled in **Capstone 1 (CAP101)**. We are required to conduct a systematic study to develop a business application or any related information system software program. The initial stage of the study will be focused on using the system of a particular department and in this case, we have unanimously chosen.

In this regard, may we be allowed to conduct a systematic study in your office, **RESEARCH TITLE: SLATE: FREIGHT MANAGEMENT CORE TRANSACTION III WITH SLA COMPLIANCE FORECASTING AND MONITORING SYSTEM USING TENSORFLOW**

Rest assured that the data gathered will be kept confidential.

The learning experience from this endeavor will be valuable to us and hopefully, the designed system could be of great use in your department.

Hoping for your positive response on this matter. Thank you.

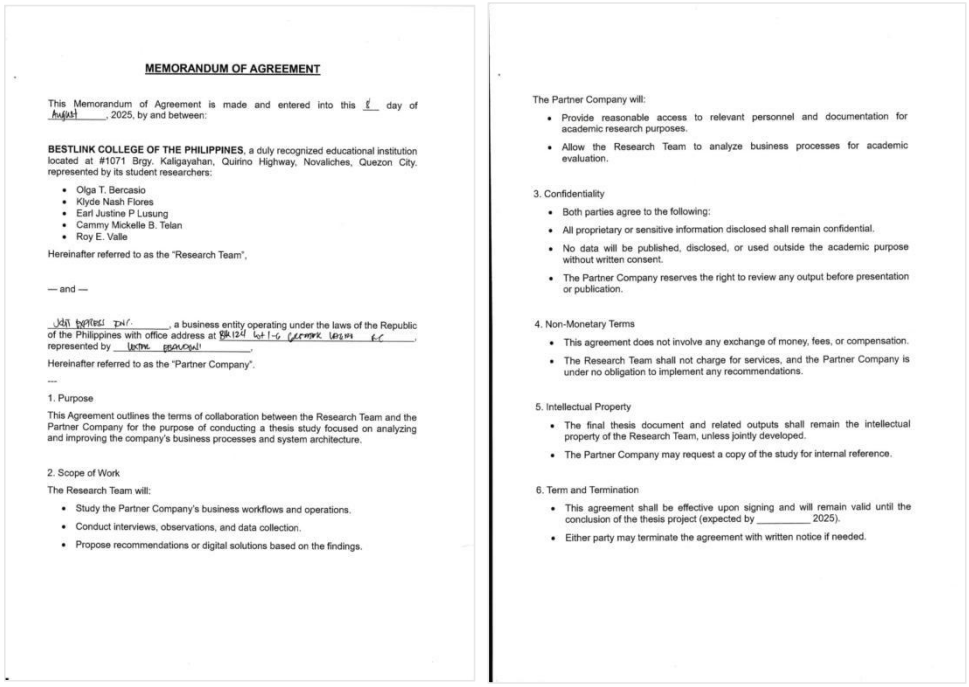
Respectfully yours,

BERCASIO, OLGA T
FLORES, KLYDE NASH
LUSUNG, EARL JUSTINE P
TELAN, CAMMY MICKELLE B
VALLE, ROY E

Approved:

MS. RICHELYN D VILLASOR
BSIT Research Coordinator

Company Confirmation (signed)



MEMORANDUM OF AGREEMENT

This Memorandum of Agreement is made and entered into this 1 day of August, 2025, by and between:

BESTLINK COLLEGE OF THE PHILIPPINES, a duly recognized educational institution located at #1071 Brgy. Kaligayahan, Quirino Highway, Novaliches, Quezon City, represented by its student researchers:

- Olga T. Bercasio
- Klyde Nash Flores
- Earl Justine P. Lusung
- Cammy Mickelle B. Telan
- Roy E. Valle

Hereinafter referred to as the "Research Team",

— and —

JAH Express Inc., a business entity operating under the laws of the Republic of the Philippines with office address at BLK 124 Lot 1-6 Governor Lascon St., represented by Ukeme Edaudoni,

Hereinafter referred to as the "Partner Company".

---

1. Purpose

This Agreement outlines the terms of collaboration between the Research Team and the Partner Company for the purpose of conducting a thesis study focused on analyzing and improving the company's business processes and system architecture.

2. Scope of Work

The Research Team will:

- Study the Partner Company's business workflows and operations.
- Conduct interviews, observations, and data collection.
- Propose recommendations or digital solutions based on the findings.

The Partner Company will:

- Provide reasonable access to relevant personnel and documentation for academic research purposes.
- Allow the Research Team to analyze business processes for academic evaluation.

3. Confidentiality

- Both parties agree to the following:
- All proprietary or sensitive information disclosed shall remain confidential.
- No data will be published, disclosed, or used outside the academic purpose without written consent.
- The Partner Company reserves the right to review any output before presentation or publication.

4. Non-Monetary Terms

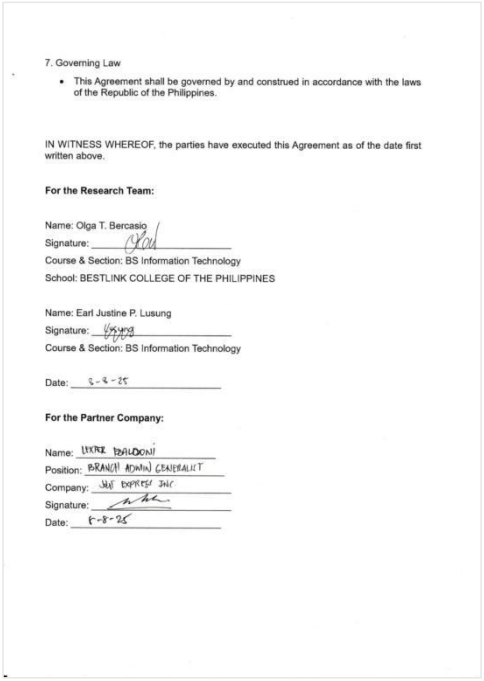
- This agreement does not involve any exchange of money, fees, or compensation.
- The Research Team shall not charge for services, and the Partner Company is under no obligation to implement any recommendations.

5. Intellectual Property

- The final thesis document and related outputs shall remain the intellectual property of the Research Team, unless jointly developed.
- The Partner Company may request a copy of the study for internal reference.

6. Term and Termination

- This agreement shall be effective upon signing and will remain valid until the conclusion of the thesis project (expected by _____ 2025).
- Either party may terminate the agreement with written notice if needed.



7. Governing Law

- This Agreement shall be governed by and construed in accordance with the laws of the Republic of the Philippines.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

For the Research Team:

Name: Olga T. Bercasio
Signature: _____
Course & Section: BS Information Technology
School: BESTLINK COLLEGE OF THE PHILIPPINES

Name: Earl Justine P. Lusung
Signature: _____
Course & Section: BS Information Technology

Date: 8-8-25

For the Partner Company:

Name: Ukeme Edaudoni
Position: Branch Admin Coordinator
Company: JAH Express Inc.
Signature: _____
Date: 8-8-25

Pilot Companies' Background with proofs of interviews

Link to codes (good for 3 years)

Link to documentation (good for 3 years)

Link to demo video guide (good for 3 years

Appendix C: Certificate of Originality

Appendix D: Certificate of Grammarian

Name of Group Members/Individual:

1		4	
2		5	
3		6	

Title of the Project: EIS:

	Adviser	Grammarian
Name		
Designation		
Work Place Address		
Academic/ Professional Qualifications/ Membership		
Email Address		
Telephone		
Signature	*I hereby confirm that I have undertaken to supervise the project mentioned above and I do certify that I am not a member of the Project Examination Board (PEC)*	
	_____ *Date:*	_____ *Date:*

Appendix E: Grammarian Curriculum Vitae

ELIZA JOYCE E. VALDEZ

PH7 LOT28 BLK5 RES3 BRGY. MAPULANG LUPA, PANDI BULACAN.
09052194582
Ejoyce.valdez@gmail.com

EDUCATION BACKGROUND:

DEGREE ATTAINED

- **SCHOOL:** Colegio de Sta. Teresa de Avila
- **LOCATION:** Kingfisher St. Brgy. Kaligayahan Zabarte Road QC
- **COURSE:** Bachelor of Secondary Education / English

SECONDARY EDUCATION

- **SCHOOL:** San Bartolome High School
- **LOCATION:** Quezon City
- **DURATION:** 2007-2010

ELEMENTARY EDUCATION

- **SCHOOL:** Rosa L. Susana Elementary School
- **LOCATION:** Quezon City
- **DURATION:** 2000-2006

PROFESSIONAL TRAINING

TITTLE	DURATION	
	FROM	TO
CONTACT CENTER SERVICES NCII	11/18/2021	12/17/2021
BEAUTY CARE SERVICES (NAIL CARE) NCII	11/22/2018	12/23/2018
TRAINOR/ COACH BATTLE OF THE BRAIN	1/30/2019	02/02/2019
CONTACT CENTER SERVICES NCII	11/18/2021	12/17/2021
2022 IN-SERVICE TRAINING FOR TEACHER	1/19/2020	03/09/2020

Key Competencies:

- Can speak, read, write and understand English
- an eager learner
- passionate and energetic

I hereby certify that the above information's are true and correct to the best of my knowledge and belief.

ELIZA JOYCE E. VALDEZ, LPT.
SHS- INSTRUCTOR

Appendix F : Technical Adviser Curriculum Vitae

RONALD G. ROLDAN JR

INFORMATION TECHNOLOGY

CONTACT

09057669976

Ronaldroldan101@gmail.com

16 Esmeralda St. Brgy Tandang Sora QC

EDUCATION

2015 - 2019
BESTLINK COLLEGE OF THE PHL.

- Bachelor of Science in Information Technology

2019 - 2022
BESTLINK COLLEGE OF THE PHL.

- Certificate of Professional Education

2022 - Ongoing
POLYTECHNIC UNIVERSITY OF THE PHL..

- Master of Information Technology (9units)

SKILLS

- Web Development (HTML, CSS, JavaScript, PHP)
- Programming (C, Java, C++)
- SQL & Database Management
- System Analysis and Design
- Hardware and Network Troubleshooting
- Scrum Master and Agile Practices
- Project Management & Leadership

PROFILE

To obtain a position in a growth-oriented organization where I can utilize my expertise in IT project management, system development, and research advising to lead projects, deliver high-quality outputs on time, and contribute to the organization's efficiency and innovation.

WORK EXPERIENCE

BESTLINK COLLEGE OF THE PHILIPPINES 2019 - 2025
IT INSTRUCTOR

BESTLINK COLLEGE OF THE PHILIPPINES 2023 - 2025
BSIT Research Coordinator

BESTLINK COLLEGE OF THE PHILIPPINES 2019 - 2025
BSIT Research Adviser

- Advised and presented research papers locally and internationally (Kuala Lumpur, Malaysia)
- Developed and managed multiple IT Capstone and ERP projects (HRIS, Financial, Freight, and Hospital Management Systems)
- Delivered resource speaking engagements on BSIT research agenda and project development
- Module developer and panelist for IT capstone defenses

KEY PROJECTS AND SUPERVISED

- Freight Management System
- Financial Management System
- School and Hospital Management Systems
- Airport Management System
- HRIS and Payroll Management Systems
- Transport Network Vehicle System

PERSONAL INFORMATION

Age:	28
DOB:	February 3, 1997
Nationality:	Filipino
Religion:	Christian
Civil Status:	Single
Height:	5'5"
Weight:	65 kg

CERTIFICATIONS AND TRAININGS

- AGILE DEVELOPMENT METHODOLOGY (2018)
- INFORMATION TECHNOLOGY IN MIXED REALITY (2018)
- FACULTY IN-SERVICE TRAININGS (2020, 2022, 2023, 2024)
- IN-SERVICE TRAINING FOR TEACHERS (INSET)
- FACULTY RESEARCH SEMINARS

TEACHING EXPERIENCE

- COMPUTER PROGRAMMING 1
- WEB DEVELOPMENT 1 & 2
- SYSTEM INTEGRATION AND ARCHITECTURE
- BUSINESS PROCESS MANAGEMENT
- NETWORKING 1, ITSP2 WEB SECURITY
- DATABASE MANAGEMENT SYSTEM 1
- INFORMATION MANAGEMENT
- CAPSTONE PROJECT AND RESEARCH 1 & 2

CHARACTER REFERENCES

MS. JESSICA BENARES
RMS - TEACHER
09168229335

MR. JORGE B. LUCERO
IT PROFESSOR,
BESTLINK COLLEGE OF THE PHILIPPINES
09460669897

Appendix G: Research Adviser Curriculum Vitae

RICHELYN A. VILLASOR
IT INSTRUCTOR

09465233195

richelynvillasor45@gmail.com

North Fairview, Quezon City

ABOUT ME

Dedicated and passionate IT instructor with an academic background and extensive experience in teaching, research advising, and curriculum development. Known for delivering industry-aligned instruction and fostering student excellence in both academics and research. Committed to cultivating a dynamic learning environment and guiding future IT professionals toward success.

EDUCATION

2019-2023
BESTLINK COLLEGE OF THE PHILIPPINES | BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY MAJOR IN INFORMATION SECURITY

- *Magna Cum Laude*
- Joined the 20th SIMP-AAG Joint Multidisciplinary Research Conference in Kuala Lumpur, Malaysia
- Champion, 5th SIMP-AAG BCP Research Festival, College Category
  Entitled: *Transport Network Vehicle Service: Logistic II (Vendor Portal, Audit Management, Vehicle Reservation, Fleet Management, Document Tracking)*

2017 - 2019
BESTLINK COLLEGE OF THE PHILIPPINES | INFORMATION AND COMMUNICATION TECHNOLOGY

- ICT top 3, Best in Science, Best in Computer Hardware.

WORK EXPERIENCE

2024 - PRESENT
BESTLINK COLLEGE OF THE PHILIPPINES | IT INSTRUCTOR

- Teaches core IT subjects including IT Fundamentals, Business Continuity, System Integration and Architecture 1, System Administration, Web Security, and Data Privacy and Security
- Developed curriculum modules aligned with industry standards and student learning outcomes
- Served as adviser to the champion team of the 9th SIMP-AARI-BCP Multidisciplinary Research Festival

CORE COMPETENCIES

-Project Management Tools
- DevOps Tools (Git, Jenkins)
- Systems Integration
- Curriculum and Module Development
- Assessment and Rubric Creation
- Critical and Problem Solving
- Leadership
- Research Advising and Capstone Supervision

I hereby certify that the above information is true and correct to the best of my knowledge and belief

RICHELN A. VILLASOR
Applicant

Appendix H : Researcher's Curriculum Vitae

OLGA TAMUNDO BERCASIO

0961 253 6291 olgabercasio18@gmail.com
Blk 225 Lot 19 Dirham St. Phase 8 North Fairview Quezon City

ABOUT ME

I am eager to grow in a professional environment where I can contribute, learn, and improve. I enjoy working with others, value collaboration, and always strive to stay organized and adaptable in every task.

EDUCATION

TERTIARY 2022 - Present	**Bachelor of Science in Information Technology** BESTLINK COLLEGE OF THE PHILIPPINES MAJOR IN NETWORK ADMINISTRATION
SECONDARY 2019 -2021	**Senior High School** AMA FAIRVIEW CAMPUS SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) STRAND
2014 - 2019	**Junior High School** NORTH FAIRVIEW HIGH SCHOOL
PRIMARY 2008 - 2014	**Elementary School** NORTH FAIRVIEW ELEMENTARY SCHOOL

TRAINING AND SEMINAR ATTENDED

NOVEMBER 2022	**NSTP Training Camp** SILANG CAVITE
APRIL 2023	**BITZ 2023: Accelerating the Innovators' Role in Digital Transformation** VISTA VENISE RESORT, MORONG BATAAN
MAY 2024	**Creation to Publication: From Scratch to a Book Spiel** MULTIMEDIA ARTS ASSOCIATION OF THE PHILIPPINES, MIMAROPA CHAPTER VIA ZOOM
AUGUST 2024	**Bestlink College of the Philippines 3rd Year Program Specific Seminar** VIA ZOOM
JULY 2025	**Bestlink College of the Philippines Research Forum 2025** VIA ZOOM

TECHNICAL SKILLS

- Capstone Leadership & Team Collaboration
- Design Tools (Draw.io, Canva)
- Fast Learner & Organized
- Document Handling (PDF, Word, PowerPoint)
- Basic Programming (HTML, PHP, CSS, JavaScript, MySQL)

REFERENCES

CAMMY MICKELLE TELAN
CAPSTONE PROJECT TEAMMATE
Phone: 09635092083
Social: cammyytelann@gmail.com

EARL JUSTINE LUSUNG
CAPSTONE PROJECT TEAMMATE
Phone: 09982365006
Social: justinelusung11@gmail.com

CAMMY MICKELLE BALANG TELAN

0963 509 2083 cammyytelann@gmail.com
#39 Elma Street, Barangay Commonwealth Quezon City, 1121

ABOUT ME

I am a hardworking and motivated person who wants to grow in a professional environment. I enjoy working with others, value teamwork, and always try to stay organized and flexible. I am eager to learn new things and do my best in every task I take on.

EDUCATION

Tertiary 2022 - Present	**Bachelor of Science in Information Technology** Bestlink College of the Philippines Major in Information Security
Secondary 2019 - 2021	**Senior High School** Commonwealth High School Accountancy, Business and Management (ABM) Strand
2015 - 2019	**Junior High School** Commonwealth High School
Primary 2009 - 2015	**Elementary School** Manuel L. Quezon Elementary School Adarna St, Commonwealth, Quezon City

TRAINING AND SEMINAR ATTENDED

November 2022	**NSTP Training Camp** Silang Cavite
April 2023	**BITZ 2023: Accelerating the Innovators' Role in Digital Transformation** Vista Venise Resort, Morong Bataan
May 2024	**Beachside Code Camp: Diving Deep into Tech Innovation** Subic, Zambales
December 2024	**Ascent to Innovation: Where Technology Meets Tomorrow** Teachers Camp Baguio
August 2024	**Bestlink College of the Philippines 3rd Year Program Specific Seminar** Via Zoom
July 2025	**Bestlink College of the Philippines Research Forum 2025** Via Zoom

SKILLS

- Fast learner and very willing to preserve and learn new ideas
- Design Tools (Canva, Draw.io)
- Computer -adept- application related to MS Office
- Low-level Programming

REFERENCES

Camille Anne Herrera
Software Engineer
Phone: 0927 302 9559

Anna Marie Bañez
Customer Service Representative
Phone: 0936 497 1383

ROY VALLE

ABOUT ME

Age: 28

Birthday: march 2 1997

Gender: Male

Status : Married

CONTACT

09499508447

royzxcasd@gmail.com

phs 7c blk 58 lot 11 pkg 7
bagong silang caloocan city

SKILLS

- Teamwork
- Time Management
- Leadership
- Effective Communication
- Critical Thinking
- Hardworking

REFERENCE

cherie mae valle

Phone: 09077100481

Email : cheriemaelabanza@gmail.com

PROFILE

Hardworking 4th year IT student with NCII certification in Computer Hardware Servicing and extensive experience in the fast food industry since 2017. Skilled in computer troubleshooting, hardware maintenance, and basic programming. Proven ability to balance academics and employment, demonstrating strong discipline, teamwork, and customer service skills.

WORK EXPERIENCE

JOLLIBEE

service crew — 2022 - Present

- Cooking - grilling burgers, frying chicken, making fries, assembling sandwiches.
- Portioning - measuring and preparing servings according to standard recipes.
- Maintaining Cleanliness - washing utensils, sanitizing counters, keeping kitchen tidy.
- Stock Management - checking supplies, refilling ingredients, storing items properly.
- Dishwashing - cleaning plates, trays, and kitchen equipment.
- Following Food Safety Standards - proper handling of food, wearing gloves/hairnets, avoiding contamination.

EDUCATION

Bestlink college of the philipines — 2022 - Present

bachelor of science information technology

Caloocan City Manpower Training Center — may 5 2014 - aug 29 2014

Computer hardware service

Tala high school — 2009 - 2013

High school student

EARL JUSTINE P. LUSUNG

ABOUT ME

As a student of Bestlink College of the Philippines, I am responsible for completing tasks, doing things well, and collaborating with my group members and my classmates.

EDUCATION

- 2016 - 2020
  San jose national highschool
- 2020 - 2022
  Datamex college of saint adeline
- 2022 - 2026
  Bestlink college of the philippines

SKILLS

- Wed developer
- Application developer
- Game developer
- Graphic designer
- Video Editor

WORK EXPERIENCE

CONTACT

09982365006

justinelusung11@gmail.com

San miguel st. grp13 Area B Payatas Q.C

REFERENCE

- MARLYN LUSUNG
  09566186802
  Marlynlusung@gmail.com
- LORRAINE ANIKA LUSUNG
  09351020114
  lorraineanikakatelusung@gmail.com

KLYDE NASH FLORES

ABOUT

I am a motivated individual who is eager to learn and grow. I may not have formal work experience yet, but I am willing to work hard, adapt quickly, and contribute positively to any team I become part of.

CONTACT

+63 9051603941

klydenashflores3@gmail.com

INTEREST

Streaming
Driving
Traveling

EDUCATION

Kalayaan ES
2010- 2016

Kalayaan NHS
2016- 2019

Saint Francis Technical Institute
2019- 2021

Bestlink College Of The Philippines
2021- 2025

EXPERINCE

Team Captain E-sports Team
2019-2021

Live Streaming
2023-2025