# TRANSPORTATION NETWORK VEHICLE SERVICE: SMART ADMINISTRATIVE FRAMEWORK FOR COMPLETE MANAGEMENT CONTROL WITH AI-SUPPORTED DECISION MAKING

A Capstone
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The College of Computer Studies
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Bachelor of Science in Information Technology

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**Part 1.0 Introduction**

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# Chapter 1

## INTRODUCTION

### 1.1 Background of the Capstone Project

An Executive Information System (EIS) is a specialized information system used by executives to monitor the overall performance of the organization. When applied to Transportation Network Vehicle Services Smart Administrative Framework for Complete Management Control, an EIS focuses on providing real-time insights into key operational areas to ensure optimal management, decision-making, and control over the various facets of the service.

The Smart Administrative Framework for Complete Management Control Proposal is a comprehensive system designed to streamline the operations of transportation and logistics vehicles (TNVS). It includes modules for document management, communication management, user management, event management, financial management, facility management, contract management, legal management, compliance management, and security management. The system provides real-time insights for better decision-making, increased operational efficiency, enhanced regulatory compliance, improved user experience, centralized management control, proactive risk management, cost optimization, and scalability. It allows executives to have full control over contracts, events, finances, and facilities without juggling multiple systems. The system also provides early alerts about potential issues, ensuring that all necessary permits, legal contracts, and driver certifications are up-to-date. The framework can be expanded as the business grows, allowing for the addition of more drivers, vehicles, and regions without overwhelming the management process.

The Smart Administrative Framework for Complete Management Control Proposal offers several benefits, including real-time insights for better decision-making, increased operational efficiency, enhanced regulatory compliance, improved user experience, centralized management control, proactive risk management, cost optimization, and scalability. The system provides real-time data and insights across all areas, reducing operational obstacles and ensuring up-to-date permits, legal contracts, and driver certifications. It also provides a unified platform for managing all facets of the TNVS business, allowing executives to have full control over contracts, events, finances, and facilities. The system also automates compliance, legal, and security monitoring, providing early alerts about potential issues. The smart administrative framework can be expanded as the business grows, allowing for more drivers, vehicles, and areas. The capstone project would provide a comprehensive Smart Administrative Framework that gives executives total control and ensures TNVS runs smoothly, complies with regulation, and grows sustainably. It would do this by implementing an Executive Information System (EIS) integrated with these management modules.

## 1.2 Context and Scope

Such a system was conceived to assist the TNVS administrator, who is beset by problems of information overload, tiring manual processing of data, and lacking real-time insights into the situation. What would normally be done by a TNVS administrator to predictively maintain, detect fraudulent activities, and optimize routes was developed to use an AI-powered framework. We were confident that with such empowerment of the administrators, who are assured of having comprehensive control with

data-driven insights, better and more precise decisions will be generated that would enhance overall efficiency. While our focus was initially confined to the administrative aspects of TNVS, we believe our project holds immense potential to positively influence the core business operations. By leveraging the power of AI, we aim to enhance operational efficiency and significantly improve safety standards.

### 1.3 Problem Statement

In taxi services relying on manual process may create various of problems for administrators which can negatively impact both daily operations and its overall performance, the problems they faces are:

1) Time consuming process: Employees have to type or record the info by hand like logging trips.
2) Data loss and Poor Record Keeping: Paper records may cause data to get loss, damaged or misplaced.
3) Limited customer services: lack of customer services may lead to increase of workload for the staffs and customers dissatisfaction.
4) Compliance and Regulatory : manually checking the rules and regulations for vehicle and driver may cause fines and penalties
5) Lack of Departments Collaboration: The absence of connection results in inefficiencies, slow decision-making, and wasted resources.

### 1.4 Objective and Goals

The targets and aims for a new TNVS system that is envisioned to simplify processes, improve safety and increase productivity through the use of automation, GPS tracking and a single database.

**Chat Bot:** can streamline TNVS administrative processes by automating routine tasks, providing information, and facilitating communication, freeing up human staff for more complex issues and improving efficiency.

**Secured Record keeping:** The developers would use a digital safe storing for records, history of the trips, passengers information, and data.

**Tracking and Monitoring:** A central system that will able to track the vehicle maintenance, driver schedule and their

Availability, this would also securing the passenger and the driver by monitoring and tracking them.

**Automated Trip Logging**: This would automatically track and record the trips that was made by the driver or their vehicle.

**Alerts and Notification:** A system were automated real time alerts to the admin and to drivers for their requirements.

**Smart Administrative:** Automation can simplify operations by offering a centralized platform for accessing and exchanging information among all departments

### 1.4 Significance and Relevance

The significance of our system lies in how it has the potential to alter the handling of TNVS operations through automation and data analytics, granting improved security and safety through verification processes on the driver and the vehicle, real-time tracking information, and ensuring passengers' safety and security while improving the passenger experience by quickly dispatching rides, efficient routes, and providing data-driven insights for business growth. Ride-sharing has become one of the most

popular and in-demand services all over the world and in our nation. It has become one of the means of transportation and requires proper management. This can be an extensive, sustainable, and future-ready solution for the ever-growing demand of TNVS.

## 1.5 Structured of the Document

### Chapter 1: Introduction

**1.1** Background of the Capstone Project: This section introduces the Smart Administrative Framework for TNVS management, outlining its core features and benefits. It emphasizes the role of the Executive Information System (EIS) in providing comprehensive control.

**1.2** Context and Scope: This section explains the motivation behind developing the system, highlighting the challenges faced by TNVS administrators and how the proposed solution addresses them. It also mentions the potential for the project to influence core business operations and enhance safety standards.

**1.3** Problem Statement: This section identifies the specific problems that the project aims to solve, focusing on the inefficiencies and limitations of manual processes in TNVS operations.

**1.4** Objective and Goals: This section outlines the project's objectives and specific goals, including centralizing administrative functions, developing an advanced data integration system, improving resource utilization, and automating key tasks.

**1.5** Significance and Relevance: This section explains the project's importance and its potential impact on the TNVS industry, emphasizing the

growing demand for ride-sharing services and the need for a comprehensive management solution.

**1.6** Structure of the Document: This section provides a roadmap for the document's organization, outlining the subsequent sections that will delve into technical details, development process, testing, results, evaluation, and lessons learned.

**Chapter 2: Literature Review**

**2.1** Overview of the Agile Scrum Methodology: This section provides a background on the Agile Scrum methodology and its relevance to the project, discussing its principles, benefits, and key roles.

**2.2** Enterprise Architecture Concepts: This section introduces the concept of Enterprise Architecture (EA) and its application to the TNVS system, explaining its core principles and outlining the different areas of architecture within EA.

**2.3** Micro services Architecture: This section provides an overview of micro services architecture and its relevance to the TNVS system, discussing its benefits and outlining common administrative tasks, third-party APIs, and internal APIs.

**2.4** DevOps CI/CD: This section explains the principles and benefits of DevOps CI/CD (Continuous Integration and Continuous Deployment) in the context of TNVS management, highlighting its key principles, benefits, and challenges.

**2.5** Relevant Studies and Research: This section provides a brief overview of relevant research and studies related to TNVS and transportation management, highlighting key findings and insights.

**2.6** Integration of Information Systems in Enterprise Environment: This section explains the integration of different information systems within the TNVS administrative framework, outlining key systems to be integrated and their benefits.

**Chapter 3: Methodology**

**3.1** Agile Scrum Method in Projects: This section details the use of Agile Scrum methodology for the project, explaining its principles, key practices, and how it will be adapted for the project's specific needs.

**3.2** Roles and Responsibilities: This section outlines the roles and responsibilities of the project team members, including the Product Owner, Programmer, Lead Programmer, System Analyst, Document Analyst, Business Analyst, Security Analyst, Scrum Master, and Development Team.

**3.3** Sprint Cycles: This section describes the planned sprint cycles for the project, outlining the specific tasks and goals for each sprint.

**3.4** Scrum Artifacts: This section presents the project's Scrum artifacts, including the Product Backlog, User Stories, and Sprint Backlog, demonstrating the detailed planning and prioritization of tasks.

**3.5** Microservices Architecture: This section will likely delve into the specific implementation of microservices architecture for the TNVS system, outlining the key services, their functionalities, and how they will interact.

**3.6** DevOps Implementation: This section will likely discuss the implementation of DevOps CI/CD principles for the project, outlining the tools and practices that will be used.

**3.7** Integration Approach for Information Systems: This section explains the data-centric integration approach for the TNVS system, outlining the use of standardized data formats, APIs, and data mapping rul**es.**

**3.8** Introduction to TOGAF and the Four Architectural Domains: This section introduces TOGAF (The Open Group Architecture Framework), explaining its principles, key components, and its relevance to the TNVS project. It also outlines the four architectural domains (Business Process, Application, Data, and Technology) and how they will be applied to the project.

**3.9** The focus of the ground-breaking TNVS system we developed is towards enhancing the safety of users by offering an easy to use mapping tool that will give constant details on routes, the traffic and other dangers that may occur. We seek to improve existing systems by looking for the required capabilities and the new features during two months last a month of testing and another month to introduce the new version in order to assess the differences.

**Overall Structure:**

This document follows a logical structure, starting with an introduction to the TNVS administrative framework, its context, and objectives. The literature review provides background information on relevant methodologies, concepts, and research. The methodology section outlines the project's approach, including the chosen development methodology, team roles, and sprint cycles. The document will likely continue with chapters covering the project's technical details, development process, testing, evaluation, and conclusions.

# Chapter 2

## LITERATURE REVIEW

### . 2.1 Overview of the Agile Scrum Methodology

The first foundational book was Agile Manifesto by Beck et al. in 2001. It depicts 12 principles for summarizing the agile approach, which is considered a landmark document (Paluch et al. 2020)

Agile methodologies have become essential in modern project management, enabling teams to adapt, collaborate efficiently, and deliver results incrementally. Compared to traditional methods, Agile reduces project failures and enhances success across industries. (Vučeković & Avlijaš, 2020)

Agile is flexible and adaptable to changes in requirements compared to traditional approaches. Agile enables the flexibility of redirecting or changing the direction based on newly perceived or updated information or shifting market conditions, which are very important in a fast business world. (Zasornova, Lysenko, & Zasornov, 2022).

Collaboration, transparency, and continuous improvement significantly impact organizational benefits. Agile frameworks empower individuals to be self-organizing, leading to higher involvement and productivity. (Wafa, Khan, Malik, Abdusalomov, Cho, & Odarchenko, 2022).

The Scrum framework is a widely adopted Agile approach known for its structured yet flexible nature. It operates on the principle of sprints, short, time-boxed periods where teams collaborate to complete a set amount of work. Key roles within the framework include the Scrum Master, facilitating the process, the Product Owner representing stakeholders, and the Development Team focused on delivering product increments. Scrum's adaptability makes it particularly effective in projects with evolving requirements, allowing for rapid adaptation and iterative development (Zasornova, Lysenko, & Zasornov, 2022).

## REFERENCES

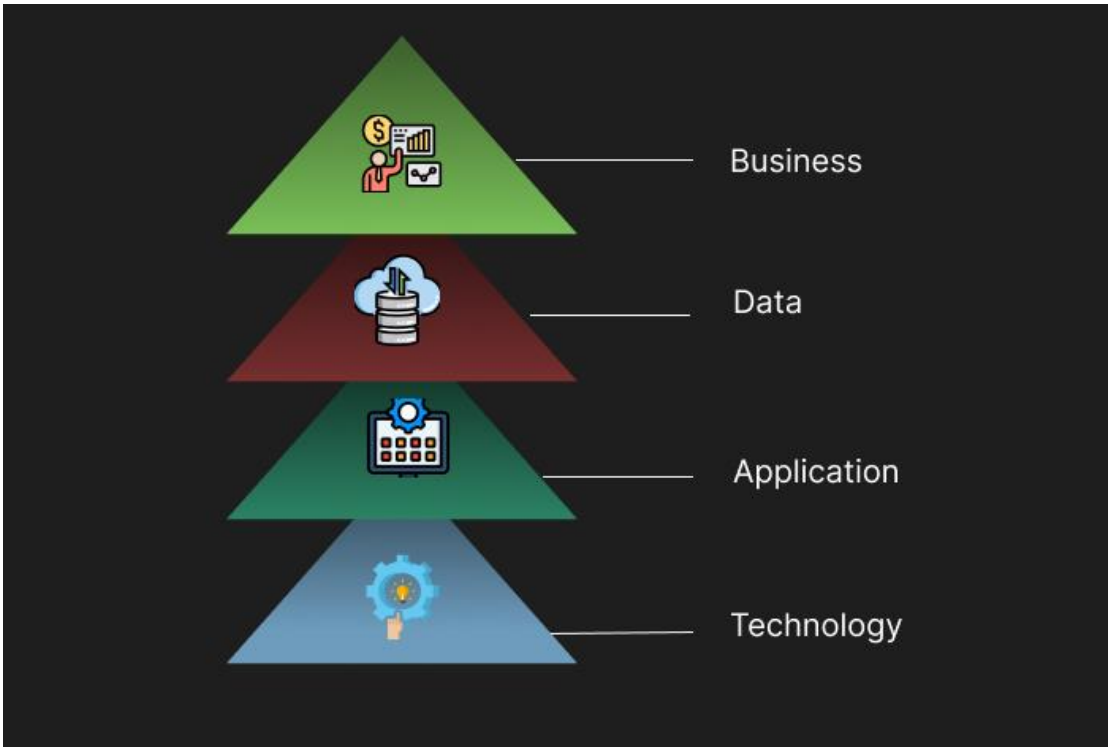
Avlijaš, G. (2020). Modern approach to project management, usage, and success rate of agile methodologies: An evidence from Serbia. In Sinteza 2020-International Scientific Conference on Information Technology and Data Related Research (pp. 154-159). Singidunum University. DOI: 10.1530sinteza-2020-154-159.

Paluch S, Antons D, Brettel M. The role of agile approaches in modern organizations: A theoretical and empirical investigation. J Bus Res. 2020;106:489-501. doi:10.1016/j.jbusres.2018.12.051

Wafa, R., Khan, M.Q., Malik, F., Abdusalomov, A.B., Cho, Y.I., & Odarchenko, R. (2022). The impact of agile methodology on project success, with a moderating role of Person's job fit in the IT industry of Pakistan. Applied Sciences, 12(21), 10698.

## 2.2 Enterprise Architecture Concepts

The basic concepts of Enterprise Architecture or EA




### Business Architecture

AbcTaxi aims to have a market expansion as they don't have a system that will help them to join on the technology generation, they also want to improve their customer service as they needed a system to manage the data, passengers and help the company to grow. They need a system that they will use on their daily basis as they still use the old ways to run their businesses. Admin users, drivers, passengers, management, and IT staff are the key stakeholders that the company will have. Objectives of the system will be the Reducing response times for admin tasks, Increasing driver and passenger satisfaction and Ensuring compliance with

regulations, this will be the one of the most important objectives that the company must have in order to grow

TNVS Admin System will have a core capabilities such as: User management for registration, onboarding, and support, Ride management for tracking, reporting, and performance analysis and Reporting and analytics for feedbacks of the costumers.

**Data Architecture**

TNVS Admin system aims to achieve to properly manage the data's of the users, managing data's that they have and giving them a precise and accurate data that they have. User's data, driver's and vehicle data etc. will be covered on the TNVS Admin system.

All the data's will be coming from the user's registrations, ride request and payment processing, their data's will be organize by the programmers and their data's are all stored on a database system. This data will be integrated across the EIS and can be used on a certain situations, this also will have a real-time updates as the other sectors will need this info on their own premise.

**Application Architecture**

TNVS Admin system aims to have a user friendly application that the users can used, this will serve as the main process of the business of the Admin, they will have a admin data operations and enabling data driven decision making. User management, ride tracking, and other data's that will come to our company will be handled by the admin. Also, IT staff, users, drivers and passengers are the key stakeholders of our system and they will help the company to grow.

The system will support the user on boarding and management, Ride monitoring and management, Reporting and analytics and Customer support management this will be the functionalities that the system support and for the non-functionalities are performance, scalability, security, usability, and compliance requirements. User will have an admin page only for them to see, it includes the dashboard for managing users, rides, and reports. User management system for handling driver and passenger profiles, Ride Management System for tracking and managing rides and Reporting and Analytics Tools for generating insights and performance metrics. Also, data's will come from the other system that our EIS will have like human resources and core that handles data's of the customers.

**Technology Architecture**

TNVS Admin system aims to enhance the operational efficiency by having a system that runs the company into the world of technology, streamlining the business process of the company and make it more user friendly on the customers while improving the data management of the company by having a databases that will store there data's and information. IT staff, users, drivers and passengers are the key stakeholders of our system and they will help the company to grow.

Having a TNVS System will be a great help for the company to compete on the world of technology, from having a system or application that will streamline the company work to having a database system that store their data's. The company will provide a system for user's management, a system that is user friendly to help them understand more and focus on the important things to navigate the system.

Enterprise Architecture help business to align it with IT infrastructure, EA gives helps us how to successfully make our business into IT world and gives us what are the challenges that our business will be faced.

Enterprise architecture (EA) in the context of transport network vehicle services encompasses a structured framework that facilitates the integration and management of various components and services within the transportation sector. This framework is crucial for enhancing operational efficiency, improving customer service, and integrating new technologies into existing systems. One of the primary functions of enterprise architecture in transportation is to streamline customer service operations. Hindarto highlights the importance of EA in enhancing customer service within the transportation industry, identifying both the benefits and challenges associated with its implementation. The study emphasizes that effective EA can lead to improved service delivery and customer satisfaction, while also addressing obstacles such as resistance to change and the need for skilled personnel (Hindarto, 2023). This aligns with the findings of Wurtz and Sandkuhl, who propose an EA approach that integrates demand-responsive services into traditional public transport systems, thereby enhancing flexibility and responsiveness to customer needs (Wurtz & Sandkuhl, 2023).

**Reference**

Enterprise Architecture for Integration of Demand-Responsive Services in Public Transport M. Susan Wurtz1, Kurt Sandkuhl2 2023CSIMQ

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## 2.3 Micro services Architecture

1. Dai et al (2022) Microservice composition is a promising solution for developing sustainable CPSs. Compared to the traditional service-oriented architecture, microservice architecture (MSA) decomposes a monolithic application into a set of lightweight microservices and allows these microservices to be developed, deployed, executed, and modified independently

2. Alshuqayran et al., (2023) Microservice architecture is considered a dominant architectural style in current software systems. It views a software system as a collection of small and independent services called microservices. In the highly dynamic enterprise domain, new features have to be introduced regularly and the microservice architectural style achieves quick time-to-market.

3. Megargel et al., (2020) Micro services architecture, which adopts some of the concepts and principles from service oriented architecture, provides a number of benefits when developing an enterprise application as compared to a monolithic architecture. Micro services architecture offers agility and faster development and deployment cycles, scalability of selected functionality, and the ability to develop solutions using a mixture of technologies.

4. Vera-Rivera et al (2023) Micro services is an architectural style for service-oriented distributed computing, and is being widely adopted in several domains, including autonomous vehicles, sensor networks, IoT systems, energy systems, telecommunications networks and telemedicine systems. When migrating a monolithic system to a micro services architecture, one of the key design problems is the “micro service

granularity definition", i.e., deciding how many micro services are needed and allocating computations among them.

## 2.4 Devops CI/CD

The Transportation Network Vehicle System (TNVS) is a transportation system designed to integrate software development, IT operations, and management control systems. The system aims to maintain high availability, performance, and security while allowing seamless application of new features, updates, and automation. Key elements of the CI System include software development, infrastructure management, monitoring and alerts, IT operations maintenance and scaling, and a smart administrative framework.

Software development involves creating new features, patches, and updates for the TNVS application, while a version control system stores source code and manages branches. Automated testing ensures that new features do not introduce bugs or performance issues. Infrastructure management involves managing the infrastructure for the TNVS application, including cloud services and on premise servers. Continuous deployment reduces downtime and ensures constant availability. Monitoring tools like Samsara, Fleetio, Slack, or Zenith monitor the performance of deployed updates, server load, and network traffic.

IT operations maintenance and scaling involve automated rollbacks, database management, and scaling capabilities for transportation data. The Smart Administrative Framework provides a comprehensive dashboard for administrators to monitor system health, user activity, driver performance, and vehicle status in real-time. Security integration includes

secure data transmission, authentication and authorization, and continuous vulnerability scanning.

Feature update and management control include feature toggles, real-time analytics on updates, and feedback for users. The system also supports real-time feedback on changes and allows for easy scheduling of new features or services without requiring downtime.

## 2.5 Relevant Studies and Research

1. Gumasing et al. (2022) explores the service quality of electric tricycle (e-trike) operations in Metro Manila, highlighting the potential of e-trikes as a sustainable transportation option. The research employs stepwise regression analysis to develop a service quality model, indicating that user satisfaction is influenced by factors such as reliability, safety, and comfort.

2. Perez et al (2021) enhancing policy capacity through co-design in local public transportation provides valuable insights into the role of local governments in transportation management. Their findings indicate that collaborative approaches can significantly improve policy implementation and service delivery in the transportation sector, which is crucial for the effective management of transportation networks.
3. Lu et al (2022) analysis of transport and vehicular crash cases reveals critical insights into the safety challenges faced by the Philippine transportation system. Their findings

advocate for the establishment of exclusive motorcycle lanes to reduce fatal injuries, highlighting the need for data-driven decision-making in transportation planning.

4. M. A. Hossain (2021) this paper examines the rapid growth of ride-hailing services in Southeast Asia, focusing on the opportunities and challenges for sustainable mobility. The authors analyze the impact of TNVS on traffic congestion, air pollution, and public transportation systems.
5. S. Zhang (2022) the impact of ride-hailing on the taxi industry in the United States and China, focusing on the competitive dynamics and regulatory responses. The authors analyze data from both countries, examining the market share of ride-hailing services, taxi driver earnings, and the evolution of regulatory frameworks.
6. S. A. Khan (2023) the regulatory challenges of cross-border ride-hailing services, proposing a framework for regulating these services in the digital age. The authors analyze the existing regulatory frameworks governing cross-border transportation services, highlighting the limitations of traditional approaches in addressing the complexities of TNVS.

## 2.6 Integration of information System in Enterprise Environment

This are the IT systems that our system integrate into to be a full functional website.

**Data Integration System**: This will be the part of combing the data from various resources for the admin system, this will also have the service history that our company have on our customers.

**Admin Dashboard:** This will allowed the admins to have a access to crucial information that the system specifically needs and this will also show the overview of the data that the company has. Admin Dashboard have a detailed data that our company have.

**Inventory Management System:** This will track the vehicles that we have and service inventory

**Crud System:** This system will create, read, update, delete data's that the company have, it will help us to have a choice if the customers or the admin have to edit or delete a user's data.

**Centralized Management System:** This can be used to view sales data, customer interactions etc.

By integrating these systems, our system will enhance our data management capabilities and have a well-rounded website.

# Chapter 3

## METHODOLOGY

### 3.1 Agile Scrum Method in Projects

Agile Scrum is the best methodology for our Capstone project since it has an iterative and incremental approach to development, which provides flexibility, collaboration, and continuous improvement.

**Sprint 1: Initial Concept & Planning**

**Task 1:** Virtual Meeting for Brainstorming & Idea Sharing

Agile Principle: Collaboration & Communication

Implementation**:** Use a virtual platform like Zoom or Google Meet to bring together your team (developers, designers, marketers, operations) to brainstorm ideas for the TNVS platform. Focus on user needs, target market, and potential features.

**Task 2:** Creating Titles & Project Names

Agile Principle: Customer Focus

Implementation: Involve stakeholders (potential drivers, passengers, investors) in the process of creating catchy titles and project names. This ensures the brand resonates with your target audience.

**Task 3**: Conducting Interviews

Agile Principle: Customer Feedback

Implementation: Conduct interviews with potential drivers and passengers to understand their needs, pain points, and expectations for a

TNVS platform. Use this feedback to inform your design and development decisions.

**Task 4**: Resources & Technology

Agile Principle: Planning & Prioritization

Implementation: Create a list of necessary software and hardware resources, prioritizing those essential for building the initial version of the platform. This might include cloud hosting, development tools, design software, and mobile app development frameworks.

**Task 5:** System Planning

Agile Principle: Iterative Development

Implementation: Begin planning the core system architecture, focusing on key functionalities like user registration, ride requests, payment processing, and driver management. Keep the initial scope manageable and plan for future iterations.

**2. Sprint 2: Design & Prototyping**

**Task 6:** Documentation

Agile Principle: Transparency & Communication

Implementation: Create initial documentation for the system architecture, user flows, and key features. This will help ensure clarity and consistency during development.

**Task 7:** Design & Prototype

Agile Principle: Working Software

Implementation: Design the user interface (UI) and user experience (UX) for both the driver app and passenger app. Create interactive prototypes to test the flow and get feedback from stakeholders.

**3. Sprint 3: Development & Testing**

**Task 8:** Development

Agile Principle: Iterative Development

Implementation: Start developing the core functionalities of the platform based on the design and prototype. Use an Agile framework like Scrum or Kanban to manage tasks and track progress.

**Task 9**: Testing & Debugging

Agile Principle: Continuous Improvement

Implementation: Conduct regular testing throughout the development cycle. Use automated testing tools to catch bugs early on. Incorporate user feedback from the prototypes to refine the app's functionality.

**4. Sprint 4: Deployment & Feedback**

**Task 10:** Deployment

Agile Principle: Deliver Working Software

Implementation: Deploy the initial version of the platform for testing and feedback. This could be a limited beta launch with a small group of drivers and passengers.

**Task 11**: Gather Feedback & Iterate

Agile Principle: Customer Focus

Implementation: Gather feedback from beta users on the platform's usability, features, and performance. Use this feedback to plan future sprints and prioritize improvements for the next iteration.

### 3.2 Roles and Responsibilities

Transportation Network Vehicle Services (TNVS): Smart Administrative Framework for Comprehensive Management Control A centralized platform or system intended to oversee, monitor, and optimize every facet of a TNVS operation is most likely what is meant to be understood when discussing a Smart Administrative Framework in relation to TNVS.

A variety of topics would be covered by the framework, such as customer relations, driver management, vehicle monitoring, and regulatory compliance. In the process of creating or maintaining an intelligent administrative framework for TNVS, the following is how the roles could function:

| **Roles** | **Responsibilities** |
|---|---|
| **Product Owner:** | The product owner represents the business side, ensuring the team prioritizes the most impactful aspects and manages the product backlog. They prioritize administrative control features like driver assignment, vehicle location monitoring, fare rates, payment systems, and transportation laws. They prioritize initiatives like route efficiency and new capabilities. |

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| | The product owner maintains and orders the backlog, collaborates with stakeholders, and decides on the team's alignment with the intended result. They ensure everyone understands the business value of user stories. |
| **Executive Leadership:** | This includes the CEO, COO, CFO, and other C-level executives who guide overall strategy and operations. |
| **Marketing and Communications:** | · Teams that manage branding, customer engagement, and promotional strategies to attract riders and drivers. |
| **Operations Management:** | Teams focused on day-to-day operations, ensuring smooth service delivery and addressing any logistical challenges. |
| **Programmer:**<br><br>**Jaybie E. Sosmeña** | Write, test, and maintain code for applications related to transportation services. Collaborate with other developers to integrate systems and features.<br><br>Debug and troubleshoot software issues. Participate in code reviews |

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| | to ensure code quality and adherence to standards. |
| **Lead Programmer:**<br><br>**Jeremy Torres** | Oversee the programming team and ensure project deadlines are met. Provide technical guidance and mentor-ship to junior programmers. Design software architecture and define coding standards. Coordinate with other teams to ensure alignment with business objectives. |
| **Legal and Compliance:** | Bring that the company adheres to local regulations, manages contracts, and mitigates legal risks. |
| **System Analyst:** | Analyze and document system requirements for vehicle management software. Assess current systems and recommend improvements. Collaborate with stakeholders to understand business needs and translate them into technical specifications.<br><br>Conduct feasibility studies and system testing. |
| **Document Analyst: Shariel Keila Pagdayunan** | Develop and manage documentation for software |

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| | projects, including user manuals and technical specifications.<br><br>Ensure documentation is clear, accurate, and accessible to all stakeholders. Implement version control for documentation to maintain consistency. Collaborate with technical teams to gather information for documentation purposes. |
| **Business Analyst:** | Gather and analyze business requirements related to transportation services. Act as a liaison between stakeholders and technical teams. Identify opportunities for process improvement and efficiency in operations.<br><br>Prepare business cases and assist in project planning. |

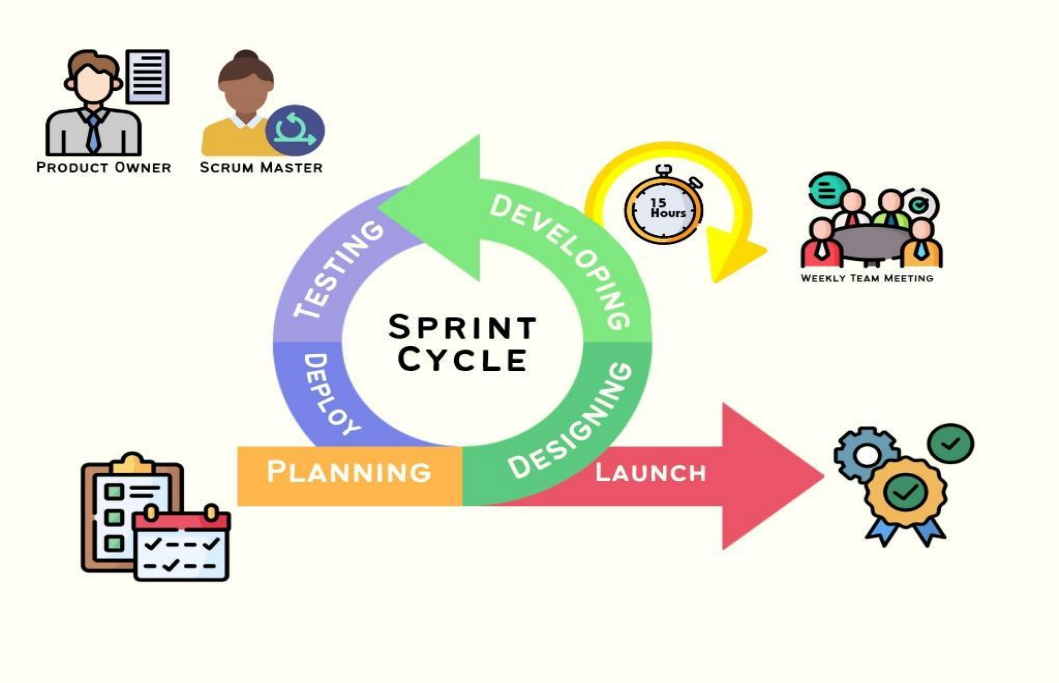
| | |
|---|---|
| **Security Analyst:** | Evaluate and enhance the security of transportation network systems. Monitor systems for vulnerabilities and respond to security incidents. Implement security policies and procedures to protect sensitive data. Conduct security audits and risk assessments. |
| **Scrum Master:**<br><br>**Divine Grace Bermejo** | Facilitate Scrum ceremonies (sprint planning, daily stand-ups, sprint reviews, and retrospectives). Help the team adhere to Scrum principles and practices. Remove obstacles that hinder the team's progress. Collaborate with the Product Owner to ensure a well-defined product backlog. |
| | |
| | |
| **Development Team:**<br><br>**Jaybie E. Sosmeña** | Collaborate to develop and deliver high-quality software solutions. Participate in sprint planning and backlog grooming sessions. Conduct unit testing and code reviews. Stay updated on emerging |

| | |
|---|---|
| | technologies to enhance product offerings. |
| **Web Designer:**<br><br>**Carl Angelo G. Antoy** | They're responsible for making websites look good, work well, and be easy to use. They start by understanding what the client wants and who their website is for. Then, they plan the layout, design the look and feel, and create interactive elements like buttons and menus. They also work closely with developers to make sure their designs are built correctly. Web designers are always learning about new trends and technologies to keep websites fresh and engaging for users. |

### 3.3 Sprint Cycles

Sprint Cycles

Weekly stand – ups and planning  sessions will be part in sprint cycles, to display the progress updates of the system.




**Sprint Cycles**

In developing the smart administrative system of TNVS the sprint cycle is organized in order to effectively work with its improvement and progress

Day 1 - 2 ( 2 days )

**Planning**

•Team Meeting for Ideas (1 hour)

•Brainstorming Session  (1 hour)

• Distribution of tasks, roles and responsibilities. (30 minutes)

• First prototype preparation (2 hours)

Day 3 - 5 ( 3 days )

**Designing:**

• Near - Ideal design for the UI (2 hours)

Discussions of potential designs with the project team (1 hour)

• User-friendly UI creation (2 hours)

• UI Designs development (2 hours)

Day 6 - 9 (4 days)

**Development**

• Front End: Building visual designs, responsiveness of the same. (5 hours)

• Backend : Databases, API's, and Domains setting. (6 hours)

• BPA Creation. (3 hours)

Day 10 - 12 ( 3 days)

**Testing**

• Testing the system (2 hours)

• Fixing bugs that may arise (2 hours)

• Unit Tests and Code reviews (2 hours)

• Receiving review from the users. (1 hour)

Day 13 - 17 ( 5 days)

**Deploy:**

• Preparing the system for deployment (2 hours)

• Final checks to ensure systems are ready (2 hours)

Day 18-20 ( 3 days)

**Launch**

• Activation of the system to public use (2 hours)

• Performance monitoring and Support Delivery. (2 hours)

### 3.4 Scrum Artifacts

Movers.com is a taxi company system that will help the people to navigate and have a user friendly application that they can use to easily have a companion on their safe rides. Movers.com wants to have a features that our users and stakeholders want. GPS for ride tracking, full background of their driver for safety purposes, an AI support to perform the data's of everything on our system, security and a user friendly system and app.Movers.com will provide the users wants and needs, we will continue to expand our system to make sure that our client is having a good time on using our system and having a safe ride from our drivers.

| User's Stories ID | User's Stories |
|---|---|
| **1** | As an Admin, I want my system to be easy to use so that I can manage the data that we have on our admin system. |
| **2** | As an Admin, I want my system to have tight security for my information so that I won't leak and I can assure that my information is safe. |
| **3** | As an admin, I want to view the list of all drivers' profiles and their status so that I can manage them. |
| **4** | As an Admin I want to review all the real-time rides so I can see if some drivers are not following. |
| **5** | As an Admin, I want to review the customers and drivers feedback on our system, so that I can improve our system. |
| **6** | As an Admin, I want to track the progress of steps of new drivers to ensure they complete all required steps before starting to work. |
| **7** | As an Admin, I want to see the accurate and real-time dashboard on our system, so that we can see if our system or our company is doing well. |
| **8** | As an Admin, I want my system to have alerts or notifications about events that we have to inform our customers and drivers. |
| **9** | As an Admin, I want my system to have a full control over my system, I want to have a create, delete, and read their information. |
| **10** | As an Admin, I want to have view feature that I can see the ongoing and completed trips. |

| | |
|---|---|
| **11** | As an Admin, I want a GPS that can see their real-time locations so I can record their rides. |
| **12** | As an Admin, I want to see any payment information that our drivers and passengers have. |
| **13** | As an Admin, I want to have a tracking and information about the incidents that the passengers and our drivers have on their trips. |
| **14** | As an Admin, I want to have a system that the driver can use to report any maintenance and any vehicle status. |
| **15** | As an Admin, I want to have a system that can track completion of the training record of the drivers of our company. |
| **16** | As an Admin, I want to have a system that can track the drivers and vehicles insurance. |
| **17** | As an Admin, I want to have an automated system for our back up data. |
| **18** | As an Admin, I want to have access to all of the information about our overall company and our system. |
| **19** | As an Admin, I want to have a system that provides training for the new admin users. |
| **20** | As an Admin, I want to have tracking for admin history and access patterns. |
| **212** | As an Admin, I want to have a record on all of system actions so i can track their actions on our system |
| **22** | As an Admin, I want to have search management for specific drivers or plate number for easy contact |

| | |
|---|---|
| **23** | As an Admin, I want to have rating system for the ride experience of the passenger |
| **24** | As an Admin, I want to have AI fraud detection for fake ride requests or unusual trip requests. |
| **25** | As an Admin, I want to have maps that suggest the best route for the fast services for customers. |
| **26** | As an Admin, I want to have AI real time chat or AI live chats for the passenger to ask questions. |
| **27** | As an Admin, I want to have AI predictive maintenance for decision making. |
| **28** | As an Admin, I want to have map that can detect the upcoming traffic for less problems for the passenger. |
| **29** | As an Admin, I want to have a partnership for e-banks for the payments of passengers. |
| **30** | As an Admin, I want my system to have all the data's I have will be encrypted. |

**Scrum Board**

| To do | In progress | Testing | Done |
|---|---|---|---|
| Design UI/UX for Admin site | | | ✓ |
| Design UI/UX for reporting dashboards. | | | ✓ |
| Develop a system for managing payment schedules. | ✓ | | |
| Ensure compliance with tax regulations. | ✓ | | |
| Use charts, graphs, and other visualizations to make data easier to understand | | | ✓ |
| Implement system for sending alerts, | ✓ | | |

| | | | |
|---|---|---|---|
| notifications, and updates. | | | |
| Allow administrators to log maintenance tasks and reports. | ✓ | | |
| Develop API endpoints for infrastructure maintenance management | ✓ | | |
| Implement Authentication | ✓ | | |
| Implement Communication management to other department | ✓ | | |

**Product Backlog**

| **PB ID** | **User's Stories** (Features) | **Users Top Priority** | **Status** |
|---|---|---|---|
| **1** | As an Admin, I want my system to be easy to use so that I can manage the | 5 | |

| | | | |
|---|---|---|---|
| | data that we have on our admin system. | | |
| **2** | As an Admin, I want my system to have tight security for my information so that I won't leak and I can assure that my information is safe. | 5 | |
| **3** | As an admin, I want to view the list of all drivers and their status so that I can manage them. | 4 | |
| **4** | As an Admin I want to review all the real-time rides so I can see if some drivers are not following. | 4 | |
| **5** | As an Admin, I want to review the customers and drivers feedback on our system, so that I can improve our system. | 5 | |
| **6** | As an Admin, I want to track the progress of steps of new drivers to ensure they complete all required steps before starting to work. | 5 | |
| **7** | As an Admin, I want to see the accurate and real-time dashboard on our system, so that we can see if our system or our company is doing well. | 5 | |

| | | | |
|---|---|---|---|
| **8** | As an Admin, I want my system to have alerts or notifications about events that we have to inform our customers and drivers. | 4 | |
| **9** | As an Admin, I want my system to have full control over my system, I want to have a create, delete, and read their information. | 5 | |
| **10** | As an Admin, I want to have a view feature that I can see the ongoing and completed trips. | 4 | |
| **11** | As an Admin, I want a GPS that can see their real-time locations so I can record their rides. | 5 | |
| **12** | As an Admin, I want to see any payment information that our drivers and passengers have. | 5 | |
| **13** | As an Admin, I want to have a tracking and information about the incidents that the passengers and our drivers have on their trips. | 5 | |
| **14** | As an Admin, I want to have a system that the driver can use to report any maintenance and any vehicle status. | 4 | |

| | | | |
|---|---|---|---|
| **15** | As an Admin, I want to have a system that can track completion of the training record of the drivers of our company. | 4 | |
| **16** | As an Admin, I want to have a system that can organize the drivers and vehicles insurance. | 5 | |
| **17** | As an Admin, I want to have an automated system for our backup data. | 5 | |
| **18** | As an Admin, I want to have access to all of the information about our overall company and our system. | 5 | |
| **19** | As an Admin, I want to have a system that provides training for the new admin users. | 3 | |
| **20** | As an Admin, I want to have tracking for admin history and access patterns. | 5 | |
| **21** | As an Admin, I want to have a record on all of system actions so i can track their actions on our system | 4 | |
| **22** | As an Admin, I want to have search management for specific drivers or plate number for easy contact | 4 | |

| | | | |
|---|---|---|---|
| **23** | As an Admin, I want to have rating system for the ride experience of the passenger | 4 | |
| **24** | As an Admin, I want to have AI fraud detection for fake ride requests or unusual trip requests. | 5 | |
| **25** | As an Admin, I want to have maps that suggest the best route for the fast services for customers. | 5 | |
| **26** | As an Admin, I want to have AI real time chat or AI live chats for the passenger to ask questions. | 4 | |
| **27** | As an Admin, I want to have AI predictive maintenance for decision making. | 4 | |
| **28** | As an Admin, I want to have map that can detect the upcoming traffic for less problems for the passenger. | 5 | |
| **29** | As an Admin, I want to have a partnership for e-banks for the payments of passengers. | 4 | |
| **30** | As an Admin, I want my system to have all the data's I have will be encrypted. | 5 | |

**Sprint Backlog**

| **User Stories ID** | **User Stories** | **Tasks** (Agile) | **Timeline** (hrs) | **Responsible Team Member(s)** |
|---|---|---|---|---|
| **1** | As an Admin, I want my system to be easy to use so that I can manage the data that we have on our admin system. | Developing User Friendly UI | 3 | Jaybie Sosmeña and Carl Angelo Antoy |
| **2** | As an Admin, I want my system to have tight security for my information so that I won't leak and I can assure that my information is safe. | Implementing Security Firewalls | 5 | Jaybie Sosmeña |
| **3** | As an admin, I want to view the list of all drivers and their status so that I can manage them. | Use Database Management System | 5 | Jaybie Sosmeña |
| **4** | As an Admin I want to review all the real-time rides so I can see if | Implement Map Integration | 5 | Jaybie Sosmeña |

| | | | | |
|---|---|---|---|---|
| | some drivers are not following. | and GPS systems | | |
| **5** | As an Admin, I want to review the customers and drivers feedback on our system, so that I can improve our system. | Implementing CRM and Employee Management System | 5 | Jaybie Sosmeña and Carl Angelo Antoy |
| **6** | As an Admin, I want to track the progress of steps of new drivers to ensure they complete all required steps before starting to work. | Implement Onboarding Management System | 4 | Jaybie Sosmeña |
| **7** | As an Admin, I want to see the accurate and real-time dashboard on our system, so that we can see if our system or our company is doing well. | Implementing Dashboard Frameworks | 5 | Jaybie Sosmeña |
| **8** | As an Admin, I want my system to have alerts or notifications about events that we have to | Event Management System | 5 | Jaybie Sosmeña, Carl Angelo Antoy |

| | | | | |
|---|---|---|---|---|
| | inform our customers and drivers. | | | |
| **9** | As an Admin, I want my system to have a create, delete, and read their information. | Full Management Control system | 10 | Jaybie Sosmeña, Carl Angelo |
| **10** | As an Admin, I want to have a view feature that I can see the ongoing and completed trips. | Tracking Management System | 5 | Jaybie Sosmeña |
| **11** | As an Admin, I want a GPS that can see their real-time locations so I can record their rides. | Tracking Management System | 5 | Jaybie Sosmeña |
| **12** | As an Admin, I want to see any payment information that our drivers and passengers have. | Financial Management System | 7 | Jaybie Sosmeña, Carl Angelo |
| **13** | As an Admin, I want to have tracking and information about the incidents that the passengers and our | Tracking Management System | 5 | Jaybie Sosmeña |

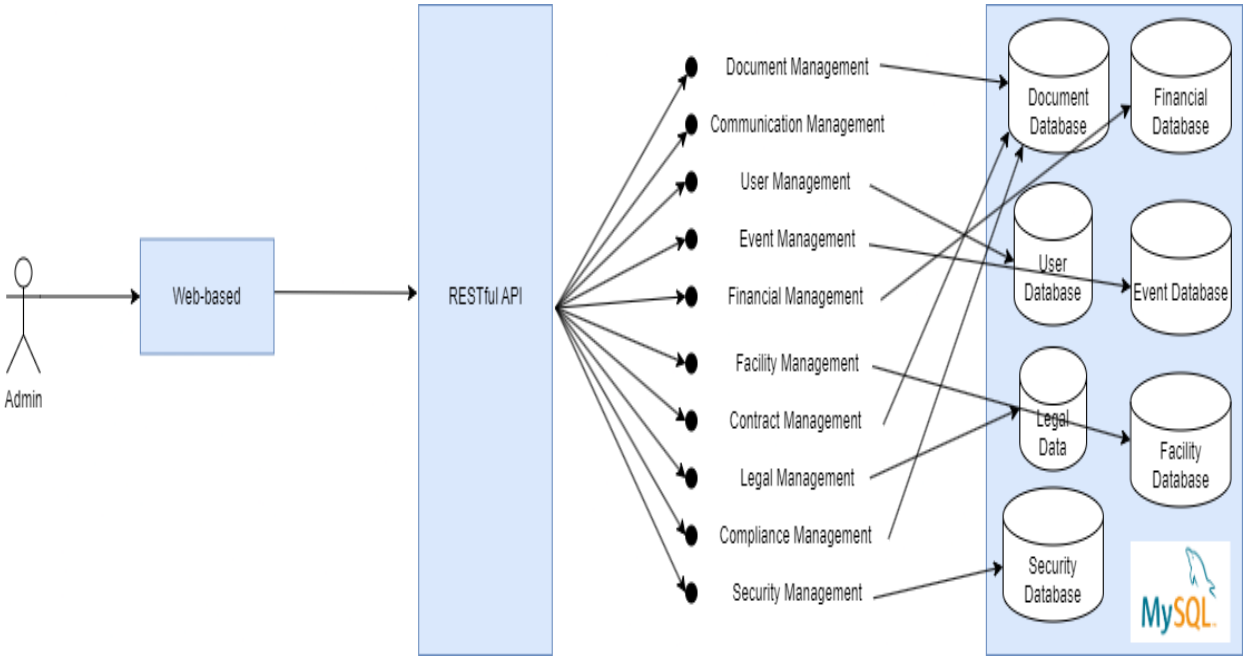
| | | | | |
|---|---|---|---|---|
| | drivers have on their trips. | | | |
| **14** | As an Admin, I want to have a system that the driver can use to report any maintenance and any vehicle status. | Report Management System | 5 | Jaybie Sosmeña, Carl Angelo Antoy |
| **15** | As an Admin, I want to have a system that can track completion of the training record of the drivers of our company. | Tracking Management System | 5 | Jaybie Sosmeña |
| **16** | As an Admin, I want to have a system that can track the drivers and vehicles insurance. | Tracking Management System | 5 | Jaybie Sosmeña |
| **17** | As an Admin, I want to have an automated system for our back up data. | Data Backup Management System | 7 | Jaybie Sosmeña and Carl Angelo Antoy |
| **18** | As an Admin, I want to have access to all of the information about | Full Management Control system | 10 | Jaybie Sosmeña |

| | | | | |
|---|---|---|---|---|
| | our overall company and our system. | | | |
| **19** | As an Admin, I want to have a system that provides training for the new admin users. | Trainee Management System | 4 | Jaybie Sosmeña and Carl Angelo Antoy |
| **20** | As an Admin, I want to have tracking for admin history and access patterns. | Tracking Management System | 5 | Jaybie Sosmeña |
| **21** | As an Admin, I want to have a record on all of system actions so I can track their actions on our system | Tracking Management System | 5 | Jaybie Sosmeña |
| **22** | As an Admin, I want to have search management for specific drivers or plate number for easy contact | Search Management System | 3 | Jaybie Sosmeña and Carl Angelo Antoy |
| **23** | As an Admin, I want to have rating system for the ride experience of the passenger | Rating Management System | 4 | Jaybie Sosmeña and Carl Angelo Antoy |

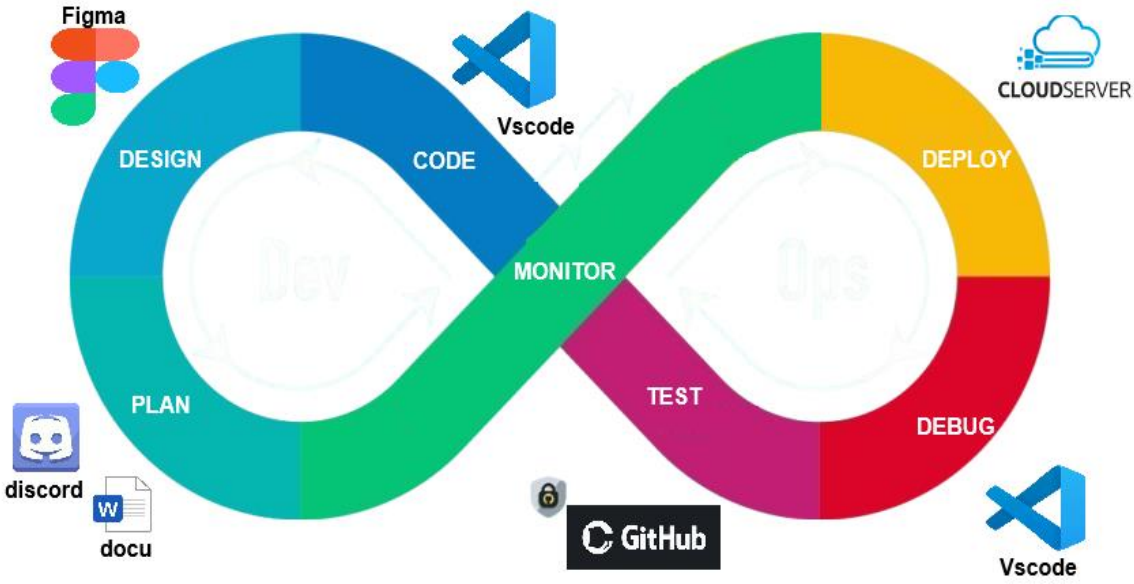
| | | | | |
|---|---|---|---|---|
| **24** | As an Admin, I want to have AI fraud detection for fake ride requests or unusual trip requests. | AI Fraud Detection system | 5 | Jaybie Sosmeña |
| **25** | As an Admin, I want to have maps that suggest the best route for the fast services for customers. | Map Detection System | 5 | Jaybie Sosmeña |
| **26** | As an Admin, I want to have AI real time chat or AI live chats for the passenger to ask questions. | Chat bot System | 7 | Jaybie Sosmeña |
| **27** | As an Admin, I want to have AI predictive maintenance for decision making. | Predictive Maintenance System | 7 | Jaybie Sosmeña |
| **28** | As an Admin, I want to have map that can detect the upcoming traffic for less problems for the passenger. | Map Detection System | 7 | Jaybie Sosmeña |
| **29** | As an Admin, I want to have a partnership for | Payment System | 5 | Jaybie Sosmeña |

| | | | | |
|---|---|---|---|---|
| | e-banks for the payments of passengers. | | | |
| **30** | As an Admin, I want my system to have all the data's I have will be encrypted. | Data Backup Management System | 7 | Jaybie Sosmeña |

### 3.5 Microservices Architecture



### 3.6 DevOps Implementation




**Planning**

Here we are making a document about our system that is still ongoing and based on our conducted information from the ABC company that we interviewed, we are looking for software and tools that can be used to create a responsive web-based system to meet all the product backlog that we took from ABC company.

**Designing**

We use the Figma site to facilitate our editing because there are tools to make the layout of the design easier in our system, in Figma you can see

the most details of the web base, and it makes it easier to find the size of the design.

**Coding**

Vscode (Visual Studio Code), here we code to create a web-based, when we are done with the design, the next step we will do is to create the function itself using vs code

**Testing**

We posted our codes on Github so that our group can instantly see what we are doing with the codes. This allows me to share my codes with other groups, and they can see the ongoing projects and tests using Github's (live website).

**Debugging**

When something goes wrong with our web-based application, we debug our code using Vscode.

**Deployment**

Cloud Server deployment, this is what the school offered us to utilize in our domain; this is where we placed our system to have our own web site.

**Monitoring**

When the deployment is done on the domain, we will pay close attention to the performance, and observe the system to find the issue on our system. User feedback will also be collected to examine the usability of the application, and any problem identified will be addressed in the appropriate course of action so as to improve the overall experience. Our objective is solve the system functionality for all users.

**CI/CD**

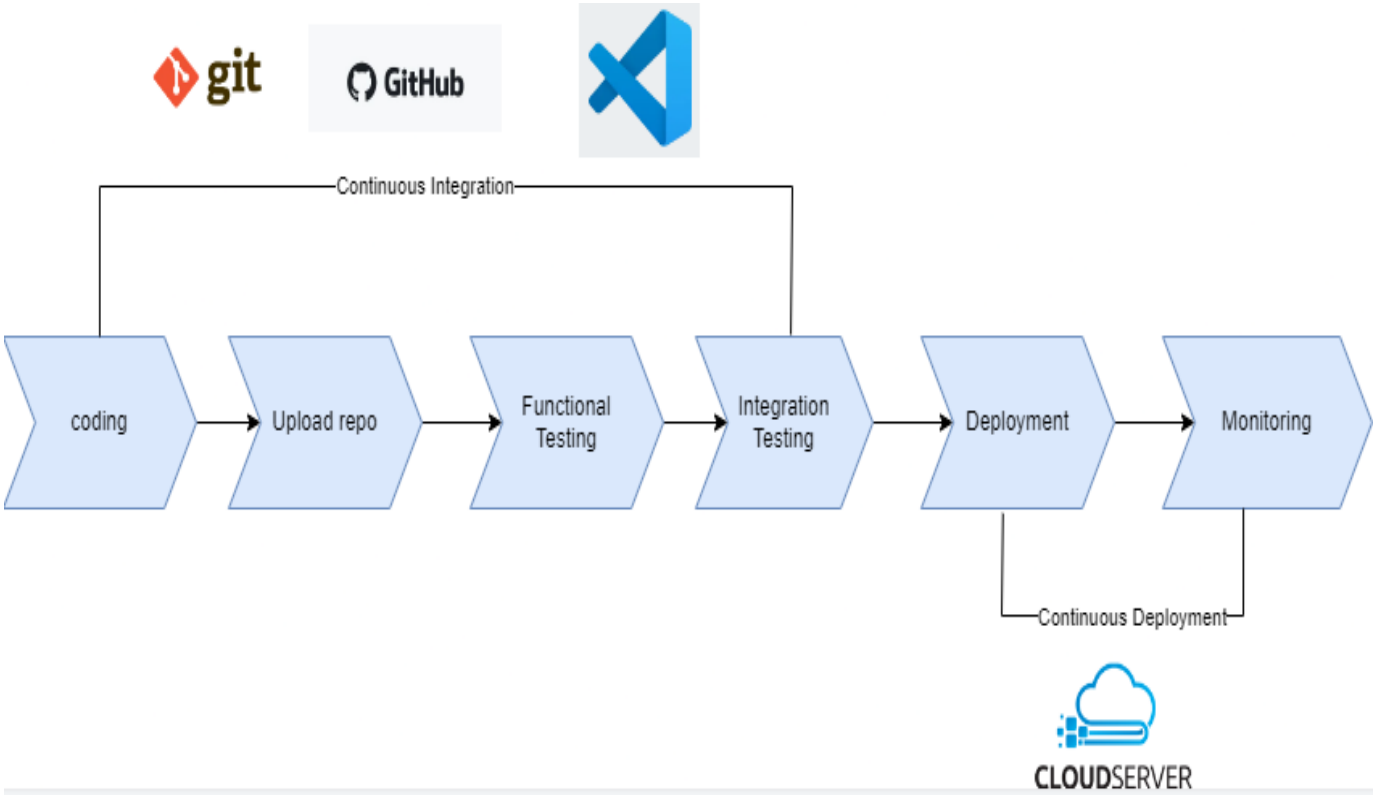
**Continuous Integration**

- We use vscode to develop the system, which we uploaded into the GitHub repository.
- When we complete working on another component of the system, we save it to the GitHub repository.
- Using git, we commit our code and alter the file in the GitHub repository.
- VS Code has set up git to connect our VS Code to GitHub, so we can quickly save a file to GitHub.
- then we test the system if have something wrong so we can debug the error, then next step is integration test to our under system so we can see if the system can receive data to other system or we can input some data to push to other system. so we can ensure the quality and functionality of our system.

**Continuous deployment**

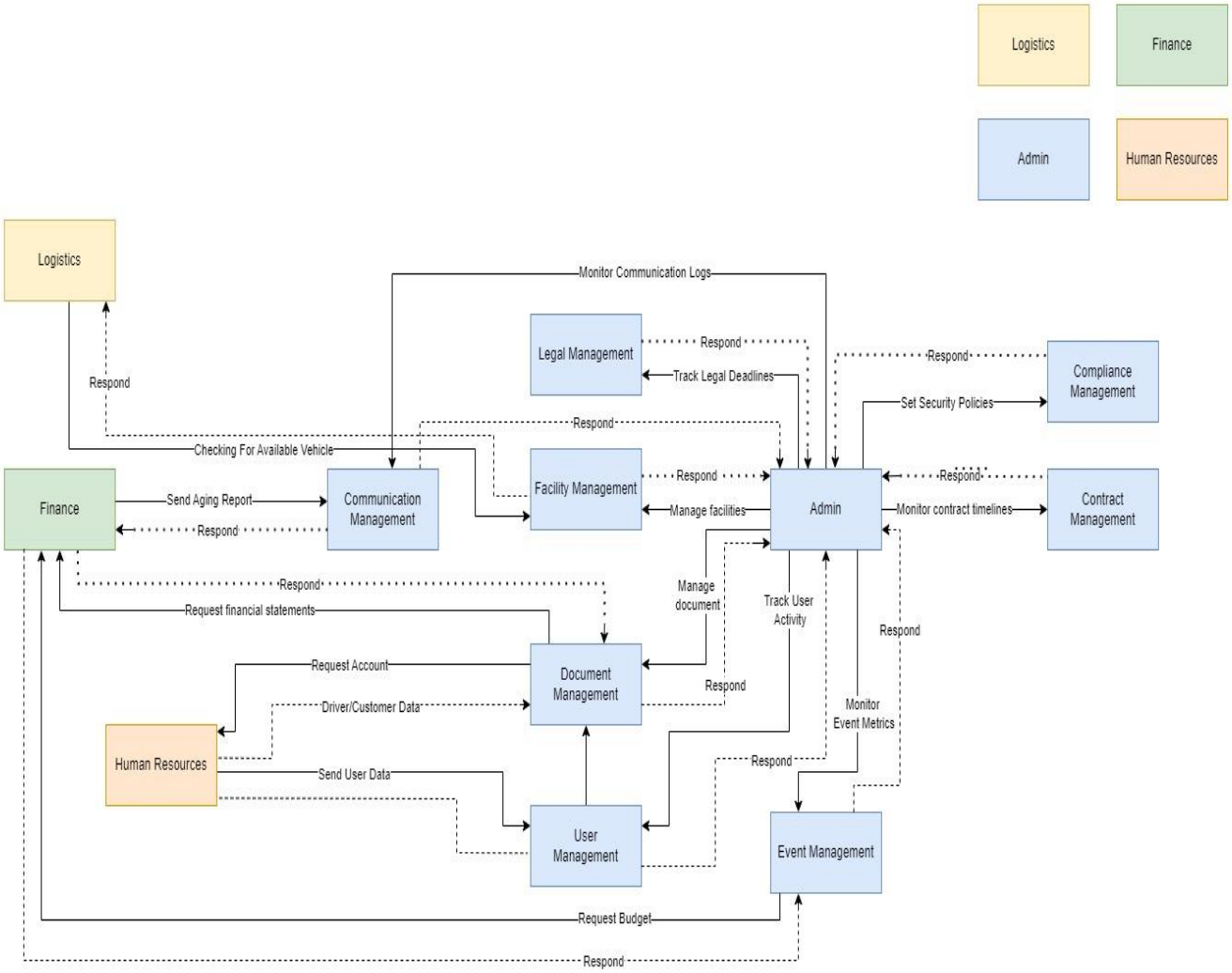
- After successful completion of the CI, the next step is Deployment, we deploy our system

- in manage.indevfinite
- We will test our system on the client once we have completed uploading it to the domain in order to see the outcome and get their feedback on the system in use.
- Here, we'll keep an eye on it to make sure the system is operational and functioning properly.

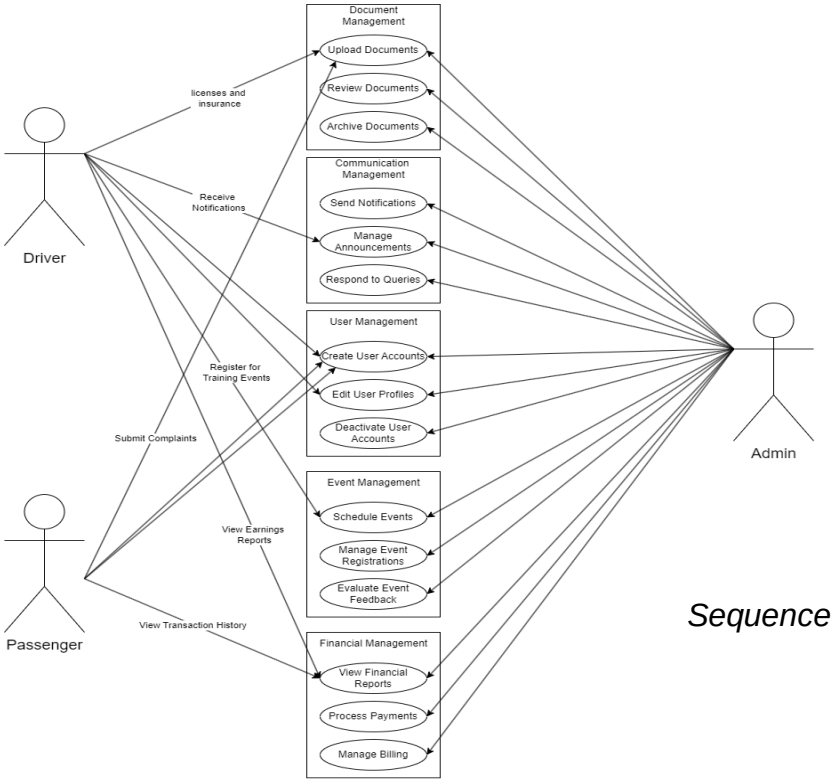


## Integration

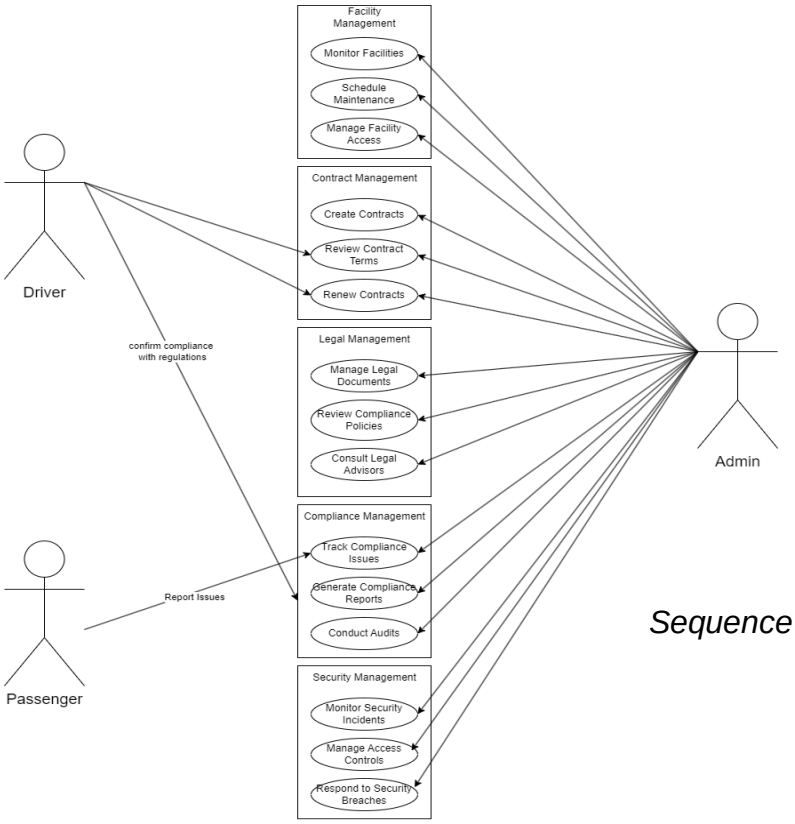
## Integration Diagram: BPA Level 2



## Sequence Diagrams

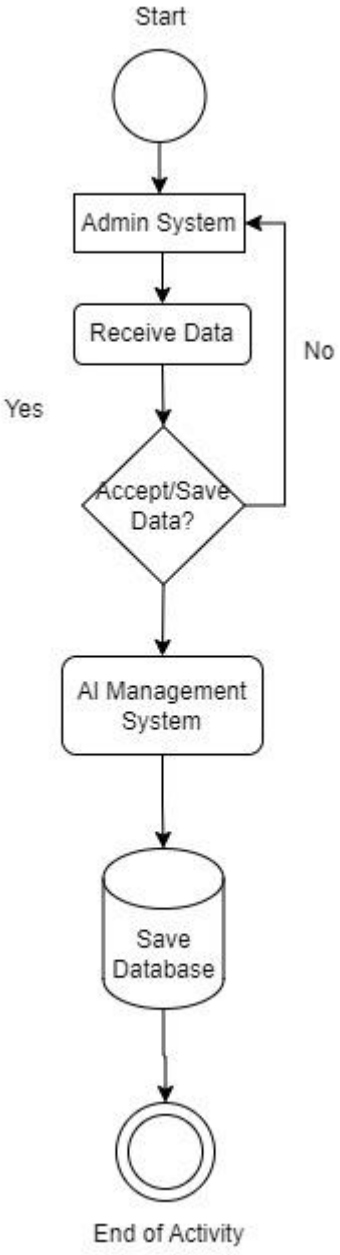


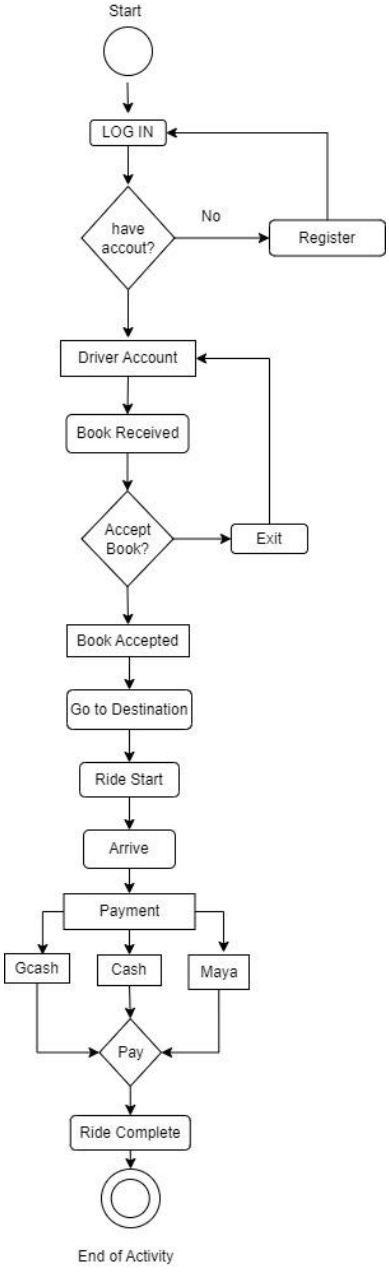

*Sequence 1*

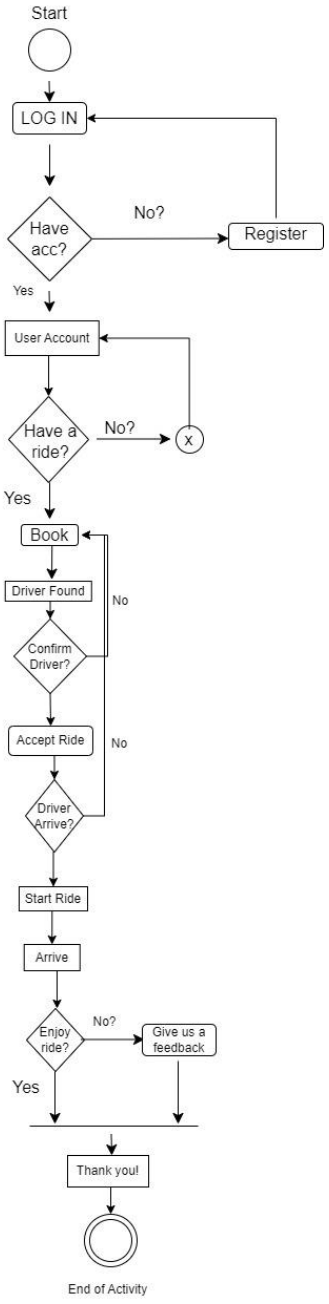



*Sequence 2*

**Activity Diagram**




***For Admin*** ***For Drivers*** ***For Passengers***

## 3.7 Integration Approach for Information Systems

As has been integrated in our "Smart Administrative Framework, several information systems must be seamless towards data flow between modules and hence toward comprehensive management control. In this sense, we adopt data-centric integration with an emphasis placed on standardizing the format of data and APIs for accommodating exchange between the diverse systems.

**Data-Centric Integration**

| | |
|---|---|
| Standard Data Formats | We will have standardized data formats while clearly defining all information exchanges between the services. Standard Data Formatting provides uniformity and offers interoperability so different systems can understand the data and process them. |
| API-bound Communication | ll information exchanges will be accomplished with well-defined Application Programming Interfaces. The use of the API acts as an intermediary throughout the channel for efficiently exchanging the data and functionalities between systems in a safe and controlled manner. |

| | |
|---|---|

**Benefits of Data Oriented Integration**

Data in flawless flow: Standardized format and API ensure that data flows seamlessly without interruptions between the different modules and have a very less probability of inconsistency or error.

Interoperability: Standardized formats and APIs support interoperability because it would allow disparate systems to talk to each other and share data correctly.

Flexibility: Data-centric architecture brings flexibility with the ability to add or integrate new systems or modules without actually disturbing the ongoing working of things.

Scalability: The use of standardized data format and APIs makes scalable by the ability to scale the system without scaling or compromising data integrity

**Implementation Details**

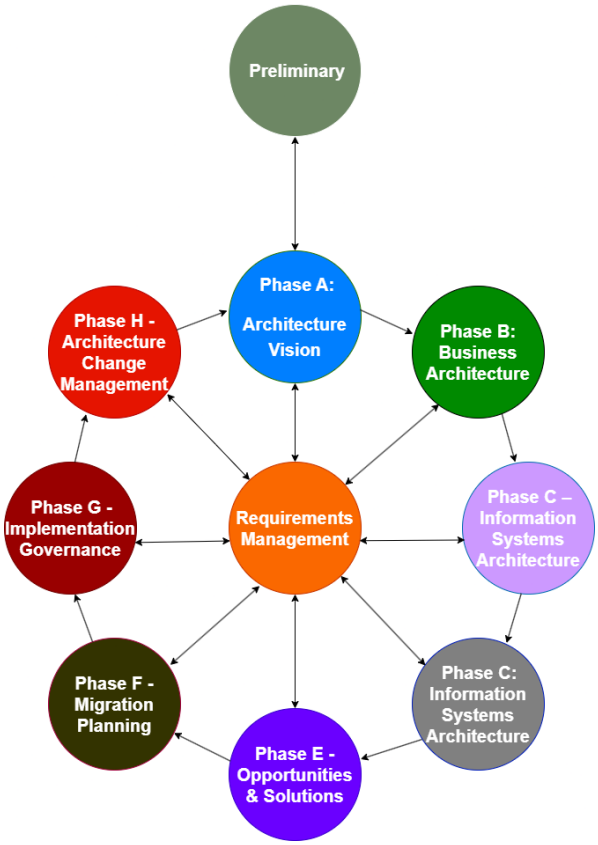
| | |
|---|---|
| Data Model | We will develop an elaborate data model that defines the structure and relationships of data elements while different services to ensure consistency and facilitate data exchange. |

| | |
|---|---|
| API Design | The APIs designed and implemented by us would be on industry standards and best practices, thereby enabling secure and dependable service-to-service communication. |
| Data Mapping | We will formulate the rules of data mapping, such that data is translated coherently between both the formats and systems. |

### 3.8 Introduction to TOGAF and the Four Architectural Domains

The Open Group Architecture Framework (TOGAF) is a globally recognized methodology for enterprise architecture, designed to help organizations create, manage, and govern IT architectures that support their business objectives. It provides a structured approach for designing, planning, implementing, and governing an enterprise's architecture in a systematic and controlled way. The framework consists of a detailed method and a set of supporting tools that assist in the development of an architecture that aligns business and IT strategies.

**TOGAF's key components**




**Architecture Development Method (ADM):** A step-by-step approach to developing an enterprise architecture.

**Enterprise Continuum:** A repository of reusable architecture assets.

**Architecture Repository:** A place to store architectural artifacts and deliverables.

**Architecture Capability Framework:** Guides the establishment of an enterprise's architecture capability.

TOGAF enables organizations to manage the transformation of their enterprise effectively and efficiently while ensuring that their IT infrastructure supports the business goals.

**Relevance to Transportation Network Vehicle Services: Smart Administrative Framework for Complete Management Control.**

The application of TOGAF in a Transportation Network Vehicle Services: Smart Administrative Framework project is vital for ensuring a well-structured and efficient system that meets all administrative, operational, and technological requirements. This project seeks to provide a comprehensive management control framework for a transportation network, which includes various stakeholders such as vehicle operators, customers, regulatory bodies, and service administrators.

By applying TOGAF to this project, the architecture will ensure that the system's technical infrastructure aligns with the business goals of improving operational efficiency, customer satisfaction, safety, and regulatory compliance. The framework will help in addressing complexities related to system integration, data flow, service reliability, and real-time communication among vehicles and the central management system.

**Applying the TOGAF Architectural Method to the Project.**

To apply TOGAF in the Smart Administrative Framework for Complete Management Control, the following key steps from the TOGAF Architecture Development Method (ADM)

**1.Preliminary Phase:**

- Define the scope of the project.
- Establish the architecture team and ensure the relevant stakeholders (transport authorities, service providers, and customers) are involved.

Set up an architecture framework that includes governance structures, principles, and goals for the smart administrative framework.

**2.Phase A: Architecture Vision**

Develop a high-level vision of the desired system.

Establish business goals such as optimizing transportation network services, improving response times, enhancing safety, and integrating modern technologies like GPS, IoT, and AI.

Engage stakeholders to align on this vision and secure initial approvals.

**3.Phase B: Business Architecture**

Create a detailed business architecture that defines the organization, processes, services, and functions required for the transportation network.

Identify key processes such as vehicle dispatching, route optimization, customer service, and regulatory compliance management.

**4.Phase C: Information Systems Architecture**

Design the data architecture, focusing on how real-time data from vehicles, traffic systems, and customers will be integrated.

Outline the application architecture for managing operations (e.g., vehicle tracking, fare management, customer app integration).

**5.Phase D: Technology Architecture**

Define the technical infrastructure needed, such as cloud-based services, communication protocols (e.g., 4G/5G), IoT devices in vehicles, and secure APIs for third-party integration.

Plan for scalability, considering the future growth of the transportation network and its increasing complexity.

**6.Phase E: Opportunities and Solutions**

- Identify technology solutions and providers that meet the system's needs.
- Prioritize key projects such as real-time vehicle tracking systems or customer engagement platforms.

**7.Phase F: Migration Planning**

- Develop a phased implementation plan, identifying milestones, deliverables, and resource allocations.
- Plan for risk management and ensure compliance with regulatory requirements in each phase of the rollout.

**8.Phase G: Implementation Governance**

- Monitor the implementation process to ensure it aligns with the architectural plans.
- Adjust the architecture as necessary to respond to new developments or requirements.

**9.Phase H: Architecture Change Management**

- Establish a process for managing changes in the system architecture as new technologies or business requirements arise.
- Ensure continuous improvement and scalability of the framework to adapt to evolving market conditions.

**Relevance to the Capstone Project**:

The Smart Administrative Framework for Complete Management Control project, being a complex system that integrates business operations, IT systems, and real-time data analytics, is highly relevant for the application

of TOGAF. It will benefit from the structured approach that TOGAF offers in several ways:

**Alignment of IT and Business Goals:** TOGAF ensures that the technological solutions are tightly aligned with business objectives such as enhancing customer experience, improving vehicle service efficiency, and maintaining regulatory compliance.

**Holistic Approach:** The use of TOGAF will allow your capstone project to approach architecture from multiple perspectives—business, data, application, and technology—ensuring a robust and comprehensive solution.

**Scalability and Adaptability:** TOGAF's iterative approach and support for change management will enable the project to scale as new technologies (e.g., AI-based route optimization, autonomous vehicles) emerge and need to be integrated.

**Risk Management:** TOGAF's emphasis on governance ensures that risks are identified and mitigated early in the process, reducing the likelihood of project failure or misalignment with stakeholder needs.

By following the TOGAF ADM phases, capstone project will be structured, scalable, and well-positioned to deliver a smart transportation framework that can meet current demands and future challenges. system.

challenges.

### 3.9 Innovation Integration

Given the abundance of similar apps and web-based solutions, we aim to provide a more advanced system that prioritizes user safety. Our goal is to implement an intuitive mapping feature that allows users to easily track

their location and understand their surroundings, including real-time traffic conditions and potential hazards such as accidents or sudden weather changes. By offering real-time updates on routes and alerts about traffic issues before users encounter them, we hope to empower them to find quicker and safer alternatives to reach their destinations.

Our approach involves examining the existing systems used by previous TNVS administrators to identify their features and functionalities. We will then determine what additional capabilities we can integrate into our system that are currently lacking. Once we pinpoint these enhancements, we aim to implement them within a two-month timeframe. Following the development phase, we will conduct testing over the course of one month. If everything functions properly and meets our standards, we plan to fully deploy the upgraded system within another month to evaluate the improvements made over previous versions.

Once we finish the complete roll-out, we plan to be fully monitoring the system to review all of that feedback in depth and look for ways it might need work or what sorts of impacts this has had on users. We will host feedback sessions that discuss issues in the system, which we detect using analytics information from user feedback. Our aim is to improve the system, and eliminate as many issues that we see — while also preventing any potential breakdowns.