PROJECT DESIGN PHASE

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Team ID	LTVIP2025TMID28953
Project Name	CRM Application for Public Transport Management System
Maximum Marks	

PROBLEM–SOLUTION FIT

Objective of Problem–Solution Fit

The Problem–Solution Fit phase ensures that the **CRM for Public Transport Management System** directly addresses real-world operational issues faced by bus transport operators, including trip scheduling, fare calculation, employee assignment, and communication. It aligns system development with user needs to maximize usability and impact.

This phase helps:

- Align CRM functionality with actual transit workflow
- Discover inefficiencies and user behavior
- Improve staff productivity and adoption of digital systems
- Design the correct solution before expanding or integrating with larger systems

1. Target Customer Segments

Customer Type	Description
Bus Depot Managers	Oversee route management, schedules, and fare setups
Dispatch Staff	Responsible for assigning buses and employees to trips
Drivers & Conductors	Execute assigned trips, interact with passengers
Administrative Staff	Handle ticketing, fare input, and reporting

2. Problem Statement (As-Is Situation)

Public transport organizations (especially government-run or regional) often depend on outdated and manual systems that create inefficiencies in daily operations:

- Trip details maintained manually
- Assigning drivers/conductors verbally or via message
- Fare details stored in spreadsheets

- Lack of validation leads to misassigned roles (e.g., assigning a conductor as a driver)
- No notifications to staff about trip assignments

Key Problems Identified

- No centralized database of buses, employees, or trips
- Errors in fare calculation and route-based pricing
- Delayed and inconsistent employee assignment
- Lack of data visibility for trip frequency, staff workload, or fare trends
- No professional communication mechanism with staff

3. Current Workaround (Before CRM Solution)

Existing Practice	**Limitation**
Manual trip entry in registers	Not scalable, easy to lose data
Verbal assignment of staff	Miscommunication, lack of accountability
Fare details calculated manually	Prone to errors, inconsistent with fare policies
Phone or WhatsApp for trip details	No formal logs, staff may miss critical updates
No reporting on performance	Managers can't analyze trip data or staff allocation

4. Proposed Solution (To-Be State)

The **CRM for Public Transport Management System** built on **Salesforce** automates trip management, fare assignment, employee allocation, and communication.

Core Solution Features

- **Bus Record Management:** All buses tracked in Bus__c object
- **Trip Scheduling:** Each trip logged in Trip__c with route, bus, time
- **Fare Management:** Ticket_Fare__c object defines pricing based on route and bus type
- **Employee Assignment:** Only valid Drivers/Conductors can be assigned via validation and triggers
- **Trigger for Role Validation:** Apex ensures employee role is correct before saving trip
- **Flow for Notification:** Sends email/SMS with trip details to assigned employees
- **Validation Rules:** Prevents assigning wrong staff roles or missing fare data
- **Reports and Dashboards:** Analyze trips, fare revenue, and employee workload

- **Access Control:** Dispatcher, Admin, Driver roles managed via Profiles and Permission Sets

5. How the Solution Solves the Problem

Problem	Feature/Function that Solves It
Incorrect staff assigned to trips	Apex Trigger validates employee role before assignment
Manual fare calculation errors	Ticket_Fare__c object automates fare based on route and bus type
No staff notifications	Flow sends emails to employees with trip data
Paper records with limited access	All trip, fare, and bus data is stored digitally and securely in Salesforce
No visibility into operations	Dashboards show trips per day, fare trends, bus usage, and staff assignment

6. Solution Adoption Channels

- Salesforce Web UI for Admins and Dispatchers
- Role-based access for each type of user (Driver, Dispatcher, Admin)
- Automatic email alerts to employees for trip notifications
- Reports accessed via dashboards to view real-time data

7. Solution Validation

The system was tested thoroughly on a live Salesforce playground with test records. Validations were applied, and automation tested as follows:

- Apex Trigger accurately restricts invalid employee assignment
- Flows successfully sent trip detail emails with dynamic content
- Fare fetched dynamically based on selected bus type and route
- Dashboards reflect total trips, route-wise revenue, and daily performance
- Validation rules ensured data entry accuracy during trip scheduling

Test cases and screenshots are included in the Functional and Performance Testing section.

Purpose Alignment Recap

Benefit	How CRM for Public Transport Achieves It
Solve real-world inefficiencies	Eliminates manual errors in staff and fare management

Ensure correct employee allocation	Enforces logic with triggers and validation rules
Enable faster decisions	Real-time dashboards and automated reports
Improve communication	Email flow ensures timely trip notifications
Reduce operational delays	Automation via Flows, lookups, and Apex logic

Problem–Solution Fit Canvas for CRM – Public Transport

Section	Description
1. Customer Segment(s) (CS)	- Depot Managers- Dispatchers- Drivers and Conductors
2. Jobs-to-be-Done / Problems	- Schedule and track trips- Assign drivers and conductors- Manage fares
3. Triggers (TR)	- Repeated trip assignment errors- Fare inconsistencies- Missed updates
4. Emotions Before / After (EM)	Before: Confused, inefficient, reactiveAfter: Confident, structured, proactive
5. Available Solutions (AS)	- Registers- Spreadsheets- Phone/WhatsAppCons: No automation, no centralization
6. Customer Constraints (CC)	- Lack of tech familiarity- Resistance to digital systems- Budget limits
7. Behaviour (BE)	- Verbal assignments- Manual fare entries- No analytics usage
8. Channels of Behaviour (CH)	Online: Basic emailOffline: Phone calls, handwritten trip logs
9. Problem Root Cause (RC)	- Lack of unified system- No enforcement of logic- No formal notifications
10. Your Solution (SL)	Salesforce CRM with:- Custom Objects (Bus, Trip, Fare, Employee)- Apex Trigger for role validation- Flows for email updates- Dashboards for daily monitoring- Profiles and Permission Sets for secure access

PROPOSED SOLUTION

S. No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Public transport systems often suffer from disorganized scheduling, fare inconsistencies, and poor staff coordination. Traditional methods like registers or spreadsheets lead to mismanagement of trips, manual fare miscalculations, and lack of proper communication with staff members.
2	Idea / Solution Description	A centralized Salesforce-based CRM system designed to manage bus operations, trips, fare calculations, and employee assignments efficiently. Key components include:- Custom objects like Bus, Trip, Ticket Fare, and Employee- Automated fare fetching based on route and bus type- Apex trigger to validate driver/conductor roles- Record-Triggered Flows to notify staff- Dashboards to track trip frequency, revenue, and employee workload- Profiles and Permission Sets for secure access
3	Novelty / Uniqueness	- Integrates fare calculation, trip scheduling, and staff assignment in a unified digital CRM- Role-based validation prevents operational errors (e.g., assigning wrong employee roles)- Fully configurable using Salesforce declarative tools with minimal coding- Real-time insights for transport managers
4	Social Impact / Customer Satisfaction	- Enhances service reliability by reducing operational delays- Increases accountability through automated staff notifications- Digitally empowers traditional transport departments to adopt CRM-based workflows- Ensures transparency in fare structure and trip assignments
5	Business Model (Revenue Model)	- Can be licensed as a SaaS product for transport authorities, depots, or private bus operators- Pricing tiers can be based on the number of buses, trips, or modules enabled (e.g., fare module, employee management)- Training and support packages can generate additional recurring revenue
6	Scalability of the Solution	- Salesforce provides native scalability across cities, depots, and organizations- Can be extended to include GPS integration, SMS alerts to passengers, and mobile apps for drivers- Supports centralized monitoring for multi-depot or franchise-based transport systems

SOLUTION ARCHITECTURE

What is Solution Architecture?

Solution Architecture is the blueprint that links business needs (like route management, fare calculation, or staff assignment) to technical solutions. It ensures that every CRM feature—such as automation, validation, and data structure—aligns with the transport system's operational goals.

It defines:

- The structure of the CRM (custom objects, processes, automation tools)
- The flow of data between entities (buses, trips, employees, fare)
- Technologies used (Salesforce Flow, Apex, Validation Rules)
- Integration and secure deployment across user roles

Goals of the Solution Architecture for This Project

- Define and connect all key custom objects: Bus, Trip, Ticket Fare, Employee, Bus Station
- Automate fare fetching, trip creation, and employee role validation using Apex and Flows
- Implement secure access through Profiles and Permission Sets
- Enable real-time analytics through reports and dashboards
- Ensure scalability and ease of maintenance for transport authorities or bus operators

Core Components of the Architecture

Layer	Component	Description
Presentation Layer	Salesforce Lightning UI	UI accessed by depot staff, admin, and operators through Lightning pages for bus, trip, and fare info.
Business Logic Layer	Flows, Apex Triggers, Validation Rules	Automates fare fetching, validates roles (e.g., only driver can be assigned as driver), and sends alerts.
Data Layer	Custom Objects: Bus__c, Trip__c, Ticket_Fare__c, Employee__c, Bus_Station__c	Core data models connected by lookup relationships for managing transport operations.
Security Layer	Profiles, Permission Sets	Role-based access ensures only relevant staff access specific objects (e.g., only Admin can create Bus).

Reporting Layer	Dashboards and Reports	Reports show trips per day, revenue from fares, employee workload. Dashboards provide summarized KPIs.

Data Flow within the System

User Journey:

1. Admin creates a new Bus Station and Bus → *Bus_Station__c* and *Bus__c* created
2. Admin schedules a new trip → *Trip__c* created and linked to Bus
3. Based on route and bus model → *Ticket_Fare__c* fetched via Flow
4. Employee assigned → *Employee__c* linked to Trip; validated by Apex Trigger
5. On trip confirmation → *Fare and employee info stored*
6. Optional Flow sends confirmation email/SMS to concerned employees

Sample Architecture Diagram (Conceptual)

[Admin / Depot Staff]

↓

[Bus_Station__c] [Employee__c]

↓ ↓

[Bus__c] ←→ [Trip__c] ←→ [Ticket_Fare__c]

↓

[Apex Trigger validates role]

↓

[Flow sends assignment notification]

If you want this visual in a diagram format (PDF, Canva layout, or Salesforce-style diagram), I can generate one. Just let me know your preference.

Summary

This CRM architecture for public transport delivers:

- Structured trip and fare management
- Role-based employee assignment with Apex validation
- Streamlined scheduling and automated fare fetching via Flows

- Dashboard views of route frequency, fare totals, and employee productivity
- A scalable, secure, and modern solution for any transport organization

References:

- Salesforce Lightning Platform Developer Guide
- Apex Trigger and Flow Automation Best Practices
- CRM Design for Transit Systems – Implementation Playbook