Phase 10

Smart Vehicle Service & Maintenance CRM – Project Documentation

Project Overview

The **Smart Vehicle Service & Maintenance CRM** is a Salesforce-based solution designed to optimize vehicle servicing operations. It integrates **Customers, Technicians, and Service Managers** into a single system to streamline service request handling, workload management, parts tracking, invoicing, and customer communication.

Key Use Cases

1. **Service Request Management**
   - Customers create service requests via portal or form.
   - System auto-assigns a technician based on availability.
   - Customers receive confirmation via email/SMS.
2. **Vehicle History Tracking**
   - Each service request is linked to the customer's vehicle.
   - System updates **Last Service Date** automatically.
   - Service history visible to technicians and managers.
3. **Technician & Workload Management**
   - Service Managers assign or auto-assign jobs.
   - Technicians view assigned tasks in their LWC dashboard.
   - Status updates: **In Progress → Completed**.
4. **Parts & Inventory Management**
   - Parts used during service are logged automatically.
   - Inventory stock auto-reduces.
   - Low-stock alerts triggered for critical parts.
5. **Preventive Maintenance Reminders**
   - Monthly batch job sends preventive service reminders.
   - Notifications via email/SMS.
6. **Invoice & Payment Handling**
   - Auto-generated invoices upon service completion.
   - Invoices > ₹10,000 require approval.
   - Online payment supported.
7. **Customer Communication**
   - SMS/Email notifications at each stage: Booked, In Progress, Completed.
   - Customers can track service status via LWC portal.
8. **Reporting & Dashboards**
   - Service requests by type (Regular, Emergency, Annual Checkup).
   - Technician productivity & workload distribution.

- Monthly revenue and inventory usage trends.

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1. Salesforce Objects & Fields

Object	Purpose	Key Fields
Vehicle__c	Stores customer vehicle details	Name, Customer__c (Lookup), Last_Service_Date__c, Vehicle_Model__c
Service_Request__c	Tracks service bookings	Name, Vehicle__c, Customer__c, Technician__c, Status__c, Service_Date__c
Technician__c	Stores technician info	Name, Email__c, Phone__c, Availability__c, Skills__c
Parts_Inventory__c	Manages parts and stock	Name, Part_Number__c, Quantity__c, Minimum_Stock_Threshold__c
Service_Parts_Used__c	Logs parts consumed during service	Name, Part__c, Service_Request__c, Quantity_Used__c
Invoice__c	Handles billing and payments	Name, Amount__c, Status__c, Service_Request__c

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2. Profiles, Roles & Users

Profile	Permissions
Service Manager	Read/Write on all objects; approve invoices; manage technicians & inventory
Technician	Read/Write on assigned requests; update status; log parts used
Customer Service Agent (CSA)	Create service requests; view customer & vehicle info; send notifications

Role	Reports To
Service Manager	–
Technician	Service Manager
CSA	Service Manager

Users:

- Service Manager → Role: Service Manager, Profile: Service Manager
- Technician → Role: Technician, Profile: Technician
- CSA → Role: CSA, Profile: CSA

3. Sharing Rules & Security

- **Org-Wide Defaults (OWD):**
  - Vehicle, Service Request, Invoice → Private
  - Parts Inventory → Public Read Only
- **Sharing Rules:** Service Manager-owned Service Requests shared with Technicians (Read/Write)

4. Validation Rules

1. **Vehicle must be linked to Service Request**
   - Object: Service_Request__c
   - Rule: `ISBLANK(Vehicle__c)`
   - Error: "Vehicle must be selected for a service request"
2. **Invoice Amount must be greater than zero**
   - Object: Invoice__c
   - Rule: `Amount__c <= 0`
   - Error: "Invoice amount must be greater than zero"

5. Flows

5.1 Auto-Assign Technician Flow

- **Object:** Service_Request__c
- **Trigger:** Record Created, Technician is null
- **Steps:**
  1. Get available technician (`Availability__c = 'Available'`)
  2. Update Service_Request__c → assign Technician
  3. Email Alert: Notify Customer
- **Activation:** Activated after testing

5.2 Service Request Confirmation Flow

- **Object:** Service_Request__c
- **Trigger:** Record Created
- **Action:** Send Email Alert to Customer confirming service request

5.3 Service Request Status Change Flow

- **Object:** Service_Request__c
- **Trigger:** Status__c field updated
- **Action:** Send Email Alert to Customer about status change

5.4 Low Inventory Flow

- **Object:** Parts_Inventory__c
- **Trigger:** Record created or updated
- **Decision:** Quantity__c <= Minimum_Stock_Threshold__c
- **Action:** Send Email Alert to Service Manager/Inventory Manager

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6. Apex Classes & Triggers

6.1 Apex Classes

1. **ServiceRequestHandler.cls**
   - Assigns technicians
   - Sends confirmation emails
2. **InvoiceProcessor.cls**
   - Fetch pending invoices
   - High-value invoice handling
3. **ServiceRequestTriggerHandler.cls**
   - Calls ServiceRequestHandler methods for beforeInsert and afterInsert
4. **InvoiceTriggerHandler.cls**
   - Handles beforeSave (validate invoice) and afterInsert (submit for approval)
5. **ScheduledPreventiveMaintenance.cls**
   - Sends monthly preventive maintenance notifications
6. **PreventiveMaintenanceNotifier.cls**
   - Email/SMS notifications logic

6.2 Triggers

- **InvoiceTrigger.trigger:** before insert/update → beforeSave, after insert → afterInsert
- **ServiceRequestTrigger.trigger:** before insert → assign technicians, after insert → send email

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7. Email Alerts

- **Service Request Confirmation** → Sent on request creation
- **Service Request Status Change** → Sent on status update
- **Low Inventory Alert** → Sent when stock is below threshold

8. Approval Processes

- **Object:** Invoice__c
- **Criteria:** Amount__c > 10000
- **Approver:** Service Manager
- **Steps:** Initial Submission → Service Manager → Approved/Rejected
- **Activation:** Activated

9. Reporting & Dashboards

- **Reports:**
  - Service Requests by Type, Technician Productivity, Monthly Revenue, Inventory Usage
- **Dashboards:**
  - Dynamic dashboards showing key KPIs for Service Manager and Technicians

10. User Interface (Phase 6)

- **Lightning App Builder** → Custom app: Smart Vehicle Service CRM
- **Record Pages & Tabs:** Vehicle, Service Request, Invoice, Parts Inventory, Technician
- **Utility Bar:** Quick access to notifications, low stock alerts
- **LWC Components:**
  - Technician Dashboard → Shows assigned service requests
  - Customer Portal → Track service request status
- **Navigation Service & Events:** Apex calls for LWC updates, record navigation

11. Data Management

- **Data Import Wizard:** Used to import Vehicles, Technicians, and Service Requests
- **Duplicate Rules:** Prevent duplicate Vehicle & Customer records
- **Data Export & Backup:** Monthly export via Salesforce Data Export

12. Integration & External Access

- **Named Credentials:** For external payment gateway APIs
- **External Services:** Vehicle Parts API integration
- **Callouts:** Apex callouts for SMS/Email notifications
- **Platform Events & Change Data Capture:** To sync with external systems if needed
- **Salesforce Connect & OAuth:** For secure external access

13. Metadata & Version Control

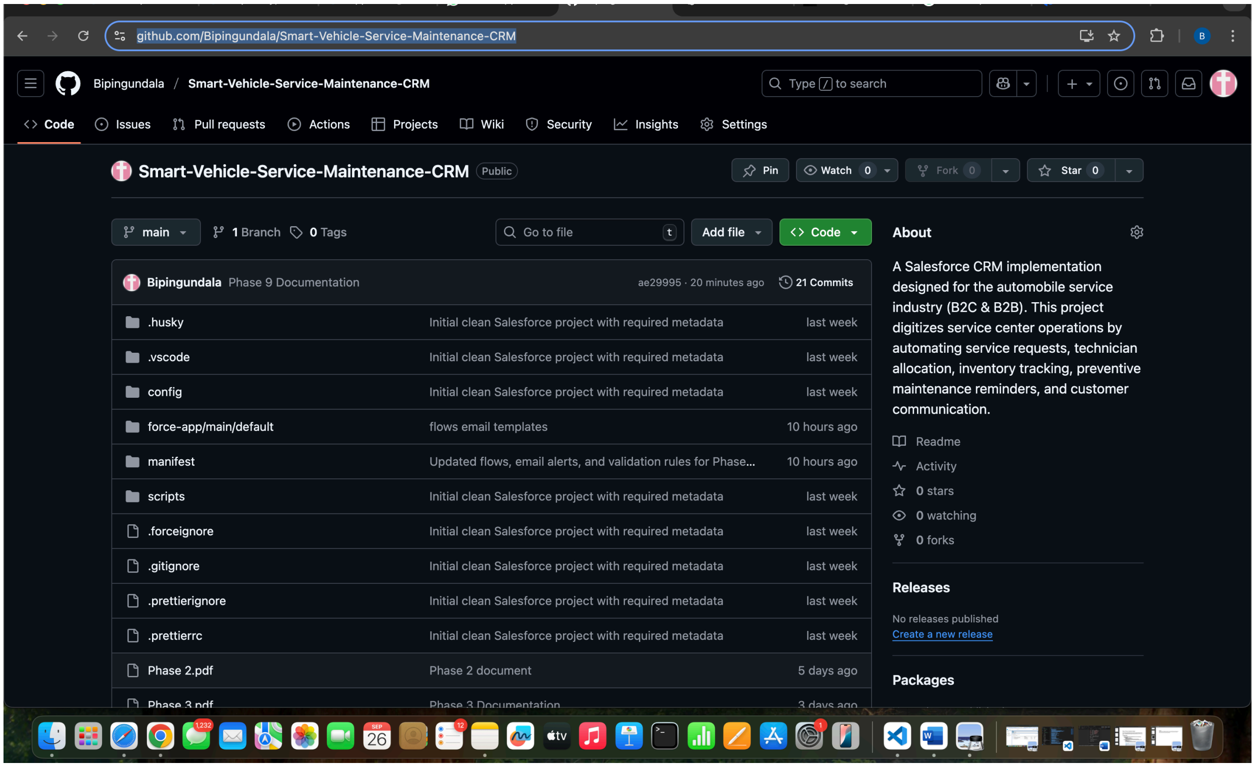
- Retrieved metadata via **VS Code & Salesforce CLI**
- Stored Classes, Triggers, Profiles, Page Layouts in **GitHub**
- Cleaned irrelevant metadata to focus only on project components

14. Workflow Summary

Customer → Service Request → Technician Assignment → Parts Used → Service Completion → Invoice → Notifications → Reports & Dashboards

1. Customer books service → Service Request__c created
2. Auto-Assign Technician Flow → assigns available Technician__c
3. Status changes → triggers Email Alerts
4. Parts used logged → Parts_Inventory__c updated → Low Inventory Flow triggered if needed
5. Invoice generated → Approval Process for high-value invoices
6. Preventive maintenance notifications sent monthly
7. Reports and dashboards track KPIs

Github profile url: https://github.com/Bipingundala/Smart-Vehicle-Service-Maintenance-CRM



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Bipingundala Phase 9 Documentation ae29995 · 20 minutes ago 21 Commits

.husky	Initial clean Salesforce project with required metadata	last week
.vscode	Initial clean Salesforce project with required metadata	last week
config	Initial clean Salesforce project with required metadata	last week
force-app/main/default	flows email templates	10 hours ago
manifest	Updated flows, email alerts, and validation rules for Phase...	10 hours ago
scripts	Initial clean Salesforce project with required metadata	last week
.forceignore	Initial clean Salesforce project with required metadata	last week
.gitignore	Initial clean Salesforce project with required metadata	last week
.prettierignore	Initial clean Salesforce project with required metadata	last week
.prettierrc	Initial clean Salesforce project with required metadata	last week
Phase 2.pdf	Phase 2 document	5 days ago
Phase 3.pdf	Phase 3 Documentation	3 days ago

About

A Salesforce CRM implementation designed for the automobile service industry (B2C & B2B). This project digitizes service center operations by automating service requests, technician allocation, inventory tracking, preventive maintenance reminders, and customer communication.

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