**SMART VEHICLE MAINTENANCE & SERVICE LIFECYCLE TRACKING**  
**Project Implementation Phases Documentation**  
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**Phase 1: Problem Understanding & Industry Analysis**

**Problem Statement**  
Vehicle owners and service centers struggle with unorganized maintenance schedules, delayed service reminders, lack of visibility on spare part availability, and manual service tracking. This results in poor customer satisfaction, reduced vehicle performance, and missed revenue opportunities.  
This project leverages Salesforce to automate service scheduling, track spare parts, manage vendor contracts, and monitor the entire vehicle maintenance lifecycle.

**Requirement Gathering**

* Capture vehicle details, service history, and maintenance schedules.
* Auto-generate service reminders and notifications.
* Track spare parts inventory and vendor supplies.
* Automate approval workflows for costly repairs.
* Create a customer self-service portal for service requests.
* Provide real-time dashboards for vehicle service status and revenue.

**Stakeholder Analysis**

* **Vehicle Owners** – Request services and get updates.
* **Service Agents** – Manage bookings, service jobs, and invoices.
* **Technicians** – Perform repairs and update service records.
* **Vendors** – Supply spare parts and maintenance materials.
* **Managers/Admins** – Track revenue, service performance, and KPIs.

**Business Process Mapping**

1. Vehicle owner requests service (via portal or staff entry).
2. Automated check for available slots, spare parts, and technician assignment.
3. Approval process for high-cost repairs.
4. Service performed and job card updated.
5. Vendor inventory auto-adjusted for used spare parts.
6. Invoice generated and payment tracked.
7. Dashboards updated for managers.

**Industry-specific Use Case Analysis**

* Auto repair shops.
* Vehicle dealerships with after-sales service.
* Corporate fleet management companies.

**AppExchange Exploration**  
Reviewed *Service Cloud*, *Field Service Lightning*, and *AutoDealer CRM*. Identified the need for **custom LWC dashboards**, **spare parts inventory automation**, and **vendor integrations**.

**Phase 2: Org Setup & Configuration**

* Setup Salesforce Developer Org for Vehicle Service business.
* Configure company profile, business hours, and fiscal year.
* Create roles: **Customer, Service Agent, Technician, Vendor, Manager, Admin**.
* Apply profiles, permission sets, OWD, and sharing rules.
* Create sandbox for development and deployment planning.

**Phase 3: Data Modeling & Relationships**

**Custom Objects**

* **Vehicle** (Owner, Model, Registration, Service Status)
* **Service Request** (Vehicle, Customer, Date, Status, Cost Estimate)
* **Job Card** (Technician, Service Request, Parts Used, Duration)
* **Spare Part Inventory** (Part Name, Stock, Vendor, Cost)
* **Vendor Contract** (Vendor, Parts Supplied, Expiry)
* **Invoice/Payment** (Service Request, Amount, Status)

**Relationships**

* Customer (Account/Contact) → Vehicle (Lookup).
* Vehicle → Service Request (Master-Detail).
* Service Request → Job Card (Master-Detail).
* Job Card → Spare Part Inventory (Lookup).
* Service Request → Invoice (Master-Detail).

**Phase 4: Process Automation (Admin)**

* **Validation Rules** – Prevent booking if part unavailable.
* **Flows** – Automate service reminders and booking confirmations.
* **Approval Process** – For repair jobs exceeding cost limit.
* **Process Builder** – Update vehicle status after service completion.
* **Notifications** – Email/SMS to customers for updates.

**Phase 5: Apex Programming (Developer)**

* **Triggers**:
  + Auto-create Job Card when Service Request is logged.
  + Deduct spare parts from inventory when used.
* **Batch Apex** – Monthly summary of service history & revenue.
* **Queueable Apex** – Vendor restock requests.
* **SOQL/SOSL** – Custom LWC dashboards for service analytics.
* **Test Classes** – Ensure >85% coverage.

**Phase 6: User Interface Development**

* **Apps via Lightning App Builder**:
  + Customer Service Portal.
  + Service Agent Console.
  + Manager Dashboard.
* **Custom LWCs**:
  + Vehicle Service Timeline Tracker.
  + Spare Part Availability Chart.
  + Real-time Service Status Dashboard.

**Phase 7: Integration & External Access**

* **Payment Gateway Integration** – For online invoices.
* **SMS/Email Services** – Automated reminders & updates.
* **IoT Integration** – Future-ready for smart vehicle sensors (mileage/alerts).
* **Vendor System API** – Sync spare parts inventory.

**Phase 8: Data Management & Deployment**

* **Data Import Wizard** – Load initial vehicles, customers, and parts.
* **Data Loader** – Bulk upload service history.
* **Duplicate Management** – Prevent duplicate vehicles/customers.
* **Backups** – Scheduled exports.
* **Deployment** – Sandbox → Change Sets/SFDX.

**Phase 9: Reporting, Dashboards & Security Review**

* Reports: Service Requests by Status, Spare Part Usage, Revenue Trends.
* Dashboards: Fleet Health, Vendor Performance, Customer Satisfaction.
* Security: Role hierarchy, FLS, audit trail, login IP restrictions.

**Phase 10: Final Presentation & Demo Day**

* Live Demo: Customer request → Technician assignment → Job card → Inventory update → Invoice → Dashboard.
* Present KPIs like **customer satisfaction, fleet efficiency, revenue boost**.
* Collect feedback for future AI integration (predictive maintenance).