

# Vehicle Management System – Service Reservation Platform

**Status:** Full-Stack Web Application

A complete **Vehicle Management System** designed to streamline the workflow of automobile service centers. The system enables **customers to book vehicle services**, **managers to assign technicians and monitor operations**, **technicians to update job status**, and **administrators to manage users and service inventory**, ensuring smooth service delivery, accurate billing, and detailed performance reporting.

## Features

### 1. Customer Features

- **Book Vehicle Service:** Submit service requests with vehicle details and issue description.
- **My Services Dashboard:** View service status, service history, and invoices.
- **Service Tracking:** Track lifecycle – Requested → Assigned → In Progress → Completed → Closed.
- **Billing History:** View generated bills and payment status.

### 2. Technician Features

- **Assigned Jobs List:** View all allocated service tasks.
- **Update Job Status:** Change job progress and add remarks.
- **Parts Usage:** Record parts consumed during servicing.

### 3. Manager Features

- **Technician Assignment:** Assign technicians to pending service requests.
- **Workload Monitoring:** Track technician performance and active jobs.
- **Service Reports Dashboard:** View daily, monthly service statistics.

## 4. Admin Features

- **User Management:** Create users and assign roles (Admin, Manager, Technician, Customer).
- **Service & Pricing Configuration:** Manage service types and charges.
- **System Reports:** View revenue, technician performance, and service trends.
- **Security & RBAC:** Role-Based Access Control to prevent unauthorized access.

# Technology Stack

## Backend

- **Framework:** ASP.NET Core Web API (.NET 8 / 9)
- **Database:** Microsoft SQL Server
- **ORM:** Entity Framework Core (Code-First)
- **Authentication:** JWT Authentication with Role-Based Authorization
- **Testing:** xUnit
- **Documentation:** Swagger / OpenAPI

## Frontend

- **Framework:** Angular (Standalone Components)
- **UI Library:** Angular Material / Bootstrap
- **Charts:** Chart.js / ng2-charts
- **State Management:** Angular Signals
- **Forms:** Reactive Forms
- **HTTP Handling:** HttpClient & Interceptors

# System Architecture

The system follows a **clean N-Tier architecture**:

- **Presentation Layer:** Angular SPA
- **API Layer:** RESTful APIs with DTOs and Global Exception Handling
- **Service Layer:** Business logic implementation
- **Data Access Layer:** EF Core with Repository Pattern

# Setup Instructions

## Pre-requisites

- Node.js v18+
- .NET SDK 8 / 9
- SQL Server (LocalDB / Express)

## 1. Database Setup

```
cd VehicleManagementAPI  
dotnet ef database update
```

Update the connection string in `appsettings.json` if needed.

## 2. Backend API Setup

```
dotnet run
```

- API URL: <https://localhost:5289>
- Swagger: <https://localhost:7290/swagger>

## 3. Frontend Setup

```
cd vehicleUI  
npm install  
ng serve -o
```

Application will run at:

<http://localhost:4200>

# Testing

## Unit Testing

```
dotnet test
```

Includes test cases for:

- AuthController
- ServiceController
- TechnicianController
- ManagerController
- BillingController

## Seed Data - User Credentials

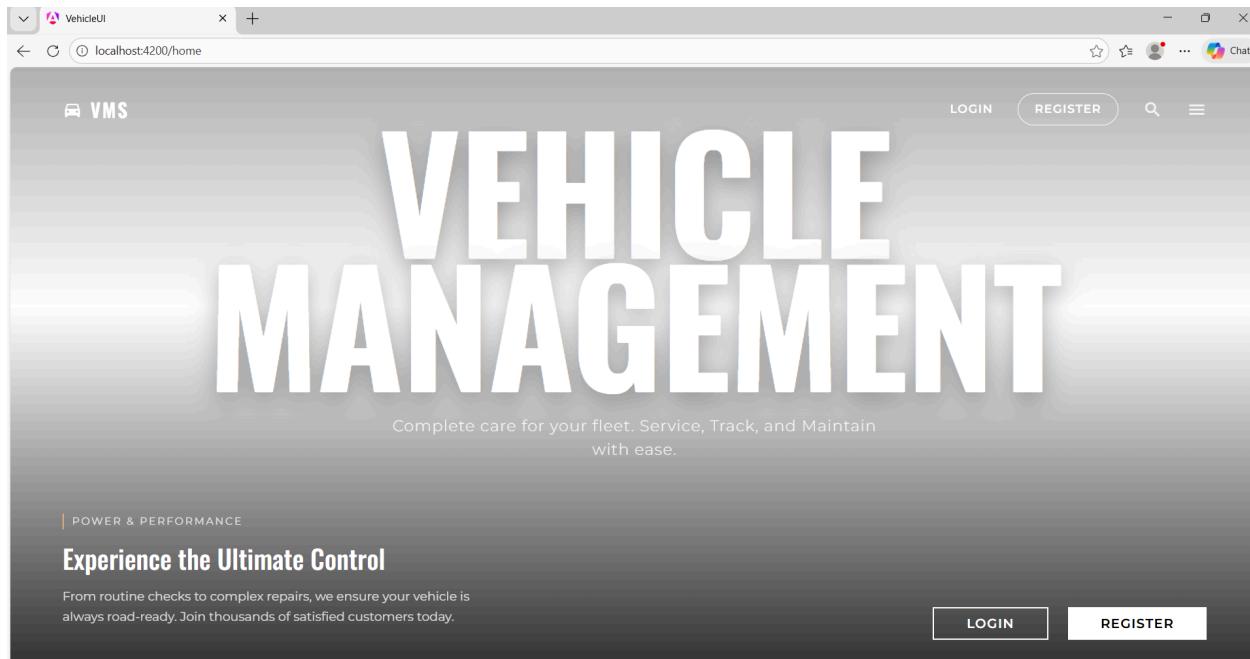
- Admin - admin@vehicleservice.com, Admin@123

## LINQ & Reporting

- Filter services by status, date, or priority
- Group services by technician and vehicle type
- Revenue aggregation per month
- Technician performance analysis

## Screenshots

### 1. Home Screen



## 2. Admin Dashboard

The screenshot shows the Admin Dashboard interface. On the left, a sidebar menu includes 'Admin' (selected), 'Dashboard' (highlighted in orange), 'Users', 'Service Categories', and 'Pricing'. A 'Logout' button is at the bottom. The main area is titled 'Dashboard Overview' with the subtitle 'System administration and statistics.' It features two orange cards: 'Total Users' (22, Admins, Managers, Technicians) and 'Service Categories' (2, Active service types). A search bar at the top says 'Search...'. The top right corner has a bell icon and an 'AD' button.

## 3. Manager Dashboard

The screenshot shows the Manager Dashboard interface. On the left, a sidebar menu includes 'Manager' (selected), 'Dashboard' (highlighted in orange), 'Assign Technician', 'Reports', and 'Parts Inventory'. A 'Logout' button is at the bottom. The main area is titled 'Operational Overview' with the subtitle 'Monitor service performance and resource allocation.' It features four cards: 'NEW REQUESTS' (1, 1 Needs Attention), 'ACTIVE TECHNICIANS' (5, 5 On Shift), 'CLOSED THIS MONTH' (3, +12% from last mo.), and 'REVENUE (EST.)' (₹9,440.00, \$ On Target). Below these are two larger sections: 'Technician Workload' (a bar chart with a single bar reaching 3.0) and 'Monthly Service Volume' (a line graph showing peaks and troughs over time). A search bar at the top says 'Search vehicle, booking ID...'. The top right corner has a bell icon and an 'MG' button.

## 4. Technician Dashboard

The screenshot shows the Technician Dashboard interface. On the left sidebar, there's a 'Technician' section with a 'My Dashboard' button. The main area has a search bar at the top. A greeting 'Hello, User!' is displayed with a small gear icon. Below it, a message says 'Manage your assigned service requests and current tasks.' A table titled 'Active Tasks' lists three service requests:

ID	Vehicle	Issue	Priority	Status	Actions
#6	ap-12-ndkv	break failure	Urgent	In Progress	<input type="button" value="Parts"/> <input checked="" type="checkbox"/> Complete
#23	Mh-12-AB-7274	sifjg9erjhoikth	Urgent	In Progress	<input type="button" value="Parts"/> <input checked="" type="checkbox"/> Complete
#27	Mh-12-AB-7274	engie noise	Normal	Assigned	<input type="button" value="Start Job"/>

## 5. Customer Dashboard

The screenshot shows the Customer Dashboard interface. On the left sidebar, there's a 'Customer' section with a 'My Dashboard' button. The main area has a search bar at the top. It displays four key metrics: 'ACTIVE REQUESTS' (18 In Progress), 'MY VEHICLES' (6 Registered), 'PENDING PAYMENTS' (₹2.00 Action Required), and 'TOTAL SPENT' (₹1,250.00 Lifetime Value). Below these, a 'Service Status Distribution' chart is shown as a donut chart with segments for Active (orange), Completed (green), and Pending (yellow).



## Contributors

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