Solution Architecture:

Goals of the Architecture:
- Develop a centralized digital system for managing garage operations.
- Maintain accurate data for customers, vehicles, and service records.
- Streamline mechanic assignments, inventory tracking, and billing.
- Enhance transparency and customer satisfaction through automation.

Key Components:
- Customer Module: Stores customer and vehicle information.
- Service Management Module: Tracks ongoing repairs, job cards, and mechanic tasks.
- Inventory Module: Manages spare parts, availability, and stock alerts.

Billing & Reports Module:

Automates invoices and generates financial reports.

User Interface (Web Portal): For garage staff, mechanics, and customers to interact with the system.

Development Phases:

- Design database structure for customer, vehicle, service, and billing data.
- Build web-based user interface for data entry and service tracking.
- Implement service scheduling and mechanic assignment workflows.
- Integrate billing and inventory automation.
- Test system with sample data and refine based on feedback.
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The Garage Management System (GMS) architecture is designed to automate and streamline every aspect of garage operations. It integrates customer management, vehicle service tracking, inventory control, and billing into a single unified platform.

The architecture follows a modular approach, ensuring scalability and easy maintenance. The frontend web interface allows staff and customers to access real-time information, while the backend database stores and processes all operational data.

Each module interacts seamlessly through defined data relationships: - The Customer Module links to Service Records for tracking vehicle history.

- The Inventory Module updates automatically when spare parts are used during a repair.
- The Billing Module generates detailed invoices once a service is marked complete.

This digital workflow eliminates manual paperwork, minimizes errors, and provides real-time insights into service progress and business performance. The architecture ensures data integrity, efficient resource utilization, and enhanced decision-making for garage owners.

Example – Solution Architecture Diagram:

Figure 1: Architecture and Data Flow of the Garage Management System (Frontend Web Application Backend Server Database Reports Dashboard)

Reference:

1. https://aws.amazon.com/architecture/
2. https://www.ibm.com/cloud/architecture