

# PROJECT DESIGN PHASE

## 1. Introduction

The **Project Design Phase** is one of the most critical parts of the software development lifecycle. It focuses on converting the requirements gathered during the analysis phase into a clear, structured design plan that guides developers in building the system. For the *Garage Management System (GMS)*, this phase ensures that every component — from the user interface to the database — is built to deliver performance, security, and usability.

A well-defined design provides a foundation for scalability, allowing future enhancements without major rework. It also ensures that the solution adheres to Salesforce best practices, offering a seamless experience to customers, mechanics, and administrators alike.

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## 2. System Architecture Design

The *Garage Management System* follows a **three-tier architecture model**, which improves system organization, maintenance, and scalability.

- **Presentation Layer (User Interface):**

This is the front-end where users interact with the system. The presentation layer is designed using **Salesforce Lightning Pages** and **Visualforce components**, ensuring a responsive and intuitive interface. Customers can easily register, book services, and view job updates, while mechanics and admins manage requests and resources efficiently.

- **Application Layer (Business Logic):**

This layer handles all operational logic, such as assigning mechanics, calculating bills, and updating service statuses. It is implemented using **Apex Classes, Triggers, and Flows**. Salesforce's automation tools like **Process Builder** and **Flow Builder** are used to streamline operations, ensuring smooth workflow execution without manual intervention.

- **Data Layer (Database Management):**

The data layer is where all the system's records are stored. Using **Salesforce Standard and Custom Objects**, this layer manages data for customers, vehicles, services, inventory, and invoices. It ensures that information is securely stored, properly linked, and easily retrievable.

This multi-layer design separates concerns, improves reusability, and enhances system reliability.

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### 3. Database Design

The database design for the *Garage Management System* ensures that all data entities are properly structured with well-defined relationships. The major entities and their descriptions are as follows:

Object Name	Purpose	Key Fields
<b>Customer</b>	Stores customer details	Customer ID, Name, Contact Number, Email
<b>Vehicle</b>	Contains vehicle details linked to customers	Vehicle ID, Model, Registration No., Owner ID
<b>Service Request</b>	Tracks service requests raised by customers	Request ID, Date, Status, Assigned Mechanic
<b>Invoice</b>	Handles billing and payment data	Invoice ID, Amount, Service ID, Payment Status

Relationships between these entities are established through **Lookup** and **Master-Detail** relationships, ensuring data integrity and smooth interconnectivity between modules. For example, each *Vehicle* record is linked to a *Customer*, and each *Service Request* is linked to both *Mechanic* and *Invoice* records.

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### 4. User Interface (UI/UX) Design

A well-designed interface ensures ease of use and accessibility for all types of users — customers, mechanics, and administrators.

- **Customer Interface:**

Customers can register, book appointments, view the service status of their vehicles, and download invoices. The interface is designed to be simple, responsive, and mobile-friendly.

- **Mechanic Interface:**  
Mechanics can log in to view their assigned jobs, update progress, and record service details. This minimizes confusion and ensures efficient job tracking.
- **Administrator Dashboard:**  
Admins have a centralized dashboard showing ongoing services, available inventory, daily revenue, and customer feedback. Charts and visual indicators are used to enhance clarity.

UI elements are built using **Lightning Web Components (LWC)** and **Visualforce Pages**, ensuring smooth navigation and real-time data updates.

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## 5. Workflow Design

The workflow outlines how different processes interact within the system. The *Garage Management System* automates most of its activities using Salesforce tools, which reduces manual work and errors.

The typical workflow includes:

1. The customer raises a new service request.
2. The admin reviews and assigns the request to an available mechanic.
3. The mechanic performs the repair and updates the job status.
4. The system automatically deducts parts from the inventory.
5. Once completed, the system generates an invoice and sends it to the customer.

This automation is achieved using **Salesforce Flow**, **Process Builder**, and **Workflow Rules**, improving operational speed and transparency.

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## 6. Security and Access Control

Security is a core part of the design to protect customer and business data.

- **Role-Based Access:** Admins, mechanics, and customers are assigned different profiles with defined permissions.

- **Object-Level Security:** Access to Salesforce objects like Service Requests and Invoices is restricted based on roles.
- **Field-Level Security:** Sensitive fields (e.g., customer contact or payment info) are hidden from unauthorized users.
- **Validation Rules:** Ensure data accuracy before records are saved.

These controls safeguard the system against unauthorized access, ensuring compliance with Salesforce's data protection standards.

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## 7. Design Tools and Technologies

The following tools and technologies are used in the design phase:

- **Salesforce Lightning Platform** – For UI and workflow design.
  - **Apex and Visualforce** – For business logic and page customization.
  - **Draw.io / Lucidchart** – For creating ER and architecture diagrams.
  - **GitHub** – For version control and collaboration.
  - **Figma (optional)** – For UI mockups and layout design.
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## 8. Conclusion

The **Project Design Phase** of the *Garage Management System* lays a solid foundation for development and testing. The architectural model, database structure, and security design together ensure that the system will be efficient, reliable, and scalable. By following Salesforce's modern design principles, the project ensures an enhanced user experience, robust data handling, and streamlined workflows — enabling garages to manage operations more effectively and professionally.