Project Design Phase

Data Model Design

Date	25 October 2025
Team ID	NM2025TMID02695
Project Name	Garage Management system
Maximum Mark	4 Marks

4.1 Data Model Design

The GMS data model follows a **hierarchical relationship structure** connecting customer, appointment, service, and billing entities. This enables end-to-end traceability of every service performed within the garage.

4.1.1 Entity-Relationship Diagram (ERD)
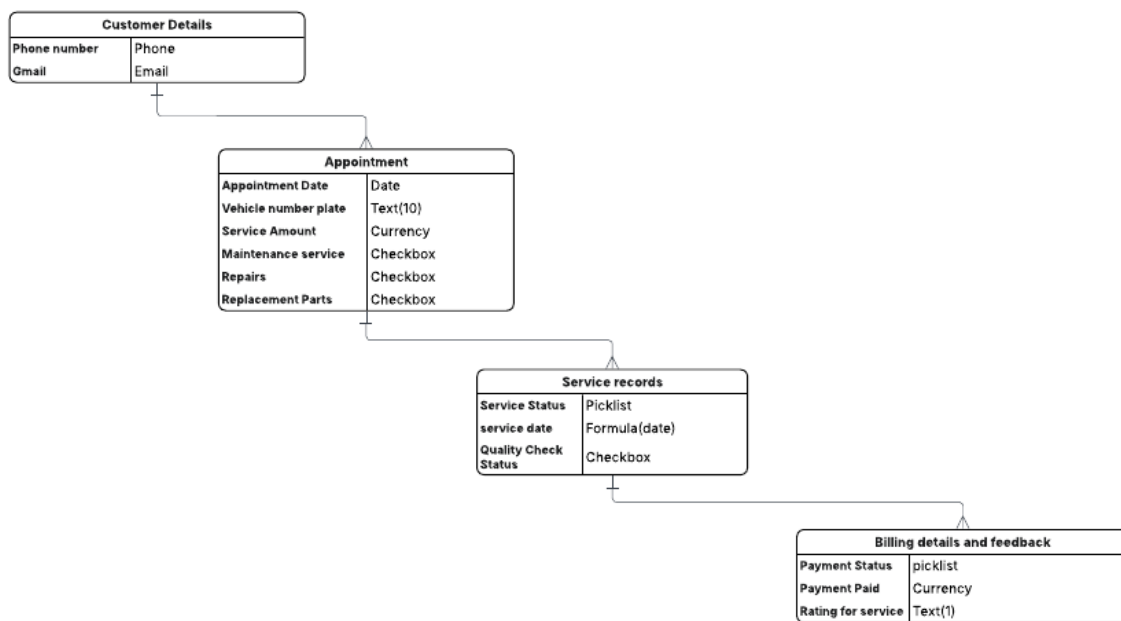
Relationship Flow Explanation:

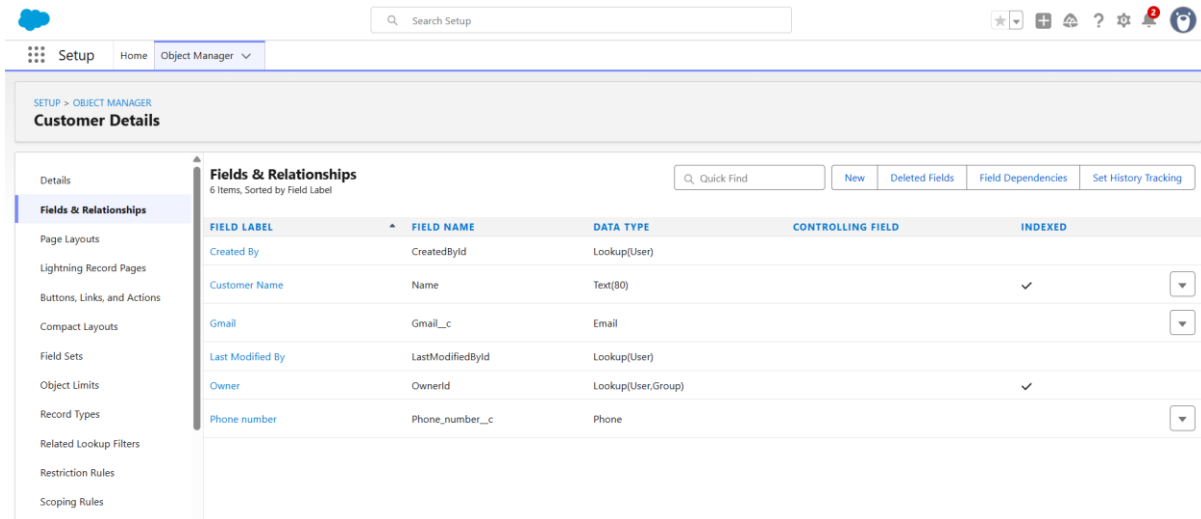1. **Customer Details → Appointment (Lookup Relationship):**

   o One customer can have multiple appointments for different vehicles or service dates.

   o Implemented using a *Lookup Relationship* from Appointment to Customer Details.

2. **Appointment → Service Records (Lookup Relationship):**

- o Each appointment can generate multiple service records based on work items (e.g., oil change, tire replacement).

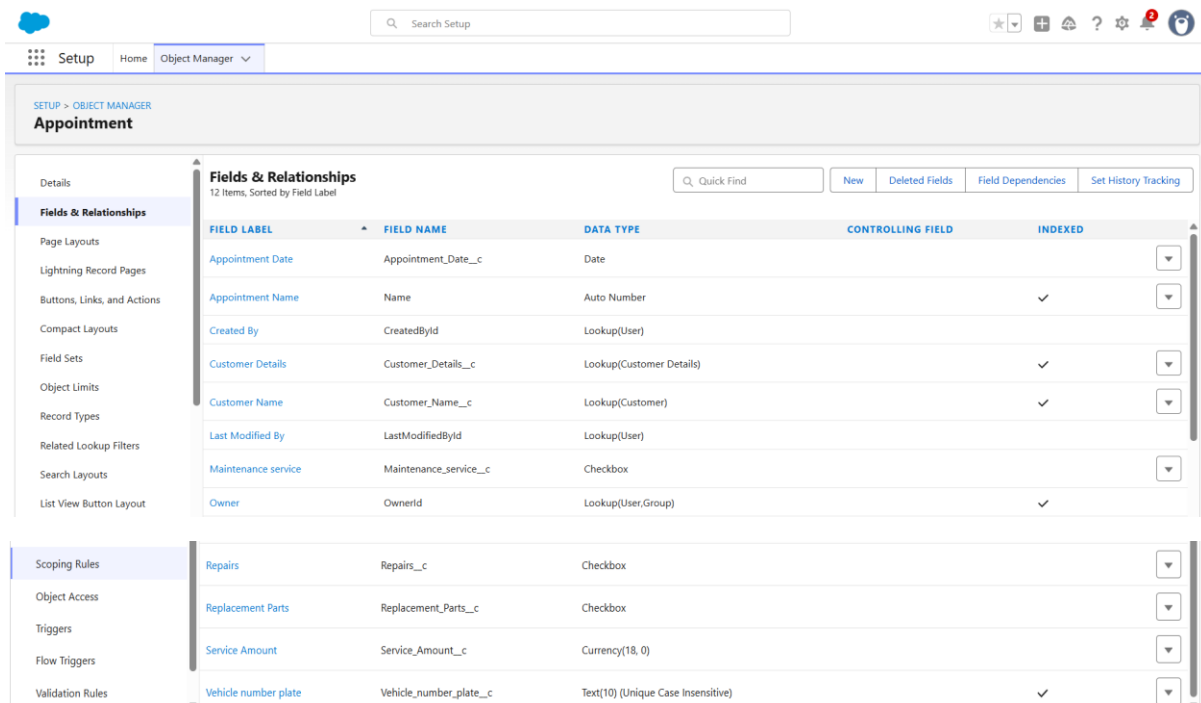- o This allows tracking each service independently.

3. **Service Records → Billing Details (Lookup Relationship):**

- o A service record can have one or more associated billing entries to capture payments and ratings.

- o This supports financial closure and feedback collection.

4.1.2 Data Integrity Design

Ensuring accurate and consistent data is central to maintaining quality within GMS. Several **Validation Rules**, **Lookup Filters**, and **Field-Level Constraints** were implemented.

Control Type	Target Object	Purpose	Implementation Details
Validation Rule 1	Appointment	Enforces the correct 10-character vehicle number plate format.	`NOT(REGEX(Vehicle_number_plate__c, "[A-Z]{2}[0-9]{2}[A-Z]{2}[0-9]{4}"))`
Validation Rule 2	Billing Details	Ensures service rating is a single digit between 1 and 5.	`NOT(REGEX(Rating_for_service__c, "[1-5]{1}"))`

Validation Rule 3 *(optional)*	Service Records	Prevents record creation unless an Appointment is linked.	`ISBLANK(Appointment__c)`
Lookup Filter	Service Records → Appointment	Allows linking only valid appointments (scheduled in the past).	Appointment Date < TODAY()
Required Fields	Across all objects	Enforces data completeness.	Phone, Email (Customer); Vehicle No. (Appointment); Service Status (Service Records).

Integrity Rationale:
These controls ensure that all entered data adheres to real-world garage operation logic and prevents incomplete or inconsistent entries from affecting reporting accuracy.