EV CHARGING STATION MANAGEMENT CRM

Project Overview:
The EV Charging Station Management System is a Salesforce-based CRM solution designed to streamline and digitize charging operations. It manages key entities such as charging stations, chargers, bookings, contacts, and maintenance records in one unified platform. Customers can easily search for available slots and book charging sessions through an interactive screen flow, while built-in validations ensure that no overlapping bookings occur, maximizing charger utilization. Booking confirmations are delivered either via on-screen alerts or through automated email templates for convenience. The system also provides powerful reporting features to track revenue, usage patterns, and overall station performance. Additionally, maintenance schedules can be recorded and monitored to ensure charger uptime and reliability. Administrators have complete visibility into customer activity, booking history, and operational performance, enabling better decision-making.

Objective:

Here are the objects (main entities) of your EV Charging Station Management System explained in 5 paragraph-style lines:

1. Charging Station – Represents each physical EV charging location, storing details like station name, city, capacity, and operational status.

2. Charger – Tracks individual charging units within a station, including type (fast/standard), availability, and maintenance status.

3. Booking – Manages customer reservations by recording time slots, assigned charger, customer details, and prevents overlapping schedules.

4. Contact (Customer) – Stores user information such as name, email, and booking history, enabling communication and personalized service.

5. Maintenance – Logs service schedules, repair history, and downtime for chargers, ensuring reliability and reducing operational risks.

 Phase 1: Problem Understanding & Industry Analysis

 Goal: To power up our understanding of the EV charging universe, identify the essential currents (requirements), and map out the entire energy grid of industry use cases before we even think about building our supercharged CRM!

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1. Requirement Gathering

Example requirements:

- **Customers should be able to:**
  - Effortlessly search for nearby charging stations.
  - Instantly view real-time slot availability.
  - Seamlessly book slots and make secure online payments.
- **Admin/Station Managers should be able to:**
  - Efficiently add and manage charging stations.
  - Accurately track utilization and revenue.
  - Proactively monitor faulty chargers and raise urgent maintenance tickets.
- **Maintenance Staff should be able to:**
  - Promptly receive notifications of faulty equipment.
  - Swiftly update repair status.

-----2. Stakeholder Analysis

- **Admin (CRM Owner)** → Masterfully manages setup, diligently monitors all stations, and generates insightful reports.
- **Station Manager** → Expertly handles daily operations, deftly manages bookings, and meticulously oversees payments.
- **Customer (EV Owner)** → Intuitively searches, books, pays, and charges their vehicle with ease.
- **Maintenance Staff** → Skillfully fixes faulty stations, precisely logs service requests, and promptly updates status.

- **Finance Team** → Thoroughly reviews billing, accurately tracks revenue, and prepares comprehensive reports.

-----3. Business Process Mapping

Booking flow:

Customer searches station → Views available slots → Books a slot → Pays → Slot reserved → Charging complete → Usage & revenue logged → Reports generated.

Maintenance flow:

Station flagged faulty → Maintenance Staff notified → Repair completed → Status updated → Station available again.-----4. Industry-Specific Use Case Analysis

- **Challenges in EV Industry:**
  - High demand but limited charging infrastructure.
  - Urgent need for real-time slot visibility.
  - Diverse charger types (slow/AC, fast/DC) requiring smart management.
  - Maintenance downtime significantly impacts customers.
- **Our CRM Solution:**
  - Optimizes slot management to flawlessly avoid double booking.
  - Integrates payments for a smooth transaction experience.
  - Provides dynamic dashboards and insightful reports.
  - Includes robust maintenance tracking for uninterrupted service.

-----5. AppExchange Exploration

- Some existing EV/IoT apps primarily focus on **charger hardware monitoring**.
- Few CRMs truly emphasize **customer booking + revenue tracking**.
- **Decision:** Forge a **custom Salesforce CRM** specifically tailored for EV Charging.

-----✅**Deliverable for Phase 1:**

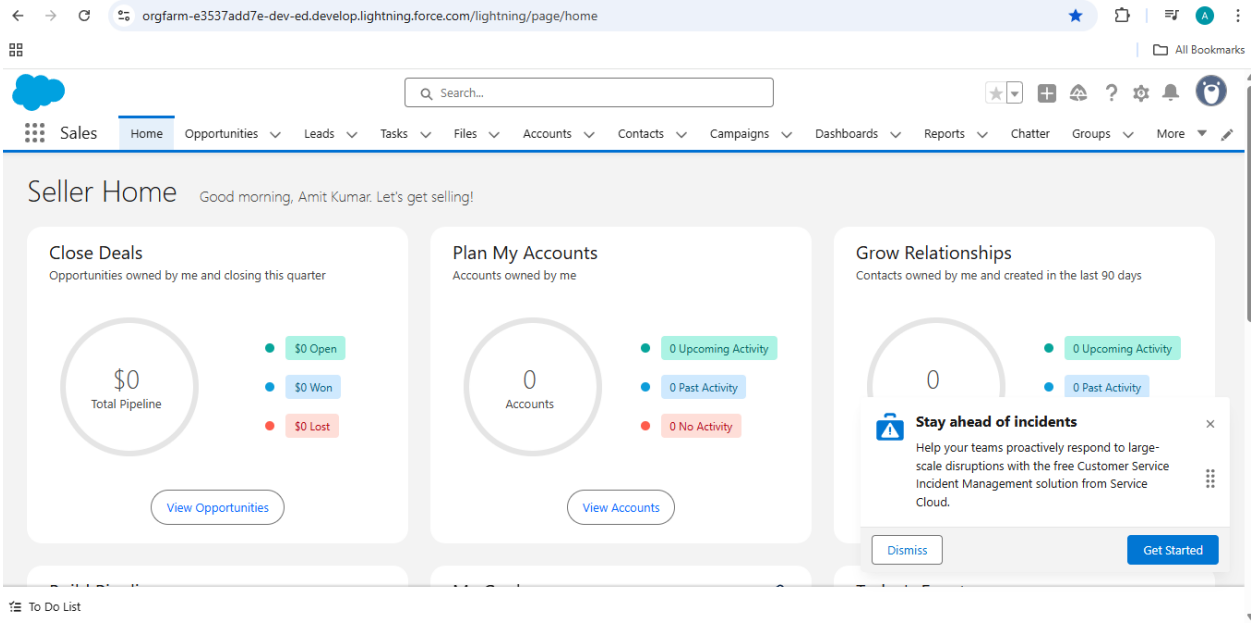
- Crystal-clear requirements.

- Comprehensive stakeholder mapping.
- Streamlined business process flows.
- In-depth analysis of industry-specific challenges and a strategic solution plan.

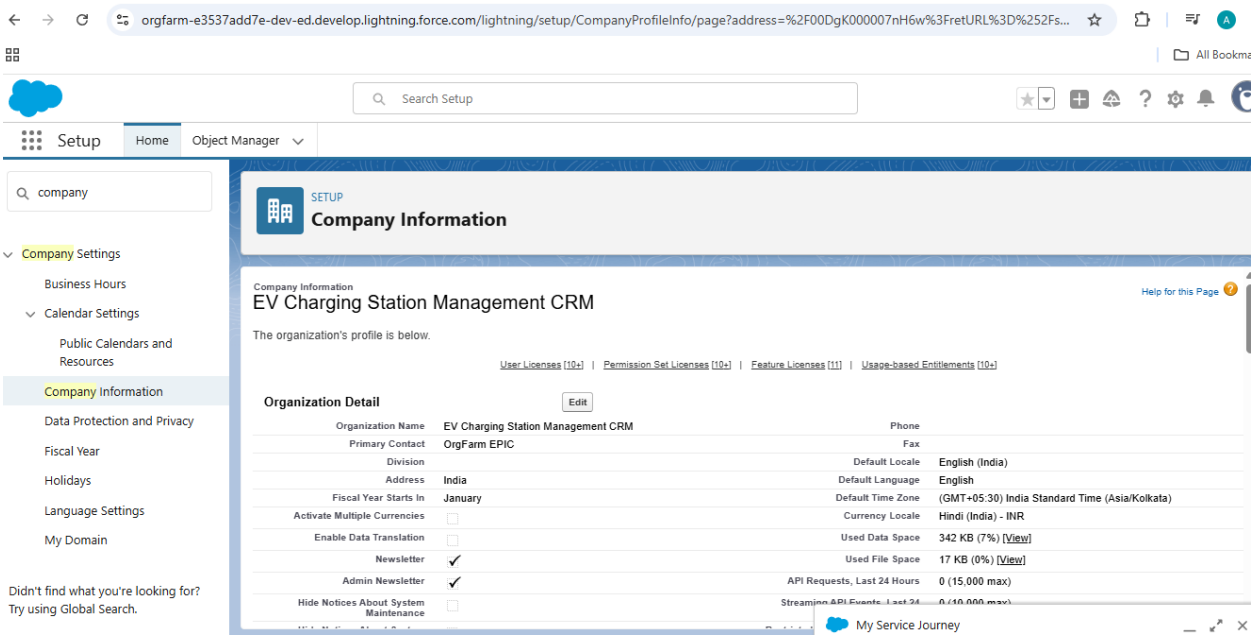
Phase 2 :org setup and configuration

Step1-

Go to salesforce developer org id

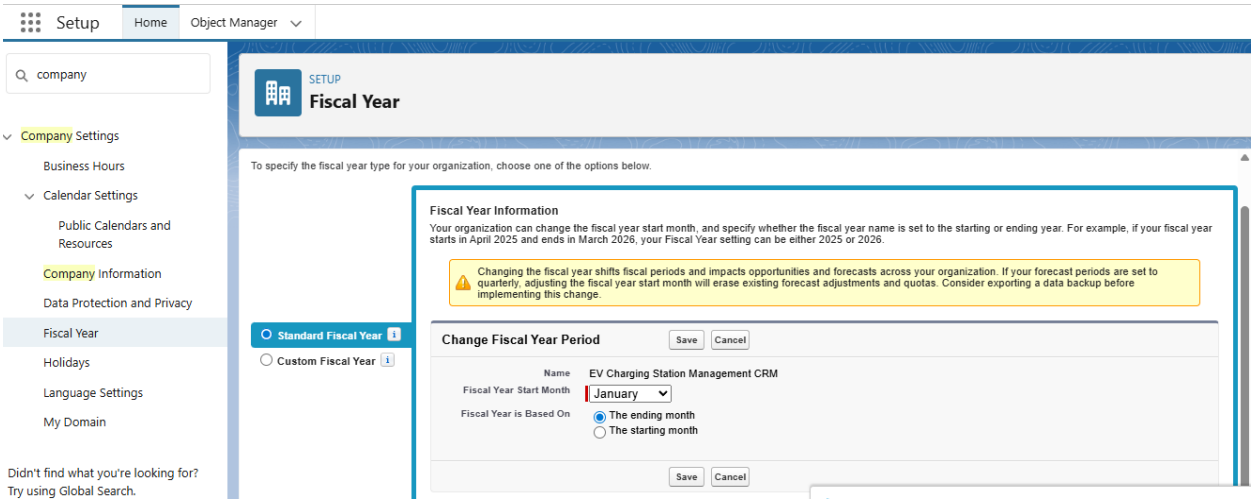


Click on the setup and search for company information(In one salesforce developer org we can have only one company)

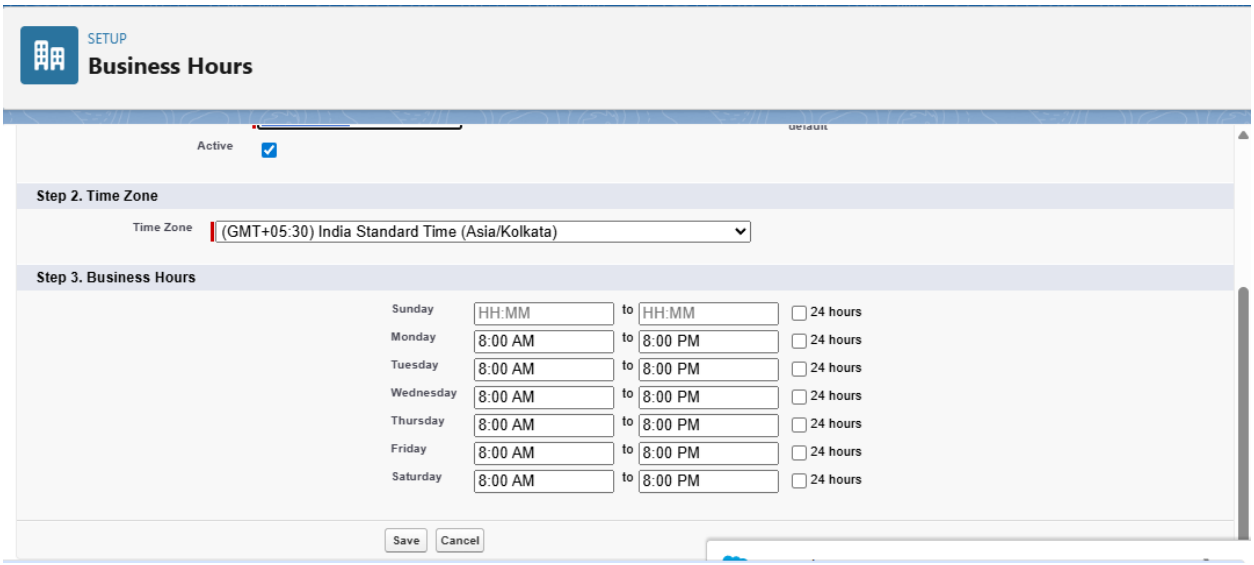


Step2

Fiscal year settings

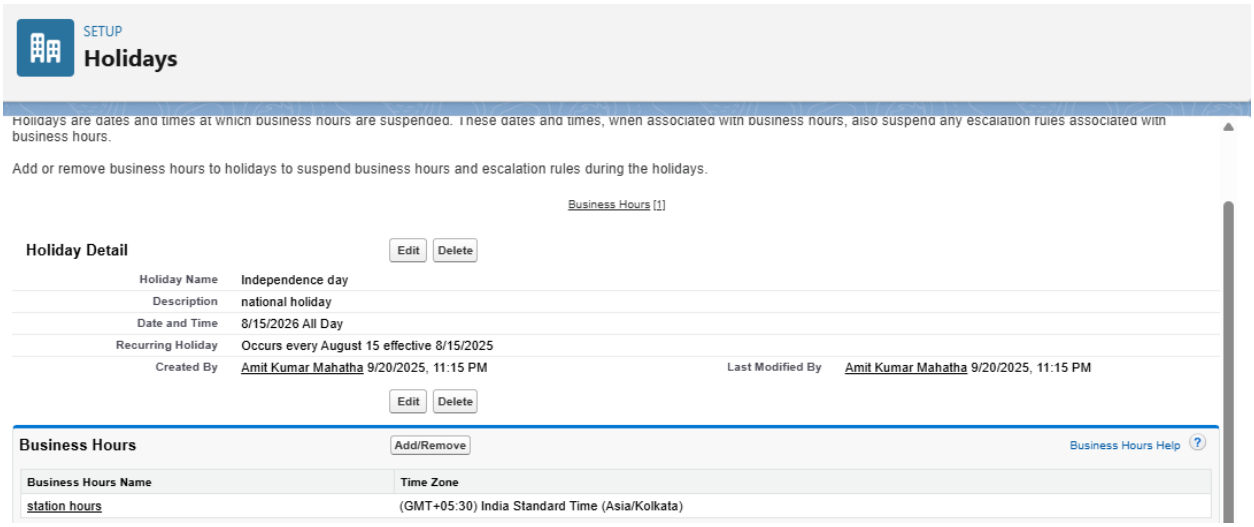


Step3



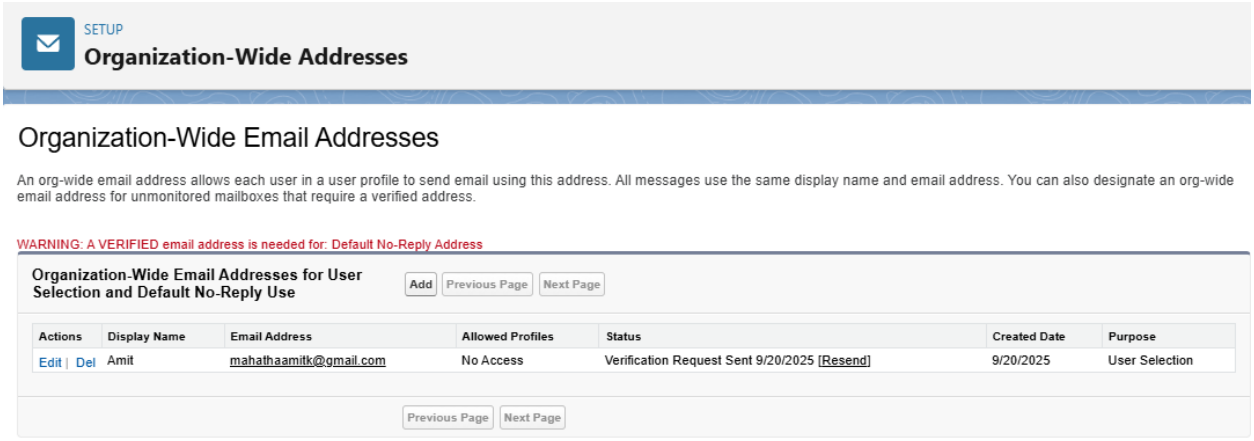
bussiness hours setup.

Step4
Holidays setup



Linked with the business hours “Station Hours”

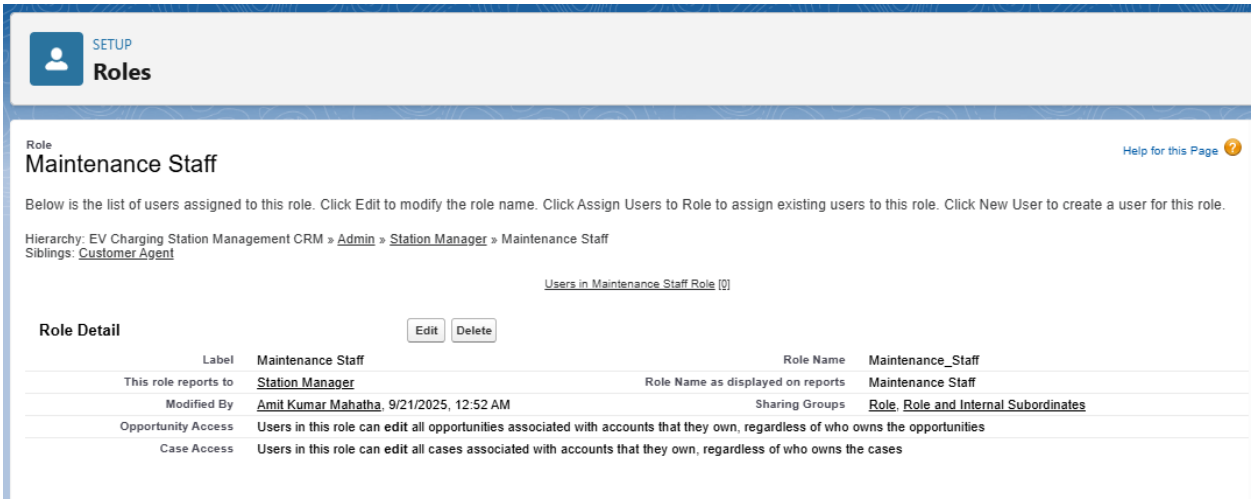
Step5:
Email setup , when ever any user will book charging point a confirmation mail will go through this mail



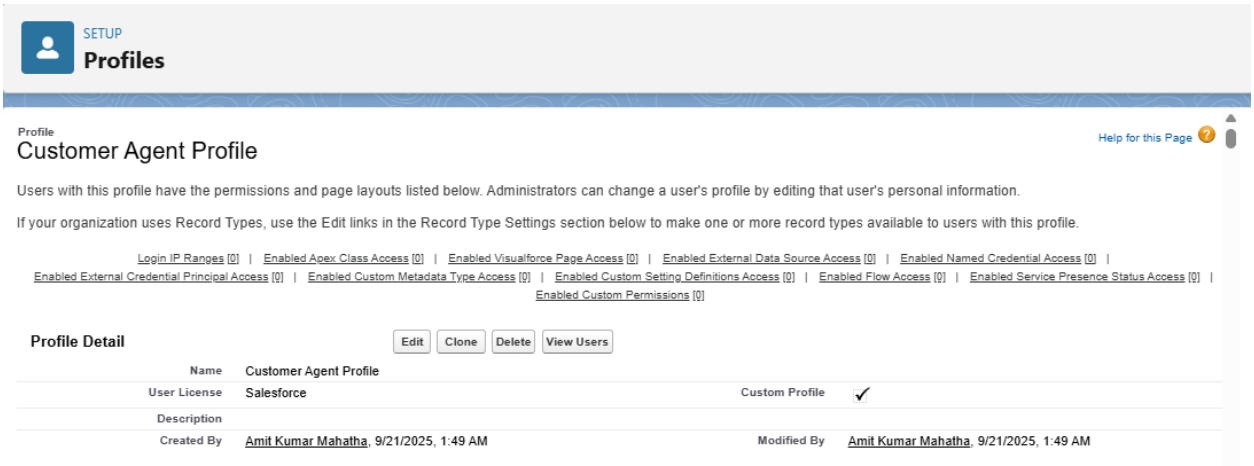
Step5:
Create roles (hierarchy)

Admin (top)

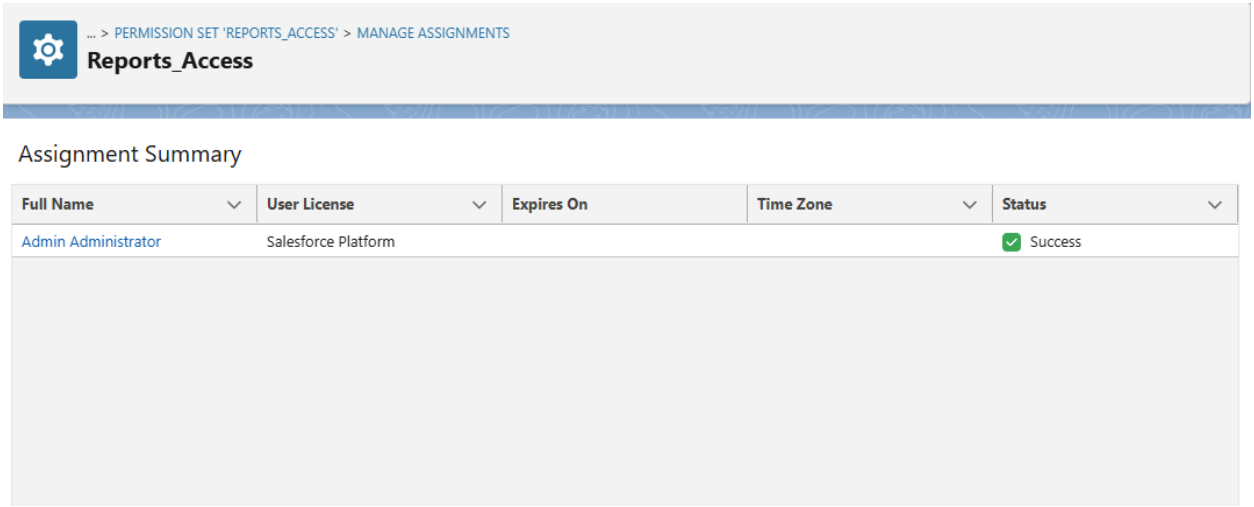
- Station Manager
    - Customer Agent
    - Maintenance Staff



Step6
Profile setup

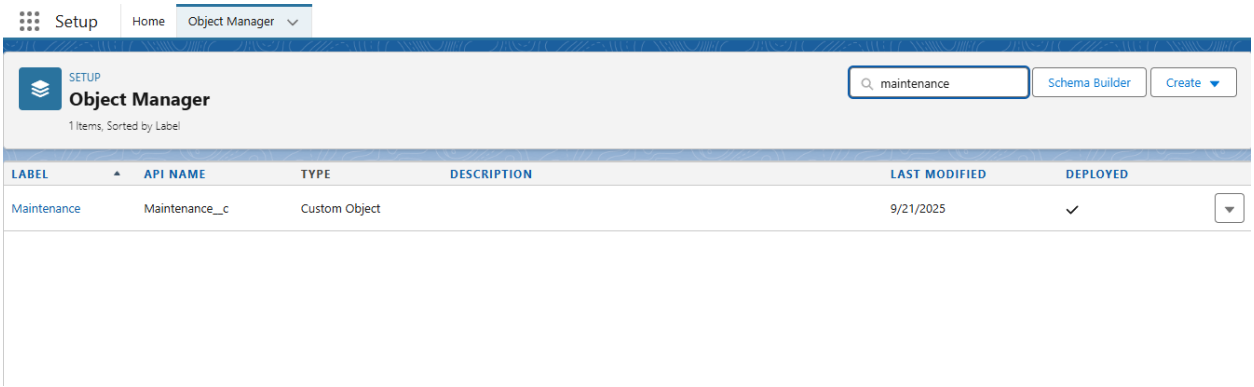


Step7
Permission setup



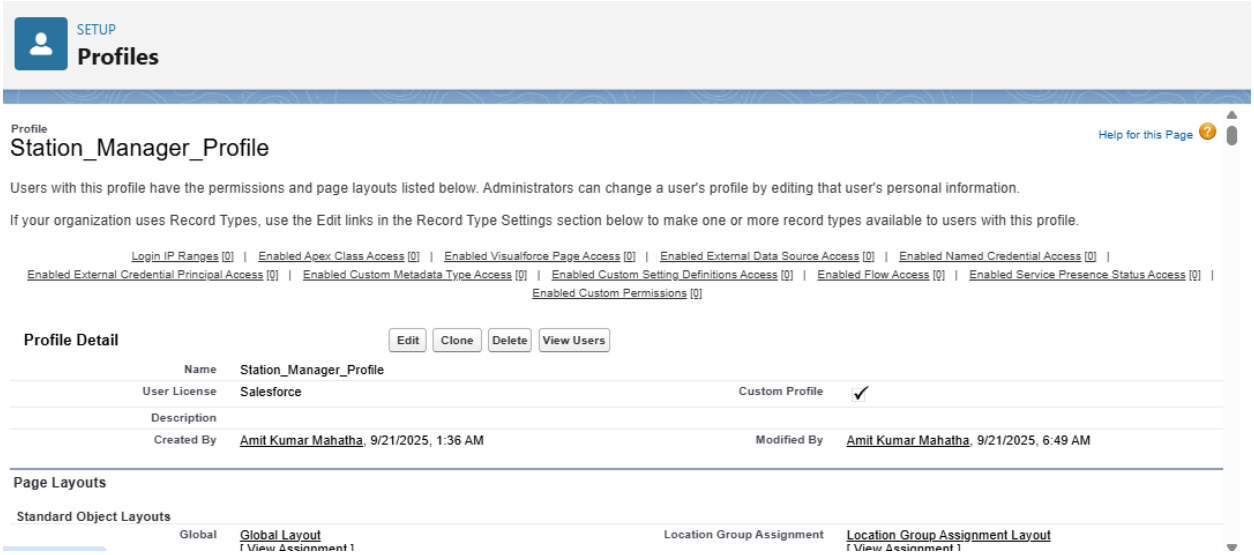
Step8:

Creating custom objects

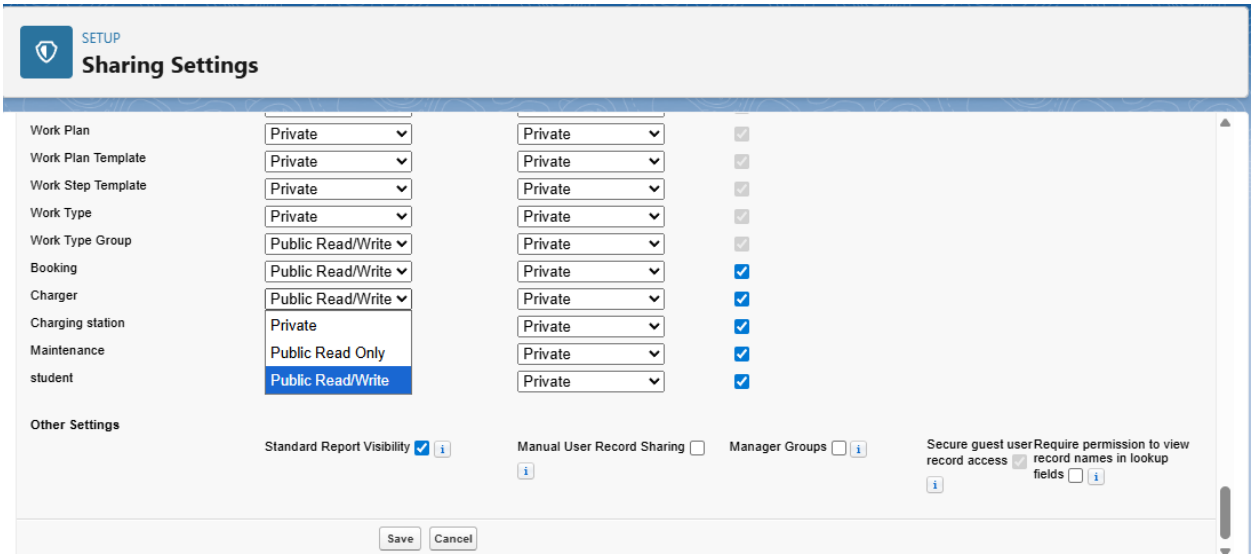


Step9:

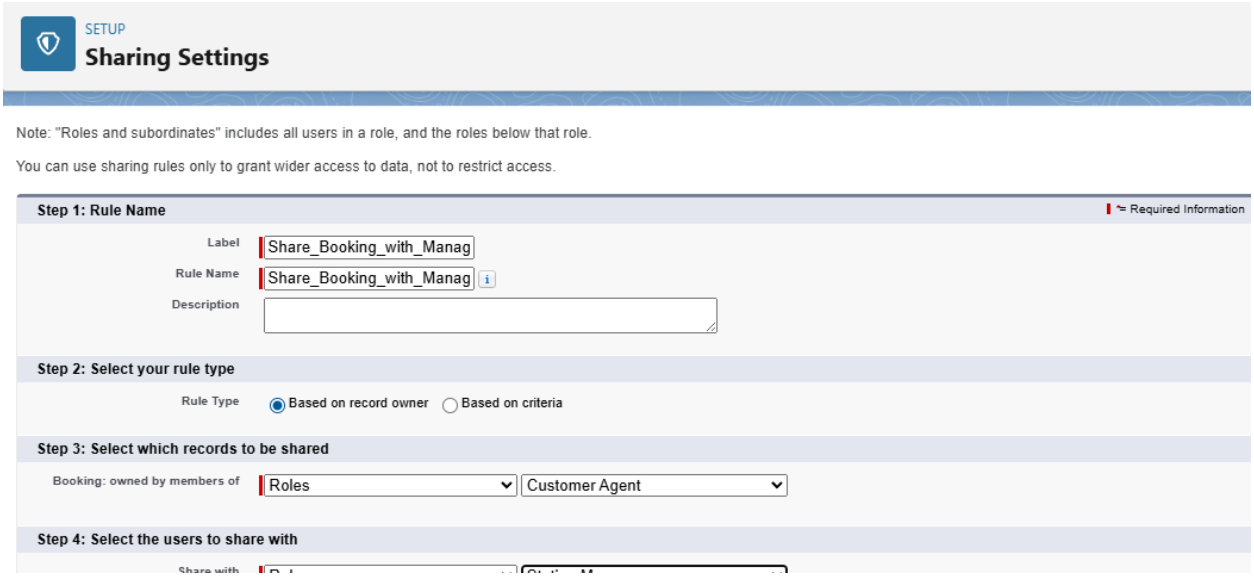
Setting up custom object setting for profiles



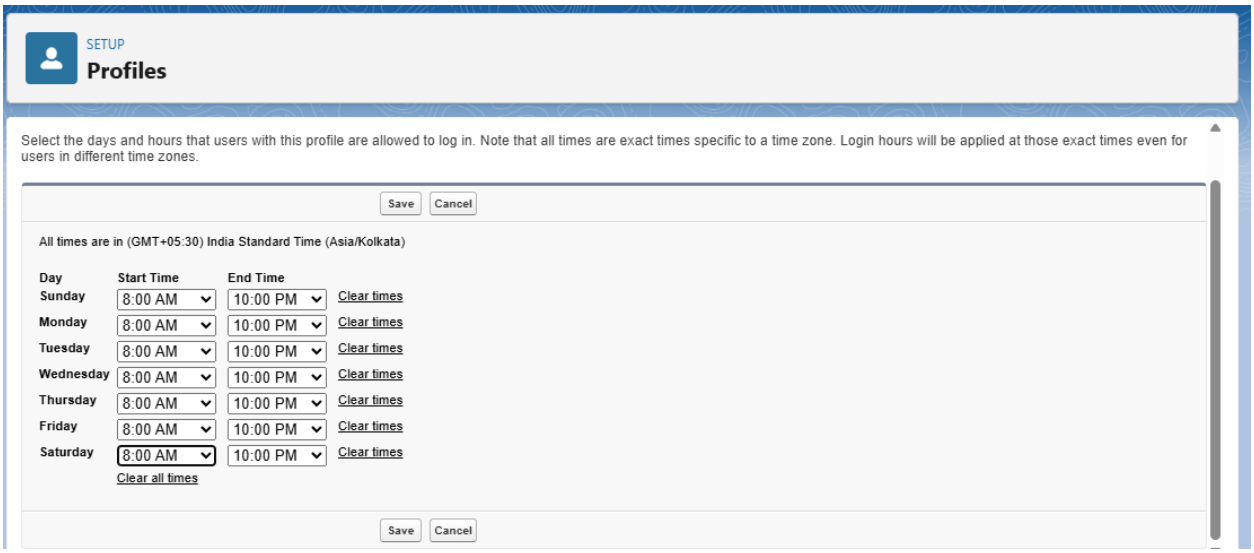
Step10:
Sharing settings



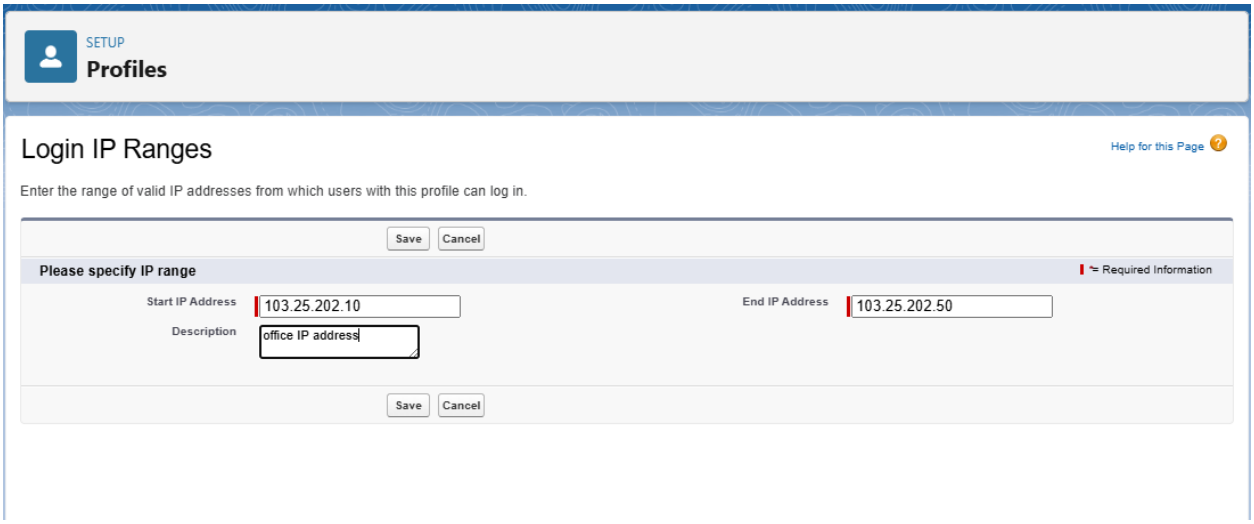
Step 11:
Create sharing rules for manager



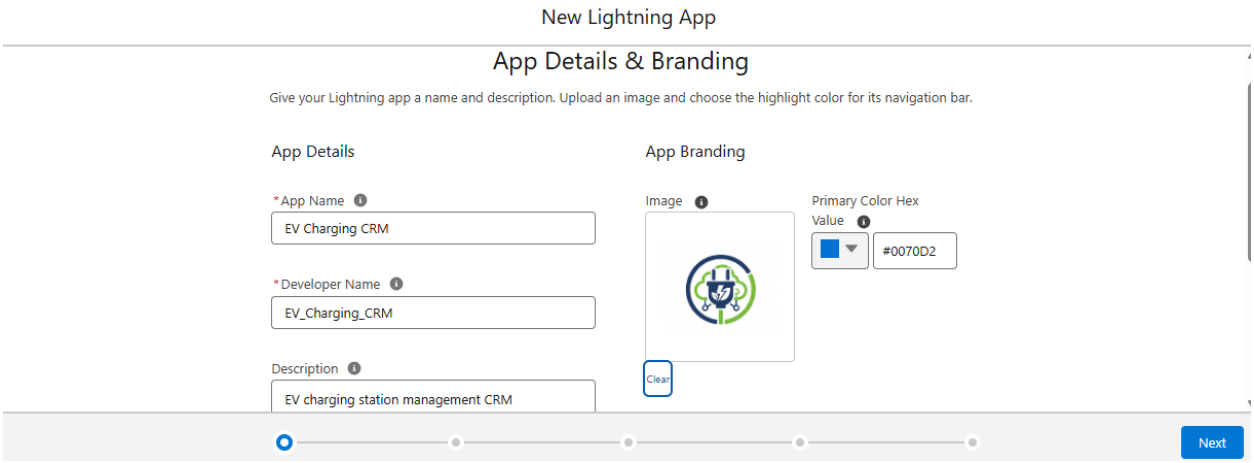
Step12:
Login hours setup



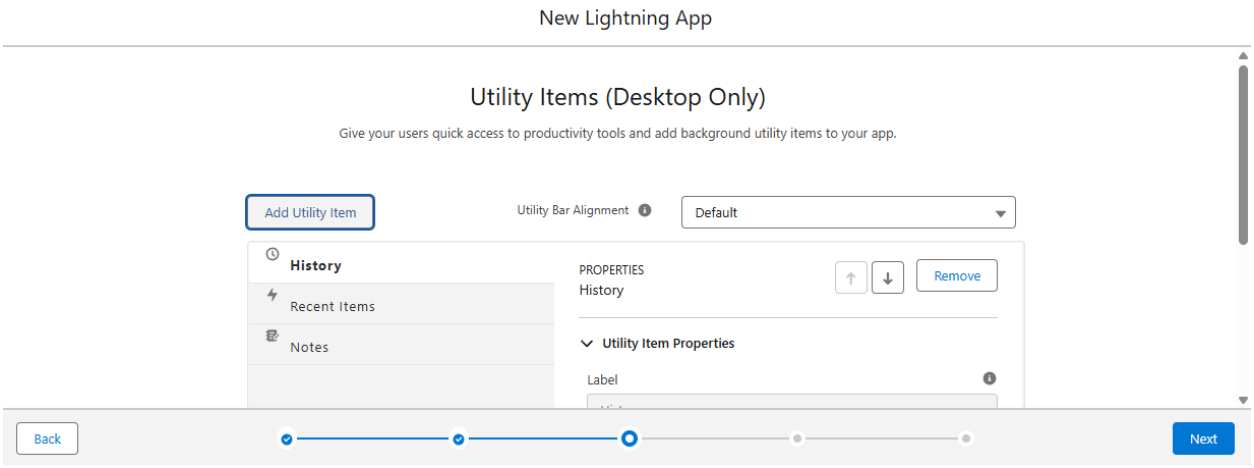
Step13:
IP ranges setup(nahi kiye hai)



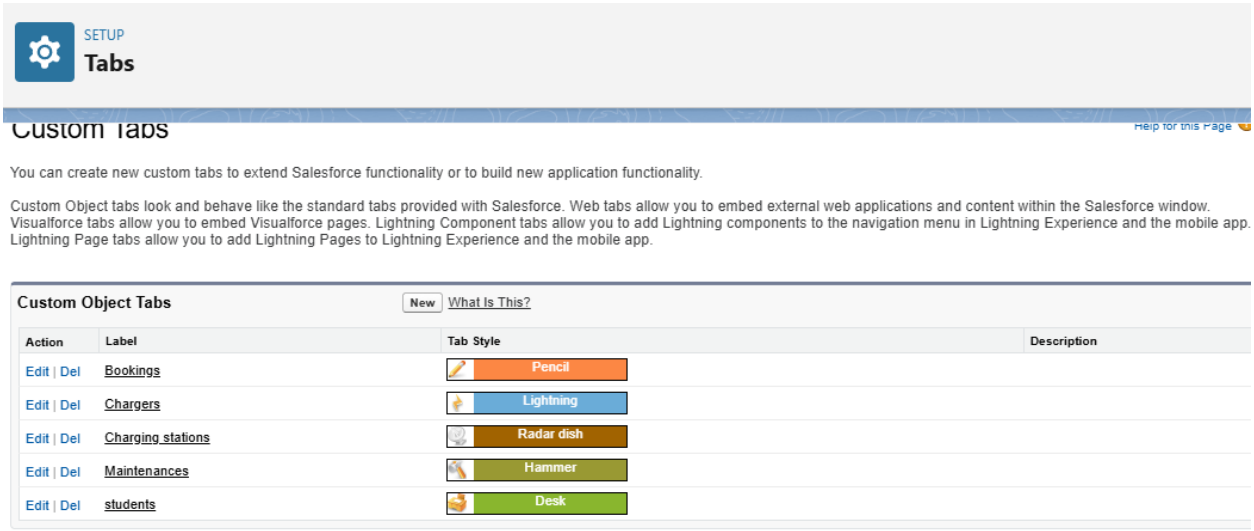
Step14:
Lightning setup



Utility settings(appears at bottom)



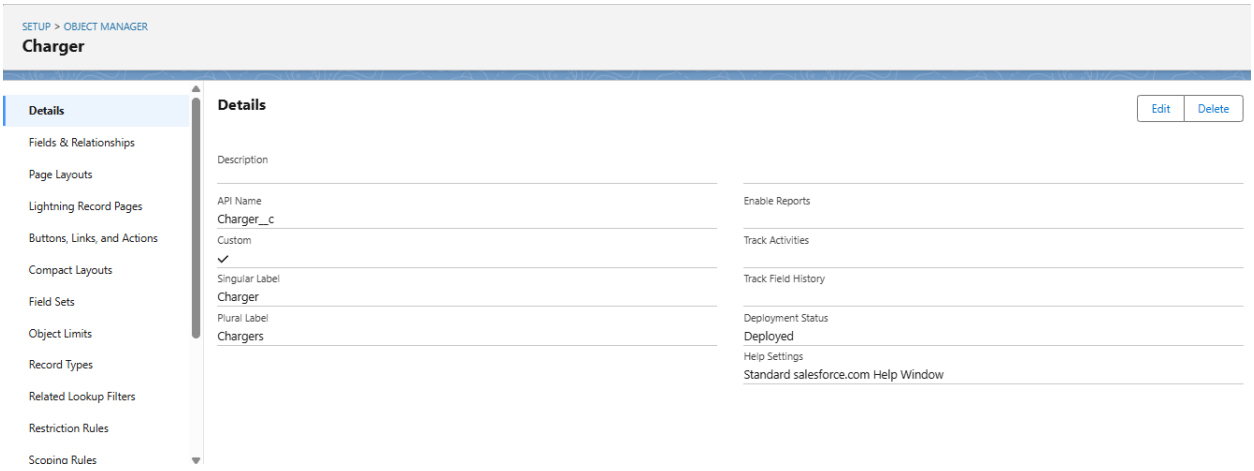
Creating the custom objects tabs



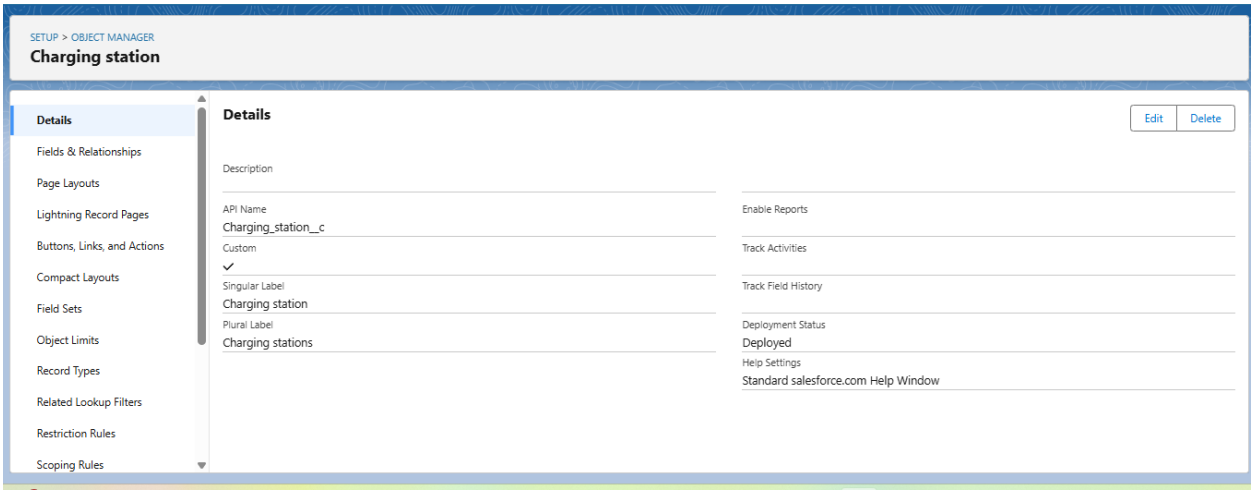
Phase 3: Data Modeling & Relationships

1. Custom object -> created custom objects (chargers , charging station ,Booking ,Maintenance)

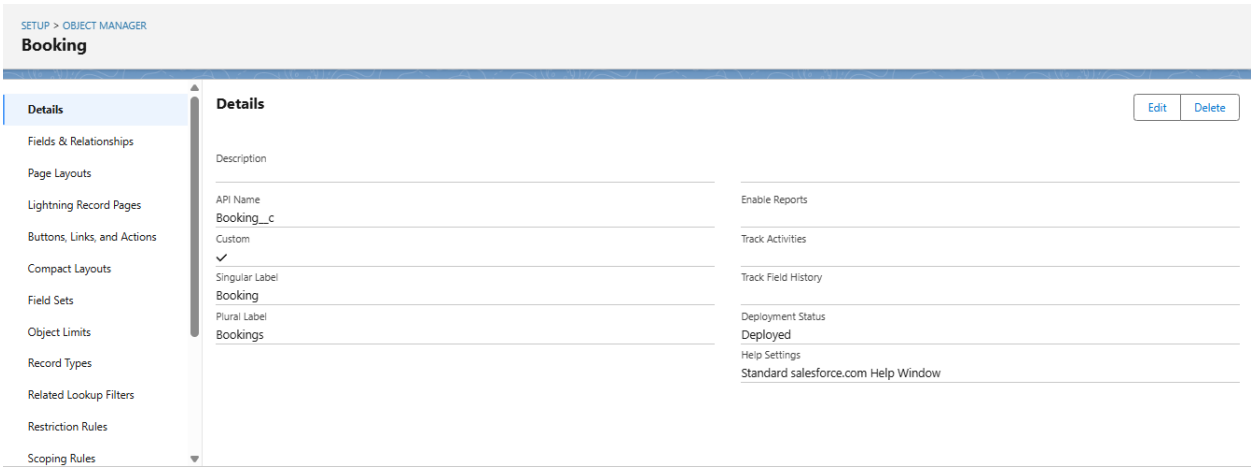
charger



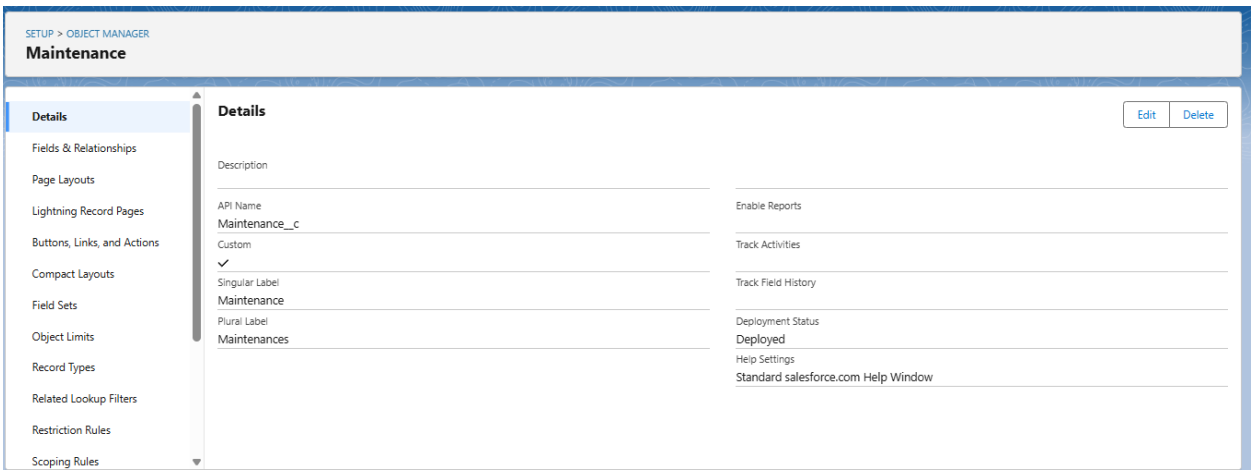
Charging station



Booking

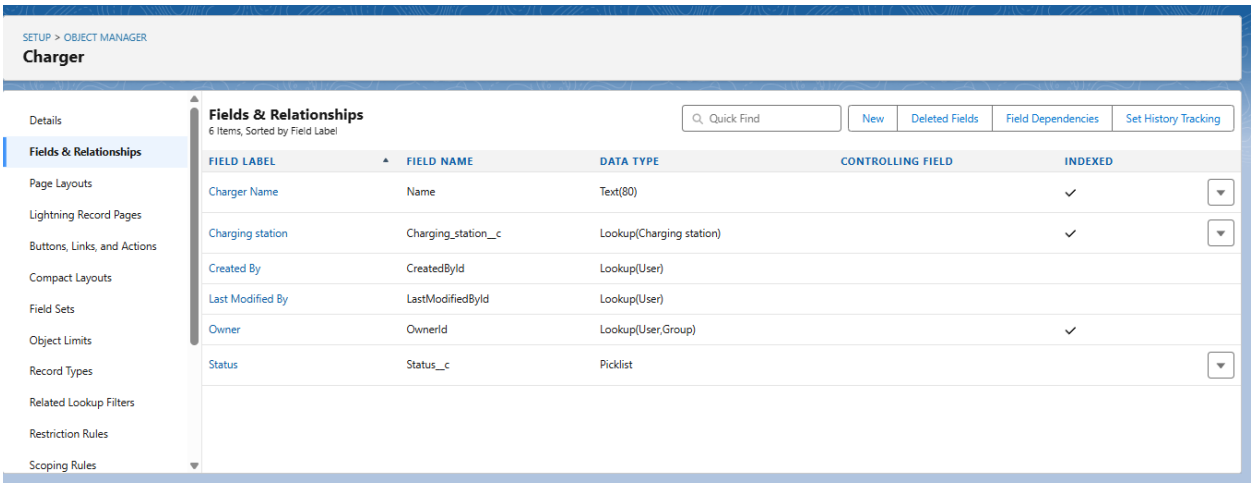


Maintenance

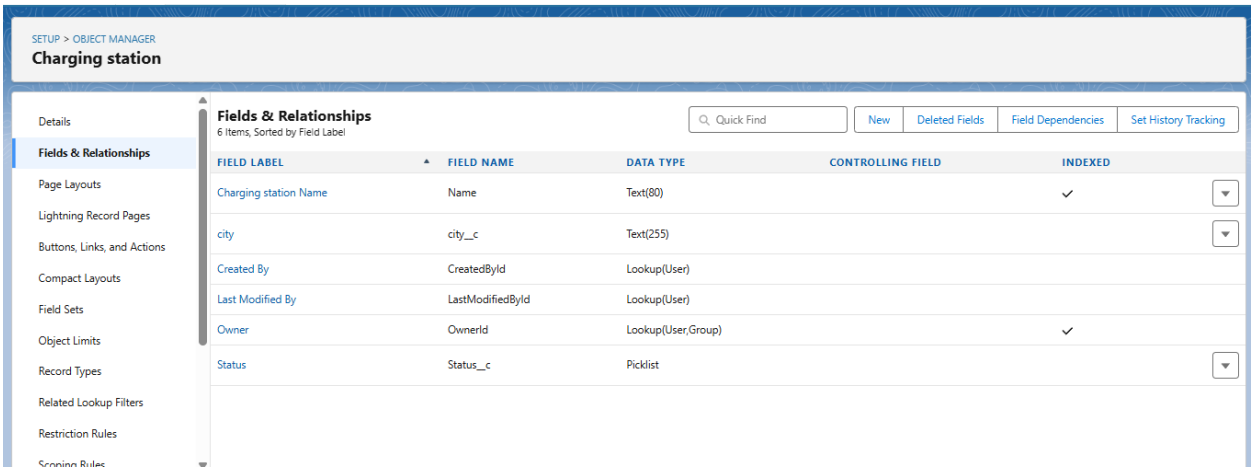


2.Fields and relationship

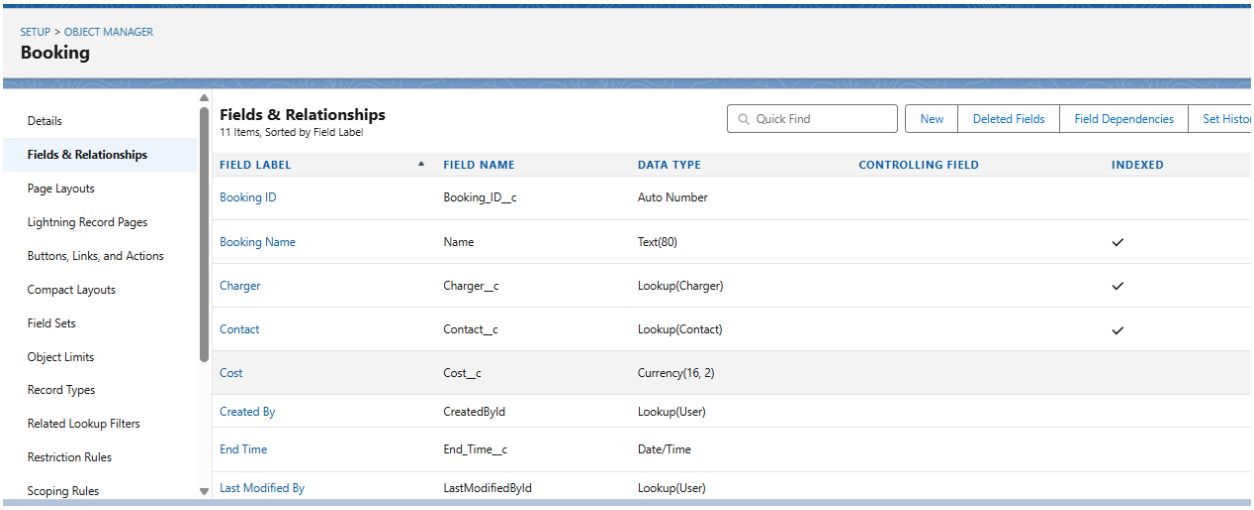
Chargers



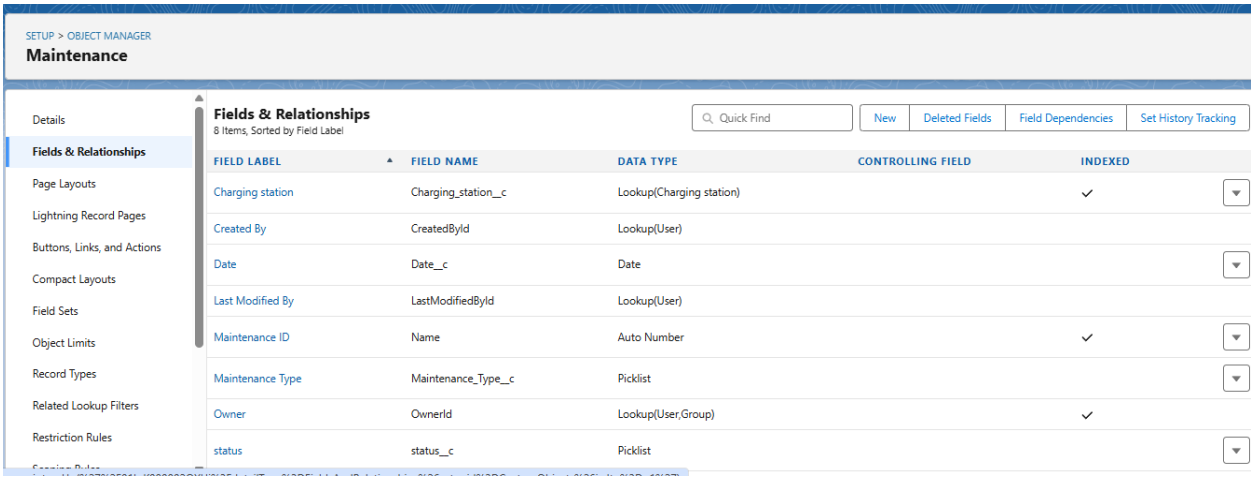
Charging station



Booking

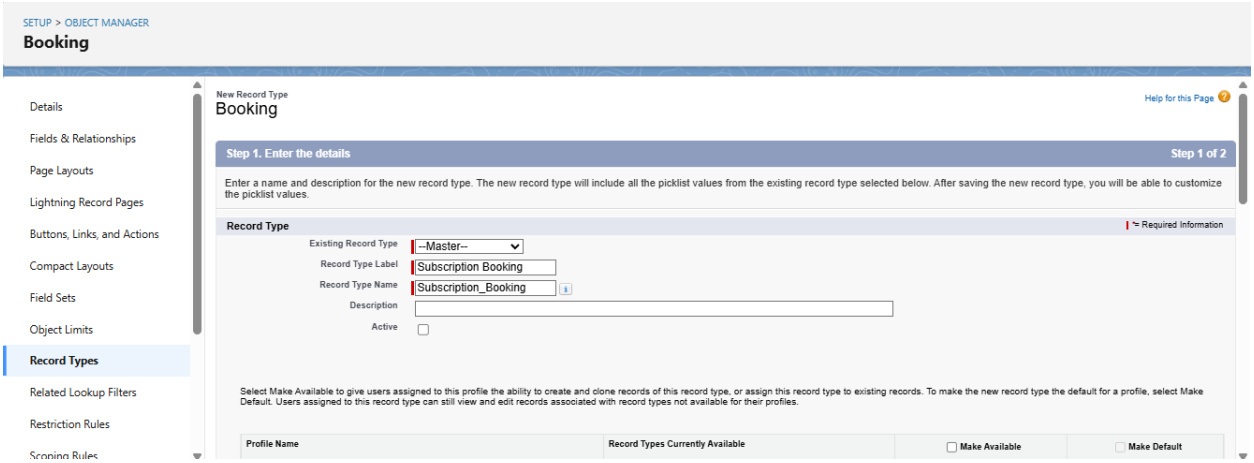


Maintenance

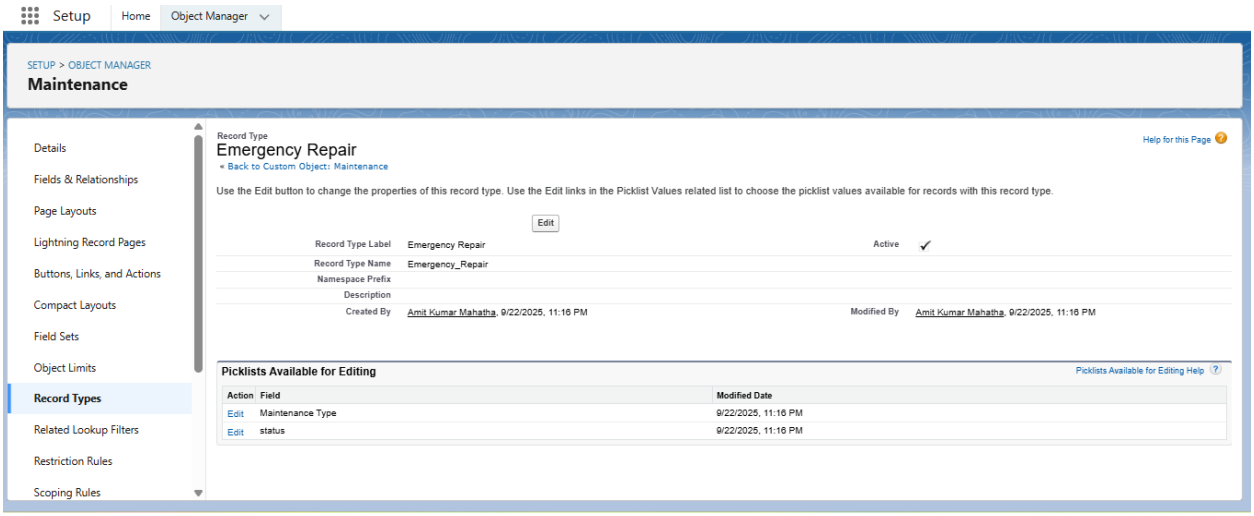


3.Record Types

Booking -> two types of record first “one time booking” and another “Subscription based”

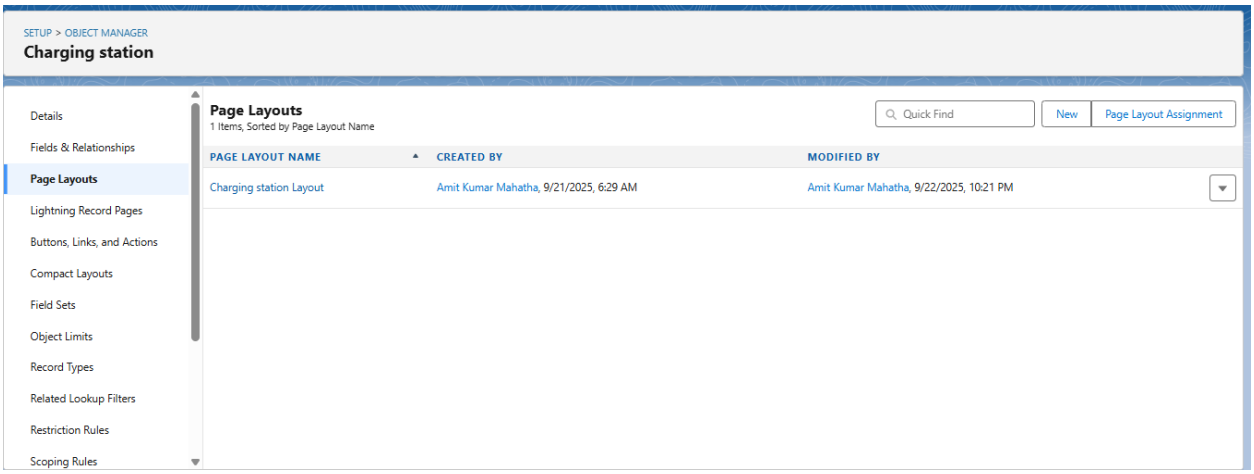


Maintenance record type

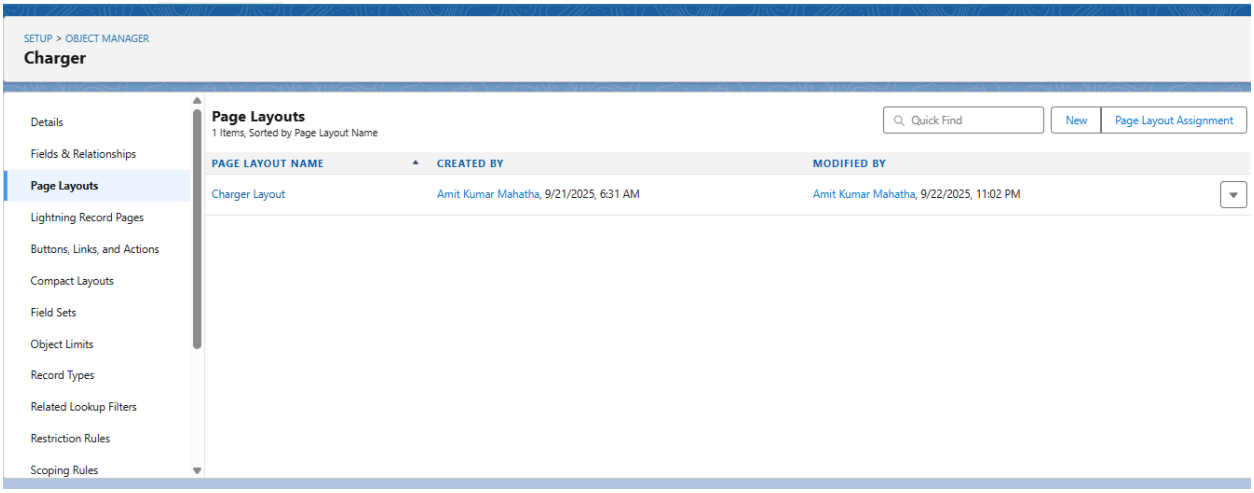


4.page layout

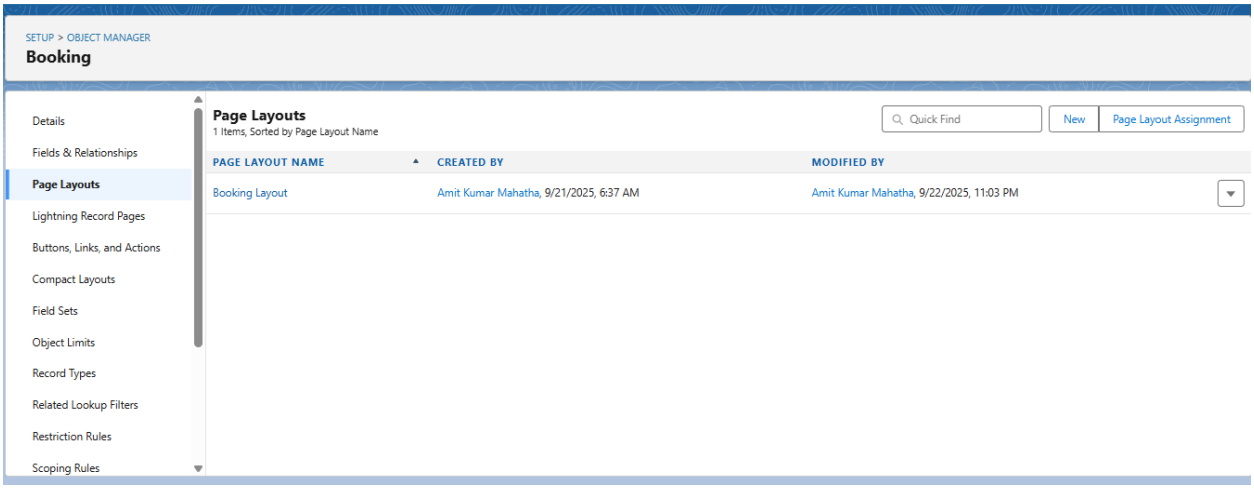
Charging station



Charger

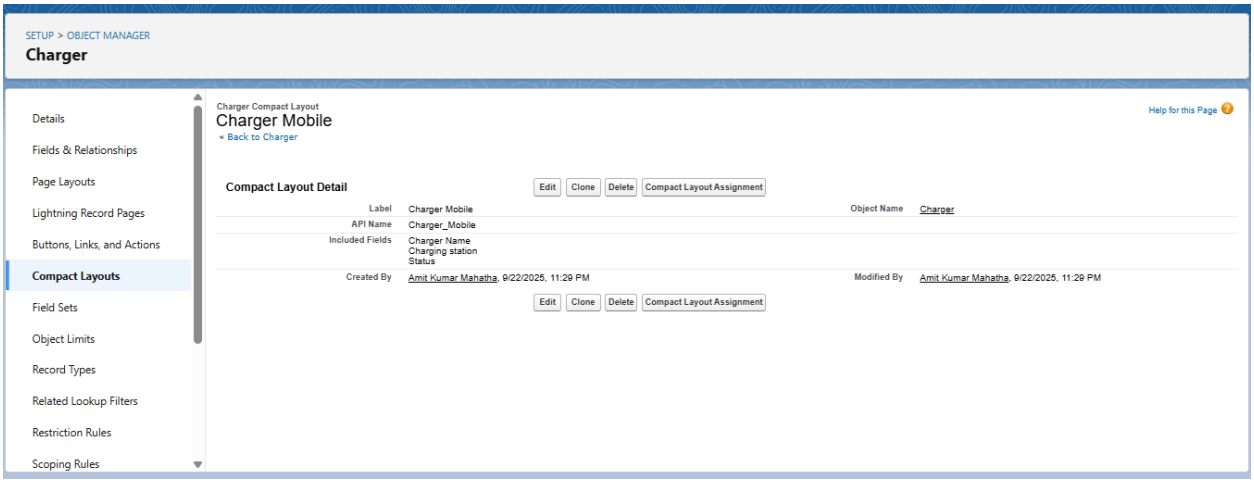


Booking

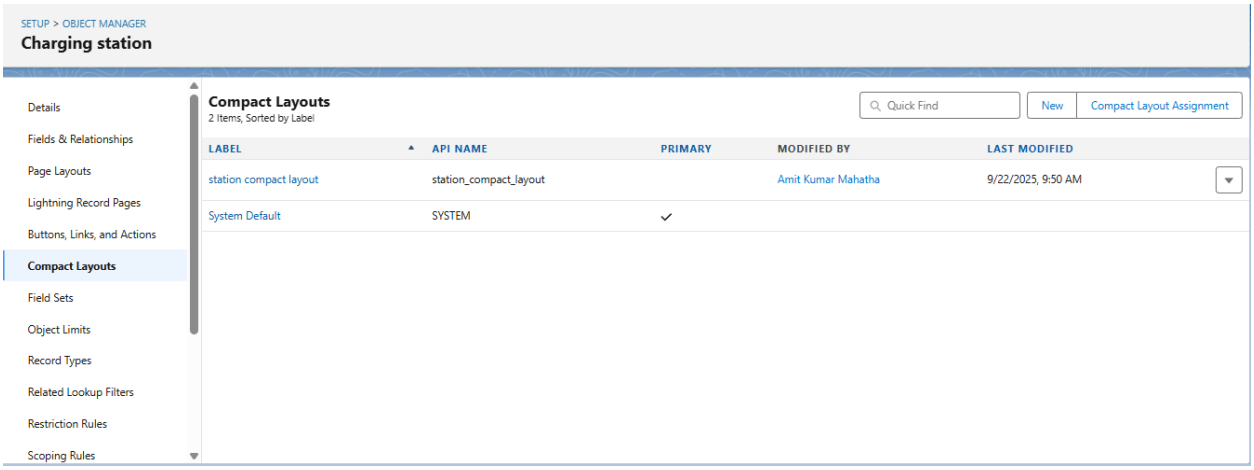


5.Compact Layout

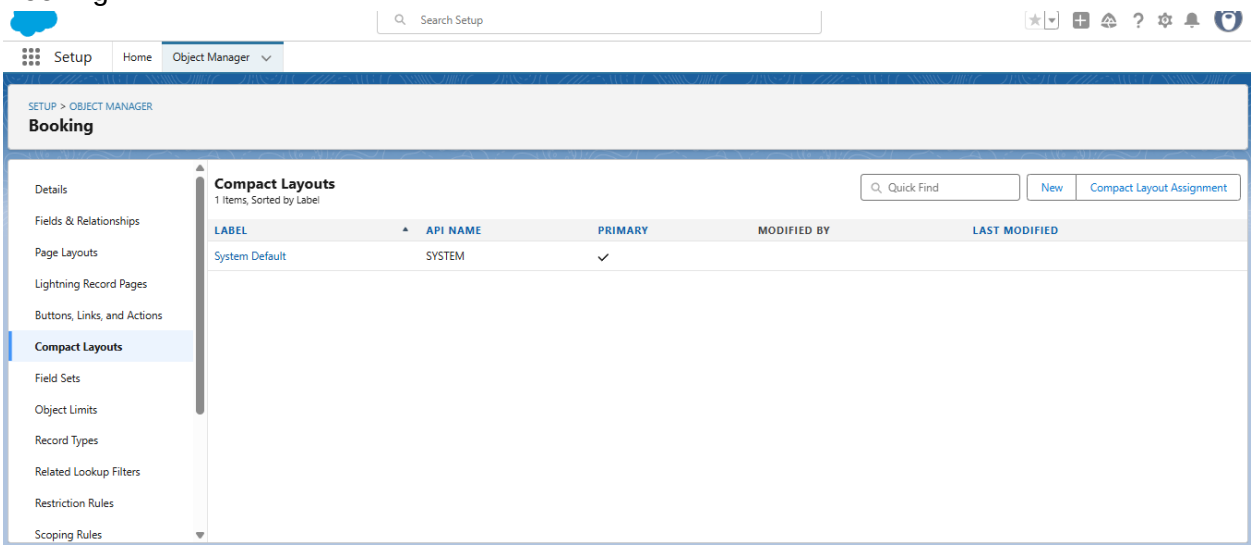
charging



Charging station

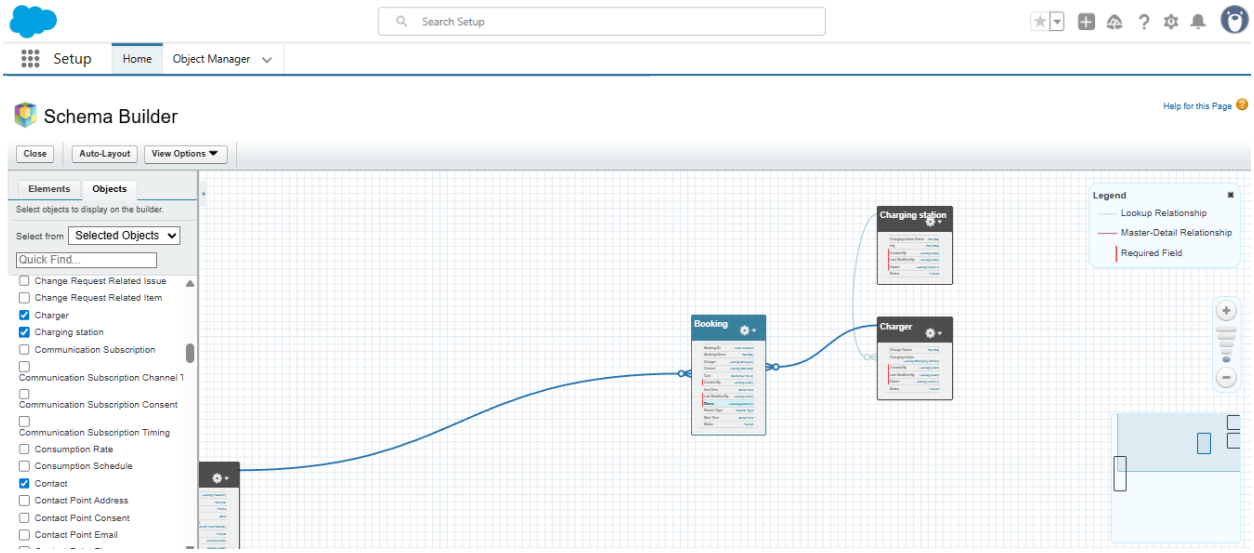


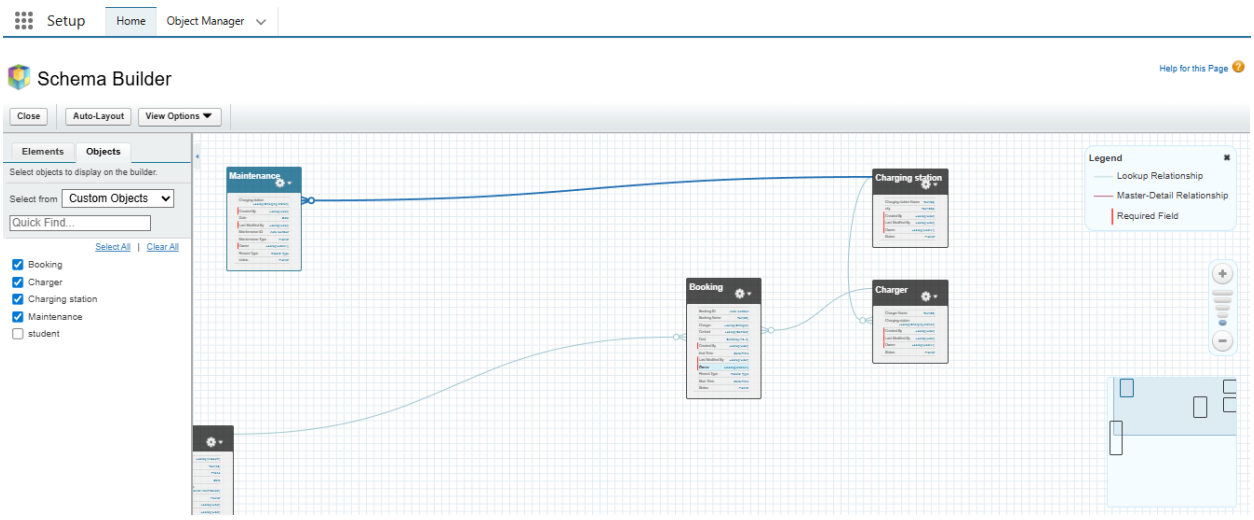
Booking



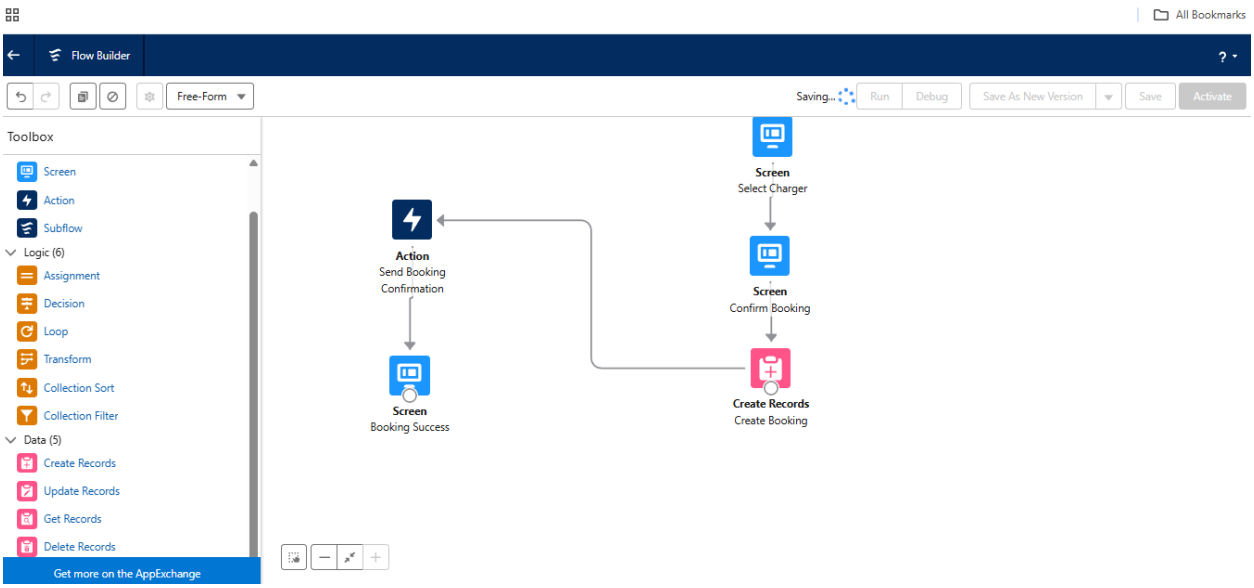
All the objects have system default as compact layout.

6.Schema builder



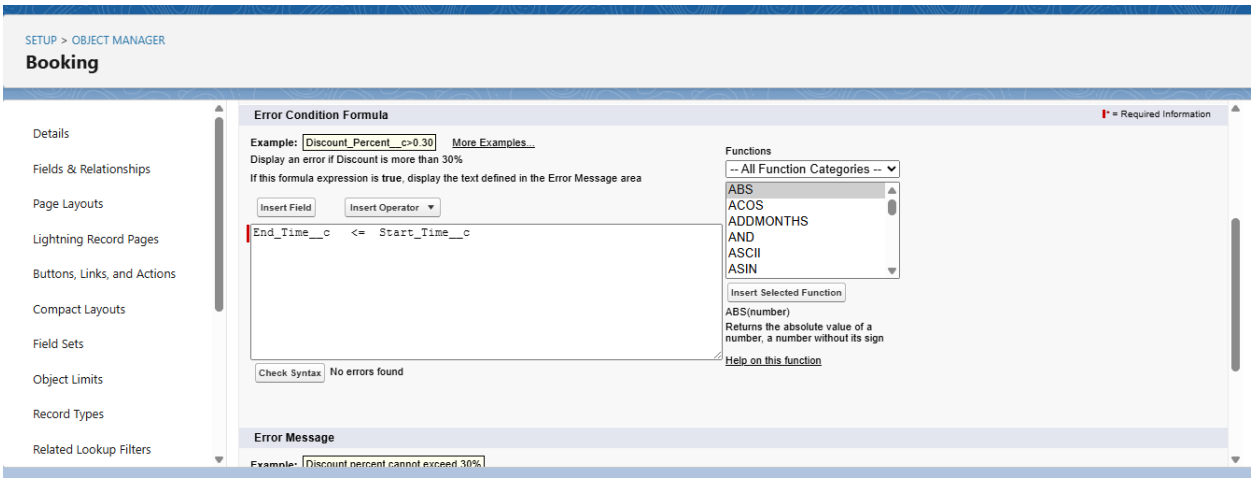


7.Flow Builder


All Bookmarks
Flow Builder
Free-Form
Saving...
Run
Debug
Save As New Version
Save
Activate
Toolbox
Screen
Action
Subflow
Logic (6)
Assignment
Decision
Loop
Transform
Collection Sort
Collection Filter
Data (5)
Create Records
Update Records
Get Records
Delete Records
Get more on the AppExchange
Screen
Select Charger
Action
Send Booking Confirmation
Screen
Confirm Booking
Screen
Booking Success
Create Records
Create Booking

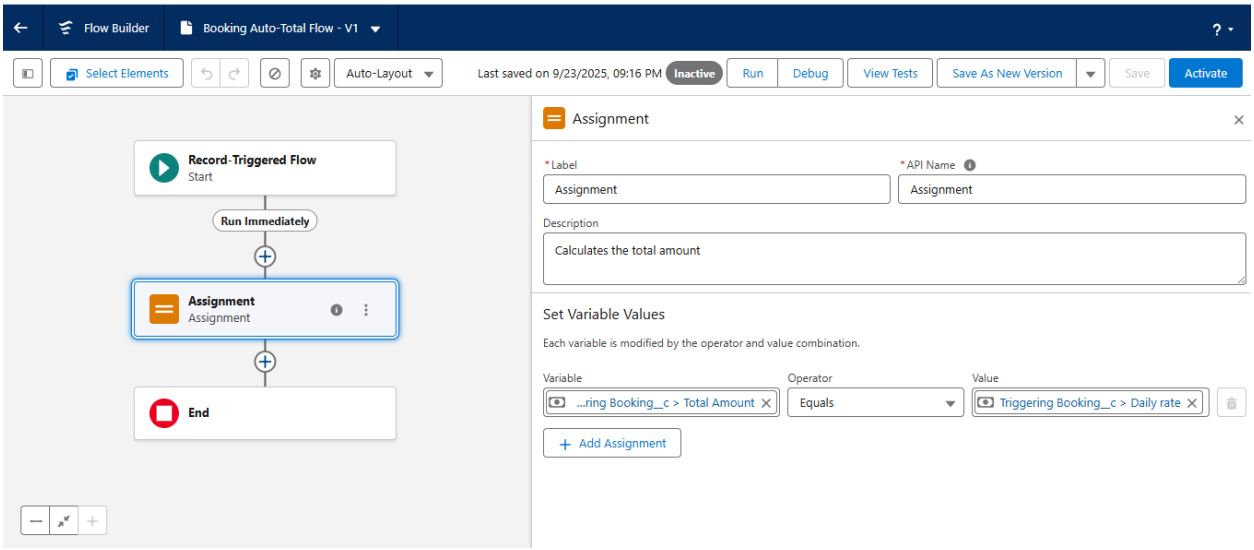
Phase 4: Process Automation (Admin)

Validation rules: It is checking if the end time <= start time it will show error
End_Time__c <= Start_Time__c



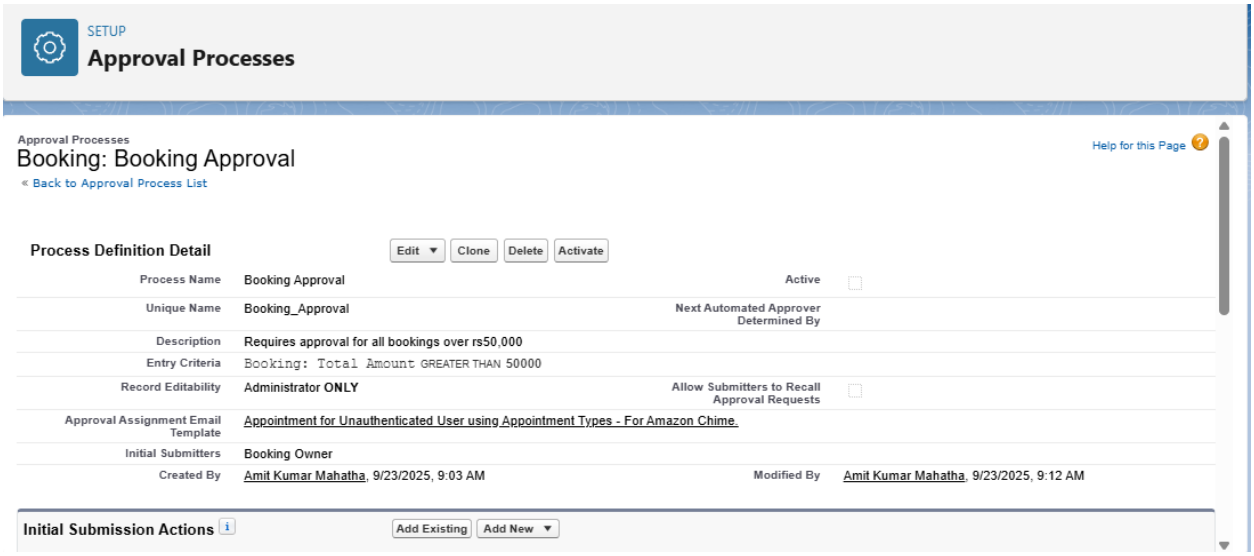
This will show the error message “End Date must be after Start Date.”

Flow builder : Record-Triggered Flow



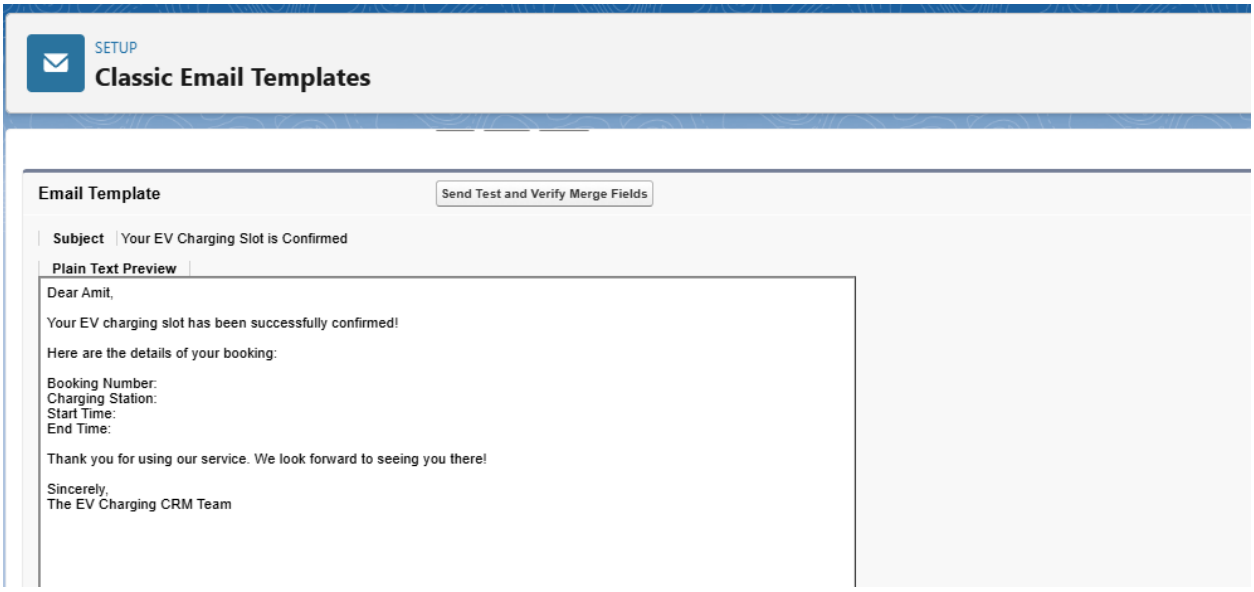
Setting variable values as “Total_Amount__c = (End_Date__c - Start_Date__c) * Daily_Rate__c”

Creating Approval process for Booking:



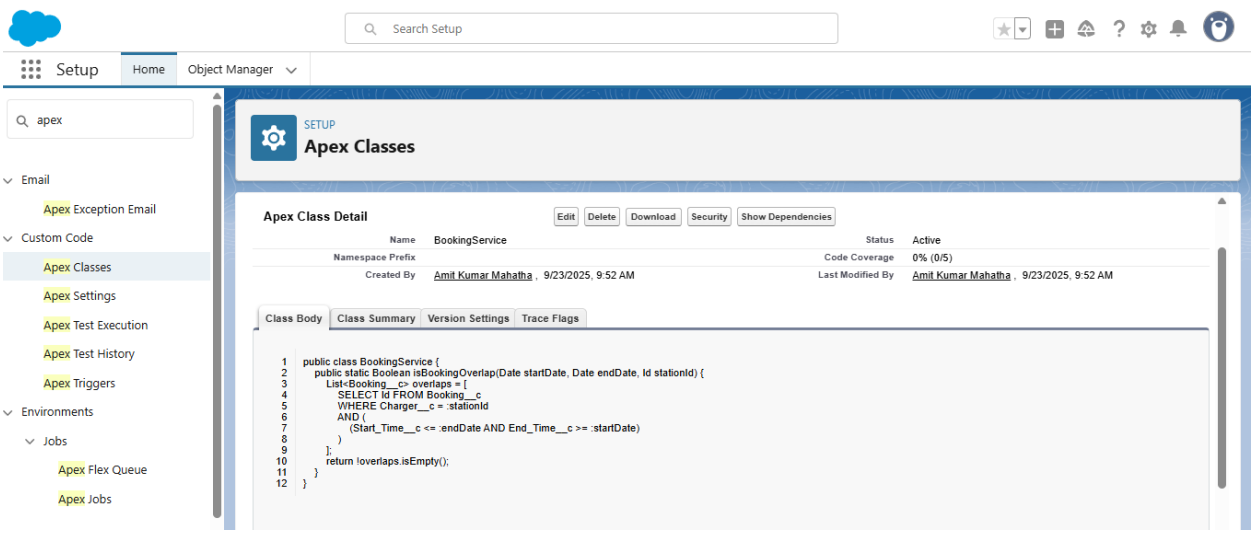
Booking approval is sent if the total amount is greater than rs50000

Email Templates:
Selecting classic email templates and creating new templates



Phase 5: Apex Programming (Developer)

Performing the apex programming



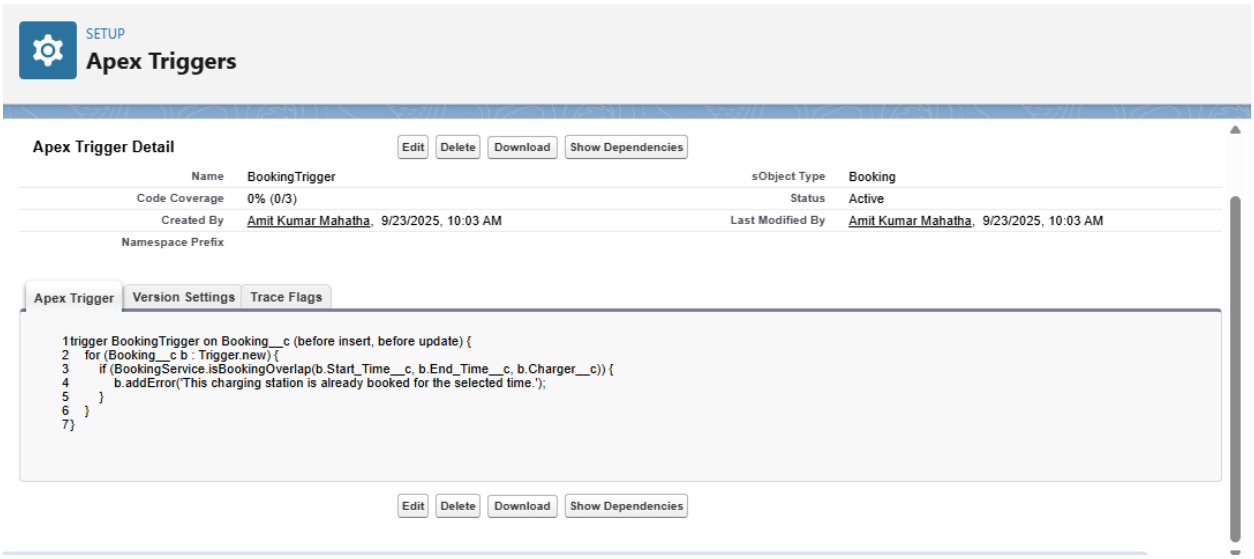

```
public class BookingService {
    public static Boolean isBookingOverlap(Date startDate, Date endDate, Id stationId) {
        List<Booking__c> overlaps = [
            SELECT Id FROM Booking__c
            WHERE Charger__c = :stationId
            AND (
                (Start_Time__c <= :endDate AND End_Time__c >= :startDate)
            )
        ];
        return !overlaps.isEmpty();
    }
}
```

Apex Trigger:

Navigation:

- Go to **Setup → Apex Classes → New**.

```
trigger BookingTrigger on Booking__c (before insert, before update) {
    for (Booking__c b : Trigger.new) {
        if (BookingService.isBookingOverlap(b.Start_Time__c, b.End_Time__c, b.Charger__c)) {
            b.addError('This charging station is already booked for the selected time.');
        }
    }
}
```

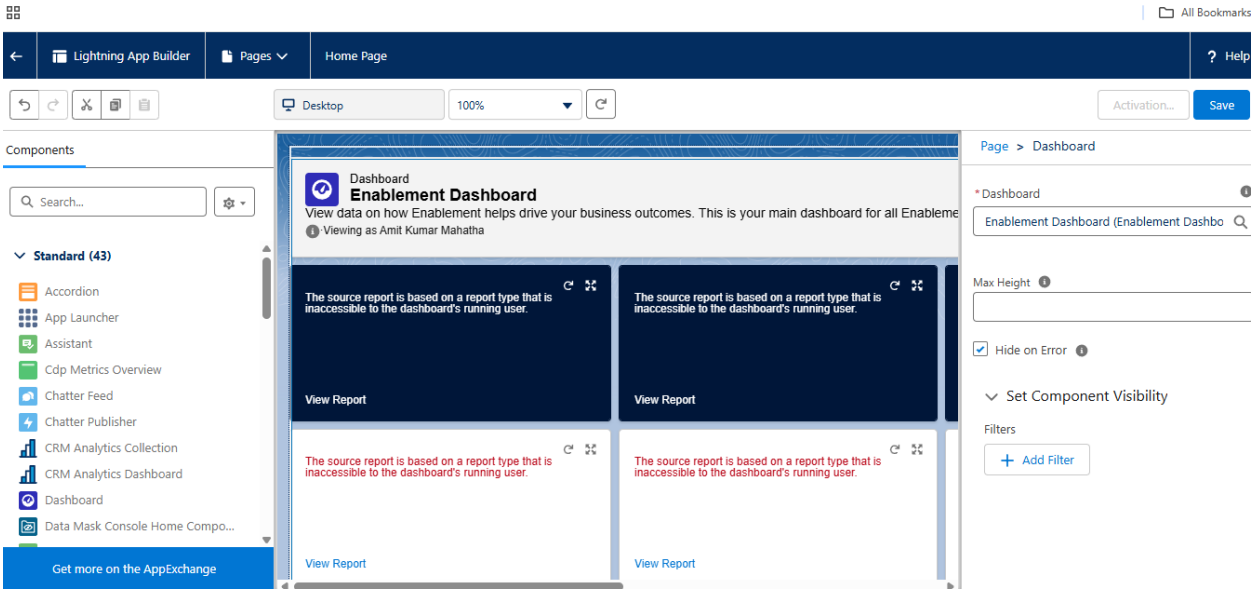

SETUP
Apex Triggers
Apex Trigger Detail
Edit
Delete
Download
Show Dependencies
Name
BookingTrigger
sObject Type
Booking
Code Coverage
0% (0/3)
Status
Active
Created By
Amit Kumar Mahatha, 9/23/2025, 10:03 AM
Last Modified By
Amit Kumar Mahatha, 9/23/2025, 10:03 AM
Namespace Prefix
Apex Trigger
Version Settings
Trace Flags
1trigger BookingTrigger on Booking__c (before insert, before update) {
2 for (Booking__c b : Trigger.new) {
3 if (BookingService.isBookingOverlap(b.Start_Time__c, b.End_Time__c, b.Charger__c)) {
4 b.addError('This charging station is already booked for the selected time.');
5 }
6 }
7}
Edit
Delete
Download
Show Dependencies

Phase 6: User Interface Development

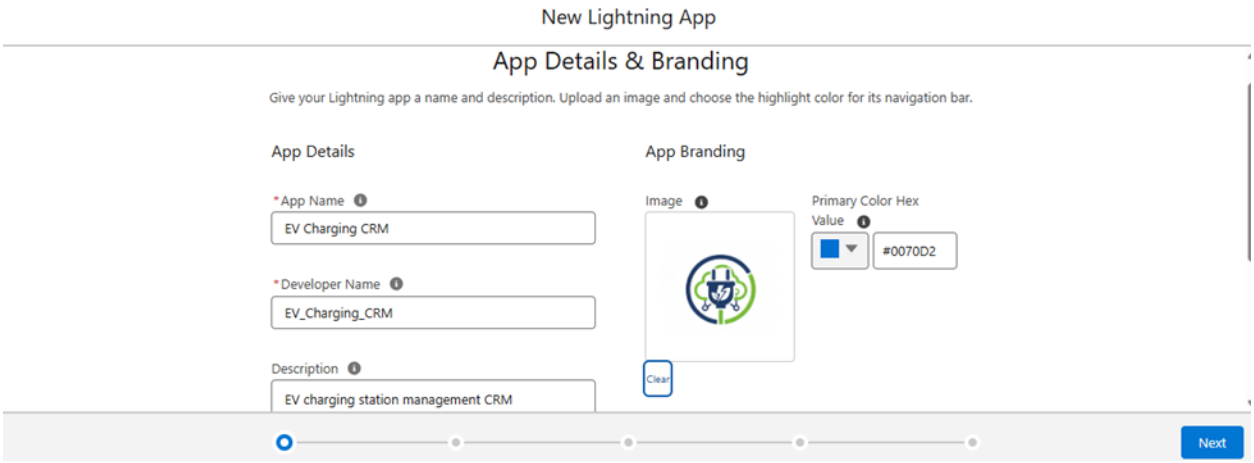
1. Building Lightining app
   Navigation:

   Go to Setup → App Manager → New Lightning App

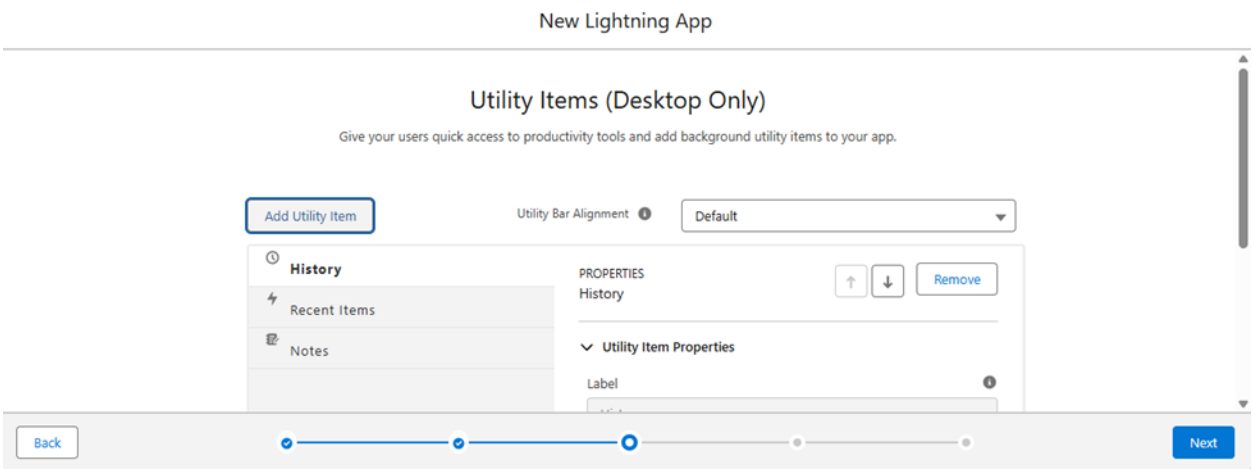
2. Settings the home page where there will be a dashboard



3.Building lightning app

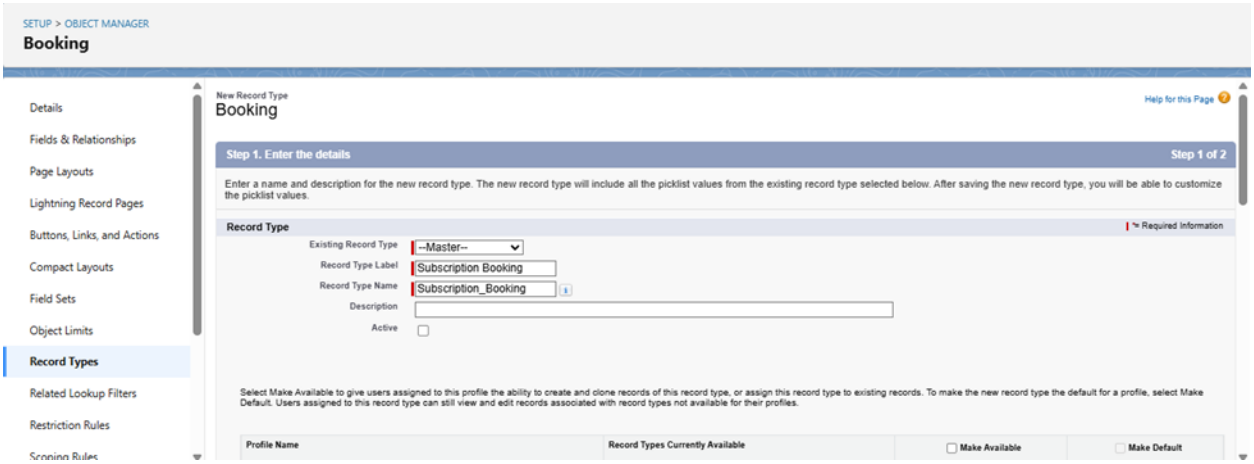


4. Utility bar setup (shown in the bottom)

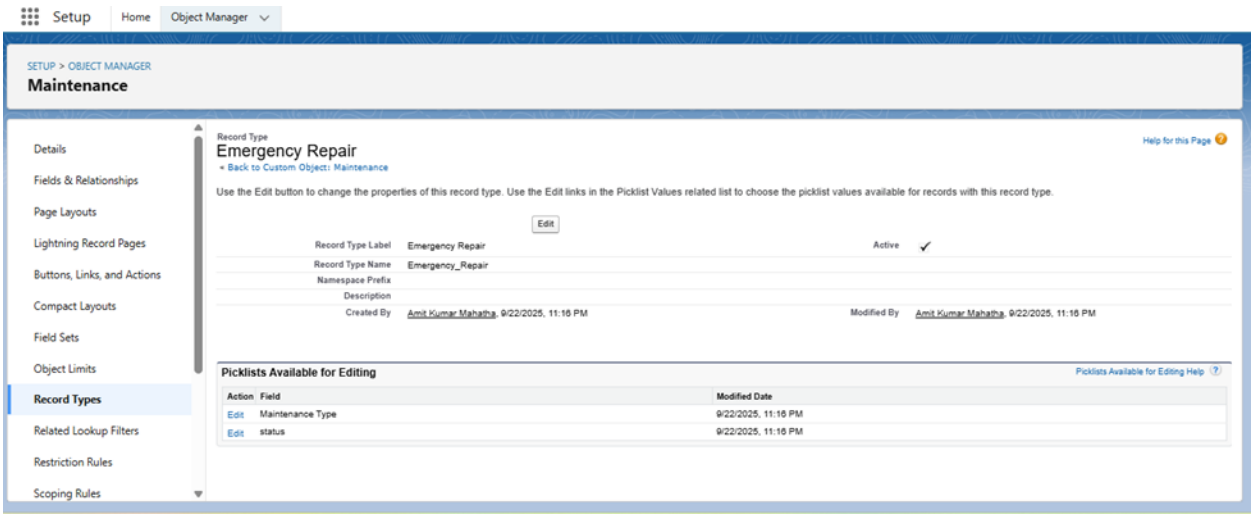


5.Record pages

Booking -> two types of record first “one time booking” and another “Subscription based”



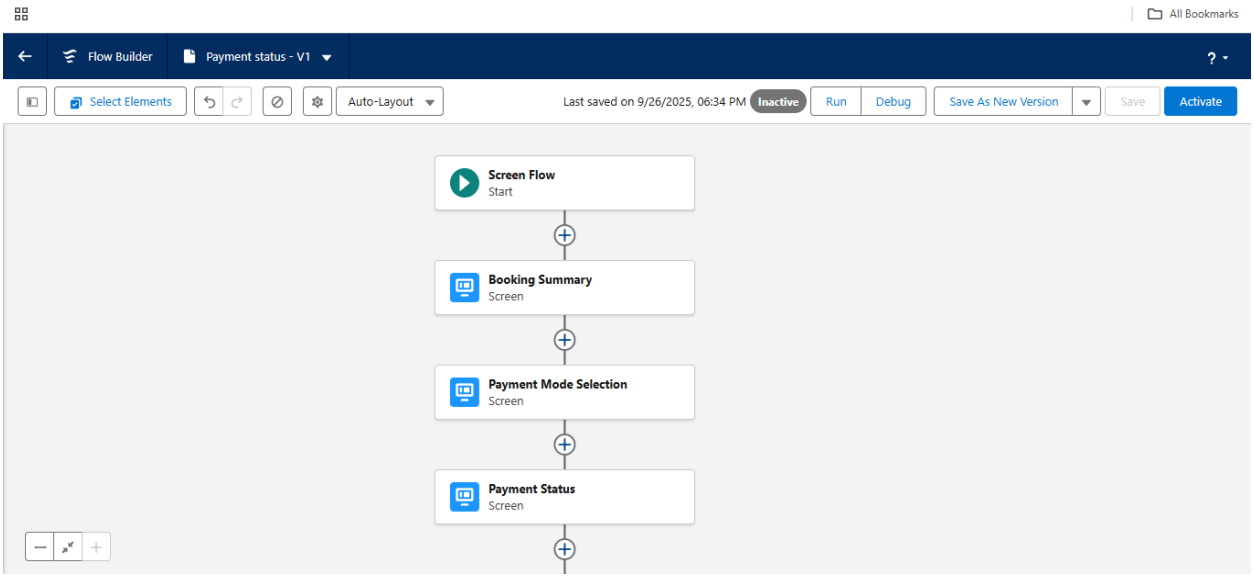
Maintenance record type


Setup
Home
Object Manager
SETUP > OBJECT MANAGER
Maintenance
Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types
Related Lookup Filters
Restriction Rules
Scoping Rules
Record Type
Emergency Repair
« Back to Custom Object: Maintenance
Help for this Page
Use the Edit button to change the properties of this record type. Use the Edit links in the Picklist Values related list to choose the picklist values available for records with this record type.
Edit
Record Type Label
Emergency Repair
Active
Record Type Name
Emergency_Repair
Namespace Prefix
Description
Created By
Amit Kumar Mahatha, 9/22/2025, 11:16 PM
Modified By
Amit Kumar Mahatha, 9/22/2025, 11:16 PM
Picklists Available for Editing
Picklists Available for Editing Help
Action
Field
Modified Date
Edit
Maintenance Type
9/22/2025, 11:16 PM
Edit
status
9/22/2025, 11:16 PM

Phase 7: Integration & External Access

Making payment status message

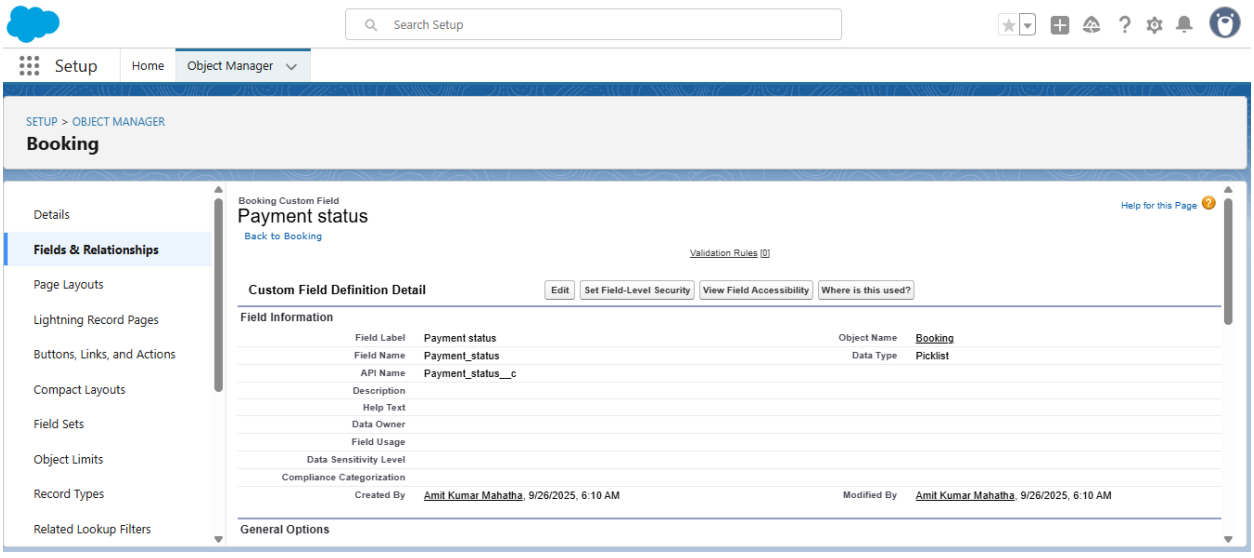
Using flow to make the payment status



First it will showing the booking summary , pending , incomplete etc.,

Then the payment mode selection such as upi , cash etc.,

And then it will show the payment status



Made the picklist values for payment status.

Phase 8: Data Management & Deployment

Performing Data import wizard

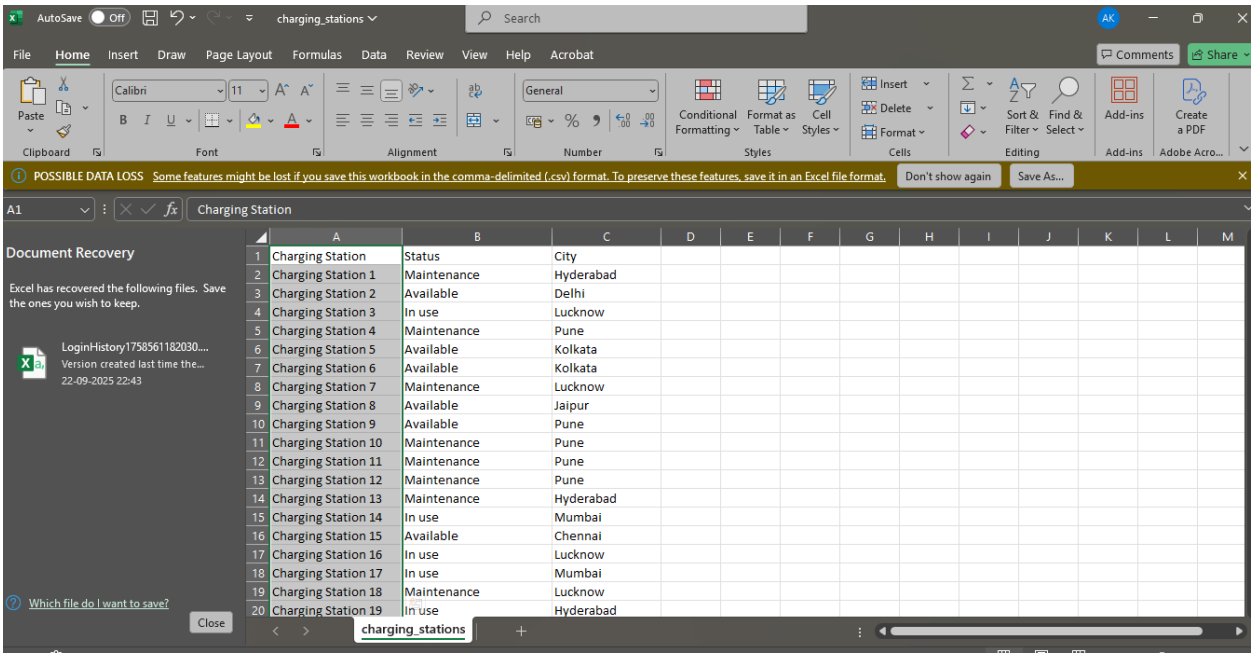
1. Making a .csv file for the charging station records

ChatGPT

make a .csv file containg the "charging station" "status" "city", where give dummy names such as charging station1 ... for the charching station field , for the status field ,fill the field with any of the three values 1. In use 2. Maintenance 3.Available and for the city field give some random indian cities name

I've created the CSV file with dummy charging station data. You can download it from here:
charging_stations.csv

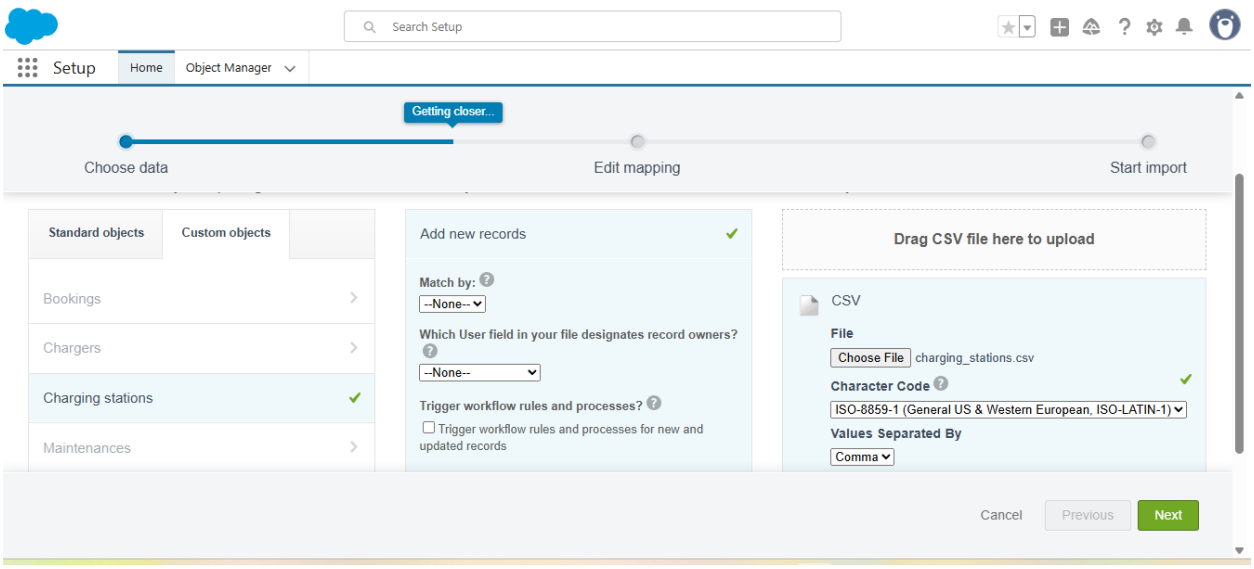
Made with the help of chat gpt



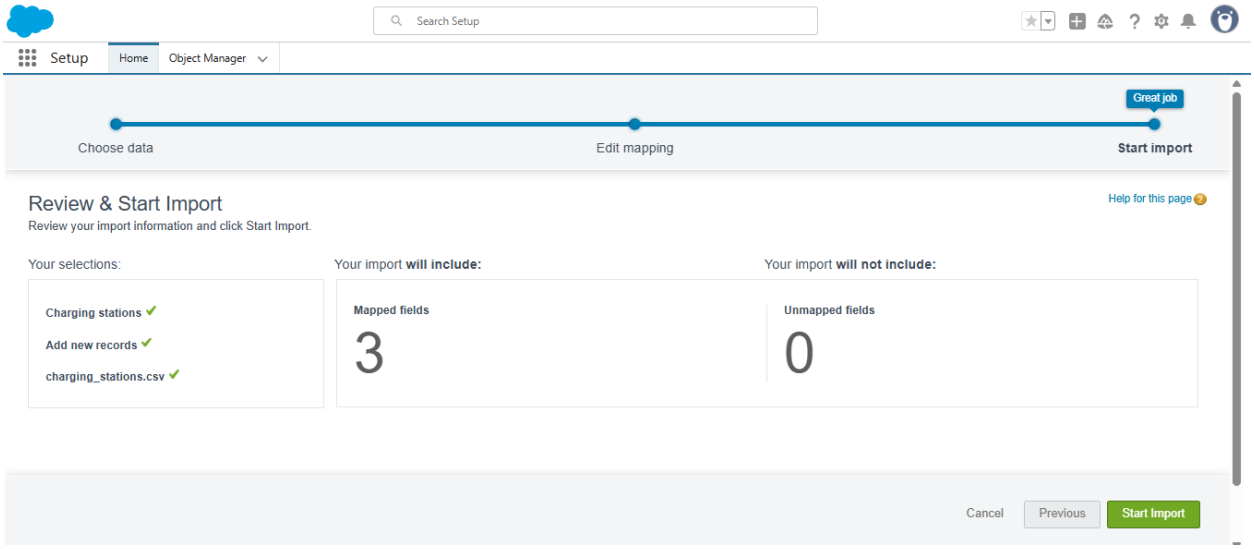
	A	B	C
1	Charging Station	Status	City
2	Charging Station 1	Maintenance	Hyderabad
3	Charging Station 2	Available	Delhi
4	Charging Station 3	In use	Lucknow
5	Charging Station 4	Maintenance	Pune
6	Charging Station 5	Available	Kolkata
7	Charging Station 6	Available	Kolkata
8	Charging Station 7	Maintenance	Lucknow
9	Charging Station 8	Available	Jaipur
10	Charging Station 9	Available	Pune
11	Charging Station 10	Maintenance	Pune
12	Charging Station 11	Maintenance	Pune
13	Charging Station 12	Maintenance	Pune
14	Charging Station 13	Maintenance	Hyderabad
15	Charging Station 14	In use	Mumbai
16	Charging Station 15	Available	Chennai
17	Charging Station 16	In use	Lucknow
18	Charging Station 17	In use	Mumbai
19	Charging Station 18	Maintenance	Lucknow
20	Charging Station 19	In use	Hyderabad

This is the csv file

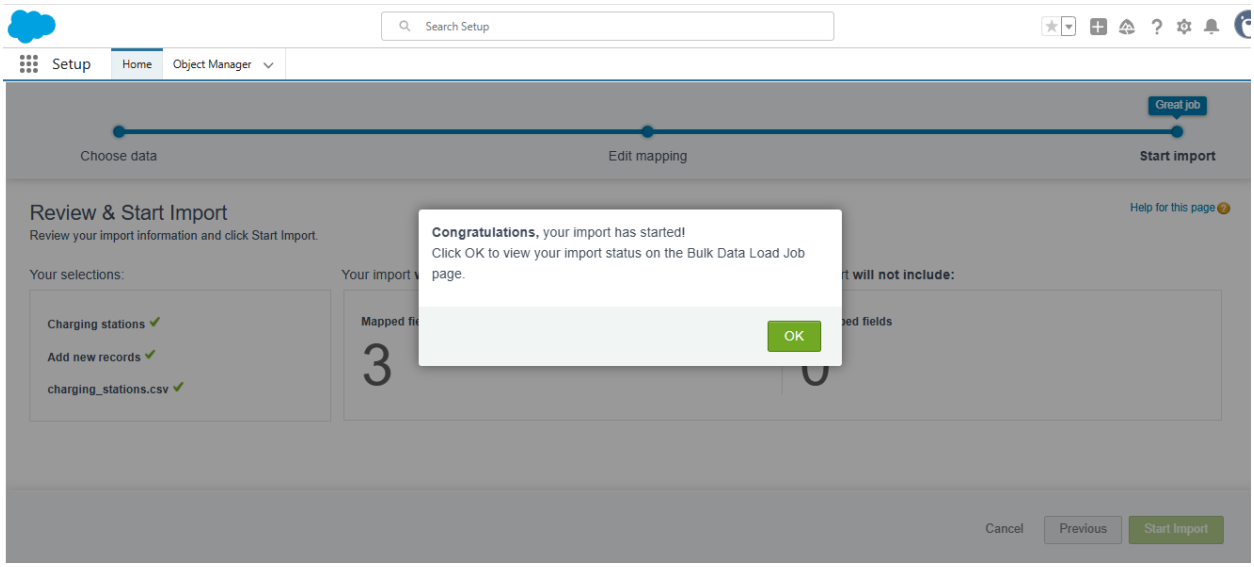
2.choosing the csv file for the custom objects

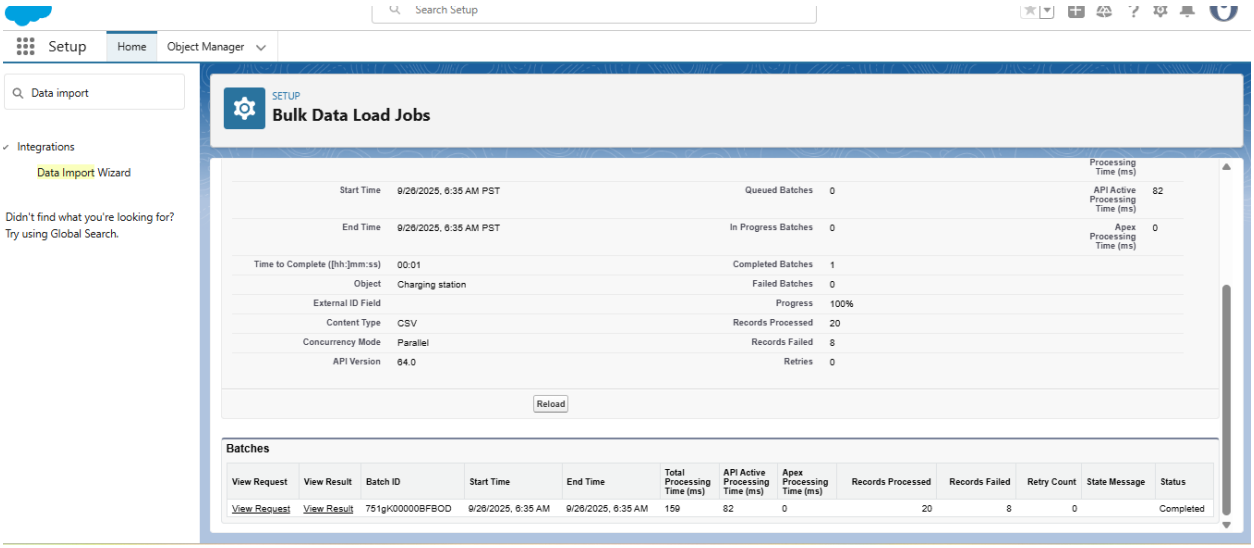


Mapping all the fields



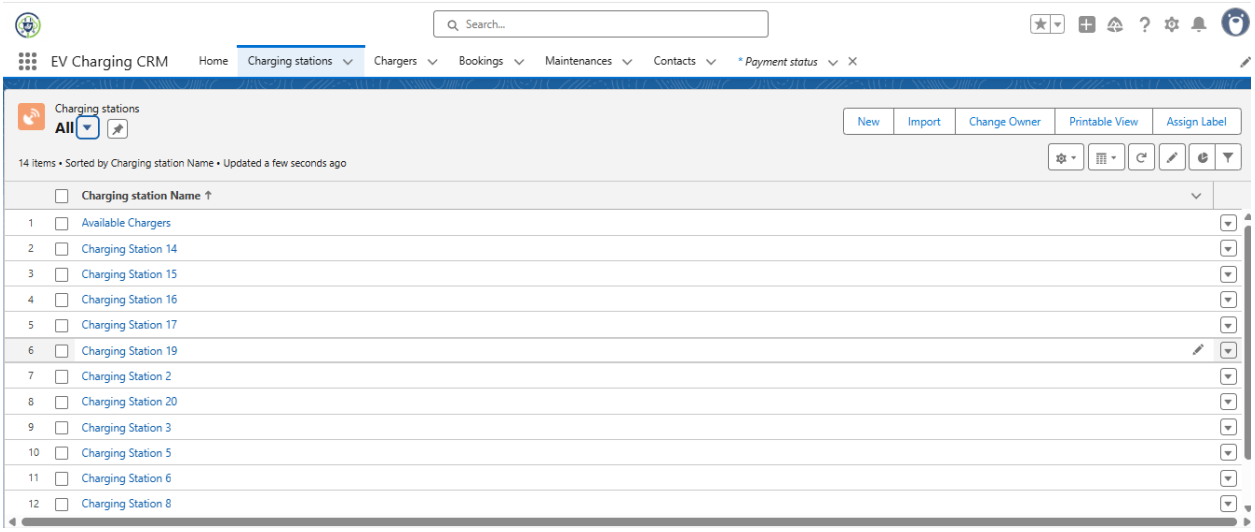
Importing has started





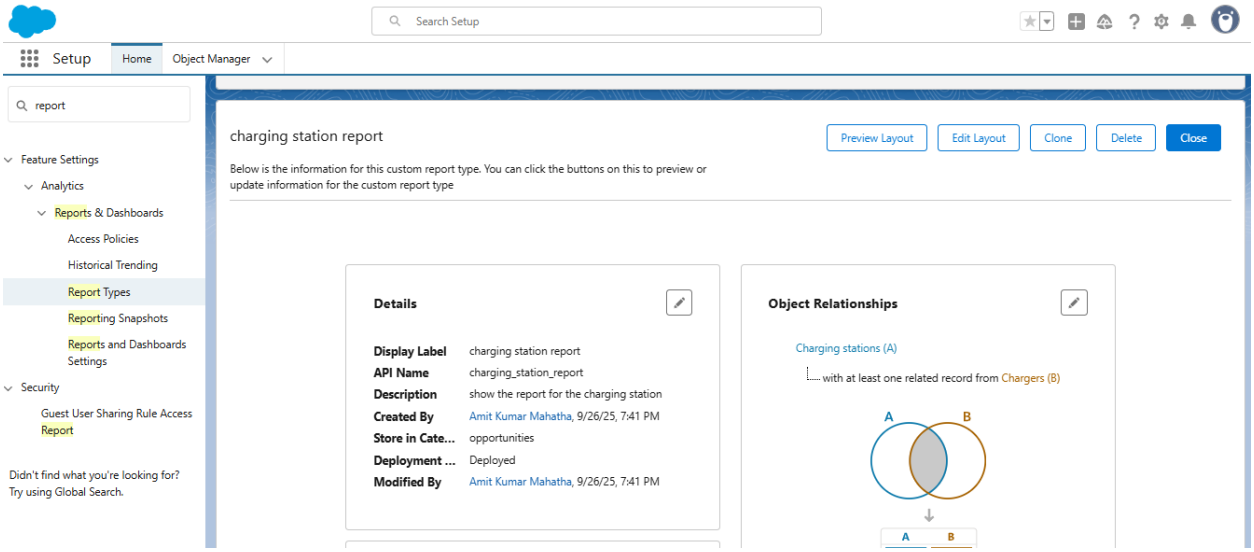
Finally the data is imported

As you can see the records have been imported


Search...
EV Charging CRM
Home
Charging stations
Chargers
Bookings
Maintenances
Contacts
* Payment status
Charging stations
All
New
Import
Change Owner
Printable View
Assign Label
14 items • Sorted by Charging station Name • Updated a few seconds ago
Charging station Name
1 Available Chargers
2 Charging Station 14
3 Charging Station 15
4 Charging Station 16
5 Charging Station 17
6 Charging Station 19
7 Charging Station 2
8 Charging Station 20
9 Charging Station 3
10 Charging Station 5
11 Charging Station 6
12 Charging Station 8

Phase 9: Reporting, Dashboards & Security Review

Building reports
Building custom reports and linking the relationship with other objects



Navigation guide
1.setup
2.report types
3.build custom reports
4.select the custom object you want to create reports
5.create the report