

Airlines Management System

Team Details

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1.INTRODUCTION

Project Overview

This project aims to enhance the efficiency and effectiveness of managing flights, reservations, and passenger information. The system enables airlines to manage their fleet, schedule flights, allocate seats, and handle bookings seamlessly. It provides functionalities for ticket reservations, seat availability checks, passenger check-ins, and baggage handling. Additionally, the system facilitates communication between airlines, airports, and passengers through automated notifications and alerts. With its user-friendly interface and robust database management, the Airlines Management System optimizes workflow, improves customer satisfaction, and ensures smooth operations for the entire airline industry.

Purpose

The purpose of the Airline Management System is to automate and streamline the core operations of airline companies, including flight scheduling, ticket reservations, passenger management, and communication processes. By digitizing these functions, the system aims to:

1. Improve the efficiency of airline operations
2. Reduce manual errors and administrative workload
3. Enhance the passenger experience through faster and more reliable services
4. Enable real-time communication and updates for both staff and passengers
5. Ensure secure and organized data management for all airline-related activities

2.IDEATION PHASE

Problem Statement

Airlines today manage a vast range of operations including flight scheduling, ticket reservations, seat assignments, passenger check-ins, and real-time communication. Many existing systems are either manual, fragmented, or outdated, leading to common issues such as:

1. Overbookings and mismanaged seat allocations
2. Delayed or missed passenger notifications

Empathy Map Canvas

- **Who?** Passengers and airline staff
- **Think/Feel?** Passengers feel uncertain about bookings; staff feel overloaded
- **See?** Delays, manual work, lack of real-time updates
- **Say/Do?** Frequent inquiries, manual check-ins
- **Hear?** Complaints about poor communication and delays
- **Pain?** Disconnected systems, booking confusion, inefficient operations
- **Gain?** Streamlined processes, automated updates, improved experience

Brainstorming

Considered:

- Manual flight and ticket booking using paper-based records
- Excel sheets for tracking flights, seat availability, and passenger details
- Web-based Airline Management System – chosen for its scalability, automation, real-time data handling, and integration with notification and check-in modules

3. REQUIREMENT ANALYSIS

Customer Journey Map

The customer journey begins when a passenger logs into the airline portal. They search for available flights based on their preferred route and date, view seat availability, and proceed to book a ticket. Upon confirming the booking, the system triggers automated workflows for seat allocation, check-in eligibility, and payment confirmation. Notifications are sent at each step, and the passenger receives updates regarding boarding time, gate number, and baggage status.

Flow:

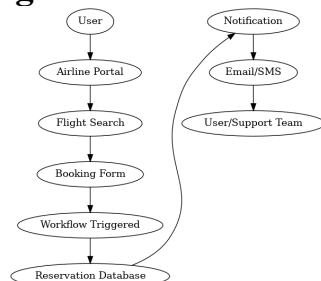
Passenger logs in → Searches for flights → Selects flight and seat → Books ticket → Workflow triggered → Seat allocated and payment processed → Notification sent → Check-in completed → Boarding and travel

Solution Requirements

To meet the needs of a streamlined and automated airline operation process, the following components are required:

- A centralized system for flight listings and reservations
- Categories: Domestic, International, Connecting Flights
- Flight listings with details: flight number, departure/arrival time, seat availability, and fare
- Real-time seat allocation and booking interface
- Check-in and boarding pass generation
- Automated workflow for booking confirmation and check-in
- Notifications for booking status, gate updates, and flight delays

Data Flow Diagram



Technology Stack

- **Platform:** Salesforce Lightning Platform
- **Languages/Scripting:** Apex (for backend business logic using Salesforce's proprietary language), Lightning Web Components and Aura Components (for frontend UI), SOQL/SOSL (for querying Salesforce data)
- **Modules Used:** HTML/CSS/JavaScript (for custom UI and email templates)
 - Service Cloud
 - Service Cloud
 - Flow Builder
 - Reports & Dashboards
 - Role-Based Access & Profiles
- **Testing Method:**
 1. Manual Testing via Salesforce Lightning Experience and Experience Cloud
 2. Apex Test Classes for validating logic and workflows (with 75%+ code coverage required for deployment)

4. PROJECT DESIGN

Problem-Solution Fit

The traditional approach to managing airline operations—such as flight scheduling, seat allocation, and passenger check-ins—is often fragmented and manual, leading to delays, booking errors, and poor passenger communication. These inefficiencies result in reduced customer satisfaction and increased workload for airline staff.

The Airline Management System addresses these challenges by introducing a centralized, automated platform that integrates flight booking, real-time seat tracking, check-in management, and notification systems. This ensures smooth operations, accurate reservations, timely updates, and a better overall experience for both passengers and airline personnel. It enhances operational transparency, minimizes errors, and streamlines the end-to-end airline workflow.

Proposed Solution

To address the problem effectively, the following components were implemented:

- **Flight Catalog Setup:** A centralized flight catalog was created to manage all scheduled flights with key information like origin, destination, fare, and timing.
- **Categories:** Flights were organized into categories such as Domestic, International, and Connecting Flights for easier search and filtering.
- **Flight Listings:** Each listing included rich details like airline name, flight number, departure/arrival time, duration, available seats, and pricing.
- **Roles:** Custom roles (e.g., Passenger, Check-in Staff, Operations Manager) were defined to ensure controlled access and feature visibility based on user responsibility.
- **Groups:** Operational groups (e.g., Check-In Team, Flight Operations, Customer Service) were created for workflow handling and task assignment.
- **Custom Object:** Dedicated Salesforce objects such as Flights, Bookings, Passengers, and Check-In Logs were designed to store and manage airline data.
- **Workflows:** Automated multi-step workflows were implemented for:
 1. Ticket Booking & Confirmation
 2. Seat Allocation
 3. Check-In Processing
 4. Notifications for Booking, Delays, and Gate Changes

Solution Architecture

- **Frontend:**

The Airline Portal (built with Salesforce Experience Cloud or a custom web interface) serves as the user interface. Passengers can search for flights, view schedules, book tickets, and check in seamlessly.
- **Logic Layer:**

This layer includes Flows, Apex Triggers, and Lightning Components to handle:

 - Automated ticket booking and seat assignment
 - Dynamic form behaviors (e.g., date/time validations)
 - Workflow-based actions (e.g., check-in or cancellation approvals)
 - Conditional UI rendering based on user role

- **Backend (Data Layer):**

Custom Salesforce Objects store and manage flight data, passenger records, seat allocation, booking status, and check-in logs. Statuses such as “Checked-In”, “Boarded”, or “Cancelled” are tracked in real time.

- **Notifications Layer:**

Configured Email Alerts and SMS integrations provide real-time updates to passengers and airline staff regarding booking confirmations, gate changes, flight delays, or cancellations.

- **Access Control:**

Role-based access is enforced using Profiles, Permission Sets, and User Groups. For example, only airline operations staff can manage flight records, while passengers can only view and modify their bookings.

5. PROJECT PLANNING & SCHEDULING

The project followed a structured and iterative development process to ensure effective implementation, testing, and deployment of all key features. The development was divided into the following major phases:

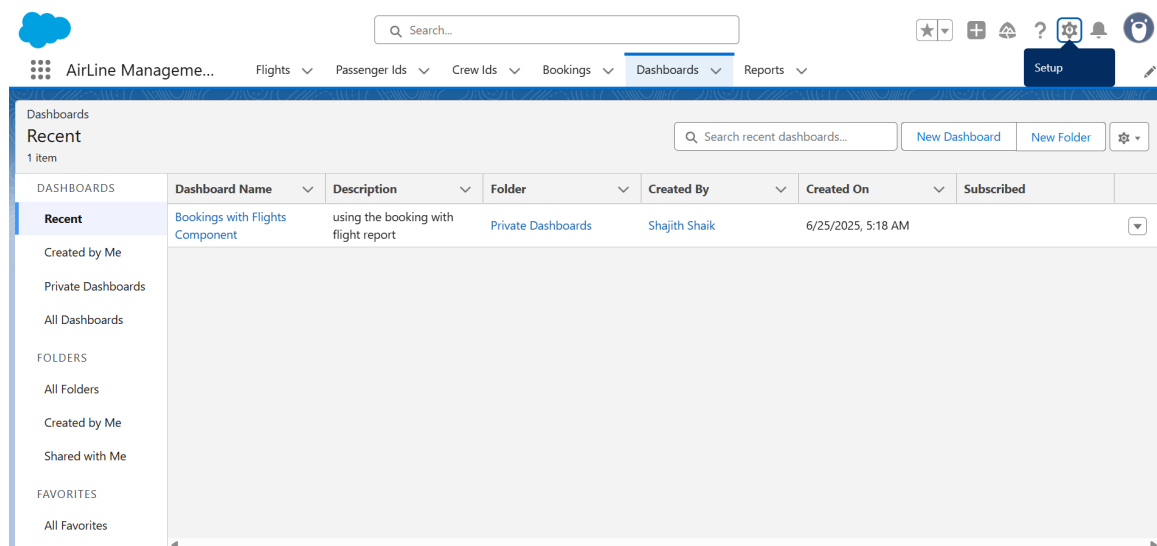
- **Catalog Structure Setup** : Developed the primary catalog containing categorized flight options such as Domestic, International, and Connecting Flights for better organization and usability.
- **Catalog Item Configuration** : Added detailed flight listings including airline name, flight number, departure/arrival times, duration, fare, and real-time seat availability.
- **User and Role Management** : Created user profiles for Passengers, Check-in Staff, and Operations Managers. Assigned roles and permissions to ensure proper access control across modules.
- **Database and Workflow Design: Designed custom Salesforce objects to manage Flights, Bookings, Seats, and Check-ins. Configured automated workflows for ticket booking, seat allocation, and check-in confirmation.**
- **Portal Configuration** : Set up a user-facing Airline Portal using Salesforce Experience Cloud (or a custom web interface) to allow easy flight search, booking, and check-in processes.
- **Notification Integration:** Implemented email and SMS notifications to alert users of booking status, gate changes, delays, and check-in confirmation. Used dynamic templates for personalized messaging.

6. IMPLEMENTATION WORKFLOW

This section outlines the step-by-step process followed to implement the Airline Management System on the Salesforce platform:

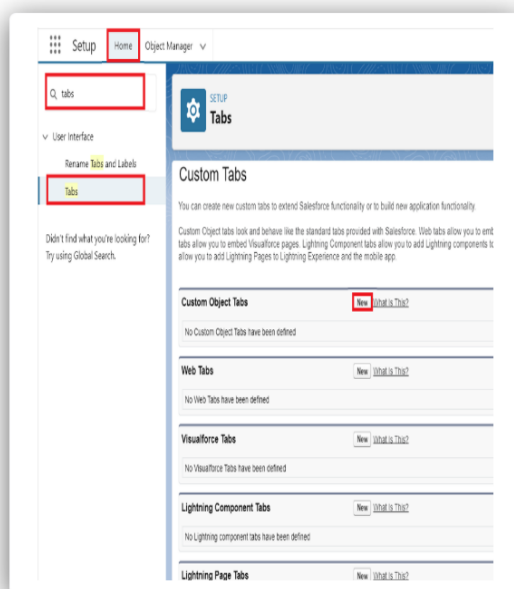
1. Create Custom Objects for Airline Data
2. Go to Setup in Salesforce.
3. Under Object Manager, click Create → Custom Object.
4. Create objects such as:
 - a. Flight__c – to store flight details
 - b. Booking__c – to manage ticket reservations
 - c. Passenger__c – to store passenger information
 - d. CheckIn__c – to manage check-in and boarding statuses

5. Add relevant fields like Flight Number, Departure Time, Arrival Time, Seat Availability, etc.



to create a tab(Flight)

1. Go to setup page --> type Tabs in Quick Find bar --> click on tabs --> New (under custom object tab)



Setup

Home

Object Manager

Search Setup

★

+

🔍

?

⚙️

🔔

👤

SETUP > OBJECT MANAGER

Booking

Details

Fields & Relationships

Page Layouts

Lightning Record Pages

Buttons, Links, and Actions

Compact Layouts

Field Sets

Object Limits

Record Types

Related Lookup Filters

Details

Description

API Name

Booking__c

Custom

✓

Singular Label

Booking

Plural Label

Bookings

Enable Reports

✓

Track Activities

Track Field History

Deployment Status

Deployed

Help Settings

Standard salesforce.com Help Window

Edit

Delete

SETUP > OBJECT MANAGER

Booking

Details

Fields & Relationships

Page Layouts

Lightning Record Pages

Buttons, Links, and Actions

Compact Layouts

Field Sets

Object Limits

Record Types

Related Lookup Filters

Fields & Relationships

11 Items, Sorted by Field Label

Quick Find

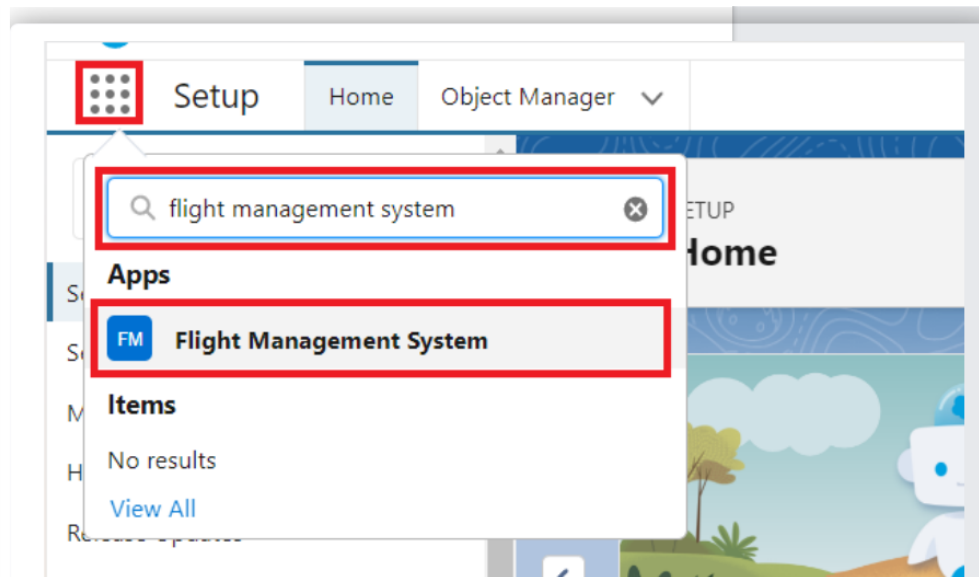
New

Deleted Fields

Field Dependencies

Set History Tracking

FIELD LABEL	FIELD NAME	DATA TYPE	CONTROLLING FIELD	INDEXED
Booking Name	Name	Auto Number		✓
Class	Class__c	Picklist		
Created By	CreatedById	Lookup(User)		
Departs From	Departs_From__c	Picklist		
Departs to	Departs_to__c	Picklist	Departs From	
Departure Date	Departure_Date__c	Date		



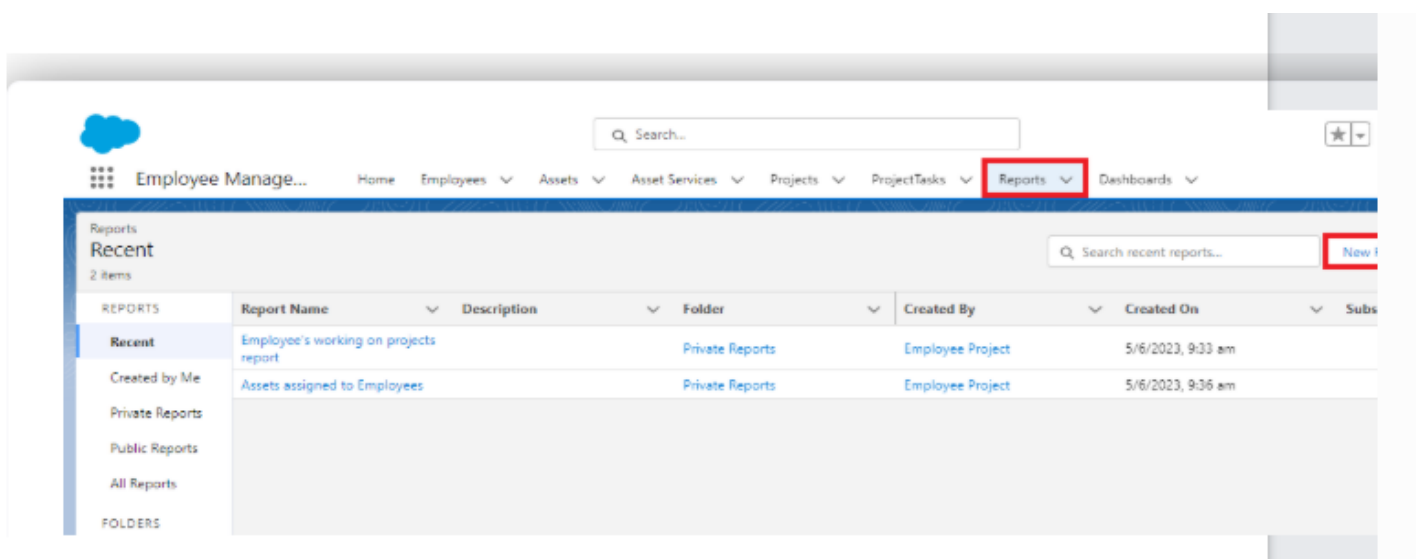
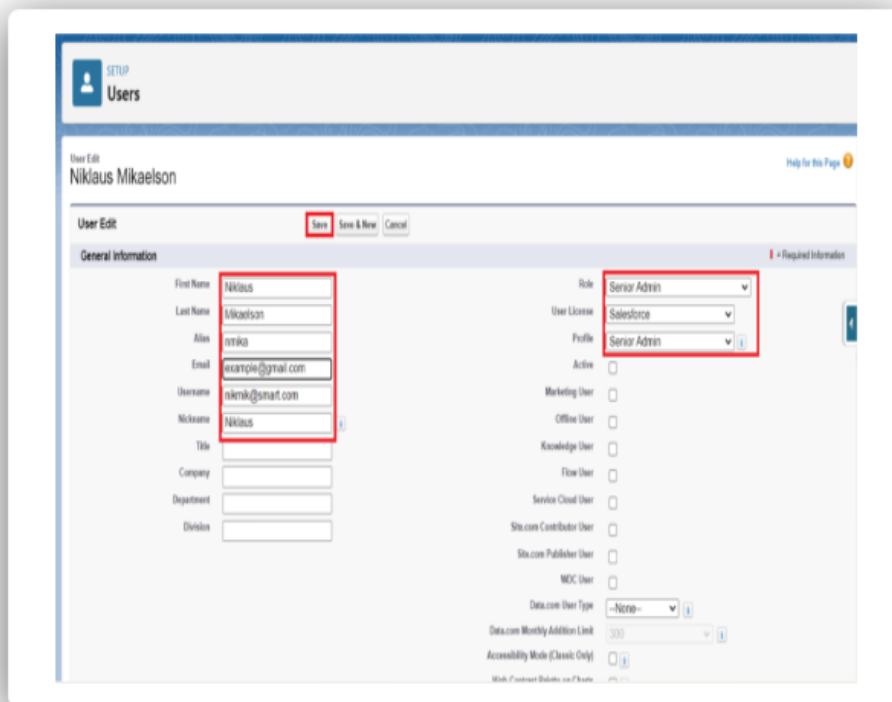
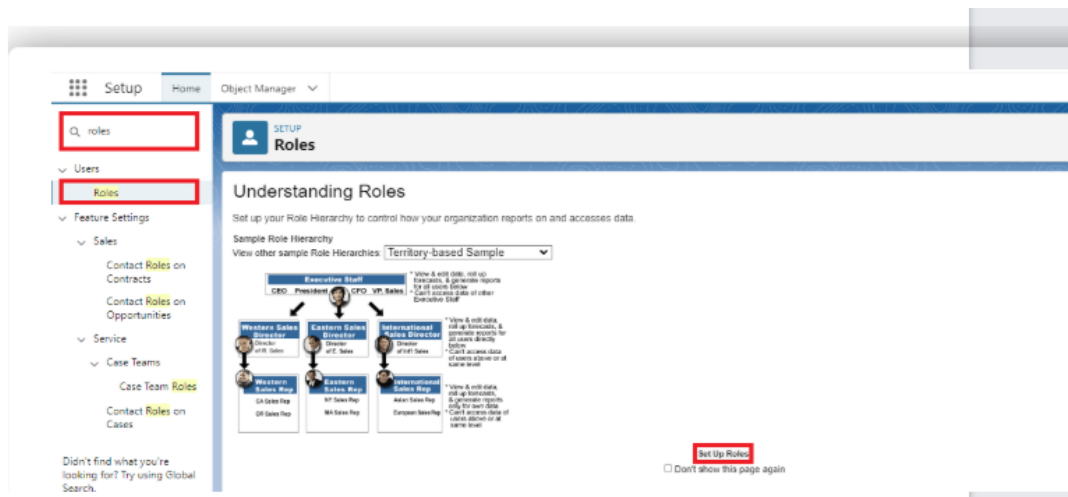
Clone Profile

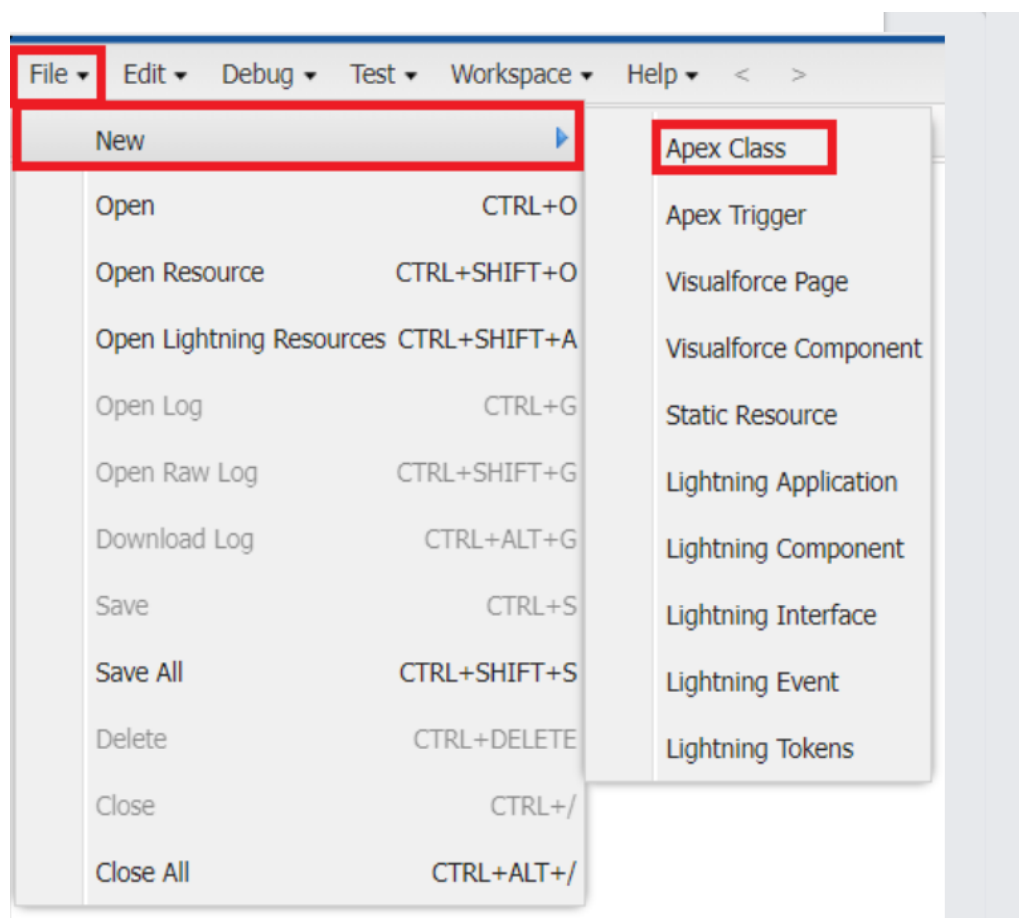
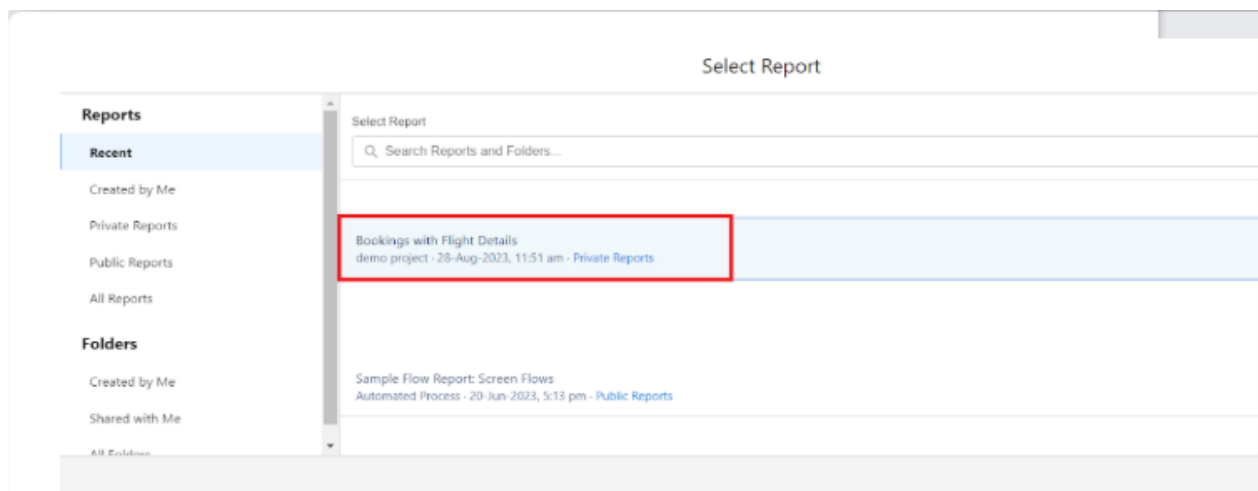
Enter the name of the new profile.

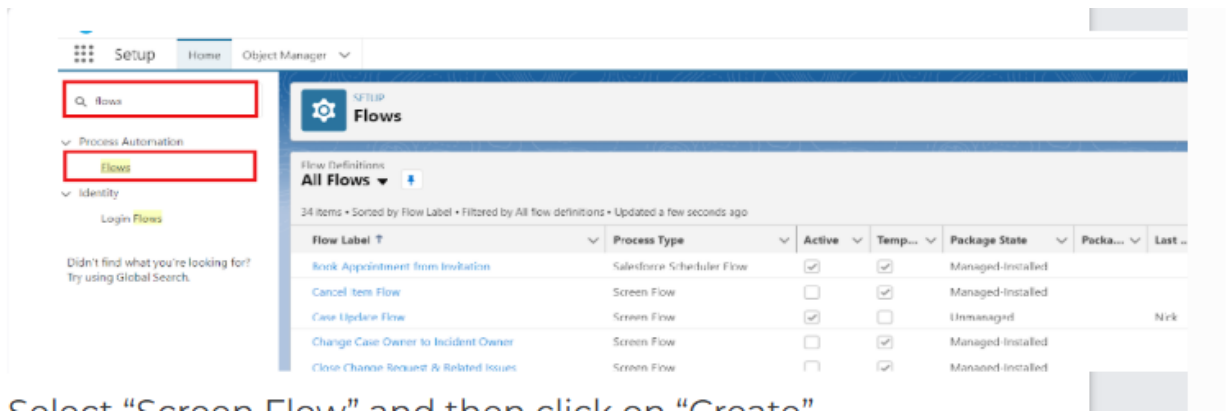
You must select an existing profile to clone from.

Existing Profile	Standard Platform User
User License	Salesforce Platform
Profile Name	<input type="text" value="General Admin"/>

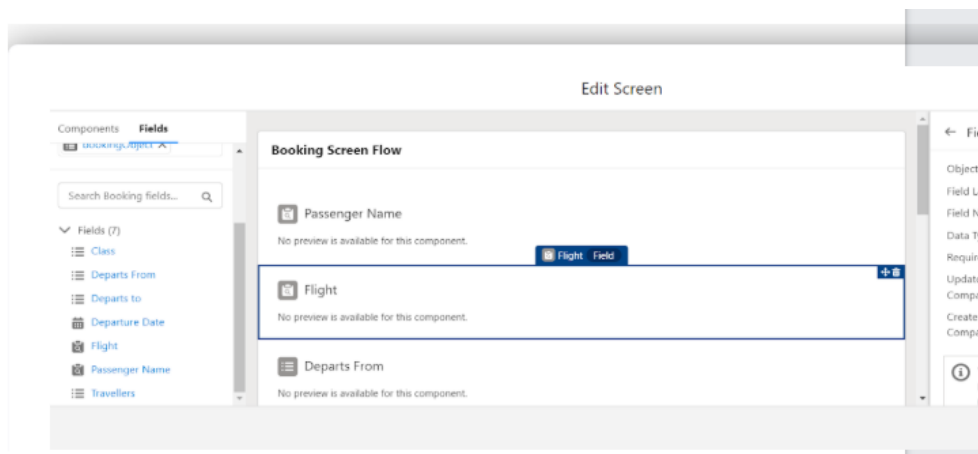
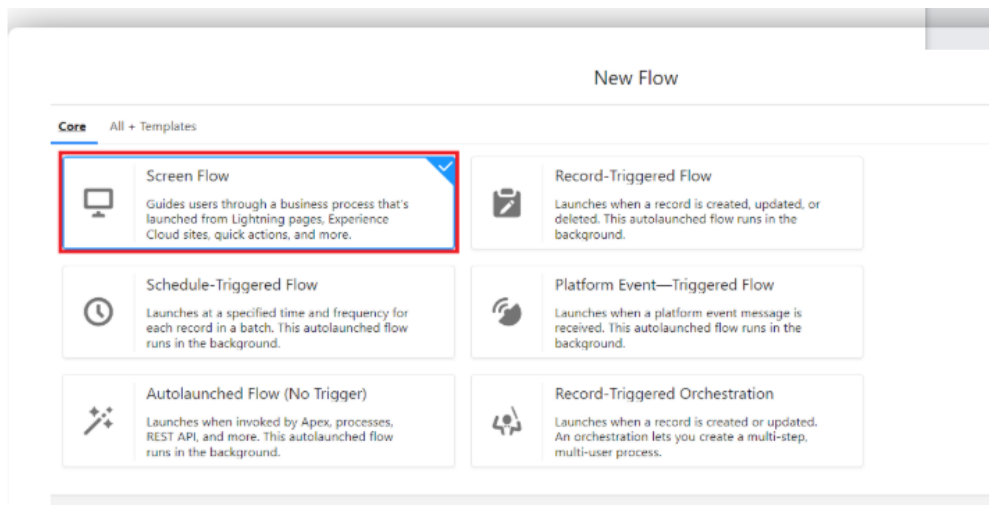
Save **Cancel**







Select "Screen Flow" and then click on "Create"



SELECTED FIELDS FOR THE BOOKING

Field	Value
Class__c	bookingObject > Class X
Departs_From__c	bookingObject > Departs From X
Departs_to__c	bookingObject > Departs to X
Departure_Date__c	bookingObject > Departure Date X
Flight__c	bookingObject > Flight X
Passenger_Name__c	bookingObject > Passenger Name X
Travellers__c	bookingObject > Travellers X

+ Add Field

Performance Testing

Flight search and booking forms load correctly with appropriate flight data

Fare, timing, and seat availability are displayed accurately for each flight

Seat allocation and booking workflows are triggered and processed as expected

Email/SMS notifications are sent correctly based on booking status and flight updates

Bookings and check-in records appear in the corresponding custom objects and related lists

All input fields and relationships (Flight → Booking → Passenger) are validated for correctness

User roles and permissions were tested to ensure secure access to data and features

8. ADVANTAGES/DISADVANTAGES

Advantages

1. Fully automated booking, seat allocation, and check-in system
2. User-friendly interface for both passengers and airline staff
3. Real-time notifications enhance communication and reduce confusion
4. Centralized data system ensures better tracking and coordination
5. Scalable architecture allows for easy integration of new features (e.g., payment gateway, loyalty program)

Disadvantages

1. Requires Salesforce admin-level knowledge to configure objects, roles, and flows
2. Initial setup of workflows and relationships can be time-consuming
3. May incur higher licensing costs if using advanced Salesforce modules
4. Dependency on internet connectivity for real-time operations

9. CONCLUSION

The Airline Management System offers a comprehensive and efficient digital solution for handling airline operations. By integrating flight scheduling, ticket booking, seat allocation, passenger check-in, and automated notifications, the system ensures smooth and transparent processes across all stages of the travel journey.

The structured architecture allows passengers to easily search for flights, book tickets, and receive timely updates, while airline staff benefit from reduced manual effort and better workflow management. Automated approvals and centralized data tracking enhance operational efficiency and improve overall passenger satisfaction.

10. FUTURE SCOPE

1. **Passenger Feedback & Ratings:**
Enable passengers to leave feedback or ratings for flights, improving service quality and helping future travelers make informed choices.
2. **Role-Based Dashboards:**
Implement interactive dashboards for roles like admin, check-in staff, and flight managers to display key metrics such as booking volumes, occupancy rates, and flight punctuality.
3. **Advanced Notifications Integration:**
* Integrate WhatsApp, push notifications, or in-app alerts for real-time updates on booking confirmations, gate changes, and delays.
4. **Group Booking Capability:**
Allow passengers to book tickets for multiple travelers in a single request—ideal for family trips, corporate travel, or group tours.
5. **Payment Gateway Integration:**
Integrate online payment options for booking tickets directly within the portal, ensuring a seamless user experience.
6. **AI-Based Flight Recommendation Engine:**
Use historical data and preferences to recommend flights, timings, and airlines tailored to each passenger.

11. APPENDIX

```
<!DOCTYPE html>
<html>
<head>
  <style>
    body { font-family: Arial, sans-serif; }
    .header { background-color: #007bff; color: white; padding: 10px; }
    .content { margin: 20px; }
    .footer { margin-top: 30px; font-size: 12px; color: gray; }
  </style>
</head>
<body>
  <div class="header">
    <h2>Flight Booking Confirmation</h2>
  </div>

  <div class="content">
    <p>Dear {{PassengerName}},</p>
    <p>Your booking for flight <strong>{{FlightNumber}}</strong> from <strong>{{
    <p><strong>Departure:</strong> {{DepartureTime}}<br>
      <strong>Seat Number:</strong> {{SeatNumber}}</p>
    <p>Thank you for choosing our airline!</p>
  </div>

  <div class="footer">
    This is an automated message. Please do not reply.
  </div>
</body>
</html>
```

Notification Text (Booking Rejection/Failure)

Notification Text (Booking Rejection/Failure)

Subject: Flight Booking Unsuccessful

Dear [Passenger Name],

We regret to inform you that your booking for flight [Flight Number] could not be

Please try again or contact our support team for assistance.

Regards,

Airline Support Team