

AIRLINE MANAGEMENT SYSTEM

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|---------------|---------------------------|
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| Team Id | LTVIP2025TMID29548 |
| Project Name | Airline Management System |
| Maximum Marks | |

Chapter-3 3 Requirement Analysis

Requirement Analysis: Airlines Management System on Salesforce

Functional Requirements

These define **what the system should do**:

-  **Flight Management**
 - Create, update, and delete flight schedules
 - Assign crew and aircraft dynamically
 - Alert users about delays or cancellations
-  **Reservation and Ticketing**
 - Real-time booking and cancellation
 - Multiple payment gateway integration
 - E-tickets and boarding pass generation
-  **Customer Relationship Management (CRM)**
 - Track customer profiles, preferences, and history
 - Segment passengers based on travel behavior
 - Send personalized communications via email/SMS
-  **Loyalty Program Module**
 - Enroll members and assign tiers
 - Manage points, rewards, and redemption
 - Generate promotions and upgrade campaigns
-  **Fleet and Crew Operations**
 - Schedule maintenance, track aircraft health
 - Assign crew shifts and monitor compliance
 - Log staff performance and feedback
-  **Analytics and Reporting**
 - Generate dashboards for ticket sales, flight occupancy
 - Predict demand trends and customer satisfaction
 - Export reports for stakeholders

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📌 Non-Functional Requirements

These define **how the system should perform**:

- ⚡ **Scalability:** Support increasing passenger and data volume as the airline grows
- 🔒 **Security:** Role-based access control, encryption, GDPR and aviation compliance
- 💻 **Usability:** Intuitive UX using Salesforce Lightning for both passengers and staff
- 🚀 **Performance:** Minimal latency in data retrieval and booking confirmation
- 🔄 **Availability:** 24/7 uptime with disaster recovery and backup protocols
- 🕹️ **Integration:** Ability to connect with GDS systems, airport APIs, payment systems

👥 Stakeholders

- Airline Operations Manager
- Marketing and Customer Experience Teams
- Flight Crew and Maintenance Staff
- Passengers and Loyalty Members
- IT Administrators

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3.1 Journey Map: Passenger Experience

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| Phase | Actions | Thoughts & Feelings | Touchpoints / System Features | Pain Points | Opportunities |
|--------------------------|-----------------------------------|---|---|----------------------------------|--|
| Search & Plan | Browses flights, checks fares | “I want the best deal.” “I need flexibility.” | Website, Mobile App (Salesforce Experience Cloud) | Info overload, confusing filters | Personalized offers using CRM segmentation |
| Booking | Selects flight, enters details | “I hope this is secure.” “Is my data safe?” | Reservation portal, Payment gateway (Salesforce + APIs) | Slow page load, limited options | Seamless UI with Lightning Components |
| Pre-Departure | Checks itinerary, upgrades seat | “Did they change my gate?” “What are my benefits?” | Email/SMS alerts, Loyalty dashboard, App notifications | Unclear loyalty benefits | Dynamic notifications using Marketing Cloud |
| Check-In | Mobile/web check-in, baggage info | “I hope this is fast.” “Is my bag safe?” | E-ticket, Digital boarding pass, Chatbot support | Baggage policy confusion | Conversational bot support via Service Cloud |
| In-Flight | Uses Wi-Fi, requests services | “Wish I could upgrade.” “I need support.” | Crew app interface, Passenger feedback channel | Service inconsistency | AI-driven crew coordination and feedback loops |
| Arrival | Gets baggage, leaves feedback | “Hope my review helps.” “Was this trip worth it?” | Feedback form, CRM profile updates | No acknowledgment of feedback | Sentiment analysis with Salesforce Einstein |

 **Key Takeaways:**

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- Use data-driven personalization to anticipate passenger needs.
- Improve real-time communication through automated alerts and omnichannel support.
- Strengthen post-flight loyalty engagement with meaningful feedback loops.

Would you like a Journey Map for airline staff or crew managers next? I can sketch that out too!



3.2 Software Requirements

Functional Requirements

These define what the system should do:

- **Flight Management**
 - Create and manage flight records (Flight ID, Name, Company)
 - Schedule flights with source, destination, departure/arrival times
 - Track flight status: Open, In Progress, Closed, Canceled
- **Pilot Management**
 - Maintain pilot profiles with experience levels and contact info
 - Assign pilots to scheduled flights
 - Validate age and experience criteria
- **Reservation System**
 - Search flights by city, date, and time
 - Book, modify, and cancel reservations
 - Handle passenger details and payment info
- **Notifications**
 - Email alerts for flight scheduling, departure, arrival, and cancellations
 - Notify pilots of their assignments
- **Reports & Dashboards**
 - Daily and monthly flight schedules
 - Pie charts for flight status (Closed vs. Canceled)
 - Historical flight data reports

Non-Functional Requirements

These define how the system performs:

- **Security**
 - Role-based access control (e.g., CEO, Manager, Operators)
 - Data sharing rules based on flight destination
 - Encryption for sensitive data
- **Performance**

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- Fast response time for flight searches and bookings
- Robust error handling and fault tolerance
- **Usability**
 - Intuitive interface for users with varying technical skills
 - Mobile-friendly design for on-the-go access
- **Scalability**
 - Support for growing number of flights, users, and data
 - Easy integration with third-party systems

Salesforce-Specific Setup

- **Objects & Relationships**
 - Custom objects: Flight, FlightSchedule, Pilot, PilotSchedule
 - Master-detail and lookup relationships for data integrity
- **Validation Rules**
 - Prevent same source and destination
 - Ensure logical departure and arrival times
- **Workflow Rules**
 - Automate status updates and email alerts
- **User Roles & Hierarchy**
 - Define user roles and reporting structure
 - Restrict data access based on role
- **Public Folders & Sharing**
 - Share flight records based on arrival city
 - Assign users to city-specific folders

3.3 Data Flow Diagrams

DFD Level 0 – Context Diagram

This is the highest-level view of the system:

- **External Entities:**
 - Passenger
 - Pilot
 - Admin
- **Main Process:**
 - Airline Management System
- **Data Flows:**
 - Booking requests, flight schedules, pilot assignments, notifications
- **Data Stores:**
 - Flight Database
 - Reservation Records
 - Pilot Profiles

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This level shows how external users interact with the system as a single process.

DFD Level 1 – Major Subsystems

Breaks the system into core modules:

| Subprocess | Inputs | Outputs | Data Stores |
|---------------------|----------------|-----------------------|----------------|
| Flight Scheduling | Flight details | Schedule confirmation | Flight DB |
| Reservation System | Passenger info | Schedule confirmation | Reservation DB |
| Pilot Assignment | Pilot profiles | Assignment notice | Pilot DB |
| Notification Engine | Events | Email/SMS alerts | — |

Each subprocess handles a specific function and interacts with relevant data stores.

DFD Level 2 – Detailed Processes

Zooms into each module:

- **Reservation System:**
 - Search Flights → Select Flight → Enter Passenger Info → Confirm Booking
- **Flight Scheduling:**

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- Create Flight → Assign Route → Set Departure/Arrival → Save Schedule
- **Pilot Assignment:**
 - Select Flight → Match Pilot → Validate Experience → Notify Pilot
 - This level helps developers understand the internal logic and data movement.

3.4 Technology Stack

Core Platform

- **Salesforce CRM:** Central platform for managing flights, pilots, reservations, and user roles
- **Salesforce Lightning Experience:** Modern UI for building responsive apps
- **Salesforce Apex:** Server-side programming language for custom logic
- **Visualforce:** For creating custom user interfaces (if Lightning isn't used)
- **SOQL (Salesforce Object Query Language):** For querying Salesforce data

Integration & Middleware

- **Salesforce Flow / Process Builder:** Automate workflows like flight status updates and pilot notifications
- **REST/SOAP APIs:** Integrate with external systems (e.g., payment gateways, weather services)
- **MuleSoft:** For enterprise-level integrations and API management
- **Heroku (optional):** Host external services or microservices that complement Salesforce

Data & Reporting

- **Salesforce Reports & Dashboards:** Visualize flight schedules, cancellations, and pilot assignments
- **Einstein Analytics (Tableau CRM):** Advanced analytics and predictive insights
- **Data Loader / Data Import Wizard:** For bulk data operations

Security & Access Control

- **Role Hierarchy & Profiles:** Define access levels for CEO, Managers, Operators
- **Permission Sets:** Grant additional access without changing profiles
- **Shield Platform Encryption:** Protect sensitive passenger and pilot data

User Experience & Mobility

- **Salesforce Mobile App:** Access system on-the-go
- **Lightning App Builder:** Drag-and-drop interface customization

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- **Custom Tabs & Components:** Tailor navigation and layout

Testing & Deployment

- **Sandbox Environments:** For development and testing
- **Change Sets / Salesforce DX:** Deploy metadata between orgs
- **Jenkins / GitHub Actions:** CI/CD pipelines for automated deployment