CHENGDU UNIVERSITY OF TECHNOLOGY

**Oxford Brookes University College**

**CHC6173 Software Engineering**

Case Study for Coursework

# TravelMate: Travel Management System

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## Requirements Definition

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**Abstract**

This document defines the requirements for a cloud-based application system called *TravelMate*, aimed at enhancing the travel experience for users by providing a comprehensive platform for booking and managing various travel-related services. The document outlines the goals, objectives, scope, target users, functional and quality requirements, and design features of the system.

## 1. Introduction:

In today's fast-paced world, efficient management of travel-related services is crucial for both travellers and service providers. The **TravelMate** system is designed to address the diverse challenges faced by travellers, travel agents, and service providers in planning, booking, and managing trips. This platform offers an integrated solution that combines flights, hotels, car rentals, and tours, providing users with a seamless travel experience from start to finish. The system is intended to streamline the booking process, enhance customer service, and optimise resource utilisation for service providers.

## 2. Type of Users:

The targeted users in the system are:

a) **Traveller:** Individuals who use the platform to search, book, and manage their travel itineraries行程, including flights, hotels, and car rentals.
b) **Hotel Manager:** Manages hotel reservations, room availability, and guest services.
c) **System Operator:** Manages the technical aspects of the TravelMate system, including user accounts, system maintenance, and updates.
d) **Airport Staff**: Manages airport operations, including check-in, security, and boarding procedures, and interacts with the TravelMate system for real-time updates on flight status.
e) **Visa Officer**: Handles visa applications, and provides real-time updates on visa status through the TravelMate system.

# 3. Functional Requirements:

## 3.1 Functional Requirements of Traveller:

*a)* **FR-TT-01:Login/Logout**: Travellers must log in using a username and a password to access their accounts and manage their bookings securely. *(Priority: high)*

*b)* **FR-TT-02:Registration**: Allows new travellers to create an account by entering personal information, including name, email, phone number, passport number, date of birth, gender and nationality. (*Priority: high)*

*c)* **FR-TT-03:Search and Book***:* Travellers should be able to search for flights, and hotels, and book them directly through the system. *(Priority: high)*

*d)* **FR-TT-04:Itinerary Management:** Travellers should be able to view, modify, and share their travel itineraries. *(Priority: medium)*

*e)* **FR-TT-05:Payment and Billing:** Provides options for secure payment using bank card ID and PIN code, invoice viewing, and billing history access. *(Priority: high)*

*f)* **FR-TT-06:Notifications:** Sends alerts and updates on booking confirmations, flight status, and itinerary changes via email or SMS. *(Priority: high)*

## 3.2 Functional Requirements of Hotel Manager:

a) **FR-TH-01:User Authentication:** Secure log in using a username and a password. *(Priority: high)*

b) **FR-TH-02:Registration:** Allow him to create his account by storing his name, email, phone number, and hotel name. *(Priority: high)*

c) **FR-TH-03:Reservation Management:** Manages room availability, guest check-ins, and check-outs. *(Priority: high)*

d) **FR-TH-04:Inventory Management:** Tracks room availability and updates the system in real-time. *(Priority: medium)*

e) **FR-TH-05:Billing Integration:** Integrates with the billing system for accurate invoicing and payment processing. *(Priority: medium)*

## 3.3 Functional Requirements of System Operators:

a) **FR-TO-01:User Authentication:** Secure login using a username and password. *(Priority: high)*

b) **FR-TO-02:User Account Management:** Creates, modifies, and deletes user accounts for all roles. *(Priority: high)*

## 3.4 Functional Requirements of Airport Staff:

a) **FR-TS-01:User Authentication**: Secure login with role-based access to ensure that only authorised airport staff can access flight-related data. (Priority: high)

b) **FR-TS-02:Registration:** Allow him to create his account by storing his name, email, phone number, and assigned airport. *(Priority: high)*

c) **FR-TS-03:Check-In Management:** Facilitate the check-in process, allowing staff to verify passenger details, print boarding passes, and manage luggage. (Priority: high)

d) **FR-TS-04:Flight Status Updates**: Provide real-time updates on flight status, including delays, cancellations, and gate changes. (Priority: high)

e) **FR-TS-05:Baggage Tracking**: Manages the tracking and handling of passenger baggage. (Priority: high)

### 3.5 Functional Requirements of Visa Officer:

a) **FR-TV-01:User Authentication:** Secure login with role-based access to ensure that only authorised visa officers can access and manage visa applications. *(Priority: high)*
b) **FR-TV-02:Registration:** Allow him to create his account by storing his name, email, phone number, and visa office/embassy name. *(Priority: high)*
c) **FR-TV-03:FR-TV-01:Visa Application Processing:** Manage and process visa applications, including reviewing documents, approving or rejecting applications, and issuing visas. *(Priority: high)*
d) **FR-TV-04:Real-Time Status Updates:** Provide travellers with real-time updates on the status of their visa applications, including required actions or additional documentation. *(Priority: high)*
e) **FR-TV-05:Appointment Scheduling**: schedule visa interviews or appointments at consulates or embassies for travellers.
f) **FR-TV-06:Document Management**: Stores and manages visa-related documents securely. *(Priority: high)*

## 4. Required Design Feature:

### 4.1 DF-01: Subsystems:

The following subsystems should be developed:

- **Traveller Subsystem:** Provides functionalities for the traveller, focusing on booking, itinerary management, and customer support in a mobile app.
- **Airport Operations Subsystem:** Manages the operational aspects of the airport, focusing on passenger check-in, security, and coordination with airlines in a web/desktop app.
- **Hotel Management Subsystem:** Manages hotel-related services, including room bookings, guest services, and billing in a desktop app.
- **Visa Management Subsystem:** Manages the visa application process for travellers, ensuring all necessary documentation is handled efficiently.

### 4.2 DF-02: Storage of processing data:

The following data should be stored:

- Traveller Information: Stores traveller profiles, booking history, and payment details.
- Booking Data: Stores all booking details, including flight, and hotel.
- Itineraries: Stores customised travel itineraries for each traveller.
- Support Tickets: Stores support inquiries, issues, and resolutions.
- Notifications: Log notifications sent to travellers, including alerts and updates.

# 5. Quality Requirements:

## 5.1 Scalability:

- **QR-SC-01: Travellers:** Ensure secure global storage and access for up to 50 million travellers.
- **QR-SC-02: Bookings:** Handle up to 10 million simultaneous bookings across all services.
- **QR-SC-03: Itineraries:** Support the creation and management of 100 million itineraries annually.

## 5.2 Performance:

- **QR-PF-01:Search and Book:** Response time for searches and bookings should not exceed 3 seconds.
- **QR-PF-02:Itinerary Updates:** Modifying an itinerary should take no more than 2 seconds.
- **QR-PF-03:Payment Processing:** Secure payments should be processed within 5 seconds.
- **QR-PF-04:Notifications:** Sending notifications should occur within 1 second of the triggering event.

## 5.3 Reliability:

- **QR-RE-01:System Availability:** The system should be available 24/7 with a maximum yearly downtime of 5 hours.
- **QR-RE-02:Data Integrity:** Ensure all booking and payment data is securely stored and recoverable within 1 hour of any failure.
- **QR-RE-03:Backup and Recovery:** The system should automatically back up data daily, with the ability to recover within 30 minutes.

## 5.4 Security:

- **QR-SE-01:Data Encryption:** All sensitive data, including personal information, payment details, and travel documents, must be encrypted in transit and at rest using industry-standard encryption protocols.
- **Access Control:** Implement role-based access controls to ensure that users only have access to the information necessary for their roles. Specifically:
  - **Traveller:** Can access their personal information, booking data, and itineraries. Their access to system logs or other users' data is prohibited.
  - **Hotel Manager:** Can access room booking data and limited traveller details (name, booking ID), but not sensitive personal or payment information.
  - **System Operator:** Has access to all data required for system maintenance, including user accounts, logs, and technical details, but cannot access sensitive traveller information.
  - **Airport Staff:** Can access passenger lists and flight status but only for travellers checked into their respective flights.
  - **Visa Officer:** Can access visa application details and passport numbers but not other personal data unrelated to visa processing.
- **QR-SE-02:Trackable Data Access**: Any access to sensitive data (e.g., personal

information, payment details, and passport numbers) must be tracked. Logs should include the following information:

  - Who accessed the data (user identity and role)
  - When the data was accessed
  - What type of data was accessed

- **QR-SE-03:Authentication and Authorisation:** Multi-factor authentication (MFA) should be required for all users to access the system. Authorisation protocols must be in place to verify user permissions for accessing different system features.
- **QR-SE-04:Data Anonymisation:** Personal data should be anonymised where possible, especially when used for analytics or reporting purposes to protect user privacy.
- **QR-SE-05:Compliance with Regulations:** The system must comply with relevant *Chinese data protection regulations*,
- **QR-SE-06:Audit Trails:** Maintain detailed logs of all user activities, including login attempts, data access, and modifications, to detect and respond to any security breaches or unauthorised access.
- **QR-SE-07:Security Monitoring and Incident Response:** Implement continuous security monitoring to detect potential threats in real-time. A robust incident response plan should be in place to address and mitigate security breaches promptly.
- **QR-SE-08:User Data Control:** Provide users with control over their data, allowing them to update, export, or delete their information as per their rights under applicable privacy laws.