## 📋 Project Overview

This is a **Travel Booking & Package Management System** designed to automate the booking process for travel packages and tours, transitioning from manual processes to a digital platform. The project uses an **Agile-Scrum** methodology with defined milestones.

## 🎯 ****Business Requirements (High-Level)****

Based on the presentation, here are the core business requirements:

### ****1. Performance Requirements****

* Reduce package booking and confirmation time by **70%**
* Improve data accuracy and inventory tracking to **99.9% reliability**
* Achieve **99.5% system uptime**
* Response time under **5 seconds** per transaction
* Increase online booking conversion rate by **20%**

### ****2. User Experience Requirements****

* Modern and intuitive interface
* **24/7 access** to travel catalogs, package customization, and booking management
* User satisfaction above **90%**

### ****3. Operational Requirements****

* Real-time inventory management
* Integration with GDS (Global Distribution System) APIs for flights, hotels, and other travel services
* Secure payment processing with SSL and encryption
* Automated booking confirmation and management

## ⚙️ ****Functional Requirements****

Now, let me break down the **functional requirements** by system module. These are the specific features and capabilities the system must provide:

### ****Module 1: Inventory & Pricing Engine****

**FR-INV-001**: Real-time Inventory Synchronization

* System shall fetch and display real-time availability from external suppliers (flights, hotels, tours)
* System shall integrate with GDS/API providers for live inventory data
* System shall update availability status in real-time (within 5 seconds)

**FR-INV-002**: Dynamic Pricing Management

* System shall calculate package prices based on multiple components (flights, accommodation, activities, meals, transfers)
* System shall support seasonal pricing and promotional discounts
* System shall automatically update prices when inventory or external factors change

**FR-INV-003**: Inventory Accuracy Tracking

* System shall maintain 99.9% accuracy in inventory data
* System shall log all inventory changes with timestamps
* System shall alert administrators when inventory discrepancies are detected

### ****Module 2: Dynamic Package Builder****

**FR-PKG-001**: Package Customization

* System shall allow users to create custom travel packages by selecting components:
  + Flight options
  + Accommodation types and hotels
  + Activities and tours
  + Meal plans
  + Ground transfers

**FR-PKG-002**: Pre-configured Package Templates

* System shall provide pre-arranged package bundles for quick selection
* System shall allow travel agents to create and save package templates

**FR-PKG-003**: Package Pricing Calculator

* System shall calculate total package price in real-time as components are added/removed
* System shall display itemized breakdown of package costs
* System shall apply bundle discounts automatically

**FR-PKG-004**: Package Catalog Management

* System shall maintain a searchable catalog of available travel destinations
* System shall support filtering by destination, price range, duration, and travel dates
* System shall display package details with images and descriptions

### ****Module 3: Booking & Payment Gateway****

**FR-BKG-001**: Booking Creation & Management

* System shall allow users to initiate and complete bookings online
* System shall generate unique booking reference numbers
* System shall send booking confirmations via email within 1 minute
* System shall allow booking modifications (subject to supplier policies)
* System shall support booking cancellations with appropriate refund processing

**FR-BKG-002**: Booking Success Rate

* System shall achieve a booking success rate of at least 95% (bookings completed without technical errors)
* System shall handle booking failures gracefully with clear error messages
* System shall prevent double-bookings and overbooking scenarios

**FR-BKG-003**: Payment Processing

* System shall integrate with secure payment gateways
* System shall support multiple payment methods (credit/debit cards, online banking, e-wallets)
* System shall use SSL certificates and encryption for all payment transactions
* System shall provide payment confirmation receipts
* System shall handle payment failures with retry mechanisms

**FR-BKG-004**: Transaction Security

* System shall comply with PCI-DSS standards for payment card data
* System shall encrypt all sensitive customer and payment information
* System shall implement fraud detection mechanisms
* System shall maintain secure audit logs of all transactions

### ****Module 4: Customer Relationship Management (CRM)****

**FR-CRM-001**: User Account Management

* System shall allow travelers to create and manage personal accounts
* System shall store user profiles with contact information and preferences
* System shall maintain booking history for registered users
* System shall support password reset and account recovery

**FR-CRM-002**: Customer Data Management

* System shall migrate historical booking data from legacy systems
* System shall store customer preferences for personalized recommendations
* System shall maintain customer communication history

**FR-CRM-003**: Travel Agent Interface

* System shall provide a separate interface for travel agents with enhanced features
* System shall allow agents to create bookings on behalf of customers
* System shall track agent performance and booking statistics

**FR-CRM-004**: Communication & Notifications

* System shall send automated booking confirmations
* System shall send reminder notifications for upcoming trips
* System shall notify customers of booking changes or cancellations
* System shall support email and SMS notification channels

### ****Module 5: Reporting & Analytics****

**FR-RPT-001**: Sales Reporting

* System shall generate reports on booking volumes and revenue
* System shall track conversion rates (visits to completed bookings)
* System shall provide daily, weekly, and monthly sales summaries

**FR-RPT-002**: Inventory Reports

* System shall report on inventory utilization and availability trends
* System shall identify popular packages and destinations
* System shall track supplier performance and reliability

**FR-RPT-003**: Performance Monitoring

* System shall track system uptime and availability
* System shall monitor transaction response times
* System shall log error rates and system failures
* System shall generate alerts for performance degradation

**FR-RPT-004**: User Analytics

* System shall track user behavior and navigation patterns
* System shall measure user satisfaction through surveys and feedback
* System shall identify drop-off points in the booking funnel

## 🔐 ****Non-Functional Requirements****

These are quality attributes and constraints:

### ****Performance****

* **NFR-PERF-001**: System response time ≤ 5 seconds for search, pricing, and confirmation
* **NFR-PERF-002**: System shall support concurrent users (specify based on expected load)
* **NFR-PERF-003**: Database queries shall complete within 2 seconds

### ****Availability & Reliability****

* **NFR-AVAIL-001**: System uptime of 99.5% (allowing ~3.6 hours downtime per month)
* **NFR-AVAIL-002**: 24/7 accessibility for users
* **NFR-AVAIL-003**: Automated backup every 24 hours with 30-day retention

### ****Security****

* **NFR-SEC-001**: SSL/TLS encryption for all data transmission
* **NFR-SEC-002**: PCI-DSS compliance for payment processing
* **NFR-SEC-003**: Role-based access control (RBAC) for different user types
* **NFR-SEC-004**: Regular security audits and penetration testing

### ****Usability****

* **NFR-USE-001**: Intuitive interface requiring minimal training
* **NFR-USE-002**: Mobile-responsive design for smartphones and tablets
* **NFR-USE-003**: Support for multiple languages (if applicable)
* **NFR-USE-004**: Accessibility compliance (WCAG standards)

### ****Scalability****

* **NFR-SCAL-001**: System architecture shall support horizontal scaling
* **NFR-SCAL-002**: Database design shall handle growing transaction volumes
* **NFR-SCAL-003**: Cloud infrastructure for flexible resource allocation

### ****Maintainability****

* **NFR-MAINT-001**: Modular codebase following industry best practices
* **NFR-MAINT-002**: Comprehensive system documentation
* **NFR-MAINT-003**: Automated testing with minimum 80% code coverage
* **NFR-MAINT-004**: Version control and CI/CD pipeline implementation

## 🔄 ****Integration Requirements****

**IR-001**: GDS/API Integration

* System shall integrate with third-party GDS providers (Amadeus, Sabre, Travelport)
* System shall support RESTful API connections
* System shall handle API rate limits and failures gracefully

**IR-002**: Payment Gateway Integration

* System shall integrate with payment processors (e.g., PayPal, Stripe, local payment gateways)
* System shall support tokenization for stored payment methods

**IR-003**: Email Service Integration

* System shall integrate with email service providers for transactional emails
* System shall support email templates for different notification types

## 📊 ****Data Requirements****

**DR-001**: Data Migration

* System shall migrate historical booking data from legacy systems
* System shall migrate customer profiles and preferences
* System shall validate data integrity during migration

**DR-002**: Data Storage

* System shall use cloud storage for scalability
* System shall implement secure backup solutions with 30-day retention
* System shall comply with data protection regulations (e.g., GDPR, Data Privacy Act)

**DR-003**: Data Accuracy

* System shall maintain 99.9% data accuracy for inventory and pricing
* System shall implement data validation rules for all user inputs
* System shall log all data changes for audit purposes