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Pearlora – Travel Agency Management System

Project Proposal

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Background

Company Background

We are implementing this system as a product for client**, Pearlora Travel Agency** (based on Sri Lanka) which is set to begin operations in the near future, is a tale of future growth and a commitment to providing the highest standards of travel service. In the open market we have identified that there are no travel agency platforms that fulfill customized tour functionalities of a travel agency with Air and Railway transportation facility in high ends.

The agency is firmly grounded in providing on time delivering personalized service and creating unforgettable travel experience for all its clients. This system will provide both clients and manager a portable, efficient way to manage travel agency activities, improving coordination and customer satisfaction.

What is Travel agency?

A travel agency is a company that helps individuals and groups plan, book, and manage their travel arrangements. It serves as a link between travellers and various service providers, including airlines, hotels, car rental companies, and tour operators. Travel agencies offer a range of services, such as flight and hotel reservations, transportation coordination, guided tours, and personalized itineraries. They can function through physical offices or online platforms, making travel planning more accessible and convenient. The primary aim of a travel agency is to ensure a seamless and stress-free travel experience by handling all essential arrangements for its clients.

What is a Travel agency management system?

A Travel Agency Management System is a software solution that simplifies and automates the daily operations of a travel agency. It enables customers to explore travel options, make reservations. And access personalized itineraries, while the managers and agents can handle approvals, monitor booking and process payments. By minimizing manual tasks, the system increases efficiency and enhances customer satisfaction and improves coordination between the travel and the services providers. The travel Agency Management System may be integrated with other types of software to perform specific tasks at a higher level. These integrations may include billing software to manage payments and membership dues, transactional emails tools for better customer communication between customers and managers, or social media marketing tools to increase customers engagement.

Our Web Application

Perlora Travel Agency Management System is a web-based travel agency management system. It provides easy day-to-day operations for customers (users), travel agents, and employees of the agency so that travel planning is efficient and hassle-free. Customers have the facility to tailor their travel packages by selecting their destinations, hotels, and transport facilities. Clients can reserve a tour, hotel, and transport facility, and organize activities, by logging into the system at their convenience. Additionally, the travellers can provide feedback and rate the travel experience based on the quality of service they received during the travel.

The users will be provided with all these benefits once they sign up for the Perlora Travel Agency Management System. Our staff can also log into the system and utilize the system for performing administrative works alongside customer-related services. All the travel agents and the customers are managed by the admin. The Destination manager allow users to explore and work popular destination, receive recommendations, and ensuring necessary travel resources are in place. Hotel Manager enables seamless booking of hotels, resorts, and other accommodations with real time availability and price. Transportation manager incorporates with real time transport booking and scheduling to ensure smooth and a fast travel logistics. Furthermore, there is a special department for financial management to handles all the tasks related to financial transactions, including payments, including payments, refunds and revenue tracking be insuring secure transaction. Event manager facilities the booking and scheduling of events, activities and experiences.

In our online application, we also use IoT-based real-time car tracking to enhance transport management. Customers can see and monitor their booked transport (most importantly flight and railway booking), ensuring their travel experiences are seamless. Our system is also able to accept QR payments via PayPal, or local payment organizations, providing hassle-free and secure payments.

Due to the lack of similar comprehensive travel agency management system, Pearlora Travel agency management system serves as a crucial tool for modern travel agencies. This platform enhances the customer and employee experience, making the travel planning more efficient, accessible and enjoyable

Problems and Motivations

Problems

After we discussed it with our clients, the team identified some of the problems faced by the existing manual travel agency system. This manual system not only consumes valuable time but also faces challenges when maintaining accurate records and satisfying customer needs. Here are the problems we have identified and motivation for those problems with IT solutions.
Real-world problem:

- Risk of data loss, unauthorized access, and the instability to collect and update information on time.
- Low customers Engagement caused due Poor digital marketing and look of personalized offers based on their budget and preferences.
- Poor payment and refund management: Customers often struggle with payment options, refund policies and cancellations.
- Communication challenges: Discomfort in notifying customers and employees regarding specific announcements, discounts, and travel advisories.
- Inability to manage the manual system.
- Customer feedback and inquiries play an important role in dealing with customer inquiries as a result of the growth of the business.
- Booking and scheduling conflicts: Overbooking and poor tour synchronization.
- Delay in updating new travel details and current availability.
- Limited customer support like poor handling of inquiries, complaints and updating their experiences with the agency.
- Limited capacity of storage for customer records and other essentials documents.
- High risk of human errors during data processing and pricing calculations.
- Poor connectivity with the airlines, hotels, and rentals.

IT solutions:

- Using multi-factor authentication (MAF)
- Regular automated backups
- Maintaining a cloud based secured Database.
- Implementing user friendly interface
- Provide announcements and offers via social media platform
- Introducing helpdesk, and customer relationship management system
- Multiple payment gateways and auto mated payment gateway.
- Introducing language translation options.

Motivation

The travel industry has a critical issue in maximizing customer experiences, booking, and payment transactions. Independent travel agency systems are not usually integrated with one another and customers and business have employed multiple systems to utilize various services. These absences of an integrated solution result in inefficiency, increased operational expenses, and less customer experience.

Pearlora travel agency management system seeks to bridge this gap by offering a comprehensive, one-stop web-based travel management system. By integrating a destination managements system, hotel booking transportation tracking and financial management, our system offers convenient travel planning for business and customers alike.

By implementing this system, we incorporate technologies such as IOT-based real-time vehicle tracking, AI-based travel recommendations, and QR code payment enablement to enhance user convenience and operational efficiency. The system is also secured with high-end reporting and analytics, allowing travel agencies to monitor their business performance and make informed choices.

Pearlore is a critical solution for the modern travel business. By streamlining administrative tasks and developing improved user experiences, we are hoping to revolutionize travel management and make it more efficient, personalized and accessible

Aims and Objectives

Aims

The goal of the **Pearlora Travel agency management System** is to enhance operational efficiency, improve user experience, ensure seamless booking processes, and maintain data accuracy and security in tourism-related services.

- **Enhanced Customer Experience:** The aim is to provide a seamless and user-friendly platform for customers to book destinations, hotels, transportation, and events effortlessly. This includes interactive features, personalized recommendations, and a smooth payment process.

- **Integrated Booking Management:** The aim is to centralize and automate the booking system for destinations, hotels, transport, events, and finances to ensure a hassle-free experience. This involves real-time availability checks, dynamic pricing, and automated confirmations.

- **Optimized Transport Coordination:** The aim is to streamline transportation services by integrating real-time vehicle tracking, automated scheduling, and route optimization, ensuring efficient and timely travel for customers.

- **Secure Financial Transactions:** The aim is to ensure safe and transparent financial transactions for bookings and payments. This includes integrating secure payment gateways, automated invoicing, and fraud detection mechanisms.

- **Data-Driven Personalization:** The aim is to offer tailored travel experience based on customer preferences and past bookings. This involves AI-driven recommendations for destinations, hotels, and event packages.

- **Efficient Vendor & Partner Management:** The aim is to optimize collaboration with hotels, transport providers, and event organizers by maintaining a structured database, tracking performance, and ensuring seamless communication.

- **Smart Scheduling & Resource Allocation:** The aim is to maximize efficiency in travel planning by dynamically adjusting schedules, optimizing pricing strategies, and ensuring availability of transport and accommodation.

- **Advanced Customer Support & Assistance:** The aim is to enhance customer service through AI chatbots, real-time support, and automated assistance for queries related to bookings, cancellations, and travel guidance.

- **Comprehensive Reporting & Analytics:** The aim is to leverage data analytics to track business performance, monitor booking trends, and generate insights for strategic decision-making and future service enhancements.
- **Sustainable & Eco-Friendly Travel Solutions:** The aim is to promote responsible tourism by integrating eco-friendly travel options, optimizing resource utilization, and encouraging sustainable travel practices.

Objectives

Depending on the specific needs and goals of the **Pearlora Travel agency management System**, the objectives of the system may vary. However, some common objectives include:

- **Seamless Destination & Hotel Booking:** The system should facilitate easy search, selection, and booking of destinations and hotels, ensuring real-time availability updates and confirmation notifications.

- **Integrated Transport Management:** The system should enable seamless booking and scheduling of transport services, allowing users to select their preferred mode of travel, check availability, and receive automated booking confirmations.

- **Efficient Event Coordination:** The system should streamline event management by allowing users to browse, book, and manage events efficiently. It should also provide automated reminders and itinerary synchronization.

- **Comprehensive Financial Management:** The system should empower users with secure financial transactions, including online payments, refunds, and invoice generation, while also tracking financial reports for business analysis.

- **Smart Scheduling & Route Optimization:** The system should allow transport providers to efficiently manage schedules and optimize travel routes, reducing delays and improving customer satisfaction.

- **Automated Customer Communication:** The system should enable personalized notifications via email or SMS regarding booking confirmations, schedule changes, payment reminders, special offers, and travel alerts.

- **Vendor & Partner Collaboration:** The system should integrate hotel, transport, and event service providers into a centralized platform, enabling efficient coordination, availability tracking, and performance monitoring.

- **Advanced Data Analytics & Reporting:** To assist business owners in making strategic decisions, the system should incorporate analytics for tracking booking trends, customer preferences, revenue generation, and operational efficiency.

- **User-Friendly Mobile & Web Accessibility:** The system should provide a responsive and intuitive interface for both web and mobile platforms, ensuring users can access services conveniently from any device.

- **Enhanced Security & Data Protection:** The system should ensure the protection of customer and transaction data by implementing secure authentication, encryption, and fraud detection mechanisms.

System Overview

System Diagram

We divided our system into 8 components (or subsystems) as Destination management, Hotel Management, Transportation Management, Financial Management and Event Management. All the above-mentioned subsystems are connected to the frontend of the system. Web API is going to be implemented using Rest API along with Express JS and it is connected to the frontend and the backend of the system. The Backend of the System is going to be

implemented using Node JS. The process of the backend is going to be implemented using the data collected from the client is stored and retrieved using MongoDB. MongoDB is the database server of the system. All the records and data of the system are going to be stored in the Travel agency database. Due to the limited amount of capacity the system is going to be hosted in external storage.

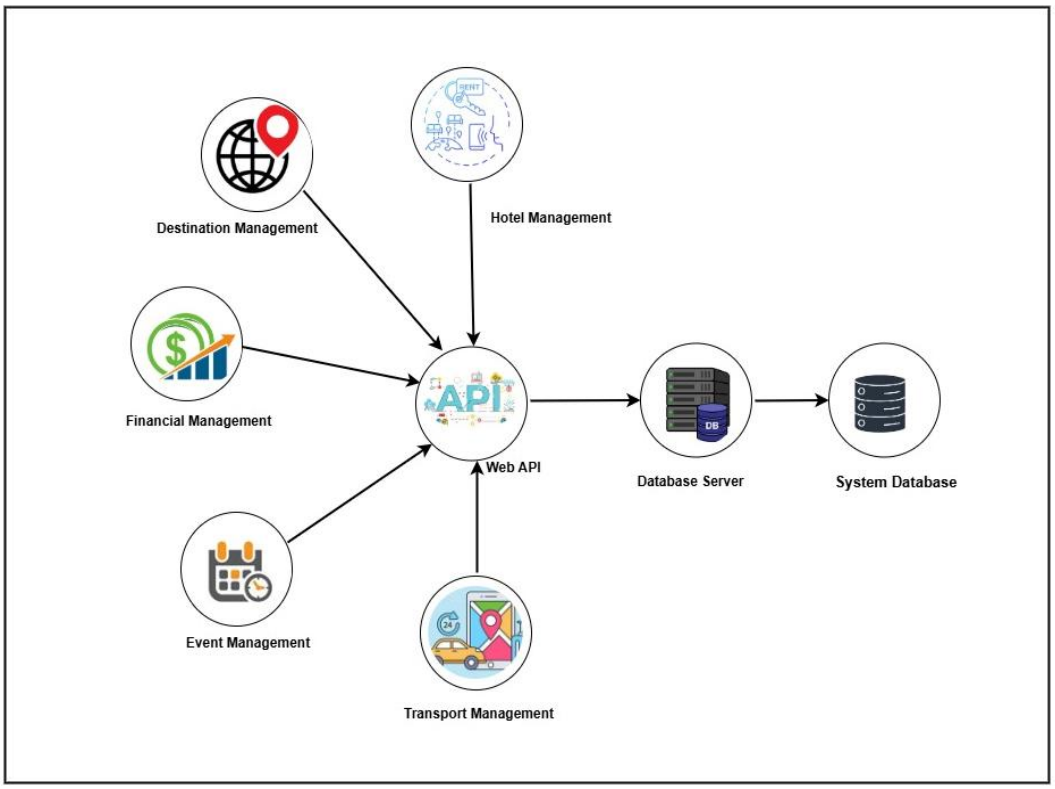

Figure 1 - System Diagram

Functional requirements

1) Destination Management

1.1 Destination Management Core Functions

- **FR1:** The system should allow **destination managers to add, edit, or delete destinations**.
- **FR2:** Each destination should have **detailed information**, including name, location, description, attractions, images, and services available.
- **FR3:** The system should allow destinations to be categorized **based on type** (e.g., beaches, historical sites, adventure spots).
- **FR4:** Destination information should be **verified and approved by an admin** before being published.

1.2 Destination Search & Filtering

- **FR5:** Users should be able to **search for destinations** by name, category, or location.
- **FR6:** Users should be able to **filter destinations** based on criteria such as price range, popularity, user ratings, and accessibility.
- **FR7:** The system should display **recommended destinations** based on user preferences or browsing history.

1.3 Destination Details & Information Updates

- **FR8:** The system should allow **real-time updates** for destination details (e.g., weather conditions, accessibility status, special events).
- **FR9:** Destination managers should be able to **upload and manage multimedia content** (e.g., images, videos, and 360-degree views).
- **FR10:** The system should allow travelers to view a **detailed itinerary suggestion** for each destination.

1.4 Interactive Maps & Navigation

- **FR11:** The system should **integrate with Google Maps or OpenStreetMap** to show destination locations.
- **FR12:** Users should be able to **view nearby attractions, restaurants, and accommodations** on an interactive map.
- **FR13:** The system should provide **directions and recommended routes** to each destination.
- **FR14:** Users should be able to **view transportation options** (e.g., buses, taxis, or rentals) from their current location to the destination.

1.5 User Engagement (Reviews & Feedback)

- **FR15:** Registered users should be able to **write reviews and give ratings** for destinations.
- **FR16:** Users should be able to **report inappropriate reviews or incorrect information**.
- **FR17:** Destination managers should be able to **respond to user reviews** to improve customer engagement.
- **FR18:** The system should display the **average rating and total number of reviews** for each destination.
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1.6 Notifications & Alerts

- **FR19:** Users should receive **notifications** about updates to their favorite destinations (e.g., temporary closures, new attractions).
- **FR20:** The system should send **alerts** for special events or seasonal discounts at certain destinations.
- **FR21:** Users should be able to **subscribe to receive updates** about specific destinations.

1.7 Reporting & Analytics

- **FR22:** The system should track and generate reports on **destination popularity, user engagement, and visitor trends**.
- **FR23:** Admins should be able to **export reports in CSV, PDF, or Excel format** for business insights.

- **FR24:** Destination managers should have access to **visitor analytics**, including most searched destinations and visitor demographics.

CRUD Operations for Destination Management

1. Create (C) – Add a New Destination
Functionality: Allows the destination manager to add new destinations to the system.
Steps:

1. The **Destination Manager/Admin** selects **"Add New Destination".**
2. The system prompts for **destination details:**
    - Name
    - Location (City, Country)
    - Description
    - Category (Beach, Mountain, City, etc.)
    - Attractions and Activities
    - Accommodation Options
    - Images and Videos
    - Maps and Navigation Details
    - Accessibility Options
3. The system **validates** the input (checks for missing or incorrect data).
4. The destination is stored **in the database** with a status of "Pending" or "Active" (based on admin approval).
5. If required, an **admin approves the listing**, and it becomes visible to users.

2. Read (R) – View and Search Destinations
Functionality: Allows users to search and view destination details
Steps:

1. Users visit the **destination search page.**
2. The system retrieves **all active destinations** from the database.
3. Users can **search by name, category, or location.**
4. Users can **apply filters** (e.g., ratings, price range, accessibility).
5. The system displays **destination details,** including images, reviews, and travel options.

3. Update (U) – Edit Destination Details
Functionality: Allows destination managers to update destination details (e.g., images, descriptions, available activities).
Steps:

1. The **Destination Manager** selects a destination to edit.
2. The system retrieves **current details** from the database.
3. The manager updates relevant details such as:
    - Description
    - Attractions & Activities
    - New images or videos

- Accessibility information

4. The system **validates the new details.**
5. The updated information is saved in the database and **reflected on the website.**

4. Delete (D) – Remove a Destination

Functionality: Allows destination managers to remove destinations that are no longer available.

Steps:

1. The **Destination Manager** selects a destination to remove.
2. The system asks for **confirmation** before proceeding.
3. If confirmed, the system:
   - **Permanently deletes** the destination (if allowed).
   - **Marks it as "Inactive"** (if historical data should be kept).
4. The destination is no longer visible to users.

2) Transportation Management

1. Vehicle Management

- Vehicle Addition, Update & Removal – Add, modify, or remove vehicles from the system.
- Vehicle Availability & Scheduling – Ensure real-time tracking of vehicle availability and scheduling.
- Search & Filter Vehicles – Search vehicles by type, capacity, and availability.
- Vehicle Maintenance Logs – Track maintenance schedules and service records.
- Vehicle Status Update – Indicate whether a vehicle is available, in use, or under maintenance.

2. Driver Management

- Driver Registration & Profile Management – Add, update, and manage driver details.
- Assign Drivers to Vehicles – Allocate drivers based on schedules and availability.
- Driver Shift & Route Management – Assign shifts and manage designated travel routes.
- Driver Performance Monitoring – Track driving behaviour and compliance with safety rules.
- License & Certification Tracking – Maintain records of driver licenses and certifications.

3. Transport Booking & Allocation

- Vehicle Booking (Online & Offline) – Allow users to book vehicles via web/app or directly through the transport desk.
- Booking Confirmation & Cancellation – Automated confirmation and easy cancellation options.
- Dynamic Pricing & Cost Estimation – Calculate transportation costs based on distance, fuel consumption, and other parameters.
- Booking Reports & History – Generate reports on vehicle usage, occupancy, and revenue.

4. GPS Tracking & Fleet Monitoring

- Real-Time Vehicle Tracking – Monitor vehicle location using IoT-based GPS integration.

- Route Optimization & Navigation – Use GPS navigation to suggest the best travel routes.
- Geo-Fencing & Alerts – Set geographical boundaries and receive alerts when vehicles leave designated areas.
- Emergency Alerts & SOS Features – Notify managers in case of vehicle breakdowns or accidents.

5. Notifications & Alerts

- Booking Confirmations & Reminders – Notify users and drivers about upcoming trips.
- Maintenance & Servicing Alerts – Remind transport managers of scheduled maintenance.
- Driver & Staff Communication – Internal messaging for seamless coordination.

CRUD Operations for Transport Management

1. Create – Adding new records to the system

This operation allows transport administrators to add new records for efficient transport operations.

- Vehicle Management – Register new vehicles with details like model, type, seating capacity, and availability.
- Driver Management – Add new drivers with personal details, license information, and assigned routes.
- Transport Booking – Create new bookings for customers, allocating vehicles and drivers.
- Expense Management – Add fuel purchases, maintenance records, and trip expenses.

2. Read – Displaying and retrieving records

This operation allows users and administrators to access relevant transport data.

- Vehicle Management – View vehicle status, availability, and maintenance history.
- Driver Management – Retrieve driver profiles, assigned routes, and performance history.
- Transport Booking – Display booking details, including trip history, cost, and assigned vehicle.
- Expense Management – View fuel consumption reports and transport expense summaries.

3. Update – Modifying existing records

This operation allows administrators to maintain up-to-date records.

- Vehicle Management – Modify vehicle details, update availability, or mark a vehicle as under maintenance.
- Driver Management – Edit driver details, change assigned vehicles, or update work shifts.
- Transport Booking – Modify booking details, reassign vehicles, or update trip schedules.
- Expense Management – Update fuel logs, maintenance expenses, and trip cost adjustments.

4. Delete – Removing records from the system

This operation ensures data remains accurate and relevant.

- Vehicle Management – Remove decommissioned or damaged vehicles.
- Driver Management – Delete driver records when they leave the company.

- Transport Booking – Cancel bookings and free up vehicles for new reservations.
- Expense Management – Remove outdated or incorrect financial records.

3) Hotel Management

1. Guest Management

- Guest Registration & Profile Management – Add, update, and manage guest information.
- Check-in & Check-out – Smooth guest handling with real-time updates.
- Booking History & Records – Maintain guest stay history for better service.

2. Room Management

- Room Addition, Update & Removal – Manage room details, amenities, and pricing.
- Room Availability & Booking – Ensure real-time availability and seamless booking.
- Search & Filter Rooms – Quick search by room type, price, and availability.
- Room Cleaning & Maintenance Logs – Track cleaning schedules and maintenance requests.
- Room Status Update – Indicate whether rooms are available, occupied, or under maintenance.

3. Hotel Staff Management

- Employee Records Management – Add, update, and manage staff details.
- Staff Role & Shift Management – Assign duties, shifts, and responsibilities.
- Attendance & Payroll – Track working hours and process salaries.

4. Reservation & Booking System

- Online & Offline Booking – Allow guests to book via website, app, or in person.
- Booking Confirmation & Cancellation – Automated confirmation and easy cancellation process.
- Payment Integration – Accept online payments via credit/debit cards, wallets, or bank transfers.
- Booking Reports – Generate reports on room occupancy and revenue.

5. Notifications & Alerts

- Booking Confirmations & Reminders – Notify guests about their stay.
- Housekeeping & Maintenance Alerts – Inform staff of pending tasks.
- Staff Communication – Internal messaging for smooth coordination.

CRUD Operations for Hotel Management

1. **Create – Adding new records to the system**
   This operation allows administrators to add new records to the hotel's system, ensuring seamless hotel operations.

- Guest Management – Register new guests with personal details, ID proof, and preferences.
- Room Management – Add new rooms with type, amenities, pricing, and availability.
- Staff Management – Add new employees, specifying their roles, departments, and work shifts.
- Reservation & Booking – Create new bookings for guests, assigning rooms based on availability.

2. Read – Displaying and retrieving records

This operation retrieves and displays records stored in the system, helping administrators and guests access relevant information.

- Guest Management – View guest profiles, booking history, and preferences.
- Room Management – Display room details such as type, number, floor, amenities, capacity, and status.
- Staff Management – Retrieve staff details, work schedules, and attendance records.
- Reservation & Booking – View booking details, including check-in/check-out dates and payment status.

3. Update – Modifying existing records

This operation enables administrators to update and maintain accurate data within the system.

- Guest Management – Edit guest details, update loyalty points, or modify contact information.
- Room Management – Modify room type, amenities, pricing, or availability status.
- Staff Management – Update staff details, shift timings, and salary information.
- Reservation & Booking – Modify reservation details, upgrade rooms, or change booking dates.

4. Delete – Removing records from the system

This operation allows administrators to permanently delete outdated or incorrect records, maintaining a clean database.

- Guest Management – Remove guest records that are no longer needed.
- Room Management – Delete rooms that are decommissioned or unavailable.
- Staff Management – Remove employees from the system when they leave the organization.
- Reservation & Booking – Cancel bookings and free up rooms for new reservations.

4) Financial Management

1.1 Payment processing and Transaction

- **Multi payment options: Support credit/debit cards, QR payment and cash transactions**
- **Invoice generation and billing**: Generate automatic invoice for booking and services.
- **Real time payment tracking**: Monitor payment received, pending or failed.
- **Secure payment gateway integration**: Ensure transactions are in high ended security encrypted
- **Refunds and cancellation handling: Process refunds based on cancellation policy rights**

1.2 Expense management

- **Revenue Tracking**. Record income from booking, transportation, and other activities
- **Automate payments for third party hotels, transport and event organizers**

1.3 Notifications & Alerts

- Users should receive **notifications** of pending payments or upcoming payments
- The system should send **alerts** when expenses exceed set budgets
- Remind finance team about tax
- Identify suspicious transactions and notify administrators

1.4 Reporting & Analytics

- The system should track and generate reports on profit and losses statements, balance sheets and cash flow reports.
- Maintain records of all financial activities.
- Generate reports based on specific time frames and categories
- Admins should be able to **export reports in CSV, PDF, or Excel format** for business insights.

CRUD Operations for Destination Management

1. Create (C) – Add a New Payment method
Functionality: Allows the financial manager to add new payment methods to the system.
Steps:

1. **Payment Records: add new payment details:**
    - **Credit Card**
    - **Debit Card**
    - **QR payment**
    - **Cash transaction**

2. **Customer can select payment method**
3. **Allow customers to enter details:**
    - **Cardholder name**
    - **Card holder number**
    - **Expiration Date**
    - **CVV (security code)**
    - **Billing address (if required)**

2. Read (R) – View and Search saved card details

Functionality: Allows users to view their card details in their profile.

1. Customer can view their saved card details
2. View historical payment records
3. View summary of transactions
4. Retrieve generated financial reports
5. The system retrieves **all active payments** from the database.
6. The system displays **details**, including QR code.

3. Update (U) – Edit Payment Details

Functionality: Allows users to update payment details

1. The system retrieves **current details** from the database.
2. The user updates relevant payment details
3. The financial manager modify the financial reports
4. The system **validates the new details**
5. The updated information is saved in the database and **reflected on the website.**

4. Delete (D) – Remove a Destination

Functionality: Allows finance managers to remove payment details that are no longer needed

1. The finance manager selects payments to remove payment details
2. The system asks for **confirmation** before proceeding.
3. Customer can delete their save card details if they:
    a. No longer to wish to use that card
    b. Want to switch payment method
    c. Do not want their card stored in the system.

4. If confirmed, the system:
    a. **Permanently deletes** the destination (if allowed).
    b. **Marks it as "Inactive"** (if historical data should be kept).
5. The payment details are no longer visible to the users

5) Event Management

1. Event Planning & Scheduling

- **Create & Manage Events** – Add, update, and delete events.
- **Event Calendar & Scheduling** – Display events in a calendar with time slots.
- **Venue Booking & Availability** – Reserve venues and check availability.
- **Speaker & Guest Management** – Assign speakers, guests, and VIP attendees.

2. Registration & Ticketing

- **Online & Offline Registration** – Allow users to register via web/app or in person.
- **Ticket Management** – Generate, sell, and validate event tickets.
- **Seat Allocation & Reservation** – Assign seats and ensure optimized seating arrangements.
- **Discounts & Promo Codes** – Apply promotional offers for ticket purchases.

3. Vendor & Staff Management

- **Vendor Registration & Contracts** – Manage event vendors, contracts, and payments.
- **Staff & Volunteer Assignments** – Allocate responsibilities to event staff.
- **Catering & Logistics Coordination** – Plan food, transport, and accommodation services.

4. Event Marketing & Communication

- **Email & SMS Notifications** – Send event reminders and updates.
- **Social Media Integration** – Promote events on social platforms.
- **Push Notifications** – Notify attendees of event schedule changes.
- **Feedback Collection & Surveys** – Gather attendee reviews and ratings.

5. Event Execution & Monitoring

- **Live Event Tracking** – Monitor real-time event progress.
- **Task & Checklist Management** – Ensure all pre-event tasks are completed.
- **Emergency & Security Alerts** – Provide quick response options for incidents.

6. Reports & Analytics

- **Attendee Reports & Insights** – Analyze visitor demographics.
- **Financial Reports & Budgeting** – Track revenue, expenses, and profit.
- **Event Performance Metrics** – Evaluate success through attendance and engagement.

CRUD Operations for Event Management

1. Create – Adding new event records (C)

- **Event Management** – Register new events with date, time, and location.
- **User Registration** – Add attendees with personal details.
- **Vendor & Staff Management** – Add vendors, staff, and assigned roles.
- **Expense Management** – Log event expenses like venue costs, catering, and marketing.

2. Read – Displaying and retrieving event records (R)

- **Event Listings** – View scheduled events and details.
- **Attendee Details** – Retrieve attendee registration info.
- **Vendor & Staff Information** – Access assigned roles and contacts.
- **Financial Reports** – View expense breakdowns and revenue generation.

3. Update – Modifying existing records (U)

- **Event Details** – Update event schedules, venue, or guest list.
- **Attendee Information** – Modify registration details.
- **Vendor & Staff Assignments** – Reassign tasks or update contracts.
- **Expense Records** – Adjust budget allocations and financial reports.

4. Delete – Removing records (D)

- **Event Cancellation** – Remove an event and notify attendees.
- **Attendee Records** – Delete user details if they cancel registration.
- **Vendor & Staff Removal** – Remove inactive vendors or staff.
- **Expense Logs** – Delete outdated or incorrect financial records.

Non-functional requirements

1) Performance

- Every interface's processing and response time must be less than a few seconds to ensure normal operation.
- The site must load as fast as possible for enhanced user experience with little delay or timeouts.
- The system must be tuned to handle a high traffic volume without overhead in performance, which is perceivable.

2) Security

- Only authorized admin users must be able to run reports so that data remains private.
- The website should also have a safe and easy way for users to log out securely.
- The registered customers should have to login on the website by providing a proper username and password to be able to view their accounts, in order that authenticated users are allowed to view the system.
- User data must be encrypted in transit to prevent it from being intercepted by unauthorized personnel.

3) Safety

- Every user will be assigned a unique username and password for secure login and account access.
- In case a customer is unable to recall their password, they must be able to contact the administration through a message link on the homepage. A recovery link will be sent to the user's registered email, from where they can reset their password securely.
- The system should have features such as CAPTCHA or two-factor authentication to lock logins and prevent any unauthorized access.

4) Software Quality Attributes

A. Availability

The system needs to be accessible to all authorized users, customers, and employees, 24/7, with little downtime for maintenance or upgrade.

B. System Maintenance

Problems or bugs identified in the system need to be immediately reported by employees and referred to the development team to check and fix.

C. Reliability

The development team must always keep a check on the system's performance, and it should be stable and free of severe bugs. There should be frequent updates to make the system more reliable and secure.

D. Usability

The system must possess an easily navigable user interface with which the users can operate easily through several functionalities. It must not take much effort to operate, with good instructions and user-friendly design.

E. Accuracy

All management functions must be able to operate with expected accuracy, i.e., all operations performed by the system, such as calculations and data processing, should be according to the right output without any sort of errors.

F. Scalability

The system must be scalable to support growing numbers of users or transactions without performance degradation. It must be capable of supporting future growth, either in user base, storage, or new functionality.

G. Backup and Recovery

All critical data should be backed up on a regular basis to be able to quickly restore the system in the event of data loss or failure. The recovery processes should be established and efficient enough in order to minimize downtime.

H. Maintainability

The system must be maintainable, with the ability to update or modify the system as necessary to fix bugs, add features, or improve performance.

I. Cost

The system must be cost-effective, with a reasonable cost that is commensurate with the value that it provides to the user.

Technical requirements

Hardware:

The system should have hardware components that meet the required specifications, such as processing power, memory, and storage capacity.

Operating System:

The system should be designed to work with a specific operating system, such as Windows, MacOS, or Linux.

Database:

The system should have a database to store and manage data efficiently.

User Interface:

The system should have an easy-to-use interface that allows users to interact with the system and perform necessary tasks.

Data Security:

The system should have appropriate security measures in place to protect data from unauthorized access, such as encryption and user authentication.

Networking:

The system should be able to connect to a network to enable data transfer and communication with other devices.

Performance:

The system should be designed to perform efficiently and effectively to meet the needs of the users.

Compatibility:

The system should be compatible with other hardware and software components that are required for its operation.

Scalability:

The system should be scalable and able to handle increasing amounts of data and users as the system grows.

Maintenance:

The system should be easy to maintain, update, and troubleshoot to ensure its continued operation and optimal performance.

Literature Review

The growth of the tourism and travel industry has led to the development of digital platforms that streamline travel agency management. The **Pearlora Travel Agency Management System** aims to improve efficiency by integrating various components like destination booking, hotel reservations, transport arrangements, event management, and finance handling in a single platform. This literature review discusses the existing research and systems related to travel management platforms, highlighting their strengths, weaknesses, and the gaps that Pearlora aims to address.

1. Existing Travel Agency Management Systems

A variety of travel agency management systems have been developed to streamline operations and enhance customer experiences. These systems often integrate booking, payment, customer service, and other essential functions.

- **Tourism Management Software (TMS)**:
  Studies show that platforms like **TMS** help automate tasks such as booking, ticketing, and customer communications. However, many of these systems are not tailored for specific niches, and they lack integration across different types of bookings (i.e., transport, hotel, event).
  - *Example*: **Amadeus** and **Sabre** are industry leaders, offering tools for booking flights, hotels, and car rentals. Despite their efficiency, these platforms often require high expertise and can be expensive for smaller agencies (IATA, 2020).
  - *Gap*: Limited customization options for specific tourism events and local services, which Pearlora aims to address by providing a more modular approach.

- **Online Travel Agencies (OTAs)**:
  OTAs like **Expedia** and **Booking.com** revolutionized the travel industry by offering

consolidated travel booking services. These platforms provide a wide range of services, but they tend to offer generalized services, leading to difficulties for agencies specializing in niche tours and custom itineraries.

- *Example*: Research shows that OTAs have greatly expanded the reach of travel businesses (Zhao, 2021). However, agencies often find it challenging to differentiate their services from these larger, global platforms.
- *Gap*: Lack of personalized experience for event-based travel services, which Pearlora intends to address by focusing on event and experience-based bookings.

2. Event and Activity Booking Systems

Event management is a key component of travel experiences, especially in tourism. There has been an increasing trend towards integrating activity and event management features into travel platforms. However, most existing systems face challenges in handling multi-faceted events, especially in areas like real-time booking and event capacity management.

- **Event Booking Platforms**:
  Existing systems like **Eventbrite** focus on large-scale events and ticketing, but they do not cater specifically to travel-related events such as guided tours, workshops, or adventure travel bookings.
  - *Example*: Studies highlight that these platforms excel in handling ticketing but lack integration with other travel services like transportation and accommodation (Smith, 2020).
  - *Gap*: The lack of holistic event management that incorporates booking, scheduling, and customer engagement within the travel context, which Pearlora will provide.

- **Integration with Travel Management**:
  Research indicates that platforms that integrate activity bookings with transportation and accommodation (e.g., **Viator** and **GetYourGuide**) help in creating a seamless travel experience. However, many of these platforms do not offer full back-end management for agencies, leaving gaps in financial tracking and event coordination.
  - *Example*: **Viator** offers activity booking but requires separate management of other aspects of the travel experience.
  - *Gap*: Lack of a unified platform that manages everything, including event logistics, transport bookings, and customer finance, which Pearlora aims to achieve with its comprehensive approach.

3. Financial and Booking Management in Travel Platforms

The integration of financial management and booking systems is critical in travel agency platforms. However, existing solutions often face difficulties in managing complex payment structures, including booking deposits, cancellations, and refunds for multi-component packages.

- **Financial Management in Travel Systems**:
  Research shows that many travel management systems focus primarily on front-end booking and neglect efficient back-end financial integration, leading to issues with accounting and payment reconciliation (Brown, 2019).
    - *Example*: **Travelport** and **Travis** provide payment solutions but face challenges in integrating these systems with other components of travel management.
    - *Gap*: Inefficiency in integrating complex financial transactions with real-time booking and event management, which Pearlora plans to address by building a more comprehensive financial management system.

4. User Experience and Interface Design in Travel Systems

The importance of a seamless and intuitive user interface (UI) in travel management systems has been widely discussed in literature. Research emphasizes that a well-designed interface improves user engagement, reduces errors, and enhances overall satisfaction. However, many travel systems still lack user-friendly features for non-expert users.

- **UI and UX Design**:
  Studies highlight that platforms with intuitive designs like **Airbnb** and **Kayak** have seen increased adoption due to their easy-to-use interfaces (Sullivan, 2022). However, in more complex systems, especially those dealing with multiple services like bookings and events, there is often a trade-off between functionality and ease of use.
    - *Example*: **Kayak** offers a streamlined experience but might overwhelm users with too many options.
    - *Gap*: Pearlora aims to bridge this gap by focusing on a user-friendly interface that simplifies booking and event management for customers while providing advanced functionality for agencies.

5. Gaps in Current Systems and Pearlora's Contribution

Despite the wide range of existing travel management systems, significant gaps remain in providing **holistic**, **modular**, and **customized solutions** for both travel agencies and their customers. The **Pearlora Travel Agency Management System** intends to address these gaps by:

- Offering a **modular system** that integrates destination booking, hotel bookings, transport, events, and finance in one place.
- Providing **real-time updates** and management for both customers and travel agencies.
- Focusing on **user-centered design** to ensure ease of use without sacrificing functionality.

Methodology

Agile development is a way of making software that focuses on flexibility, keeping customers happy, teamwork, and always improving through step-by-step processes. It involves breaking a project into small parts, choosing the most important features based on user feedback, and releasing working software in short periods called sprints.

After thinking about the type of work, the team's size and experience, and the kind of project, we decided that Scrum would be a good choice. Scrum has a clear structure with well-defined roles, meetings, and important documents, which can help teams that are new to agile methods. It also focuses on repeating steps and getting feedback often, which helps teams improve their work and get better results, even when project needs stay the same. However, since your team has less experience, it is important to give them proper guidance and support, so they understand and follow the Scrum framework correctly.

Methods

Agile Software Engineering Methodology

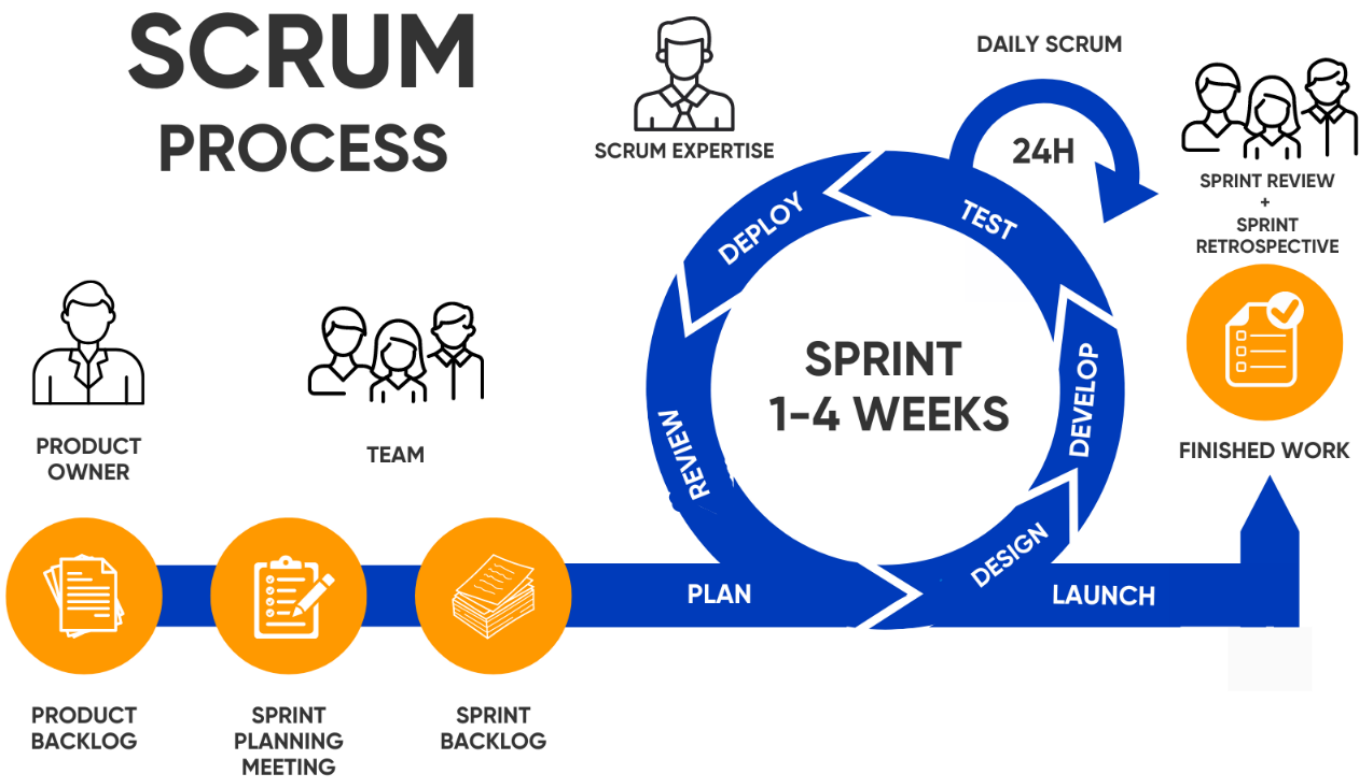

Figure 2 – Agile Methodology

Reason for Choosing Agile Methodology

Agile methodology offers many benefits, especially in fast-changing work environments where flexibility, teamwork, and continuous improvement are important. Here are the key reasons why businesses prefer Agile:

1. Ability to Adapt to Changes

- **Handling Changing Needs:** Agile allows teams to adjust to new requirements and customer needs through step-by-step development. This is useful when market trends or user demands frequently change.
- **Flexibility:** Agile frameworks like Scrum and Kanban are designed to embrace change instead of resisting it. Teams can easily shift priorities and plans based on continuous feedback.

2. Better Customer Satisfaction

- **Regular Updates:** Agile focuses on delivering working software in short cycles, called sprints or iterations. This ensures early feedback and helps meet customer expectations.
- **Customer Involvement:** Agile keeps customers and stakeholders engaged throughout the development process, ensuring their needs and suggestions are considered, leading to higher satisfaction.

3. Higher Product Quality

- **Ongoing Testing:** Agile encourages continuous testing and integration, helping teams find and fix bugs early. Methods like Test-Driven Development (TDD) from Extreme Programming (XP) maintain software quality.
- **Step-by-Step Improvements:** Frequent iterations allow teams to enhance the product gradually, leading to a more reliable and high-quality solution.

4. Better Teamwork and Communication

- **Teamwork:** Agile focuses on teamwork across different roles, encouraging open communication and cooperation. Daily meetings help keep everyone updated and working together.
- **Talking to Stakeholders:** Agile methods keep in touch with stakeholders often, solving problems quickly and making sure the project stays on track with company goals

5. Faster Product Release

- **Step-by-Step Delivery:** Agile breaks projects into small parts, helping teams release useful features faster. This allows the product to launch sooner and start benefiting users early.
- **Focusing on Important Tasks:** Agile gives priority to the most important features first, making sure key parts are developed and released quickly.

6. Handling Risks

- **Finding Problems Early:** Agile's step-by-step process helps detect and fix problems early, preventing major issues later.
- **Flexible Planning:** Continuous planning and changes help reduce project failure by managing risks and making improvements when needed.

7. More Transparency

- **Clear Progress:** Stakeholders can see project updates regularly through sprint reviews and daily meetings, allowing them to give feedback.
- **Responsibility:** Agile ensures everyone has a clear role and tracks progress, promoting accountability within the team.

8. Empowered Teams

- **Self-Management:** Agile encourages teams to make decisions on their own, boosting motivation and teamwork.
- **Continuous Growth:** Teams regularly review their work to find better ways to improve efficiency and productivity.

9. Better Alignment with Business Goals

- **Delivering Value:** Agile focuses on creating features that provide the most value to customers and match business goals.
- **Regular Feedback:** Ongoing feedback from stakeholders ensures the project stays aligned with business needs and adjusts priorities when required.

10. Flexible Resource Management

- **Scalability:** Agile methods can adapt to different project sizes and complexities, making them suitable for various organizational needs.
- **Efficient Resource Use:** Agile allows flexible team structures, adjusting roles and responsibilities based on project demands.

Design methods

Architectural Design

- **Presentation Layer (Frontend)**
  – Handles **user interactions** (React.js)

- **Business Logic Layer (Backend & Microservices)**
  – Processes **requests, applies business rules** (Node.js, Express.js)

- D**ata Layer (Database & Storage)**
  – Stores **user, booking, and transaction data** (MongoDB, Firebase for real-time tracking)

System Components and Technologies

Frontend (Presentation Layer)

- **Technology:** React.js (Next.js for SSR optimization)
- **Features:**
  - Interactive **user dashboards**
  - **Vehicle booking, Event booking, Hotel reservations**
  - **Real-time notifications**
  - **Google Maps integration** for GPS tracking
  - **Payment processing UI**

Backend (Business Logic Layer)

- **Technology:** Node.js with Express.js (RESTful API)
- **Features:**
  - User authentication
  - Role-based access (**Admin, User, Transport Manager**)
  - Handles **business logic** (booking, event management, payment processing)
  - **Microservices:**
    - **Booking Service** – Handles **vehicle, hotel, and event bookings**
    - **Tracking Service** – Manages **GPS-based real-time vehicle tracking**
    - **Payment Service** – Integrates **Stripe & PayPal** for secure payments
    - **Notification Service** – Sends **email/SMS alerts**

Database Layer (Data Storage)

- **Technology:** MongoDB (NoSQL) for main storage
- **Other Databases Used:**
  - **Firebase Realtime Database** for **real-time GPS tracking**

Design Methodology for Pearlora (Using Agile)

1. Requirement Gathering & Analysis (Sprint 1-2)

- Identify core features: GPS tracking, vehicle booking, hotel booking, payments, etc.
- Conduct stakeholder meetings with tourists, transport managers, hotel managers, and admins to refine needs.
- Define user stories for each stakeholder (e.g., "As a tourist, I want to book a vehicle easily").
- Prioritize requirements into a product backlog and estimate the effort.

2. Planning & Sprint Backlog (Sprint 2)

- Break down features into smaller tasks (e.g., database setup, UI design, backend API).
- Assign tasks to the development team using Trello.
- Define sprint goals.

3. UI/UX Design & Prototyping (Sprint 3)

- Create wireframes and mockups for the user interface.
- Design a responsive UI for web and mobile using Figma, Adobe XD.
- Conduct user testing with stakeholders for feedback.

4. Development Phase (Sprints 4-10)

- Use MERN Stack (MongoDB, Express.js, React.js, Node.js) for web development.
- Implement microservices for vehicle booking, payments, and GPS tracking.
- Ensure real-time tracking using Google Maps API + IoT-based GPS.

5. Continuous Testing & Integration (Parallel to Development)

- Implement unit testing for backend and frontend.
- Perform API testing with Postman.

6. Deployment & Hosting (Sprint 11)

- Host the web app on Firebase / Vercel.
- Use MongoDB Atlas for scalable cloud database hosting.

7. User Acceptance Testing (Sprint 12)

- Conduct beta testing with real users (tourists, transport managers, etc.).
- Collect feedback and refine the product.
- Ensure cross-browser and device compatibility testing.

8. Final Launch & Maintenance

- Deploy stable release for public use.
- Monitor performance with Google Analytics + New Relic.
- Provide post-launch support, fix bugs, and add new features as needed.
- Implement feedback loops for continuous improvements.

Reason for choosing Agile Methodology?

Faster development – Frequent iterations ensure quick releases.

User-centric approach – Continuous feedback keeps the system user-friendly.

High flexibility – Allows changes in features based on evolving needs.

Better risk management – Detects and fixes issues early.

Tools and Technologies

We will be using MongoDB, Express.js, React.js, Node.js (MERN stack), Git, Postman, VS Code, GitHub, Microsoft Teams, Figma, and Trello for your project.

MongoDB is a NoSQL database known for its flexibility and scalability, ideal for storing various types of data like product details, user information, and order records efficiently

Express.js is a popular web application framework for Node.js, providing a robust set of features for building the backend of web applications and APIs quickly and easily

React.js is a JavaScript library developed by Facebook for building interactive user interfaces. It allows for the creation of dynamic, fast-rendering UI components for web applications

Node.js is a JavaScript runtime environment that allows developers to run JavaScript on the server side, enabling the development of scalable and efficient backend applications that are compatible with frontend technologies

Git is a distributed version control system that tracks changes to files and enables collaboration among team members, making it easier to manage and maintain codebases

Postman is a comprehensive API testing tool that simplifies the process of testing and debugging APIs. It provides a user-friendly interface for sending requests, inspecting responses, and automating testing workflows

VS Code is a lightweight, yet powerful code editor developed by Microsoft. It offers a wide range of features, including debugging capabilities, intelligent code completion, and support for various programming languages and extensions

GitHub is a widely used code hosting platform that provides version control and collaboration features. It allows developers to store, manage, and share their code with others, facilitating team collaboration and open-source development

Microsoft Teams is a communication and collaboration platform that brings together chat, meetings, files, and apps in a unified workspace. It helps teams stay connected and organized, especially when working remotely

Figma is a cloud-based design tool used for creating user interface designs, prototypes, and collaborative design projects. It offers features for real-time collaboration and sharing designs with team members and stakeholders

Trello is the visual tool that empowers your team to manage any type of project, workflow, or task tracking. Add files, checklists, or even automation: Customize it all for how your team works best

Testing Methods

A. Functional Testing

- **Unit Testing** – Check small components.
- **Integration Testing** – Ensure smooth connection between modules.
- **System Testing** – Test the whole system's performance and features.
- **User Acceptance Testing (UAT)** – Validate that the website meets user needs.

B. Non-Functional Testing

- **Performance Testing** – Ensure fast load times, even under heavy traffic.
- **Security Testing** – Prevent hacking, SQL injection, and data breaches.
- **Usability Testing** – Ensure a smooth, user-friendly experience for travelers.

Integration Methods

A. API-Based Integration

- Connects **Hotels, Flights, Events, and Payment Gateways** via APIs.
- Example: **Google Maps API for Destination Tracking, Stripe API for Payments**.

B. Database Integration

- Centralized database for **hotel, transport, event, and financial records**.
- Uses **SQL or NoSQL databases** to store & manage travel-related data.

C. Third-Party Service Integration

Connects with external systems like Airlines, Payment Gateways, and CR

Evaluation Method

Pre-Evaluation

Before starting the project, we will analyze whether the system is feasible. We'll check if the technology works, if the budget is manageable, and if there are any legal concerns. We will also set clear goals, identify risks, and get feedback from stakeholders to make sure we're building something useful.

Ongoing Evaluation

As the project progresses, we'll continuously check our progress. We will have regular team meetings, test features, and gather feedback from users. A prototype will be built early so we can make improvements based on real user input. Security and performance checks will be done regularly to ensure the system runs smoothly.

Post-Project Evaluation

After deployment, we will compare the final product with our original goals. We will gather feedback from users, analyze performance, and fix any issues. A final security check will be done to ensure the system is safe and reliable. Based on user feedback, we will plan future updates and improvements to make the system even better

Project plan (Gantt chart)

TASKS	W1	W2	W3	W4	W5	W6	W8	W9	W10	W11	W11	W12	W13
DECIDING THE TOPIC	✓												
REQUIREMENT GATHERING	✓												
ANALYZE REQUIREMENT	✓												
CREATE THE PROJECT CHARTER	✓	✓	✓										
AGILE AND SCRUM ACTIVITY		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CREATE PROJECT PROPOSAL		✓	✓										
DESIGN THE SYSTEM GUI			✓	✓	✓								
Design the Database			✓	✓									
Back End Development					✓	✓	✓	✓					
Front End Development					✓	✓	✓						
Start CRUD Implementation						✓	✓	✓	✓				
Modifying the System										✓	✓		
Unit Testing										✓			
INTEGRATE TESTING											✓		
FINALIZED PROJECT												✓	✓
FINAL PRESENTATION												✓	✓

Figure 3– Gantt Chart

Work breakdown structure (work distribution)

Prashanth A – IT23273580	Done Functional requirements for Destination management. Gave ideas and contribution to the proposals.
Thivyan J – IT23210424	Done Functional requirements for Transport management. Gave ideas and contribution to the proposals.
Kesigan M – IT23210974	Done Functional requirements for Hotel management. Gave ideas and contribution to the proposals.
Nafy F A – IT23321236	Done Functional requirements for financial management. Gave ideas and contribution to the proposals.
Priyatharshini A H – IT23158436	Done Functional requirements for Event management. Gave ideas and contribution to the proposals.

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Travel Agent in Sri Lanka | Tour Operator in Sri Lanka | Olanka Travels

Appendix

Figure 1 - System Diagram

A graphical representation of a system, showing the various components and their relationships. The system diagram typically includes various components, such as inputs, processes, outputs, feedback, and control mechanisms. Inputs are the data or materials that are fed into the system, and outputs are the results or products that are produced by the system.

Figure 2 - Agile Methodology

Agile software engineering methodology is an iterative and incremental approach to software development that emphasizes flexibility, collaboration, and customer satisfaction.

Figure 2 - Gantt Chart

Tool for project management that provides a visual representation of a project schedule and helps to ensure that the project is completed on time.