

Lab 2- Itiner-Ease Product Description

Itiner-Ease - Team Copper

Old Dominion University (ODU)

CS 411 Professional Workforce Development II - Fall 2025

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October 14th, 2025

Version 1

Table of Contents

1 Introduction	2
1.1 Purpose	3
1.2 Scope	4
1.3 Definitions, Acronyms, and Abbreviations.....	5
1.4 References	7
1.5 Overview	9
 2 Overall Description	 9
2.1 Product Perspective	9
2.2 Product Functions.....	12
2.3 User Characteristics	13
2.4 Constraints	14
2.5 Assumptions and Dependencies	15

List of Figures

Figure 1. Itiner-Ease Major Functional Components Diagram	11
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1. Introduction

Planning a trip has become increasingly complex as travelers navigate an overwhelming number of digital platforms, each providing fragmented information about destinations, activities, events, and accommodations. While many systems assist with basic travel arrangements, few deliver a cohesive experience that truly supports users throughout the entire planning process. Travelers must compare reviews, browse maps, search for dining, and organize schedules across multiple tools. These tasks, when combined, often lead to disorganized plans, overlooked opportunities, and increased stress. Group travel introduces even greater challenges, requiring coordination among individuals with conflicting preferences, limited time, and varying expectations. Many group planners struggle to identify common interests, manage shared itineraries, or adapt quickly to unpredictable changes such as weather disturbances or business closures.

Itiner-Ease is designed to address these challenges by providing an intelligent, adaptive, and user-centered travel-planning system. The system integrates artificial intelligence, preference modeling, and environmental data to generate personalized itineraries tailored to individual and group preferences. It supports dynamic itinerary updates, enabling users to receive real-time adjustments when unexpected circumstances arise. Additionally, Itiner-Ease enhances the travel experience by incorporating local experts and small businesses, allowing users to access unique insights, discover trending attractions, and benefit from tailored promotions. The system also encourages user engagement through a rewards structure that motivates travelers to explore new locations and contribute reviews.

This Software Requirements Specification (SRS) document serves as the technical foundation for the design and development of Itiner-Ease. Unlike the earlier Lab 1 document, which focused on background, motivation, and problem framing, this SRS defines the technical expectations of the system. Following the IEEE 830-1998 standard, this document presents detailed descriptions of the system's purpose, scope, functionality, architecture, constraints, assumptions, and user characteristics. It establishes a unified understanding of what is required from developers, designers, and testers to ensure that Itiner-Ease is implemented accurately and effectively.

1.1 Purpose

The purpose of this SRS document is to outline the complete set of technical requirements for the Itiner-Ease system in a manner suitable for engineers and developers responsible for building the product. This document defines what the system must do, how it must interact with external components, and what constraints influence its behavior. It serves as a reference throughout the lifecycle of the project, from initial design to final testing, ensuring that all stakeholders share a clear and consistent understanding of the system's expected performance and features. The SRS focuses exclusively on describing the system itself, rather than marketing goals or business motivations, and is intended to support accurate implementation, quality assurance, and long-term maintainability.

1.2 Scope

Itiner-Ease is a mobile and web-based travel-planning system that integrates personalized recommendation tools, dynamic itinerary management, and group collaboration features. The system assists travelers in constructing schedules that align with their preferences, budget, and travel style. It also enables users to adjust their itineraries based on real-time conditions such as weather shifts, local events, and changes in business availability. Through AI-driven analysis, Itiner-Ease provides intelligent suggestions that guide users toward attractions, dining options, and experiences that match their interests.

The system is particularly beneficial for groups, as it supports collaborative decision-making through shared profiles, ranked-choice voting, and joint itinerary management. This feature helps groups reconcile differing preferences and ensures that decisions reflect the collective interests of all travelers. Itiner-Ease also incorporates local experts and small businesses, allowing them to contribute insights, offer personalized recommendations, and promote events or discounts to users who match their target audience. This helps travelers discover unique experiences while supporting local communities.

While Itiner-Ease performs a wide range of planning and recommendation tasks, it does not engage in booking flights, hotels, or transportation services, nor does it provide live support through human travel agents. The system depends on third-party data for maps, weather information, and event listings, and therefore cannot guarantee complete accuracy of external sources. This SRS defines the functional boundaries of the system, ensuring that development remains aligned with the intended technical scope.

1.3 Definitions, Acronyms, and Abbreviations

AI Preferences Learned Behaviors – The ability of the app's AI to learn from a user's past behavior to provide more accurate recommendations in future interactions.

AI Recommendations – Suggestions generated by artificial intelligence to personalize itineraries based on user preferences and behaviors.

Curated Itineraries – Personalized travel plans that are specifically tailored to a user's preferences and interests.

Dynamic Itinerary Support – Real-time adjustments or updates to travel plans based on changing conditions like weather or local events.

Explorer Rewards – Incentives, such as discounts or coupons, for users based on their activity within the app (e.g., completing tasks, rating attractions).

Foot Traffic – The number of people visiting a location or business, often used to measure the success of promotions or events.

Group Profiles – A feature that allows multiple users to create and share a single itinerary for a group trip, capturing the collective preferences and needs of the group.

“Hot Spot” Advocating – Recommending popular or noteworthy locations (such as restaurants, parks, or attractions) to users, helping them explore the best local experiences.

Itinerary Creation – The process of planning and organizing travel plans, including activities, accommodations, and transportation.

Joint Itineraries – Collaborative itineraries created by multiple users to coordinate their travel plans.

Offline Access – The ability for users to access and view their travel plans without requiring an internet connection.

Targeted Promotions – Marketing efforts aimed at specific groups, such as nearby travelers, to promote local businesses or attractions.

Tourism Industry – The sector of the economy focused on services related to traveling, including accommodations, transportation, and guided tours.

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1.5 Overview

The remaining sections of this document outline the Itiner-Ease system from a development-focused perspective. Section 2 provides an overall description of the system's environment, architecture, major functions, user characteristics, system constraints, and dependencies. Section 3 will define specific requirements required for system implementation, including functional requirements, interface descriptions, and performance criteria.

2. Overall Description

2.1 Product Perspective

Itiner-Ease is a standalone application that integrates with multiple external systems to support its functionality. It is designed using a three-tier architecture that consists of the Presentation Layer, Application Layer, and Data Layer. This structure promotes scalability, modularity, and maintainability while enabling efficient communication between subsystems. The Presentation Layer includes the mobile application for iOS and Android as well as the web interface. These interfaces allow users to create profiles, input preferences, view itineraries, interact with group members, and explore recommendations. All user interactions originate from this layer and are transmitted through secure channels to the Application Layer.

The Application Layer contains the system's core logic, including itinerary generation, AI-driven recommendations, dynamic itinerary adjustments, and group preference merging. It interacts with multiple external APIs, such as Google Maps for geolocation services, weather forecasting platforms for real-time environmental tracking, and event aggregation systems for up-to-date activity recommendations. This layer is also responsible for managing the reward system, expert evaluations, and communication between users and local businesses. The backend processes are designed to handle large volumes of data while maintaining efficient performance.

The Data Layer stores all persistent information, including user profiles, group profiles, itineraries, reviews, reward histories, and local business or expert listings. A structured MySQL relational database supports consistent organization of data, optimized queries, and secure storage. This database is hosted on a cloud-based environment to ensure availability, redundancy, and scalability. The system's architecture is further illustrated through the Major Functional Component Diagram (Figure 1) , which visually represents the relationships among subsystems and their interactions with external services.

Major Functional Component Diagram (MFCD)

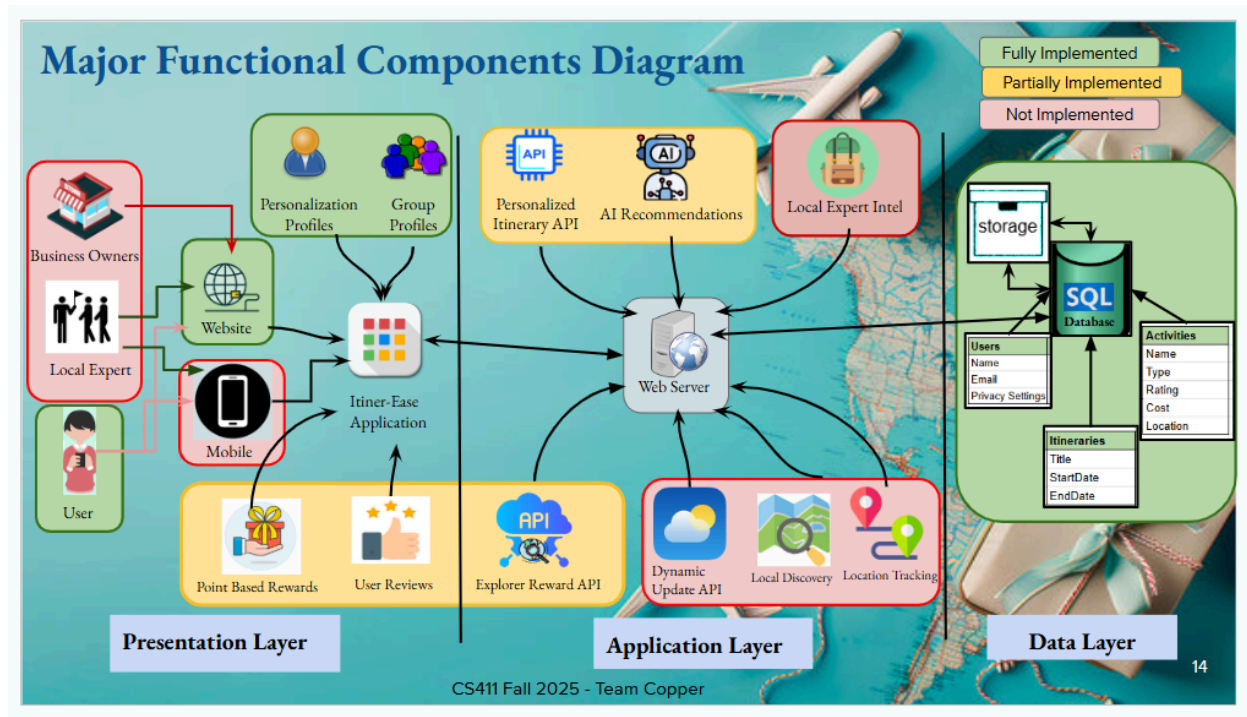


Figure 1 Major Functional Components Diagram

This architectural structure ensures efficient scalability, modularity, and maintainability.

Subsystems interact through well-defined APIs, enabling flexible updates and future expansion.

2.2 Product Functions

Itiner-Ease provides a comprehensive collection of features that are designed to streamline the travel-planning experience. The system's core functionality revolves around user profile creation and preference management. Users are able to construct detailed profiles that capture their interests, budgets, accessibility needs, dietary preferences, activity types, and travel styles. These preferences influence all recommendations produced by the system and provide the foundation for itinerary generation.

Another major function of Itiner-Ease is the construction of personalized itineraries. The system synthesizes user preferences with contextual information such as destination data, operating hours, travel distance, weather forecasts, and relevant events. These itineraries can be modified by users at any time, allowing them to adjust their plans by adding, removing, or rearranging activities. The itinerary builder is designed to provide flexibility, especially when unexpected disruptions occur. For example, sudden weather shifts or closure alerts prompt the system to recommend suitable alternatives that fit within the user's schedule.

Group travel is also central to the functionality of Itiner-Ease. The system allows multiple users to merge their preferences into a single group profile, ensuring that the final itinerary reflects the interests of all participants. Group decision-making is facilitated through the ranked-choice voting mechanism, which helps resolve conflicting preferences without requiring extended discussions. The system then uses these results to generate recommendations and construct shared itineraries accessible to all group members.

The application also incorporates dynamic itinerary support. This function leverages real-time environmental data to notify users when changes in conditions might affect their plans. If adverse weather is detected or unexpected closures occur, Itiner-Ease automatically suggests appropriate alternatives. Additionally, users receive updates about trending locations, peak hours, and nearby attractions, helping them stay engaged and informed throughout their trip.

Itiner-Ease contains features for local experts and businesses as well. Experts may provide optional itinerary reviews or give personalized suggestions to enhance user experiences. Local businesses can promote events, discounts, and popular attractions. These interactions support a mutually beneficial ecosystem in which users gain access to authentic experiences while businesses increase foot traffic and visibility.

2.3 User Characteristics

The users of Itiner-Ease represent diverse groups, each with distinct needs, goals, and usage patterns. Solo travelers often seek personalized recommendations and efficient planning tools that help them organize trips without extensive research. These users may have varying levels of technological experience, but the interface is designed to support both beginners and advanced users. They primarily use the system to construct itineraries, discover attractions, and make informed decisions about how to maximize their time at a destination.

Group travelers—such as families, friends, or student groups—often face additional challenges due to differing preferences and schedules. These users rely on Itiner-Ease to merge their individual settings into a cohesive group profile and to participate in collaborative decision-making. The system's voting and shared itinerary features help resolve conflicts and

reduce the burden typically placed on a single trip organizer. Group users benefit from structured planning tools that streamline communication and maintain transparency throughout the process.

Local experts form another user category and typically possess moderate experience with mobile and web applications. These users contribute insights by reviewing itineraries, offering suggestions, and engaging with travelers. Local experts enhance the system by providing real-world perspectives that may not be captured through automated recommendations alone. Their participation assists users in exploring hidden attractions, local culture, and unique experiences.

Local businesses also make use of the system to promote their offerings, share event details, and interact with potential customers. These users may vary in their digital proficiency but generally require tools that allow them to advertise effectively without complex interfaces. Their interaction with the system gives travelers access to deals, promotions, and community-based experiences that enrich their journeys.

2.4 Constraints

Itiner-Ease must operate within several technical, hardware, and environmental constraints. The system must remain compatible with modern versions of iOS and Android, which imposes limitations on interface design, storage usage, and feature implementation. Because many of the system's functions rely on external APIs, the availability and performance of those services influence the overall reliability of the application. For instance, disruptions in weather or mapping APIs may affect the accuracy of recommendations and dynamic updates.

Security constraints also play a significant role. User data—including preferences, travel dates, and location information—must remain protected through secure authentication methods such as OAuth 2.0 and encrypted communication protocols. Additionally, the system must adhere to privacy requirements by ensuring that personal information is stored securely and accessed only when necessary. Performance constraints require the system to generate itineraries in a timely manner, as excessive delays may negatively impact user experience, especially on mobile devices where processing power may be limited.

Another major constraint is network dependence. Dynamic itinerary support and real-time data retrieval require consistent internet access. Although some basic features may be accessible offline, full functionality cannot be guaranteed without connectivity. The system must be designed in a way that gracefully handles intermittent network access while maintaining usability whenever possible.

2.5 Assumptions and Dependencies

The system assumes that users will accurately provide the preferences and information necessary for generating meaningful recommendations. It also assumes that users will have access to stable internet connections during the planning and travel phases to support real-time updates. The functionality of Itiner-Ease depends heavily on external APIs—including mapping, weather forecasting, and event data providers—and therefore assumes these services will remain operational and accessible. Cloud hosting providers must also maintain sufficient uptime to support continuous system availability.

The system further assumes that local businesses and experts who choose to participate will provide accurate, up-to-date information regarding promotions, events, and recommendations.

Additionally, it is assumed that users will engage responsibly in activities such as writing reviews, redeeming rewards, and interacting with collaborative features. Dependencies also include authentication frameworks, database hosting environments, and mobile operating system support, all of which must remain stable for the system to function as intended.