



# **Problem Definition Document**

## **On**

### **Local Service Booking and Trust System**

**Program:** B. Sc. (Hons) in Computer  
Science & Engineering

**Course Title:** Software Engineering Lab

**Course Code:** CSE-3298

Summer-2025

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#### **Submitted To:**

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**Submission Date:** 08.10.2025

## **Introduction:**

Accessing reliable service providers such as electricians, plumbers, tutors, or domestic workers remains a widespread challenge in Bangladesh. Existing platforms and informal methods—whether through social media groups, manual hotlines, or urban-focused apps—suffer from persistent weaknesses. Common complaints include unreliable workers arriving late or unqualified, fake or outdated “verified” profiles leading to fraud, unresolved payment disputes, slow refunds, overpriced charges or hidden costs, and an absence of rural or offline access. These systems are also heavily dependent on manual processes, making them inefficient and difficult to scale.

The proposed Local Service Booking and Trust System directly addresses these shortcomings. It is designed as a trust-first and inclusive digital ecosystem, combining a mobile application with an automated SMS booking gateway. Unlike manual or urban-only systems, the platform integrates identity verification through NID or Birth Certificate OCR, safety features such as SOS alerts and reliability scoring, dual payment modes (escrow-protected digital payments and Cash-on-Service), and inclusive access via Bangla voice and SMS booking. This ensures households across both urban and rural areas can access services with confidence, fairness, transparency, and safety.

## **Problem Statement:**

Access to trustworthy and affordable local service providers such as electricians, plumbers, tutors, and domestic workers remains a major challenge in Bangladesh. Current platforms and informal networks suffer from weak verification, inconsistent quality, overpricing, and urban-centric reach, leaving rural and low-tech users underserved. Many workers operate without proper identity checks, leading to fraud, scams, and unprofessional behavior, while users face unreliable service delivery, hidden charges, and slow refund processes. Existing solutions are also heavily dependent on manual systems and lack inclusivity for those without smartphones or stable internet. Therefore, there is an urgent need for a digital yet accessible platform that ensures verified worker identities, fair pricing, safe payments, offline usability, and equal service access for all citizens.

## **Project Objectives:**

- Provide verified and reliable local service access for all users.
- Improve community safety with SOS alerts and live job tracking.
- Create digital job opportunities for low-income and informal workers.
- Ensure fair and transparent pricing with bargaining flexibility.
- Support both cash and digital payments for wider accessibility.
- Enable offline booking through SMS and call-center systems.
- Encourage professionalism through loyalty points and badges.

## **Preliminary Solution:**

To overcome those difficulties which are describe before in the problem statement we have proposed three preliminary solutions below:

<b>Solution 1</b>	<b>Solution 2</b>	<b>Solution 3</b>
Mobile-Based Local Service Booking and Trust System: A Flutter app + SMS booking gateway with NID/birth certificate verification, SOS alerts, escrow + cash payments, fair pricing, loyalty rewards, and Bangla/voice support.	Manual Agency Model (Not Scalable): Workers register through local agencies with manual checks; customers must call or visit. Slow, costly, excludes informal workers, and prone to corruption.	Informal Referral & Social Media Model (Unreliable): Depends on Facebook/word-of-mouth. No verification, no structured payment, high fraud risk, and frequent overpricing.

## **Project Scopes:**

There are several facilities exist of those solutions. I will show you, all several functionalities of those solution. Now, describes those scope , facilities and functions. Let's see the **Table 01**.

**Table 01:** Project scopes

<b>Solution No</b>	<b>Functions</b>	<b>Features</b>	<b>Facilities</b>
01	Worker verification, real-time booking, safety monitoring, In-app complaints, refund handling, and dispute management and payment processing.	NID/Birth Certificate OCR, SMS/voice booking, SOS alerts, escrow payments, offline mode.	Trusted identities, fair pricing, scalable access, secure transactions for urban/rural users
02	Manual credential checks, agency-based scheduling, and limited dispute handling.	In-person registration, call/visit bookings, basic staff oversight.	Provides localized trust but is slow, costly, and excludes informal workers.
03	Referral tracking, informal recommendations, and ad-hoc communication.	Unverified reviews, word-of-mouth referrals, social media posts.	Basic access but lacks verification, security, fair pricing, and reliability

## **Cost Estimation:**

- Development cost 40 lakh approximately.
- Budget of project 70 lakh.

### **Estimation Cost and Time for Feasibility Study:**

A feasibility study will be carried out prior to full-scale development. This will validate technical, operational, and economic viability through surveys, rural trials, and prototype testing. Without Feasibility study the project may lead to failure. We will need 2 week and BDT 2,00,000 to make a feasibility on our project. Let's see the **Table 02** for better knowing.

**Table 02:** Cost Estimation

<b>Serial No</b>	<b>Tools and Requirements</b>	<b>Cost (BDT)</b>
01	Personnel Cost(developer + researcher + field assistants)	1,00,000
02	Communication and Travel (urban/rural site visits, interviews)	30,000
03	Marketing and Administrative (meetings, awareness leaflets)	40,000
04	Training and Worker Onboarding (trial workers, NID check process)	30,000
	Total	2,00,000

Our project feasibility study will BDT 2,00,000 TK approximately.

### **Conclusion:**

The Local Service Booking and Trust System addresses the trust, affordability, and accessibility gaps in Bangladesh's service economy. By combining verified worker identities, safety features, offline access, fair pricing, and dual payment options, it ensures transparent and reliable service for all users. Designed for both urban and rural households, the platform goes beyond a marketplace which building a scalable, secure, and socially equitable ecosystem with future potential for AI-driven fraud detection, e-KYC integration, and national partnerships.

**Contribution:****Table 03:** Contribution Table

<b>Team Name</b>	<b>Member ID</b>	<b>Name</b>	<b>Contribution</b>
EJspire	223071033	S. M. Mehrab Hossain Jayeed	<ol style="list-style-type: none"><li>1. Drafted Introduction, Problem Statement, and Project Objectives.</li><li>2. Designed Preliminary Solution Approaches.</li><li>3. Prepared Feasibility Study plan with cost breakdown.</li><li>4. Reviewed and finalized overall PDD structure.</li></ol>
	223071008	Marufa Khanam	<ol style="list-style-type: none"><li>1. Drafted Project Scope and Conclusion.</li><li>2. Designed Cost Estimation &amp; Pilot Budget tables.</li><li>3. Proofread document for formatting &amp; clarity.</li></ol>



# **Feasibility Study Document**

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**Submission Date:** 10.10.2025

## **Introduction:**

Feasibility study is an assessment of the practicality of a proposed project. It helps determine whether the system can be developed efficiently, meets user needs, and is worth implementing. The main objectives of this study are:

- To evaluate whether the proposed system is technically and financially feasible.
- To determine the operational effectiveness and scalability of the new system.
- To identify the potential risks and ensure the project's sustainability.
- To justify whether developing the proposed solution is practical and beneficial.

This feasibility study will analyze the technical, operational, and economic aspects of the proposed Local Service Booking and Trust System and provide an evidence-based recommendation on the most suitable implementation approach.

After this section, the essential components of the feasibility study will be presented. The 1<sup>st</sup> section is the Background, which outlines the existing situation and explains the problem, necessity, or opportunity that led to the preparation of this report. The 2<sup>nd</sup> section is the Outline of the System, providing a clear description of the proposed project and its main components. The 3<sup>rd</sup> section is the Methodology, which discusses the analytical methods and criteria used to evaluate the project's feasibility. The 4<sup>th</sup> section is the Overview of Alternatives, where the current system and other potential solutions are examined and compared based on well-defined economic, technical, and operational factors. The 5<sup>th</sup> section is the Conclusion, which summarizes the individual findings and identifies the most feasible option in terms of overall cost and benefits. Finally, the 6th section is the Recommendation, which presents a clear justification for selecting the best alternative and provides the rationale for its implementation.

## **Background:**

This section will describe the problem, the need and opportunity of this project.

**The problem:** Accessing reliable, verified, and affordable service providers such as electricians, plumbers, tutors, and domestic workers remains a critical problem in Bangladesh. Existing systems whether through social media, local agencies, or unregulated online platforms often lead to fraud, overpricing, or unsafe interactions. Workers frequently operate without identity verification, and users face service failures, payment disputes, and limited rural coverage. The lack of a transparent, digital, and inclusive solution has created a serious trust and affordability gap in the local service economy.

**The Need:** There is a strong need for a digitally verified and accessible service network that ensures reliability, fairness, and inclusivity. The proposed system aims to introduce worker verification through NID/Birth Certificate OCR, transparent pricing, dual payment modes, and SOS safety features, ensuring both users and workers can interact safely and confidently.

**Opportunity:** This project presents multiple opportunities:

### **Opportunities for Users:**

1. Enables instant access to verified and affordable service providers.
2. Provides transparent pricing, reducing hidden costs or overcharging.
3. Offers safety through SOS alerts and live job tracking.
4. Ensures rural and low-tech inclusion via SMS or call-center booking.

### **Opportunities for Workers:**

1. Connects informal workers with digital job opportunities.
2. Provides income stability through wallet-based earnings.
3. Builds reputation through community ratings and verified badges.
4. Encourages professionalism with reward points and training certifications.

### **Opportunities for Society:**

1. Promotes digital inclusion in both urban and rural areas.
2. Creates employment opportunities and supports local economies.
3. Reduces fraudulent or unsafe service interactions.
4. Contributes to Bangladesh's Digital Transformation and SDG employment goals.

## **Outline of the Software Project**

The outline of our project is given below:

The proposed project, Local Service Booking and Trust System, is a mobile and SMS-based platform designed to connect verified local service providers with users in a secure, fair, and transparent manner. It includes both mobile app and automated SMS gateway to ensure usability across varying digital literacy levels.

The users of the system are Service Seekers (Customers), Service Providers (Workers), Call Center Staffs.

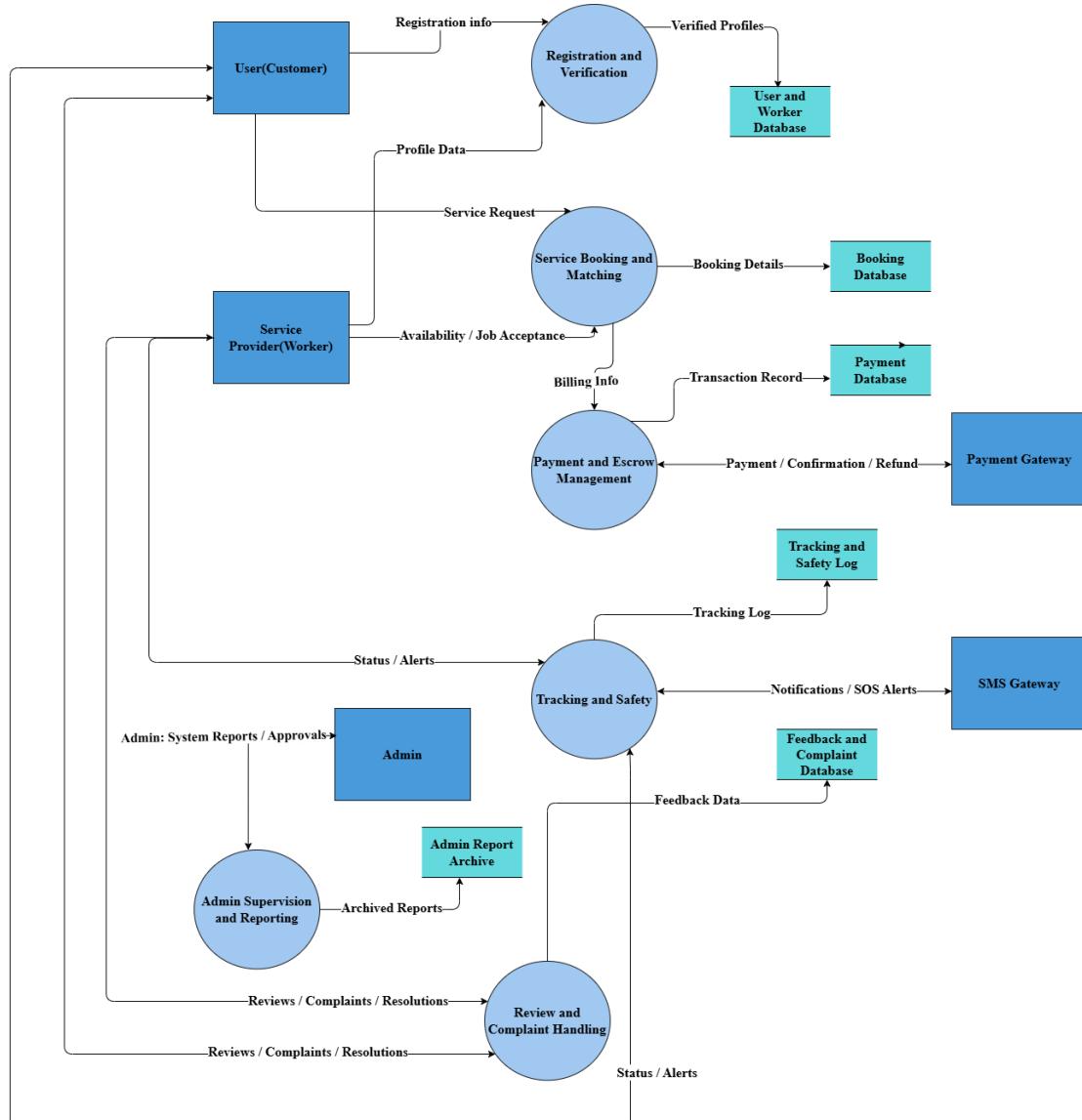
The existing informal system is time-consuming, lacks verification, and exposes users to fraud and hidden costs. Hence, the proposed solution will automate identity verification, introduce fair payment handling, enable complaint resolution, and provide both online and offline booking facilities.

The main components of the proposed system are:

1. Registration and Login for both users and workers.
2. NID/Birth Certificate OCR Verification for worker identity confirmation.
3. Service Booking Module through App or SMS gateway.
4. Payment System with escrow (digital) and cash-on-service options.
5. Safety and Tracking including SOS alerts and live job tracking.
6. Review and Loyalty System with badges and ratings.
7. Complaint and Refund Management to handle disputes fairly.
8. Admin Dashboard for supervision, data management, and analytics. Registration

## Logical Model using DFD (Data Flow Diagram)

Figure 1 illustrates the Data Flow Diagram of the system



## **Method of Analysis/Methodology**

Based on the requirement of the client, we have studied our feasibility study. We have proposed three alternatives. The main objective of this feasibility study is to determine the solution based on three types of feasibilities: technical feasibility, operational feasibility and economic feasibility.

**a) Technical Feasibility:** By studying technical feasibility, we will be able to know that if the required technology to implement the alternatives is available or not.

**b) Operational Feasibility:** Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed or implemented. It is a measure of how well a proposed system solves the problems and takes advantage of the opportunities identified during scope definition.

**c) Economic Feasibility:** By conducting the economic feasibility, we can estimate the feedback based on our present investment. According to the cost which will be the investment on our project we can estimate the feedback of it using the formula (i),

$$P = F / (1+I)n \dots \dots \dots \text{ (i)}$$

Here P, F, n, I present value, future benefit, year of benefit & expected rate of return, respectively.

## **Overview of Alternatives**

We have proposed three alternatives for the system. Alternative 1 is developing a Mobile-Based Local Service Booking and Trust System, Alternative 2 is introducing a Manual Agency Model for worker registration and coordination, and Alternative 3 is relying on an Informal Referral and Social Media Model for service connection.

### **Overview of Alternative 1:**

**a) Technical Feasibility:** Our proposed system requires a mobile and SMS-based infrastructure that will be available 24/7. The system integrates a Flutter-based mobile application connected to a secure cloud database (MySQL/Firebase). It also includes NID/Birth Certificate OCR verification, SMS gateway integration, SOS alerts, and escrow-based payment features. Since all required technologies and development resources are available and well-supported, this system is technically feasible.

**b) Operational Feasibility:** Both general users and service providers will be able to use the system easily through Bangla interface, voice/SMS booking, and intuitive UI design. The system ensures fairness, transparency, and inclusivity for both urban and rural users. Therefore, it is operationally feasible and expected to achieve wide community acceptance.

c) **Economic Feasibility:** The investment of alternative 1 is illustrated in table I.

**Table I:** The investment of alternative 1

Serial no	Particular	Cost
01	System setup (server, hosting, domain, tools)	2,50,000/=
02	Personnel cost (Flutter dev, backend dev, UI/UX designer, QA)	10,00,000/=
03	API Integration (bKash/Nagad, SMS gateway, OCR, Google Maps)	2,00,000/=
04	Marketing & User Onboarding (pilot campaigns, posters, social media)	2,50,000/=
05	Administrative & Legal setup	1,00,000/=
06	Training and Worker Onboarding (NID check process, awareness)	1,50,000/=
	Total	19,50,000/=

The cost/benefit of alternative 1 is illustrated in table II.

**Table II:** The cost/benefit analysis of alternative 1 (yearly basis)

Cost		Benefit	
Particular	Amount	Particular	Amount
Maintenance & Server Operation	3.50,000/=	Commission from Service Transactions (8–10%)	9,00,000/=
Customer Support & Staff Salaries	2,00,000/=	Worker Subscription Fees (verified accounts)	3,00,000/=
Marketing & Awareness Campaigns	1,00,000/=	Advertisement & Local Business Partnerships	2,00,000/=
Total	6,50,000/=	Total	14,00,000/=

Net return per year =  $(14,00,000 - 6,50,000)$  TK = 7,50,000 Tk.

The cost/benefit of alternative 1 is illustrated in table II.

**Table III:** The cost/benefit analysis of alternative 1 (yearly basis)

Year	Saving (lakh)	Present value (at 15%)	Cumulative value
1	7.5	6.52	6.52
2	7.5	5.67	12.19
3	7.5	4.93	17.12
4	7.5	4.29	21.41
5	7.5	3.73	25.14
6	7.5	3.24	28.38
7	7.5	2.82	31.20

## Overview of Alternative 2

- a) **Technical Feasibility:** This approach focuses on expanding existing local service agencies by hiring more coordinators and using manual booking processes rather than introducing a digital system. Since it relies on phone-based coordination and physical worker assignment, no advanced tools or automation are used. Therefore, while technically feasible on a small, localized scale, it lacks scalability and data integration for nationwide use.
- b) **Operational feasibility:** In this model, customers contact agency offices directly or through hotlines. The agency manually schedules workers and verifies them through in-person checks. Although it offers a degree of supervision, it still suffers from delays, human error, inconsistent worker availability, and limited-service transparency. Thus, the solution is operationally possible but inefficient, especially during high demand or rural deployment.
- c) **Economic feasibility:** The model incurs high recurring costs in staff salaries, communication, and office maintenance. Manual verification increases expenses, while revenue remains limited to small commissions and service charges. Over time, the system becomes cost-heavy and unsustainable compared to digital alternatives. After completing the economic feasibility study we know about the solution is economically feasible or not.

Table – The cost/benefit analysis of alternative 2 (yearly basis)

**Table IV:** The investment of alternative 2

Cost		Benefits	
Particular	Amount	Particular	Amount
Staff and Coordinator Salaries	10,00,000/=	Customer satisfaction improvement	2,00,000/=
Office Rent and Utilities	2,00,000/=	Service commission revenue	3,00,000/=
Manual Verification and Record Keeping	1,50,000/=	Worker credibility improvement	1,00,000/=
Travel and Communication	1,00,000/=	Small onboarding fees	80,000/=
Total	14,50,000/=	Total	6,80,000/=

Net return per year = $(6,80,000 - 14,50,000)$ TK= -7,70,000 Tk. Since, it has no benefit/positive return value. So, no need to calculate the present value per year. This solution involves high operational cost and limited automation, it is not economically feasible, even though it is technically and operationally workable on a small scale.

### Overview of alternative 3:

- a) **Technical feasibility:** This approach depends on social media groups (e.g., Facebook Marketplace or local community pages) and personal references for worker hiring. Technically, it requires minimal infrastructure and can reach many users instantly. However, it lacks data protection, structured verification, and quality assurance mechanisms. Hence, it is technically feasible but highly unreliable for professional service delivery.
- b) **Operational feasibility:** Informal hiring through personal contacts or social media offers convenience but no guarantee of quality, fair pricing, or accountability. Refunds, service delays, and fraud incidents are common. Urban users may occasionally find help, but rural

users remain largely excluded. Therefore, the model is operationally weak and inconsistent, failing to ensure user safety and trust.

- c) **Economic feasibility:** Because there is no structured payment or transaction monitoring, the system has almost no formal revenue stream. Fraud cases and failed services often cause long-term losses, outweighing any temporary savings. Thus, despite its minimal setup cost, the model is not economically viable. See the Table Figure V

**Table V:** The investment of alternative 3

Serial no	Particular	Cost
01	Admin/Moderator Manpower	2,50,000/=
02	Social Media Promotion	1,00,000/=
03	Complaint Handling(Manual)	50,000/=
04	Communication and Data Tracking	80,000/=
05	Miscellaneous (Post Verification etc.)	70,000/=
	Total	5,50,000/=

**Table VI:** The cost/benefit of alternative 3 is illustrated (yearly basis)

Cost		Benefit	
Particular	Amount	Particular	Amount
Fraud and Service Failure Losses	2,50,000/=	Occasional Successful Matches	80,000/=
Communication and Moderation	1,00,000/=	Community Goodwill / Referrals	50,000/=
Support and Maintenance	50,000/=	Minimal Ad Revenue	30,000/=
Total	4,00,000/=	Total	1,60,000/=

Now ,we calculate the net return value from the project. Total return value is given below. Net Return value per year =  $(1,60,000 - 4,00,000)$ Tk = -2,40,000Tk. Since, it has no benefit/positive return value. So, no need to calculate the present value per year.

## **Recommendation**

After analyzing the alternatives in different sectors like technical, operational and economic analysis we need to recommend any one of them on the basis of different features.

The summarized comparison of Alternative 1, Alternative 2 and Alternative 3 is shown in Table VII.

**Table VII:** Economic analysis between Alternative 1, Alternative 2 and Alternative 3

Serial No	Feature	Alternative 1	Alternative 2	Alternative 3
01	Investment	19,50,000	14,50,000	5,50,000
02	System Life Cycle	7 Years	Continuous	Continuous
03	Annual Return Value	7,50,000	Negative	Negative
04	Payback Period	4 Years	No	No
05	Technically Feasible	Yes	Yes(Limited)	Yes(Basic)
06	Operationally Feasible	Yes	Yes(Partially)	Yes(Limited)
07	Economically Feasible	Yes	No	No

So, on the basis of feasibility studies I have strongly recommendation for Alternative 1.

## **Conclusion**

In this feasibility study, three potential alternatives were analyzed to address the service access and trust challenges in local worker hiring systems:

- Alternative 1: Developing a software-based mobile system for booking and verification.

- Alternative 2: Increasing manpower and expanding manual coordination through agency models.
- Alternative 3: Relying on informal, community-based social media systems.

All three alternatives were found to be technically and operationally possible to varying degrees. However, based on economic feasibility, Alternative 1 provides clear advantages in cost-effectiveness, scalability, transparency, and sustainability than Alternative 2 and Alternative 3. So finally, we have preferred Alternative 1 for our project.

## **Contribution:**

**Table VIII:** Contribution Table

<b>Team Name</b>	<b>Member ID</b>	<b>Name</b>	<b>Contribution</b>
EJspire	223071033	S. M. Mehrab Hossain Jayeed	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Outline of the Software Project</li> <li>3. Methodology</li> <li>4. Overview of Alternatives</li> <li>5. Cost-Benefit Analysis</li> <li>6. DFD Design</li> </ol>
	223071008	Marufa Khanam	<ol style="list-style-type: none"> <li>1. Background</li> <li>2. Cost Estimation Tables</li> <li>3. Recommendation</li> <li>4. Conclusion</li> </ol>

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# **SOFTWARE REQUIREMENTS SPECIFICATION**

**for**

## **LOCAL SERVICE BOOKING AND TRUST SYSTEM**

**Prepared by**

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**October 31, 2025**

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## **1 Preface**

This is the Software Requirements Specification Document (SRS) for the Local Service Booking and Trust System. The objective of an SRS is to list and prioritize all requirements established for the software under development, serving as a contract between the development team and the stakeholders. This document establishes a foundation for subsequent improvements and minimizes development overhead. It outlines the project's intended users and specifies the user interface, hardware, and software prerequisites. With version 1.0, users will experience a fully stable release featuring robust authentication for customers, service providers, and administrators. This eliminates concerns regarding unauthorized access. Version 1.0 will also ensure highly secure and encrypted data handling and viewing. Users will benefit from a rapid, seamless, precise, and dependable platform for booking local services in Bangladesh.

## **2 Introduction**

A software requirements specification (SRS) provides a comprehensive outline of a software system to be built, including its functional and non-functional requirements. The SRS is formulated through consensus between stakeholders and developers. It may include the use cases of how the user is going to interact with the software system. The aim of this document is to offer an in-depth overview of the requirements for the "Local Service Booking and Trust System". It will deliver a thorough declaration for the system's development in a clear and definitive way. It will also explain system constraints, what system will do and how the system will react to external interactions.

The "Local Service Booking and Trust System" is a mobile application with an integrated SMS gateway that enables users to connect with reliable local service providers, such as electricians, plumbers, tutors, or domestic workers. The system will handle various user data, including customer profiles, service provider details, booking records, and payment information in a secure manner. It will allow access from anywhere with quick updates. Customers can schedule services, while providers can accept bookings and update statuses. The system will send notifications for bookings and safety alerts. It will uphold the confidentiality, integrity, and availability of data.

The SRS document includes ten sections. Section 1 describes the preface of this document, while section 2 acquaints readers with the system and the document itself. Section 3 introduces the technical terms used in this document. Section 4 narrates the user requirements definition while section 5 gives a brief description to the system architecture. The specific description of user requirement is described in section 6. Use case scenarios of the system are given in section 7 and section 8 bears the anticipated change or evolution of the system due to hardware changes. Section 9 and section 10 include the

appendices and index for this document respectively.

### 3 Glossary

Glossary is an alphabetical list of terms in a particular domain of knowledge with the definitions for those terms. It lists the technical terms used in the document. The glossary for this document is given in Table 1.

**Table 1: Glossary**

Technical Term	Description
Authentication	The mechanism used to confirm the identity of a user or service provider before granting access to the system.
Backup	A duplicate copy of system data, including user profiles, bookings, and transactions, stored to prevent loss in case of failure or corruption.
Booking	The formal reservation of a service with specified time, location, and provider.
Cloud Server	A remote, internet-hosted infrastructure that runs the backend of the system, enabling scalable and reliable access across Bangladesh.
Complaint	A formal report submitted by a user or provider regarding poor service, fraud, overcharging, or safety concerns, requiring administrative review.
Constraints	External or internal limitations affecting system design, such as internet dependency, device compatibility, or regulatory compliance.
Credentials	Information such as phone number, OTP, or NID used to prove identity during login or verification.
Database	A structured digital repository that organizes and stores all system data—user profiles, service history, payments, and reviews—for efficient retrieval and management.
Digital Payment	A cashless transaction executed via mobile wallets (e.g., bKash, Nagad) or bank cards, integrated with escrow protection.

Escrow	A secure payment mechanism where funds are held by the system until the service is successfully completed and confirmed by both parties.
Encryption	The process of encoding sensitive data (e.g., NID details, payment info) to protect it from unauthorized access during storage and transmission.
Login	The entry process where registered users or providers access their accounts using verified credentials.
OCR	Optical Character Recognition – automated technology that scans and extracts text from uploaded NID or birth certificates for identity validation.
Online	The state of being connected to the internet, enabling full use of the mobile app and real-time features.
Rating and Review	Post-service feedback submitted by users, contributing to a provider's reliability score and public trust profile.
Reliability Scoring	A dynamic trust metric calculated from ratings, complaint history, punctuality, and job completion rates to rank service providers.
Response Time	The length of time taken for a system to react to a given event.
Server	A computer or computer program which manages access to a centralized resource or service in a network.
Service Provider	A verified individual registered on the platform to offer local services.
SMS Gateway	A communication interface that enables offline users to book services, receive confirmations, and get alerts via text messages.
SOS/Emergency Alert	An urgent distress signal triggered by a user during a service, instantly sharing live location with emergency contacts and system admin.

## 4 User Requirements Definition

Requirements are physical or functional need that a particular design, product or process aims to satisfy. After meeting with the client and properly discussing with them, some

requirements are discovered. The requirements are divided into two categories such as, *functional requirements*, which defines the functions of the system required by the client, and, *nonfunctional requirements*, which defines the characteristics as well as constraints of the system. The user requirements are defined in Table 2.

**Table 2: Definition of User Requirements**

Requirement Type	Definitions of Requirements
<b>Functional Requirement</b>	1. Users can <b>register</b> and <b>log in</b> to the system using secure OTP. 2. Customers can <b>book a service</b> (choose category, date, and location). 3. Service providers can <b>receive and accept bookings</b> in real time. 4. The system supports <b>digital or cash payment</b> upon job completion. 5. Customers and providers can <b>communicate</b> (call/SMS/chat) during service delivery. 6. Users can <b>rate and review</b> each other after a transaction. 7. An <b>SOS/emergency alert</b> feature is available for customers and providers. 8. The system allows users to <b>file and track complaints</b> if any issue arises. 9. Customers in rural/low digital areas can <b>access services by SMS or call center</b> .
<b>Non-Functional Requirement</b>	10. The system must <b>encrypt all user and transaction data</b> . 11. Access is <b>role-based</b> ; only authorized users perform sensitive operations. 12. Booking actions must be <b>processed within 3 seconds</b> under peak load. 13. The system should require <b>minimal hardware resources</b> (works on entry-level Android, SMS, web). 14. Interface is <b>multi-lingual and accessible</b> . 15. All actions are <b>audited for traceability</b> . 16. UI must be <b>user-friendly</b> for all ages and skill levels.

## 5 System Architecture

A system architecture is the conceptual framework that defines the structure, components, and interactions of a software system. It provides a high-level representation of how various modules and subsystems are organized to support the system's behavior, scalability, and performance. The system architecture of the Local Service Booking and Trust System is illustrated in Figure 1.

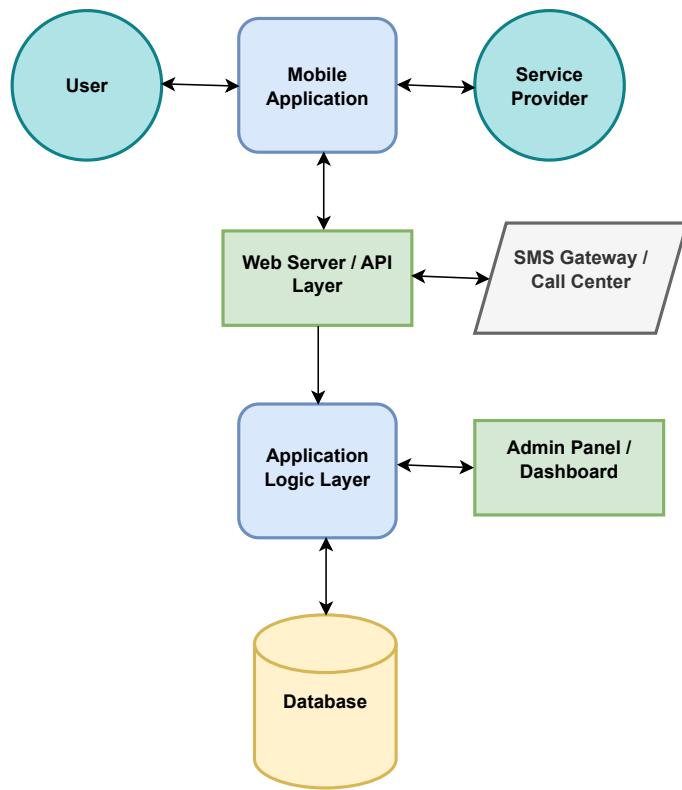


Figure 1: System Architecture

## 6 User Requirements Specification

The software requirements specification document outlines all essential requirements necessary for the successful development of the Local Service Booking and Trust System. To accurately identify these requirements, developers must possess a comprehensive understanding of the system's intended functionality and user expectations. Each

requirement is articulated in detail to ensure clarity and alignment with stakeholder needs, enabling both technical teams and clients to visualize the final product. The user requirements are comprehensively specified in Table 3.

**Table 3: Specification of User Requirements**

Requirement Type	Specifications of Requirements
<b>Functional Requirement</b>	1.1 System will display the service booking form with fields for category, location, and preferred time. 1.2 User will enter personal details and submit service request via app or SMS. 1.3 User will receive confirmation with provider details and estimated arrival.
	2.1 System will show provider registration form requiring NID/Birth Certificate upload. 2.2 Service provider will submit documents for OCR-based identity verification. 2.3 System will automatically extract and validate ID data using OCR technology. 2.4 Admin will review and approve/reject provider profiles.
	3.1 System will match user requests with verified, available providers based on location, rating, and service type. 3.2 Provider will receive job notification and accept or decline the booking. 3.3 System will update booking status in real time for both parties.
	4.1 System will initiate escrow hold for digital payments via bKash/Nagad. 4.2 User will complete payment before or upon service confirmation. 4.3 System will release funds to provider only after job completion and user approval. 4.4 Cash-on-service option will be supported with on-site verification.
	5.1 System will send SMS/app push notifications for booking updates, reminders, and safety alerts.

	5.2 System will notify providers of new job requests and schedule changes.
	<p>6.1 System will track provider location in real time during active jobs.</p> <p>6.2 User will activate SOS alert to send emergency location to contacts and admin.</p>
	<p>7.1 System will generate reliability score based on ratings, punctuality, and complaint history.</p> <p>7.2 User will submit post-service review and rating.</p> <p>7.3 Provider can respond to feedback and file counter-complaints if needed.</p>
	<p>8.1 System must encrypt all sensitive data (NID, payment, location) using AES-256 and HTTPS.</p> <p>8.2 System must decrypt data only for authorized access using secure key management.</p>
<b>Non-functional Requirement</b>	<p>9.1 Every user and provider must have a unique account with OTP-based login.</p> <p>9.2 Authentication required for all actions; no access without login.</p> <p>9.3 Admin can suspend or ban any account for policy violation.</p> <p>9.4 Only verified providers can accept jobs; unverified users limited to viewing.</p> <p>9.5 Users can view only their own bookings and history.</p>
	<p>10.1 Booking confirmation response time must be under 3 seconds.</p> <p>10.2 System must support at least 500 concurrent users.</p> <p>10.3 System must handle 200 booking requests per minute.</p> <p>10.4 SOS alerts must be delivered within 5 seconds.</p> <p>10.5 System must be low power consuming.</p> <p>10.6 The software must be operable with a minimum of 900MHz dual core CPU.</p> <p>10.7 Software must be restricted within 512MB of RAM.</p>

	<p>11.1 System must run on low-power devices with minimal battery drain.</p> <p>11.2 Software must operate on Android 7.0+ and iOS 12+.</p>
	<p>12.1 Mobile app must support Bangla language and voice input.</p> <p>12.2 SMS interface must allow text-based booking for feature phones.</p> <p>12.3 UI must be simple, icon-based, and accessible for low-literacy and elderly users.</p>

## 7 System Model

### 7.1 A. Use Cases

A use case is a sequence of actions or event steps that define the interactions between a role and the Local Service Booking and Trust System to achieve a specific goal. Use cases are essential for understanding system behavior, user journeys, and data flow. The use cases of the system are listed in Table 4.

**Table 4: List of Use Cases**

Use Case	Title
UC1	Register Account
UC2	Log In to the System
UC3	Book a Local Service
UC4	Verify Service Provider Identity
UC5	Accept and Complete Booking
UC6	Process Payment (Escrow/Cash)
UC7	Track Service in Real Time
UC8	Trigger SOS Emergency Alert
UC9	Submit Review and Rating
UC10	Access via SMS Gateway

The use cases are described in detail as follows:

#### UC1: Register Account

Actors:

1. Customer
2. Service Provider

Preconditions:

1. Device is powered on and unlocked.
2. Internet or SMS connectivity is available.
3. App is installed or SMS-capable phone is ready.
4. User opens the Local Service Booking app or sends SMS to gateway.
5. No existing account with the same phone number.

Main Success Scenario:

1. Click Create Account button to open registration form.
2. Enter phone number; system sends OTP via SMS.
3. (For Service Provider) Upload NID or Birth Certificate.
4. Fill in personal details (name, address, service category).
5. Click Submit; system processes OCR on provider documents.
6. Admin reviews and approves/rejects provider profile.
7. User receives account confirmation via SMS/app.

Postcondition:

1. Account created successfully.
2. Customer redirected to login; verified provider receives "Trusted" badge.

Alternative Course:

2.a Duplicate phone number

2.a.1 Show error: "Phone already in use"; redirect to login

3.a Invalid document format

3.a.1 Display: "Upload clear NID/Birth Certificate"

6.a OCR fails

    6.a.1 Flag for manual admin review

7.a Admin rejects

    7.a.1 Provider notified with reason; allowed to re-upload

**UC2: Log In to the System**

Actors:

1. Customer
2. Service Provider
3. Administrator

Preconditions:

1. Device is powered on and unlocked.
2. App installed or SMS access available.
3. Internet/SMS connectivity active.
4. User has a registered account.

Main Success Scenario:

1. Click Login or send "LOGIN" via SMS.
2. Enter phone number.
3. System sends OTP.
4. Enter OTP to authenticate.

Postcondition:

1. Login successful.
2. Redirected to dashboard (Customer: Book — Provider: Jobs — Admin: Overview).

Alternative Course:

3.a OTP not received

    3.a.1 Click Resend OTP

4.a Invalid OTP

#### 4.a.1 Re-enter or request new OTP

UC3: Book a Service

Actors:

1. Customer
2. Service Provider
3. System

Preconditions:

1. Customer is logged in.
2. Internet or SMS active.
3. Dashboard displayed.

Main Success Scenario:

1. Click Book Service.
2. Select service category (e.g., Electrician, Tutor).
3. Enter location (GPS or manual).
4. View list of verified providers with ratings and availability.
5. Choose provider and preferred time.
6. Confirm booking via app or SMS.
7. Provider receives job alert and accepts.
8. Customer gets confirmation with ETA and contact.

Postcondition:

1. Booking recorded.
2. Both parties receive SMS/app notification.

Alternative Course:

#### 4.a No providers available

- 4.a.1 Show: "No providers nearby. Try later or expand area."

#### 7.a Provider declines

- 7.a.1 System auto-matches with next available provider

## UC4: Verify Service Provider Identity

Actors:

1. Service Provider
2. System
3. Administrator

Preconditions:

1. Provider has submitted documents.
2. Internet connection active.

Main Success Scenario:

1. System runs OCR on NID/Birth Certificate.
2. Extracts Name, NID Number, DOB, Photo.
3. Compares with internal rules or external API (if available).
4. Admin reviews OCR result and approves/rejects.
5. Provider receives verification status via SMS/app.

Postcondition:

Verified providers can accept jobs and earn trust badges. Alternative Course:

3.a OCR confidence low

    3.a.1 Flag for manual admin review

4.a Admin rejects

    4.a.1 Provider notified; allowed to re-upload corrected document

## UC5: Accept and Complete Booking

Actors:

1. Service Provider
2. Customer
3. System

Preconditions:

1. Service Provider is logged in.
2. A booking request has been received by the Service Provider.

3. Booking details (service type, location, time) are confirmed.

Main Success Scenario:

1. Service Provider receives notification of the booking request.
2. Service Provider reviews job details (service type, location, time, customer info).
3. Service Provider accepts the booking.
4. System notifies Customer of acceptance and provides estimated arrival time.
5. Service Provider travels to the location.
6. Upon arrival, Service Provider taps "Start Job" to begin tracking.
7. Service Provider performs and completes the service.
8. Service Provider taps "Job Completed" to update status.
9. System prompts Customer to confirm job completion (via app or SMS).
10. Customer confirms completion.

Postcondition:

1. Booking status updated to completed.
2. Payment process is initiated (release escrow or confirm cash).
3. Review and rating option becomes available for Customer.

Alternative Course:

3.a Service Provider declines the booking.

- 3.a.1 System notifies Customer of decline.
- 3.a.2 System auto-matches and reassigns to next available provider (if available).

6.a Service Provider cannot arrive (e.g., delay or cancellation).

- 6.a.1 Service Provider reports issue via app; system notifies Customer and Admin.

9.a Customer does not confirm completion.

- 9.a.1 System holds payment and escalates to dispute resolution (Admin review).

10.a Dispute arises during confirmation.

- 10.a.1 Either party files a complaint; Admin intervenes to resolve.

## UC6: Process Payment (Escrow / Cash)

Actors:

1. Customer
2. Service Provider
3. Payment Gateway
4. Administrator

Preconditions:

1. Job marked completed and confirmed.
2. Payment method selected.

Main Success Scenario:

1. System generates invoice.
2. If digital:
  - Funds held in escrow via bKash/Nagad.
  - Customer approves release.
3. If cash-on-service: Provider confirms cash received on-site.
4. System updates payment status.
5. Provider receives payout.

Postcondition:

1. Transaction closed.
2. Review prompt shown.

Alternative Course:

2.a Payment fails

    2.a.1 Retry or switch to cash

3.a Cash not confirmed

    3.a.1 Customer reports; admin resolves

## UC7: Track Service in Real Time

Actors:

1. Customer
2. Service Provider
3. System

Preconditions:

1. Job is active.
2. GPS enabled on provider's device.

Main Success Scenario:

1. Provider taps "Start Job".
2. System activates live location tracking.
3. Customer views real-time map with ETA.
4. Provider updates status: En Route to Arrived to Working to Done.
5. Customer receives push/SMS updates.

Postcondition:

Job completion confirmed. Alternative Course:

3.a GPS lost

- 3.a.1 Show last known location; fallback to SMS updates

UC8: Trigger SOS Emergency Alert

Actors:

1. Customer
2. System
3. Administrator
4. Emergency Contacts

Preconditions:

1. Job is active.
2. SOS button visible in app.

Main Success Scenario:

1. Customer presses SOS button.

2. System captures GPS location.
3. Sends emergency alert
4. Alert includes: Location, Time, User ID, Job Details.

Postcondition:

1. Alert logged.
2. Job paused; support dispatched.

Alternative Course:

2.a No GPS

- 2.a.1 Use cell tower or last known location

UC9: Submit Review and Rating

Actors:

1. Customer
2. Service Provider
3. System

Preconditions:

Job completed and paid. Main Success Scenario:

1. System prompts: "Rate your experience".
2. Customer gives 1–5 stars and writes review.
3. Submit feedback.
4. System updates provider's reliability score.
5. Provider can view and respond to review.

Postcondition:

1. Review published.
2. High-rated providers earn trust badges.

Alternative Course:

2.a Customer skips

- 2.a.1 No impact on score

### 5.a Provider disputes

#### 5.a.1 File complaint to Admin review

UC10: Access via SMS Gateway

Actors:

1. Customer (non-smartphone user)
2. SMS Gateway
3. Call Center
4. System

Preconditions:

1. User has basic/feature phone.
2. SMS service active.

Main Success Scenario:

1. User books service.
2. Gateway parses and creates booking.
3. System matches with provider.
4. Confirmation sent via SMS.
5. All updates (status, SOS, payment) via SMS.
6. Call center assists if needed.

Postcondition:

Booking completed without app. Alternative Course:

### 2.a Invalid SMS format

#### 2.a.1 Reply: "Invalid format. Use: BOOK [SERVICE] [LOCATION] [TIME]"

### 4.a No reply

#### 4.a.1 Resend or call user

## 7.2 B. Use Case Diagram

The use case diagram shows the interaction between user and the system graphically. The use case diagram is shown in Figure 1



Figure 2: Use Case Diagram

## 8 System Evolution

Software Evolution is a term which refers to the process of developing software initially, then timely updating it for various reasons. The evolution process includes fundamental activities of change analysis, release planning, system implementation and releasing a system to customers.

The Local Service Booking and Trust System is developed to be an adaptive system. It is implemented in such a way that it adjusts its performance with respect to the specification of the hardware such as cloud or on-premise servers. With version 1.0, the system can process as much as 500 concurrent booking requests per minute on a mid-range server with processor speed of 3.6 GHz, consisting of 8 logical cores and 16 GB of maximum memory. Any change to the hardware would change the performance of the system in proportion to the change of processor speed, number of cores and maximum memory.

## 9 Appendices

Appendices contain the texts that are explanatory, statistical, or bibliographic in nature. The appendix for this document contains the hardware specification and database specification for the system.

### 9.1 Appendix A: Hardware Specification

The system is developed using the server "HPE ProLiant DL20 Gen11 Rack Server". The specification of the server is given in Table 5.

**Table 5: Server specification**

Processor	Intel® Xeon® E-2434
Number of Processors	1
Processor Core Available	8
Processor Cache	12 MB Intel Smart Cache
Processor Speed	3.6 GHz (up to 4.5 GHz Turbo)
Chipset	Intel C252 Chipset
Power Supply Type	500 W 80+ Platinum Redundant Power Supply
Memory	32 GB DDR5 ECC UDIMM (Expandable up to 128 GB)
Memory Slots	4 DIMM Slots
Memory Type	DDR5 ECC UDIMM
Memory Protection Features	ECC
Included Hard Drives	1 TB NVMe SSD + 4 TB SATA HDD
Maximum Internal Storage	16 TB
Optical Drive Type	None
System Fan Features	Smart Fan with Thermal Management
Network Controller	Dual 1 GbE LAN Ports + Optional 10 GbE Adapter
Storage Controller	HPE Smart Array S100i SR Gen11
Infrastructure Management	HPE iLO 6 (Integrated Lights-Out) for remote server management

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This configuration enables stable performance for moderate workloads (up to 500–700 concurrent user requests per minute) and can easily scale through cloud extension using AWS EC2 or Azure VM services when user demand increases.

## 9.2 Appendix B: Database Specification

The Local Service Booking and Trust System uses MySQL Enterprise Edition 8.0 as its primary database management system. This database is ideal for medium to large applications that require structured data handling, high availability, and enterprise-grade security and support. The detailed technical specification is presented in Table 6 below.

**Table 6: Database specification**

Version	8.0
Data Type	Dynamic
Architecture	Relational Model
Operating System	Linux (Ubuntu 22.04 LTS), Windows Server 2022, macOS Sonoma
Software License	Commercial (Oracle MySQL Enterprise Subscription)
Security	<ul style="list-style-type: none"><li>• SSL/TLS Support</li><li>• Data Encryption at Rest &amp; in Transit (TDE)</li><li>• Enterprise Authentication (PAM, Windows AD)</li><li>• Role-Based Access Control</li><li>• Audit Logs &amp; Advanced Query Analysis</li><li>• MySQL Enterprise Firewall</li></ul>
Access Control	<ul style="list-style-type: none"><li>• User Privileges and Authentication Plugins</li><li>• Password Policies and Two-Factor Authentication</li><li>• Integration with LDAP, Kerberos, and OAuth</li><li>• Enterprise Monitor &amp; Security Advisor</li></ul>
Indexes	<ul style="list-style-type: none"><li>• B-Tree, Hash, Full-Text, Spatial Indexes</li><li>• Invisible Indexes, Descending Indexes</li></ul>

Partitioning	<ul style="list-style-type: none"> <li>Range, Hash, List, Key and Composite Partitioning</li> <li>Automatic List Partitioning</li> </ul>
Max Database Size	Unlimited (dependent on storage capacity)
Max Table Size	64 TB (InnoDB)
Max Row Size	64 KB
Max Column Per Row	4096
Max Blob/Clob Size	4 GB
Max CHAR Size	255 bytes (VARCHAR up to 65,535)
Max NUMBER Size	64-bit (BIGINT)

The database supports real-time service bookings, transactional consistency for payment handling, and secure storage for verified worker documents such as NID images. Enterprise features like MySQL Enterprise Backup, Thread Pool, and 24x7 Oracle Support ensure high availability and rapid recovery. Scheduled backups are configured every 12 hours using MySQL Enterprise Backup to ensure data integrity and disaster recovery readiness.

# 10 Index

## 10.1 A. List of Figures

Figures are graphical representations of information. The figures used in this document are listed in Table 7.

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## 11 Contribution

**Table 8: Contribution Table**

Team Name	Member ID	Name	Contribution
EJspire	223071033	S. M. Mehrab Hossain Jayeed	<ul style="list-style-type: none"> <li>1. User Requirements Definition</li> <li>2. User Requirements Specification</li> <li>3. System Model</li> <li>4. Appendices</li> <li>5. Index</li> </ul>
	223071008	Marufa Khanam	<ul style="list-style-type: none"> <li>1. Preface</li> <li>2. Introduction</li> <li>3. Glossary</li> <li>4. System Architecture</li> <li>5. System Evolution</li> </ul>



# DETAIL CLASS DIAGRAM

On

## Local Service Booking and Trust System

**Program:** B. Sc. (Hons) in Computer

Science & Engineering

**Course Title:** Software Engineering Lab

**Course Code:** CSE-3298

Summer-2025

**Submitted By:**

**1. Name:** Marufa Khanam

**ID:** 223071008

**2. Name:** S. M. Mehrab Hossain Jayeed

**ID:** 223071033

**Submitted To:**

Md. Akram Hossain

Lecturer

Department of CSE & CSIT

SMUCT

**Submission Date:** 20.12.2025

**Detail Class Diagram:** Detail Class Diagram Class diagram is the fundamental building block in object-oriented modeling. It is used to show the different objects in a system, their attributes, their operations and the relationships among them. It shows detail class diagram for Local Service Booking and Trust System in Figure 1.

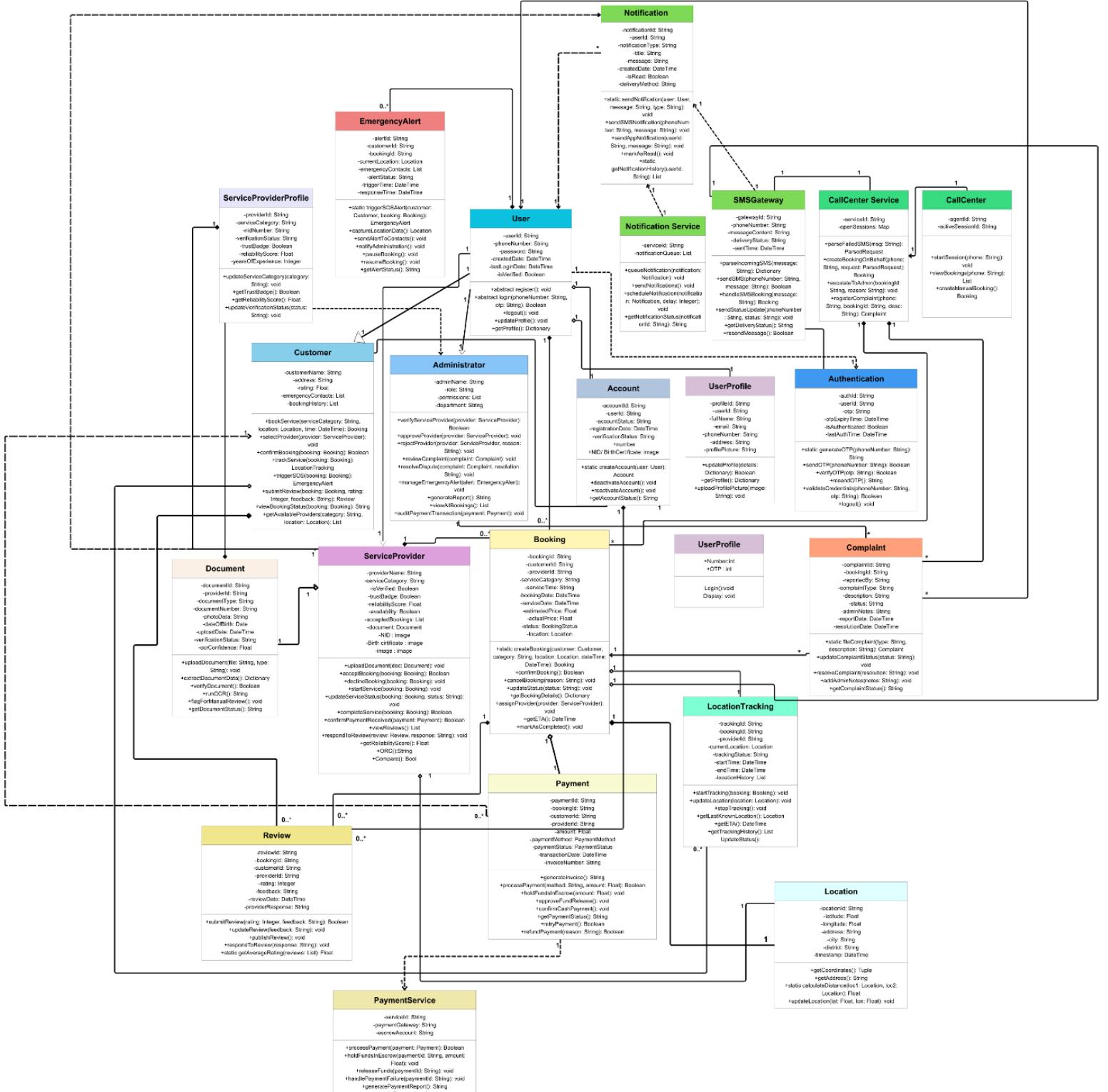


Figure 1: Detail Class Diagram

