SOFTWARE REQUIREMENTS SPECIFICATION

for

FIR Management System
Using Blockchain

Version 1.0

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1 Introduction

1.1 Purpose

The purpose of this document is to present a comprehensive overview of the FIR Management System. It will detail the objectives and functionalities of the system, describe its interfaces, outline the operations it will perform, and define the constraints under which it must operate. Additionally, it will explain how the system will respond to external inputs and interactions. This document is intended for both stakeholders and developers of the system.

1.2 Intended Audience and Reading Suggestions

This document is designed to serve the needs of three primary groups of users: citizens, investigation officers and police inspectors.

For citizens, the document provides essential information on how to use the FIR Management System to file complaints online. It explains the step-by-step process for submitting an FIR, managing digital evidence, and tracking the status of their case.

For investigation officers, the document offers detailed guidance on how to navigate the system's workflow, from the assignment of FIRs to their investigation and resolution. It covers the tools available for managing cases, communicating with complainants, and ensuring the integrity of the FIR process.

For the police inspector, the document provides comprehensive instructions on how to manage and oversee the FIR management system as a higher authority. It details the process of assigning investigation officers to specific FIRs based on case requirements and monitoring the overall workflow of the system.

1.3 Project Scope

1. Enabling citizens to file FIRs online
2. Ensuring FIR records are secure, transparent, and immutable using blockchain technology.

The FIR Management System is a secure and efficient web-based application designed to streamline the process of filing and managing FIRs. It enables citizens to file FIRs online through an intuitive interface. Integrated messaging, automated notifications, and digital evidence management further enhance the system's functionality, while a robust relational database ensures the secure storage and management of FIR records and associated data.
The system leverages blockchain for transparency and immutability and IPFS for secure decentralized storage, addressing challenges like data breaches, unauthorized access, and inefficiencies. This ensures a tamper-proof, efficient, and trustworthy

platform for FIR registration, tracking, and resolution.

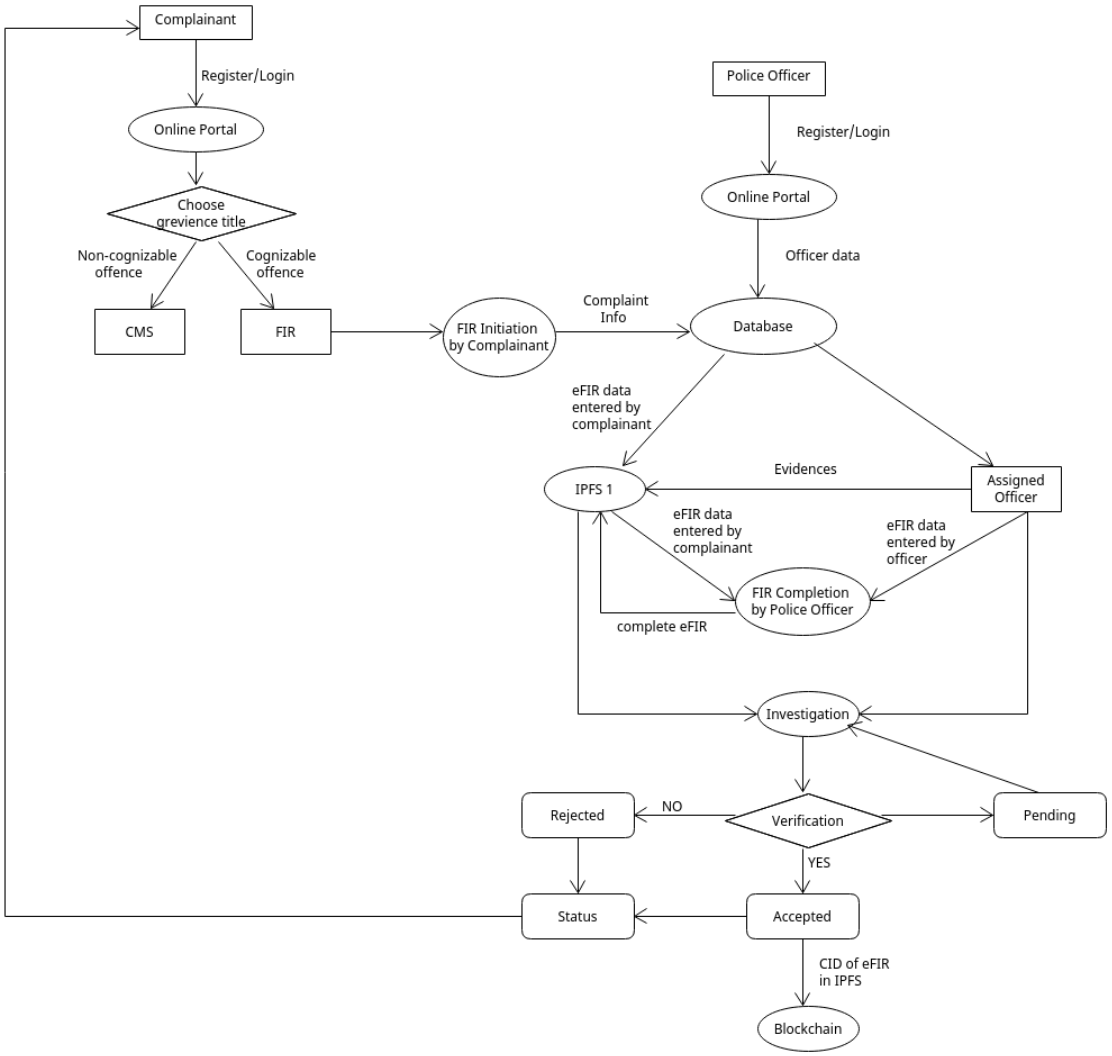

Figure 1.1: Entire work-flow

2 Overall Description

2.1 Product Perspective

The main objective of our FIR management system is to leverage Blockchain and IPFS technologies to securely store FIR data and evidence in a decentralized, tamper-proof manner. The system will minimize manual work, streamline processes, and enhance the efficiency of FIR management while ensuring the integrity and transparency of the data.

2.2 User Classes and Characteristics

FIR system has basically 2 types of users.

1. Citizens :
   Can file eFIR , check status of the case.

2. Police officers :
   Can view the complaint details added by complainant , add remaining details to complete eFIR ,update the status of the case, add evidence found during investigation.

3. Police Inspector :
   Can assign a police officer to each case, view eFIR records.

Each user type has specific permissions and roles within the system, designed to maintain privacy, security, and efficient management.

2.3 Product Functions

The FIR Management System is designed to handle and store all FIR records, including complaints details, evidence, and related officer data. The system enables secure storage and efficient management of FIRs by using Blockchain and IPFS technologies. Users must register to perform their authorized functionalities, and upon registration, their passwords are securely stored in a hashed format in the backend.

All users have the following attributes: UID, Name, Email.

Complainants provide details during registration including all relevant information, such as time and place of offense , content of FIR and supporting evidence if any. Each complaint is timestamped and is associated with a specific police officer. Assigned police officers have the authority to investigate complaints, manage FIRs, and add or verify evidence. They are identified by officerID, with additional attributes like rank. They are responsible for updating the case status and ensuring the integrity

of the investigation. The Police Inspector is authorized to assign officers to individual FIRs and has access to view all registered FIRs.

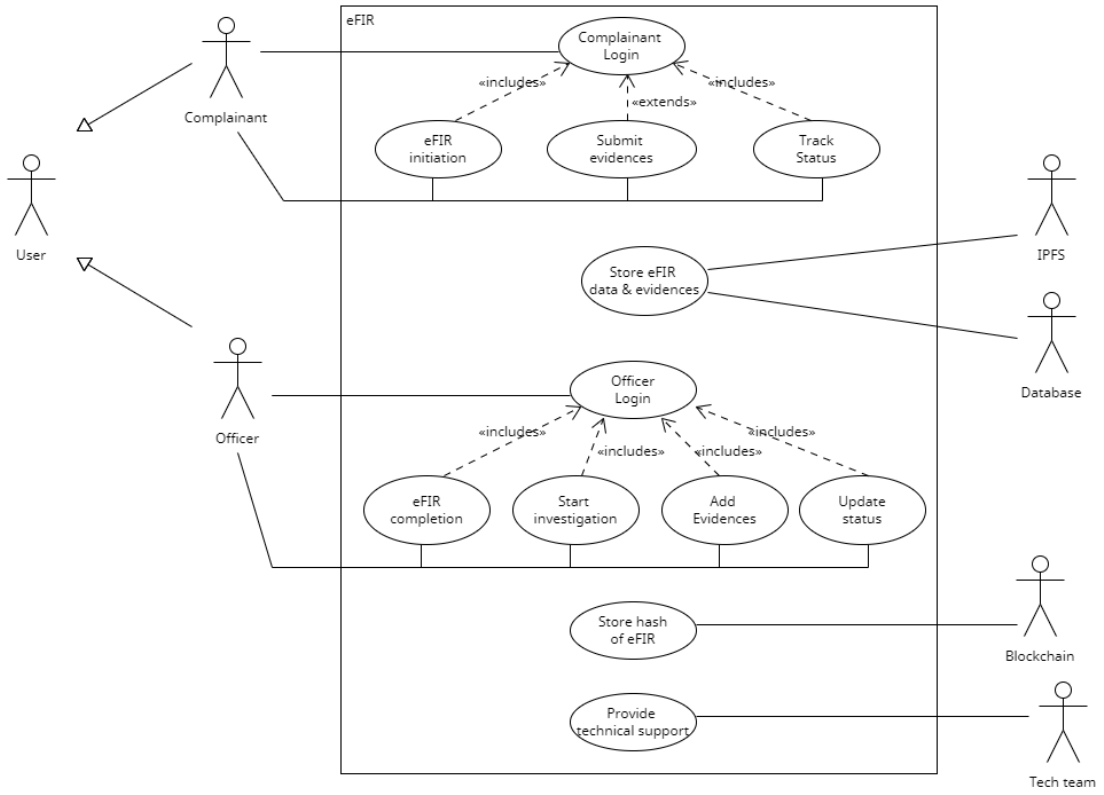

Figure 2.1: Use case diagram

FIRs are linked to both complainants and officers, recording important case details such as investigation status, and timestamps of each stage. The system ensures that all FIR data is securely stored and can be accessed or updated by authorized users. Evidence is a critical component of the FIR management system, providing supporting documentation or media files (such as images, videos, or documents) that are uploaded to the IPFS network for secure and tamper-proof storage. Each FIR is assigned a dedicated IPFS folder to securely store its associated documents and evidence. On the blockchain, a structured object is used to store crucial metadata, including the complaint ID, officer details (such as officer ID, police station ID, and assignment period), document details (including document ID and name), the FIR hash (a cryptographic hash of the FIR document), and the evidence hash (a combined hash of all evidence files).

2.4 Operating Environment

The website will be operated in any Operating Environment - Mac, Windows, Linux etc.

2.5 Design

2.5.1 Complainant Activities

Complainant activities consist of the following steps:

1. Register an eFIR
2. Adding Evidence (if any)
3. Checking Case Status
4. View and update profile

2.5.2 Investigation Officer Activities

Investigation officer activities consist of the following steps:

1. View all assigned complaints.
2. Completing eFIR Details
3. Verifying eFIR and Conducting Investigations
4. Adding Evidence Found During Investigations
5. Updating Case Status

2.5.3 Police Inspector Activities

Police Inspector activities consist of the following steps:

1. Assigning investigation officers to each FIR.
2. View and monitor registered FIRs.

3 System Features

3.1 Description and Priority

The system's core features include:

1. FIR Lodging (High Priority): Citizens can lodge FIRs online. This feature is critical as it allows the primary interaction between citizens and law enforcement.
2. Status Tracking (High Priority): Once an eFIR is lodged, citizens should be able to track the status of their FIR in real-time. This transparency is essential for ensuring trust in the system.
3. Evidence Management (High Priority): Digital evidence (e.g., photos, documents) can be uploaded and linked to eFIRs. This ensures proper documentation of cases.
4. User Authentication (High Priority): Secure login for both citizens and police officers to protect sensitive information.
5. Automated Notifications (Medium Priority): Citizens and officers receive notifications about changes in eFIR status. Helps keep users informed without needing to log in constantly.
6. Blockchain and IPFS Integration (Critical Priority): Ensuring eFIR immutability using blockchain, and evidence management via IPFS, ensures security and transparency.

3.2 Functional Requirements

1. FIR Registration:

   Citizens can sign up/log in to file an FIR. The FIR is submitted to the police, and its status will be tracked.

2. Evidence Handling:

   The system will allow users to upload digital evidence and store it using IPFS. Only authorized officers can access this evidence.

3. Blockchain Ledger:

   Every FIR lodged will be recorded immutably on the blockchain to ensure data integrity.

4. Case Assignment:

   The police inspector will assign FIRs to police officers based on predefined criteria like the nature of the complaint, jurisdiction, and officer availability.

5. Investigation Workflow:

Once an FIR is lodged, officers can update investigation progress, add evidence.

6. Real-time Notifications:

   The system will notify citizens about FIR status, officers about FIR assignment and police inspector about registered FIR.

4 Other Nonfunctional Requirements

1. Scalability: The system must handle multiple users filing FIRs simultaneously and support growth without performance degradation.

2. Response Time: Key actions, such as filing FIRs, uploading evidence, and querying status, must respond within 2-3 seconds.

3. Availability: Ensure 99.9% uptime for uninterrupted system accessibility.

4. Data Throughput: Support handling of large evidence files without delays during upload or retrieval.

5. Authentication: Implement two-factor authentication (2FA) for police officers and strong password protocols for citizens.

6. Access Control: Use role-based access control (RBAC) to ensure only authorized personnel can view and update FIR data.

7. Data Immutability: Ensure lodged FIRs cannot be altered without a trace using blockchain technology.

8. Usability: Provide an intuitive interface for users with minimal technical expertise to navigate the system efficiently.

9. Portability: Ensure accessibility across multiple platforms, including desktops, mobile devices, and tablets.

10. Legal Compliance: Comply with national and local laws governing FIRs, data privacy, and law enforcement procedures.

11. Auditability: Log all actions performed within the system for auditing and review purposes.