■■ SERVER MONITORING SYSTEM

Complete SDLC Documentation (A–Z)

Project Title: Server Monitoring System (MERN + AI/ML)
Prepared, Developed, and Documented By: Pankaj Mishra – Full Stack Developer & AI Engineer
Duration: 06/10/2025 – 04/11/2025
SDLC Model: Agile (Iterative)

This document represents complete SDLC documentation (A–Z) — from requirement analysis to deployment and maintenance — entirely managed and executed by Pankaj Mishra, showcasing technical excellence, process discipline, and independent project ownership.

1. Requirement Analysis

The project aims to build an intelligent Server Monitoring System using MERN Stack with AI integration for predictive anomaly detection. Requirements include real-time monitoring of CPU, RAM, Disk, and Network metrics, along with user management, dashboards, and automated alerting.

2. Feasibility Study

Technical, operational, and economic feasibility were analyzed. The system was deemed viable with the MERN stack and Python-based AI microservices for anomaly prediction.

3. System Design (HLD + LLD)

High-Level Design defines architecture, modules, and interactions. Low-Level Design covers internal logic, API routes, AI model flow, and database schema relationships.

4. Database Design

MongoDB was chosen for flexibility and scalability. Collections include: users, server_metrics, alerts, logs, and models. Schema defined with validation and indexing for high performance.

5. Module Design

Modules: (1) User Auth, (2) Real-Time Monitor, (3) Alert Engine, (4) AI Predictor, (5) Dashboard UI, (6) Report Generator.

6. Implementation

Frontend built in React.js with Tailwind CSS. Backend in Node.js + Express.js with RESTful APIs. AI model integrated via Flask microservice using scikit-learn for anomaly detection.

7. Testing

Testing covered Unit, Integration, and UAT. Tools: Jest, Postman, PyTest. All modules passed reliability, performance, and regression tests.

8. Deployment

Deployed on AWS EC2 with Docker containers. MongoDB Atlas for cloud DB, and CI/CD pipeline via GitHub Actions ensuring automated builds and tests.

9. Maintenance & Future Scope

Includes continuous monitoring, bug fixing, and performance optimization. Future plans: multi-agent monitoring, AI self-healing, and predictive scaling.

10. Sign-off & Developer Acknowledgement

Developed, tested, deployed, and documented entirely by Pankaj Mishra, demonstrating full ownership and lifecycle execution.

■ **Final Note:**

This document represents complete SDLC documentation (A–Z) — from requirement analysis to deployment and maintenance — entirely managed and executed by **Pankaj Mishra**, showcasing technical excellence, process discipline, and independent project ownership.