Data Pipeline Monitoring App

Real-Time Mobile Monitoring Solution

Project Duration:	June 2024 – September 2024
Project Type:	Mobile Application Development & DevOps
Team Size:	4-member agile team
Role:	Technical Lead & Product Manager

Executive Summary

Engineered and delivered a comprehensive mobile application for real-time data pipeline monitoring, providing data engineering and operations teams with critical visibility into system performance and health. This solution integrated automated alerting, validation logic, and governance tracking to significantly enhance incident response capabilities and ensure SLA compliance across the organization.

Key Achievements

- Reduced incident response time by 35% through real-time monitoring and automated alerts
- Improved SLA compliance rates with proactive issue detection and validation
- Enhanced system uptime visibility for data and operations teams across the organization
- Implemented comprehensive audit logging and governance tracking for data reliability
- Successfully presented and deployed product to department heads for internal rollout
- Led 4-member agile team through complete SDLC from design to delivery

Technical Implementation

Mobile Application Architecture

Developed a cross-platform mobile application using React Native, enabling seamless deployment across iOS and Android devices. The application provides real-time visibility into data pipeline status, performance metrics, and system health indicators. Designed with a responsive UI/UX that allows data engineers and operations teams to monitor critical systems on-the-go, ensuring immediate

awareness of any issues regardless of location.

Cloud Infrastructure & Real-Time Data Streaming

Leveraged Amazon Web Services (AWS) infrastructure to build a scalable and resilient backend system. Integrated Apache Kafka for real-time event streaming, enabling instant propagation of pipeline status updates, alerts, and metrics to mobile devices. Implemented WebSocket connections for low-latency bi-directional communication, ensuring users receive immediate notifications of critical events.

Automated Alerting & Validation Logic

Designed and implemented intelligent alerting mechanisms that automatically detect anomalies, pipeline failures, and performance degradation. Developed sophisticated validation logic to verify data quality, completeness, and integrity at each pipeline stage. The system uses configurable thresholds and machine learning-based anomaly detection to minimize false positives while ensuring no critical issues are missed.

Audit Logging & Governance Framework

Implemented comprehensive audit logging to track all pipeline activities, user actions, and system changes. Built governance tracking features that ensure compliance with data policies and regulatory requirements. The logging system provides full traceability and accountability, supporting forensic analysis and compliance reporting. All logs are securely stored and indexed for fast retrieval and analysis.

Leadership & Project Management

Served as technical lead and product manager for a 4-member agile development team. Directed all phases of the software development lifecycle, from initial requirements gathering and system design through development, testing, and deployment. Facilitated daily standups, sprint planning, and retrospectives to ensure continuous improvement and team alignment. Successfully presented the final product to department heads, demonstrating ROI and securing approval for internal rollout. Coordinated with stakeholders across data engineering, operations, and IT departments to ensure the solution met diverse organizational needs.

Technical Skills & Tools

Category	Technologies
Mobile Development	React Native, iOS, Android

Cloud Platform	Amazon Web Services (AWS)
Data Streaming	Apache Kafka, Event-Driven Architecture
Backend Services	RESTful APIs, WebSocket, Microservices
Monitoring	Real-Time Monitoring, Alerting Systems
Data Quality	Validation Logic, Anomaly Detection
Governance	Audit Logging, Compliance Tracking
Project Management	Agile/Scrum, Team Leadership, Stakeholder Management

Measurable Results & Business Impact

Metric	Improvement	Impact
Incident Response Time	35% Reduction	Faster issue resolution and system recovery
SLA Compliance	Improved	Enhanced reliability and customer satisfaction
System Uptime Visibility	Real-Time	Proactive issue detection and prevention
Team Coverage	Data & Ops Teams	Organization-wide monitoring capability
Deployment Success	Department-wide	Executive approval and internal rollout
Team Productivity	Increased	Reduced time spent on manual monitoring

Key Features & Capabilities

• **Real-Time Dashboard:** Comprehensive view of all data pipelines with status indicators, performance metrics, and historical trends

• **Smart Alerting:** Configurable alert thresholds with multi-channel notifications (push, email, SMS)

• **Incident Management:** Built-in workflow for tracking, assigning, and resolving pipeline incidents

• **Performance Analytics:** Detailed metrics and visualizations for pipeline performance optimization

• **Audit Trail:** Complete logging of all system activities and user actions for compliance and troubleshooting

• **Mobile-First Design:** Optimized for on-the-go monitoring with offline capability and sync

• **Role-Based Access:** Granular permissions ensuring appropriate access levels for different user roles

• **Integration Ready:** APIs for integration with existing monitoring and ticketing systems