

TITLE PAGE

Project Title: HealthInsight - Real Time Hospital Analytics and Monitoring Platform

Client Type: Enterprise Healthcare Organization

Prepared By: [Team / Company Name]

Date: [Month, Year]

1. PROJECT OVERVIEW

HealthInsight is an enterprise grade monitoring and analytics platform designed to provide real time visibility into hospital operational metrics including bed occupancy, ER wait times, ICU load, patient flow, and equipment utilization. The system integrates data from existing HIS sources and streams updates to a Grafana based dashboard for continuous monitoring.

2. BUSINESS REQUIREMENTS

Key requirements include: 1. Centralized real time visibility across departments. 2. Role based dashboard access. 3. Automated alerts for threshold breaches. 4. Data retention and compliance with HIPAA standards. 5. High availability and failure recovery.

3. SYSTEM ARCHITECTURE

HealthInsight uses the following architecture: Data ingestion via secure API connectors. Kafka streaming for real time event flow. Processing layer for aggregation and validation. Storage in InfluxDB for time series retention. Visualization via Grafana with RBAC enabled.

4. DATA ENGINEERING PIPELINE

Pipeline functions include: 1. Data standardization from multiple hospital systems. 2. Deduplication and anomaly flagging. 3. Time-based aggregation for hourly and daily views. 4. Storage with retention policy for up to 12 months. 5. Backup and archival workflow.

5. DASHBOARD DESIGN

Grafana dashboards include: ER wait time heatmaps. ICU utilization trend lines. Bed availability by department. Critical alerts for patient overflow. Historical

occupancy comparison.

6. ALERTING AND AUTOMATION

Alerts configured: ICU load > 90 percent for 10 minutes. ER wait times exceeding threshold. Equipment downtime notifications. Alerts sent via SMS, email, and webhook.

7. IMPLEMENTATION PHASES

Phase 1: Requirements and integration assessment. Phase 2: Data pipeline and connector deployment. Phase 3: Dashboard and alert configuration. Phase 4: UAT and rollout. Phase 5: Training and maintenance handover.

8. COMPLIANCE AND SECURITY

Security measures: TLS encryption for all communication. Access control using RBAC. Audit logging enabled. HIPAA aligned data handling.

9. FUTURE ENHANCEMENTS

Predictive modeling for patient surge. Machine learning based staffing optimization. Mobile dashboard access. Integration with wearable patient monitors.

10. CONCLUSION

HealthInsight provides a scalable and secure healthcare monitoring platform, facilitating proactive decision making and resource optimization.

11. REFERENCES

[1] HIS Integration Standards. [2] Grafana Enterprise Documentation. [3] HIPAA Security Guidelines.