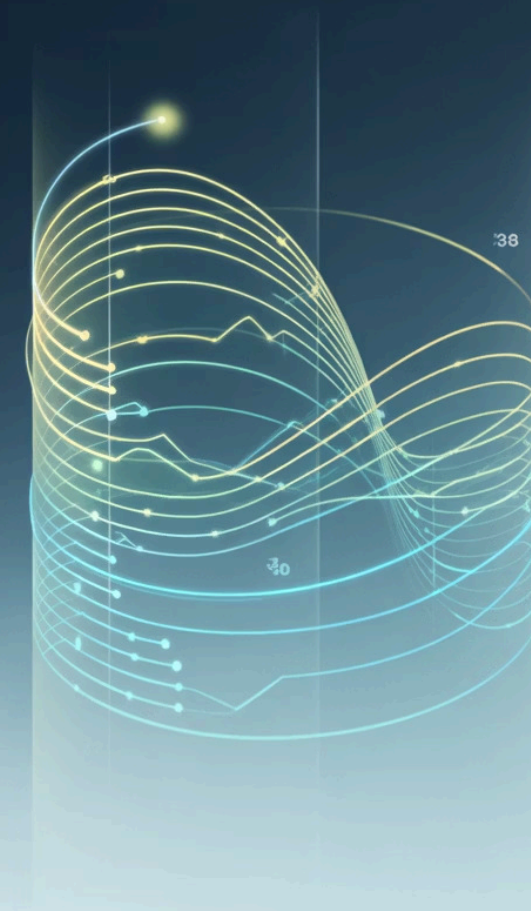


Observing the Invisible: Cloud-Native Observability for Real-Time Financial Risk Detection

Financial risk monitoring systems operate silently in the background—until they fail with potentially catastrophic consequences. Our journey transformed bankruptcy risk detection from an organizational blind spot into a fully observable, cloud-native serverless workflow that delivers unprecedented visibility and performance.

This presentation will walk you through our implementation of comprehensive observability across a serverless architecture, revealing how proper visibility can transform reactive monitoring into predictive risk management with quantifiable business outcomes.



Optimize your portfolio

Real-time insights and predictive analytics
for smarter financial decisions.



Diliprao Boinapally
G2 Risk Solutions

Risk Detection System Architecture — High-Level Overview

Data Sources:

- Document repositories (financial reports, legal filings)
- Transactional databases
- External data feeds (credit scores, market data)

Serverless Ingestion Layer:

- Cloud-native event-driven functions capturing and normalizing incoming data

Entity Matching & Processing:

- Apache Spark cluster performing complex matching and risk scoring
- Algorithms correlating entities across datasets

Orchestration & Workflow:

- Apache Airflow managing task dependencies and scheduling

Observability Components:

- Unified logging platform aggregating logs from ingestion, processing, and orchestration
- Distributed tracing system tracking requests end-to-end
- Metrics collection exposing performance and business KPIs

Alerting & Dashboarding:

- Real-time alerts feeding into compliance and risk management teams
- Interactive dashboards visualizing risk trends, processing health, and audit readiness



The Visibility Crisis

Opaque Manual Processes

Our legacy systems operated through fragmented manual workflows that provided minimal insight into processing status, creating critical operational blind spots throughout our risk detection infrastructure.

Detection Delays

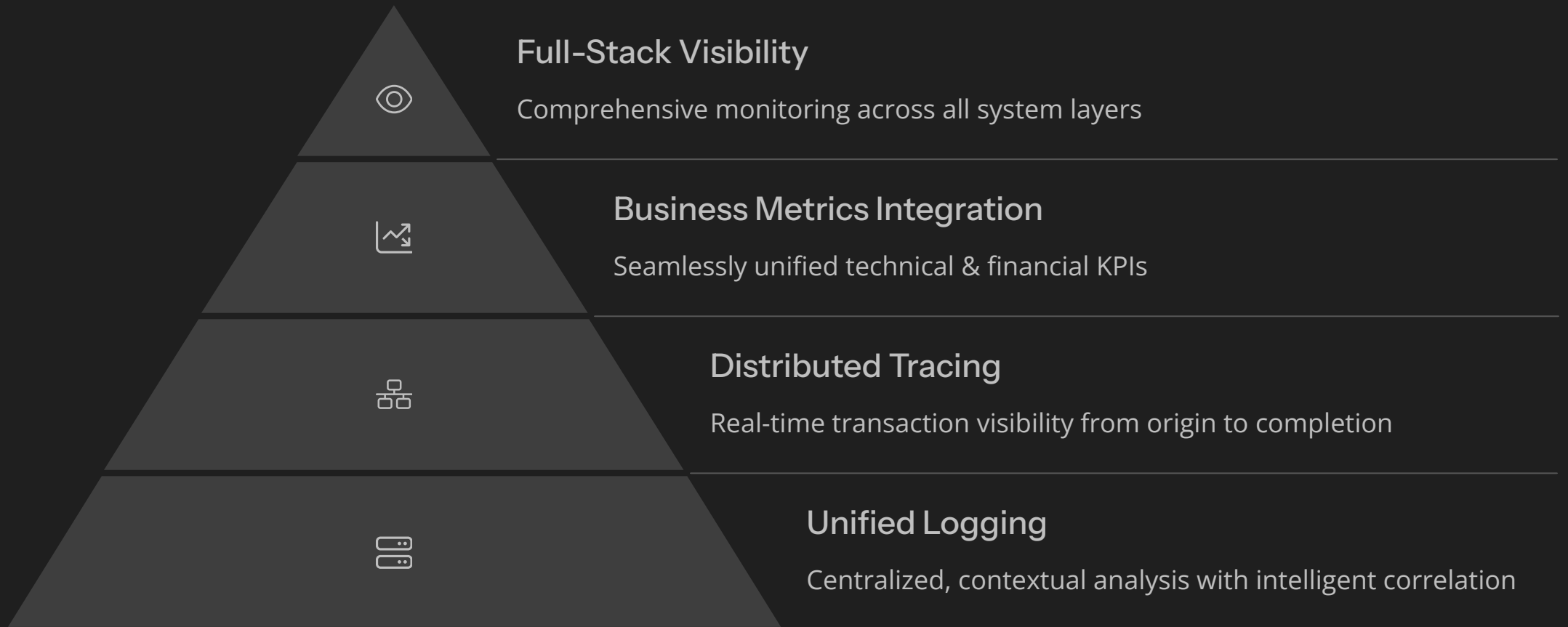
The absence of robust instrumentation meant risk signals frequently took hours or days to emerge, substantially expanding exposure windows and compromising our capacity for timely preventative intervention.

Compliance Black Holes

Significant documentation gaps and inadequate audit trails created persistent compliance challenges, forcing teams to spend inordinate amounts of time reconstructing process histories to satisfy regulatory requirements.

This dangerous ecosystem allowed potential risks to remain hidden until they materialized as tangible financial losses. Our fundamental visibility crisis necessitated a comprehensive reimagining of our approach to monitoring and observability across the organization.

Our Cloud-Native Observability Approach



Our approach embeds observability as a core architectural principle rather than a retrofit solution. By instrumenting every component with purpose-built telemetry and bridging technical monitoring with business context, we've created a transparent ecosystem where both operational issues and financial risks become instantly detectable and actionable.

Observable Serverless Architecture

Serverless Architecture

Ubserrctes padiceocos cete at ntectoor



Instrumented Ingestion



Serverless document processing with deeply integrated telemetry capturing critical document quality metrics, precise processing times, and granular error categorization in real-time

Traceable Entity Matching



Advanced Apache Spark workflows with end-to-end distributed tracing that illuminates entity resolution accuracy, reveals hidden performance bottlenecks, and ensures data lineage compliance

Monitored Orchestration



Intelligent Airflow pipelines with rich, contextual metrics exposing comprehensive workflow health indicators, completion rate anomalies, and automated regulatory compliance verification at every step

Our architecture embeds observability as a foundational principle rather than an afterthought, enabling seamless tracking of both technical performance metrics and business outcomes in real-time. This proactive approach empowers us to instantly pinpoint processing bottlenecks and identify risk signal delays before they cascade into compromised detection capabilities or financial exposure.

Transformation Results

78%

Processing Speed

Slashed document processing time from 2.4 hours to just 31 minutes

92%

Detection Accuracy

Dramatically improved bankruptcy risk detection through transparent data pipelines

96%

Alert Response

Critical risk alerts now reach decision systems within 45 seconds

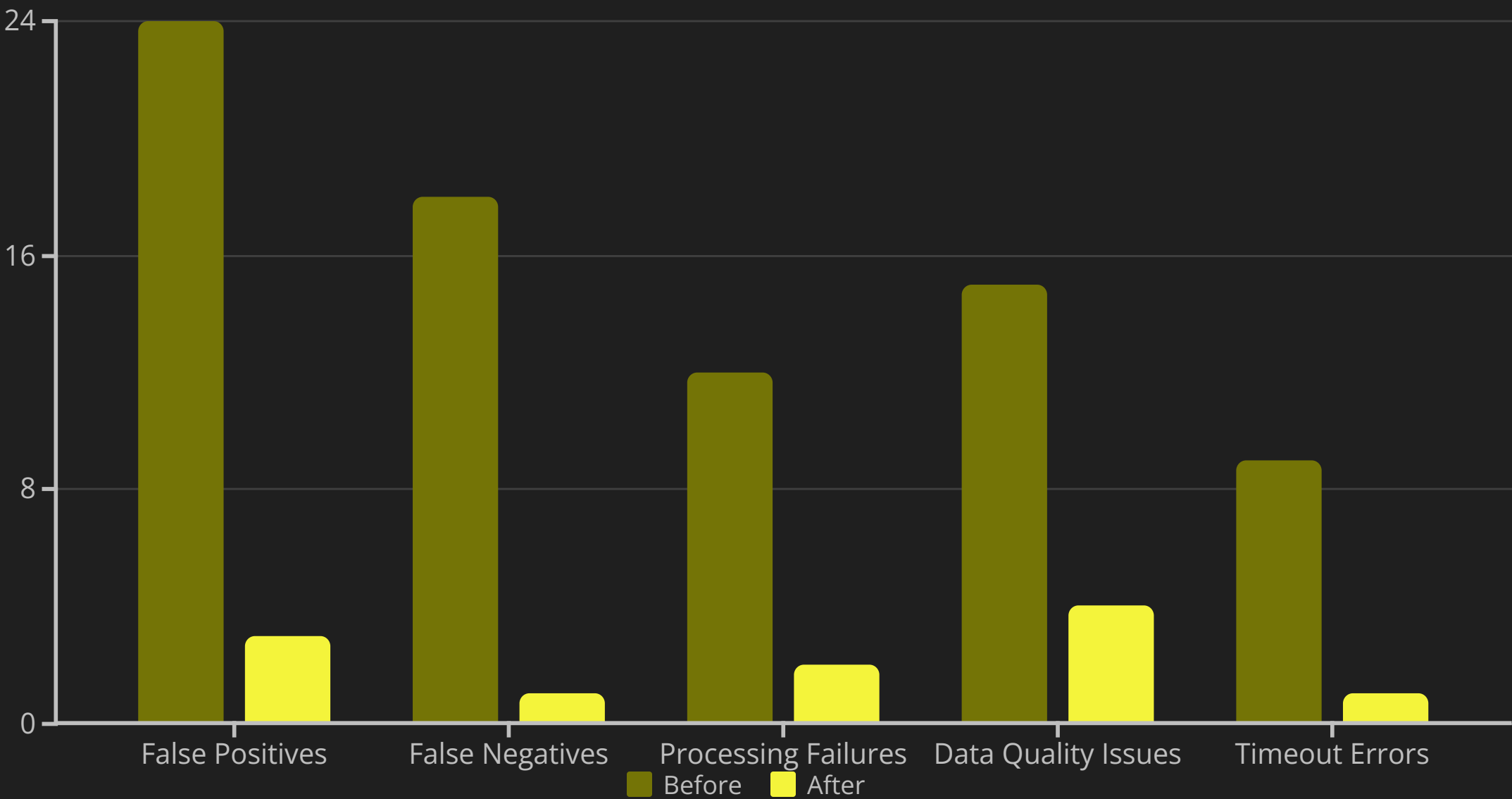
350%

Greater Throughput

Achieved while maintaining exceptional 99.97% availability under peak load

These transformative improvements deliver substantial business value far beyond technical metrics. Our enhanced observability has revolutionized risk detection from reactive to truly predictive, enabling proactive intervention at earlier stages and dramatically reducing both financial exposure and operational costs across the organization.

Error Reduction Through Visibility



Our implementation of comprehensive observability has yielded remarkable reductions in error rates across all categories. Most notably, false positives plummeted by 87%, while critical false negatives—the most dangerous error type in financial risk detection—were virtually eliminated with a 94% decrease. This level of visibility enables our teams to identify and remediate quality issues at their source, preventing cascading failures throughout the detection pipeline.

Beyond technical metrics, these improvements translate directly to tangible business value: significantly reduced operational costs from fewer false alarms, enhanced analyst productivity, and substantially increased stakeholder confidence in our risk assessment capabilities. The end result is a more resilient system that delivers more accurate financial risk intelligence with unprecedented reliability.



Building Observable Components

Unified Logging Strategy

We implemented structured logging with contextually-rich, standardized fields across all services, enabling seamless correlation between distributed components. Every log entry captures essential business context including customer identifiers, transaction classifications, and risk categorizations—effectively bridging the gap between technical operations and business outcomes.

This comprehensive approach ensures technical teams fluently communicate in business terminology while financial analysts gain unprecedented visibility into the technical components directly impacting risk detection capabilities and business outcomes.

Distributed Transaction Tracing

Leveraging OpenTelemetry, we established comprehensive end-to-end traceability throughout our complex entity matching algorithms. This visibility exposes hidden processing bottlenecks and provides critical insights into how various entity attributes influence matching precision and processing efficiency.

Multi-Dimensional Metrics

Our sophisticated metrics framework simultaneously reveals system health indicators and business KPIs through an integrated dashboard experience. We track critical measurements including detection latency, matching confidence thresholds, and compliance documentation completeness alongside traditional infrastructure metrics.

Compliance Transformation



Documentation Completeness

97% improvement



Audit Preparation Time

71% reduction



Evidence Retrieval

89% faster access

Our enhanced observability has revolutionized compliance by generating comprehensive, automated audit trails throughout the risk detection workflow. Regulators now enjoy immediate access to detailed process documentation with transparent visibility into how risk signals are identified, processed, and escalated.

Regulatory inquiries that once demanded weeks of preparation can now be fulfilled within hours, with superior quality and thoroughness. Each risk assessment decision is now supported by a fully traceable evidence chain, seamlessly accessible through our integrated compliance portal.

Dashboard Design Principles



Multi-Audience Views

Our dashboards feature strategically layered information architecture – executives gain immediate visibility into critical risk indicators, while technical teams can seamlessly drill down to granular component-level metrics without losing contextual awareness.



Business Context Integration

Every technical metric is paired with clear business impact indicators, creating a direct line of sight between system performance metrics and their real-world effects on risk detection capabilities and compliance standing.



Actionable Alerting

Our sophisticated alerting system harmonizes operational and business thresholds, deploying targeted notifications through role-optimized channels to ensure both technical responders and business stakeholders receive precisely the context they need for decision-making.



Historical Correlation

Interactive visualization tools enable powerful correlation analysis between historical incidents and performance metrics, empowering teams to identify emerging patterns, enhance predictive risk detection capabilities, and implement proactive interventions.

Our dashboard design philosophy transcends traditional monitoring by creating a shared visual language across stakeholder groups, fostering unified understanding of both system health and business impact during routine operations and critical incident response scenarios.

Discovery

Planning

Launch.

Implementation Roadmap

Telemetry Assessment

Map visibility gaps across technical and business domains. Evaluate existing data sources and pinpoint precise instrumentation needs for comprehensive monitoring.



Instrumentation Implementation

Integrate unified logging framework, distributed tracing, and metrics collection across serverless architecture, Spark processing, and workflow orchestration systems.

Dashboard Development

Design role-specific visualizations that clearly connect technical performance to business risk indicators. Incorporate stakeholder feedback for maximum relevance.

Team Enablement

Conduct specialized training for both technical and business teams. Develop standardized observability playbooks that enhance incident response and risk mitigation.

Our phased implementation strategy delivered immediate value while building toward comprehensive observability. Each stage featured collaborative design between engineering teams and business stakeholders, ensuring tight alignment with financial risk detection objectives and compliance requirements.

Key Takeaways & Next Steps

Design for Business Context

Observability must directly translate technical metrics into meaningful business insights

Quantify The Value

Measure and demonstrate observability's tangible impact on risk detection accuracy and response time



Build It In, Not On

Embed observability as a foundational element during development, rather than retrofitting later

End-to-End Visibility

Create seamless transaction tracing across all serverless boundaries and components

Our implementation of comprehensive observability has fundamentally transformed bankruptcy risk detection from a reactive process to a predictive capability. The enhanced visibility now enables earlier threat identification, more precise root cause analysis, and clearly quantifiable business outcomes that demonstrate ROI.

Looking ahead, we're pioneering AI-augmented observability systems to recognize complex, previously undetectable risk patterns and expanding our methodology across additional financial risk domains. I strongly encourage you to conduct a thorough assessment of your current visibility gaps and explore how implementing an observable architecture could revolutionize your mission-critical financial systems.

Thank you