

# COMPAS

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## Compliance Process Automation Service

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### Product Requirements Document (PRD)

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**Product Name:** COMPAS (Compliance Process Automation Service)

**Version:** 1.0

**Author:** Banat Zata (Tata)

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# PART 1: AI PRODUCT CONCEPT EVALUATION & RECOMMENDATION

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## 1. Project Selection & Justification

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### 1.1 Executive Summary

*Chosen Project: AI Monitoring for Operational Process & Regulation Alignment (COMPAS)*

***One-line Justification:** COMPAS addresses a mission-critical need with built-in customer base (40+ SMMA subsidiaries), clearer ROI through compliance cost avoidance, and stronger strategic alignment with SQE's position as digital enabler for Sinar Mas Group.*

### 1.2 Comparative Analysis

Criteria	Concept 1: Market Insights Platform	Concept 2: COMPAS (Compliance AI)	Winner
Market Opportunity	Large but crowded market; many established players	Growing RegTech market (19.6% CAGR); less competition in Indonesian market	COMPAS
Competitive Landscape	Dominated by Bloomberg, Nielsen, Gartner; high barrier	Limited local players; global GRC tools lack Indonesian regulatory expertise	COMPAS
Technical Feasibility	Requires diverse external data sources; complex NLP for sentiment	Internal data available; rule-based + AI hybrid approach	COMPAS
Business Impact	Revenue generation (uncertain adoption)	Cost avoidance (Rp 10B+ fines); license protection; rating confidence	COMPAS
Strategic Fit	Generic B2B product; no unique SQE advantage	Perfect fit: 40+ captive subsidiaries; cross-pillar (Finance + Mining)	COMPAS
TOTAL	1/5	5/5	COMPAS

### 1.3 Justification Narrative

#### Why COMPAS?

- 1. Market Opportunity:** The RegTech market is projected to grow from \$14.9B (2024) to \$106.9B (2035) at 19.6% CAGR. Indonesian regulatory environment is becoming stricter with MOE Regulation No. 20/2025, OJK strengthening, and ESG pressure from investors.
- 2. Competitive Advantage:** No existing solution combines Indonesian regulatory intelligence (OJK, BI, MOE), Bahasa Indonesia AI assistant,

and cross-pillar design for both Financial Services and Mining. Global players like IBM OpenPages and SAP GRC lack local regulatory expertise.

3. **Technical Feasibility:** Core data (SOPs, process logs, regulatory documents) exists within Sinar Mas Group. AI approach can start with rule-based systems enhanced by ML, reducing initial complexity. RAG architecture prevents hallucination risks.
4. **Business Impact:** Direct cost avoidance through preventing regulatory fines (OJK fines can reach billions of Rupiah), license protection, and audit efficiency (70% time reduction). ROI is measurable and immediate.
5. **Strategic Alignment:** SQE positions as the digital transformation enabler for Sinar Mas Group. COMPAS serves 40+ SMMA subsidiaries immediately, with expansion path to Mining pillar (DSSA/GEMS - USD 3B revenue).

### Why NOT Market Insights Platform?

- Highly competitive market with established players (Bloomberg, Nielsen, Gartner, Palantir)
- Requires significant external data acquisition costs
- No unique SQE advantage; would compete as generic vendor
- Longer path to ROI with uncertain enterprise adoption
- Less strategic alignment with Sinar Mas Group's immediate needs

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## 2. Market Opportunity & Problem Solved

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### 2.1 Problem Statement

#### The Core Problem:

*Large conglomerates like Sinar Mas Group struggle to maintain consistent compliance across 40+ subsidiaries, each managing*

*compliance independently with fragmented standards, reactive approaches, and manual processes that consume 60-70% of compliance officers' time on documentation rather than strategic risk management.*

## Who Experiences This Problem?

Stakeholder	Pain Point	Current Solution	Gap
C-Level / Board	No single view of enterprise-wide compliance risk; surprises during audits	Quarterly reports from each subsidiary	Real-time visibility; proactive risk identification
Compliance Officers	60-70% time on documentation; reactive issue discovery	Manual spreadsheets; email-based tracking	Automation; predictive risk detection
Department Managers	Unclear SOP requirements; fear of audit findings	Ad-hoc compliance training	Clear guidance; real-time compliance status
Employees	Complex SOPs; don't know "why" behind rules	PDF manuals; occasional training	Easy-to-understand guidance; AI assistant
Auditors	Time-consuming audit preparation; incomplete trails	Manual evidence collection	Pre-compiled audit trails; AI-generated summaries

## 2.2 Market Size

Market	Size	Source
TAM (Global RegTech)	\$14.9B (2024) → \$106.9B (2035)	Precedence Research
TAM (AI Compliance Monitoring)	\$1.8B (2024) → \$5.2B (2030)	MarketsandMarkets
SAM (SEA Financial Services GRC)	~\$500M (2024)	Industry estimates
SOM (Indonesia Enterprise GRC)	~\$50M (2024)	Sinar Mas internal data
Initial Target (SMMA)	\$5-10M internal budget allocation	SQE estimates
CAGR	19.6% (RegTech), 19.4% (AI Compliance)	Multiple sources

## 2.3 Target Customer Segments

Segment	Description	Priority
SMMA Financial Services	Bank Sinarmas, Asuransi Sinar Mas, Sinarmas Multifinance, etc. (40+ entities)	P0
Mining Pillar (DSSA/GEMS)	Large mining operations with environmental compliance needs; USD 3B revenue	P1
External Indonesian Conglomerates	Similar multi-entity structures with compliance challenges	P2 (Future)

## 3. Competitive Landscape

### 3.1 Competitor Analysis

Competitor	Type	Strengths	Weaknesses
IBM OpenPages	Direct (Global)	Enterprise GRC; Watson AI integration; brand trust	Expensive; no Indonesian regulatory expertise; complex implementation
SAP GRC	Direct (Global)	Deep ERP integration; comprehensive modules	Locked to SAP ecosystem; limited AI capabilities; no local language support
ServiceNow GRC	Direct (Global)	Modern UX; IT workflow integration	Adapted from ITSM, not compliance-first; limited regulatory content
Celonis	Indirect	Process mining leadership; AI-powered insights	Process-first, not compliance-first; no gamification; expensive
Local Consultants	Indirect	Indonesian regulatory knowledge; relationship-based	Manual processes; not scalable; no AI capabilities
Singapore GRC Startups	Regional	Regional presence; modern tech stack	Limited Indonesian regulatory depth; smaller scale

### 3.2 SQE's Strategic Advantages

Advantage	How to Leverage
Built-in Customer Base	40+ SMMA subsidiaries ready for pilot; no sales cycle needed
Local Regulatory Expertise	Deep OJK, BI, MOE knowledge; partnership potential with regulators
Cross-Pillar Position	Unique opportunity to serve both Financial Services AND Mining
Sinar Mas Ecosystem	Integration with existing digital products (ASJ, GARASI Dealer)
Indonesian Language	Native Bahasa Indonesia AI assistant; cultural understanding

### 3.3 Key Differentiators

- 1. Indonesian Regulatory Intelligence:** Built-in knowledge of OJK, BI, MOE, SMKP regulations with OCR capability for Indonesian regulatory PDFs and API integration with regulatory bodies.
- 2. Bahasa Indonesia AI Assistant:** RAG-grounded natural language compliance support that answers questions, cites SOPs, and explains "why" behind requirements - 24/7 availability for all employees.
- 3. Human-in-the-Loop by Design:** Mandatory human approval for high-risk decisions; multi-level escalation workflow; full audit trail - addressing Indonesian corporate culture's preference for human oversight.
- 4. Contextual Compliance Engagement:** Risk-based approach replacing generic gamification; links compliance to real-world KPIs; respects Indonesian corporate culture.
- 5. Cross-Pillar Architecture:** Designed from day one for both Financial Services and Mining compliance requirements.
- 6. PDP Law 2023 Native:** Data protection built-in; data residency compliance; 7-year retention aligned with regulatory requirements.

## 4. Feasibility Assessment

### 4.1 Data Availability & Quality

Data Type	Source	Availability	Challenges
SOPs & Policies	Internal documentation	High	Inconsistent formats; some in PDF
Process Logs	ERP systems (40+ subsidiaries)	Medium	Legacy system diversity; ETL complexity
Regulatory Documents	OJK, BI, MOE publications	Medium	PDF format; handwritten notes; no API
Transaction Data	Core banking, ERP	High	Privacy concerns; data residency
Training Records	HR systems	Medium	Fragmented across entities

#### Privacy & Ethical Considerations:

Concern	Regulation	Mitigation
Personal Data Processing	PDP Law 2023 (UU PDP)	Privacy by design; consent management; data minimization
Financial Data Residency	OJK regulations	On-premise/local cloud option; encryption
Employee Monitoring	Labor laws	Transparency; aggregate metrics; no individual surveillance
AI Decision Transparency	Emerging AI regulations	SHAP/LIME explainability; human-in-the-loop

## 4.2 AI Model Complexity

Capability	AI Type	Complexity	Maturity
Deviation Detection	Rule-based + ML Classification	Medium	Proven
Document Processing	OCR + NLP	Medium	Proven
AI Assistant	LLM + RAG	Medium-High	Proven (with safeguards)
Regulatory Change Detection	NLP + Knowledge Graph	High	Emerging
Risk Scoring	ML Regression/Classification	Medium	Proven
Explainability	SHAP/LIME	Medium	Proven

### Key Technical Considerations:

- Bahasa Indonesia NLP is 15-20% less accurate than English; requires fine-tuning

- RAG architecture essential to prevent hallucinations in compliance context
- Hybrid approach: start rule-based, enhance with ML over time
- Model retraining: quarterly with regulatory updates

## 4.3 Computational Needs & Infrastructure

Requirement	Specification	Cost Estimate
Training Infrastructure	GPU cluster (4x A100) for initial training	\$8,000/month (cloud)
Inference Infrastructure	CPU-based for most; GPU for AI assistant	\$3,000/month
Storage	10TB initial; 50TB growth	\$500/month
LLM API	OpenAI/Anthropic API for assistant	\$2,000-5,000/month
Total (Cloud)		~\$15,000/month

**Infrastructure Recommendation:** Hybrid approach

- Cloud (AWS/GCP) for development and scaling flexibility
- On-premise option for sensitive financial data (OJK compliance)

## 4.4 Integration Challenges

System	Complexity	Challenge	Mitigation
Legacy ERPs (40+)	High	Diverse systems; outdated APIs	Phased integration; API gateway; data connectors
Core Banking	High	Real-time requirements; security	Dedicated secure channel; batch processing option
HR Systems	Medium	Fragmented across entities	Standard data model; manual upload fallback
Regulatory Sources	Medium	No official API; PDF-heavy	OCR pipeline; manual update process

## 5. Hypothesis Validation

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### 5.1 Key Hypotheses & Validation

ID	Hypothesis	Category	Validation Method	Success Criteria
H1	Compliance officers spend 60%+ time on manual documentation	User Need	Survey + time tracking study	>50% confirm; baseline established
H2	AI can detect SOP deviations with >90% accuracy	Technical	POC with historical data	Precision >90%, Recall >85%
H3	Indonesian regulatory PDFs can be processed with >85% accuracy	Technical	OCR benchmark test	Character accuracy >85%
H4	Users will adopt AI assistant for compliance questions	User Need	Beta test with 50 users	>70% weekly active usage
H5	Human-in-the-loop workflow acceptable to management	Market	Executive interviews	>80% approval from compliance heads
H6	ROI achievable within 12 months	Market	Financial modeling + pilot metrics	Cost avoidance > implementation cost

## 5.2 Validation Timeline



H1, H5, H6]	H2, H3]	H4]	Go/No-Go]
Activities:	Activities:	Activities:	Activities:
- Stakeholder interviews	- OCR accuracy test	- 50-user pilot	- Consolidate findings
- Time study	- Deviation detection POC	- Usage tracking	- ROI validation
- Financial modeling	- LLM+RAG test	- Feedback surveys	- Executive presentation

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## PART 2: HIGH-LEVEL PROJECT PLAN & SIMPLE PRD

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### 6. Project Plan Approach

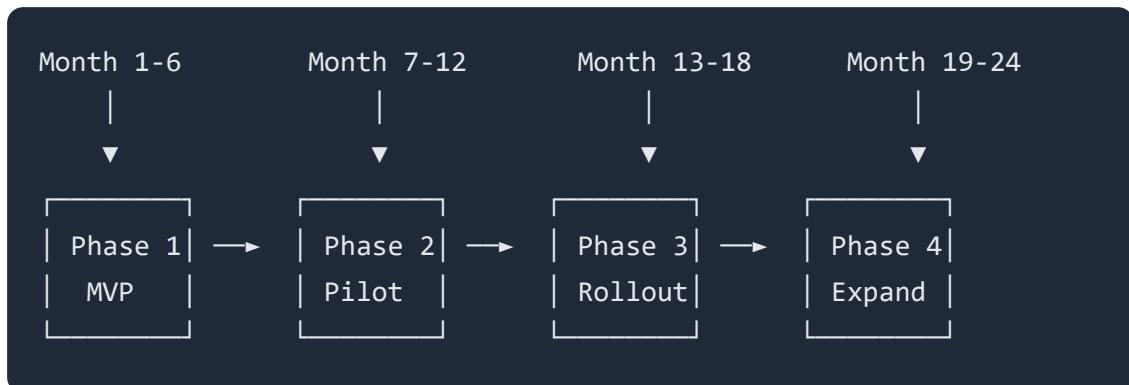
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#### 6.1 Strategic Alignment

SQE Strategic Goal	How This Project Aligns
Digital Transformation	Transforms manual compliance processes into AI-powered automation; positions SQE as AI leader within Sinar Mas
Market Leadership	First-mover advantage in Indonesian RegTech; builds competitive moat through local regulatory intelligence
Revenue Growth	Internal budget allocation from 40+ subsidiaries; future external monetization; cross-pillar expansion to Mining
Operational Excellence	Reduces compliance FTE effort by 30%; prevents costly regulatory fines; improves audit readiness

## 6.2 Key Milestones & Timeline

Visual Timeline (18-24 Months):



Phase	Duration	Key Deliverables
Phase 1: MVP Development	Month 1-6	Core platform; Dashboard; AI Assistant (basic); SQE internal pilot
Phase 2: Pilot & Validation	Month 7-12	Human-in-loop modules; One SMMA subsidiary pilot; ROI validation
Phase 3: SMMA Rollout	Month 13-18	Full SMMA deployment; Cross-entity benchmarking; 3-month UAT buffer
Phase 4: Expansion	Month 19-24	Mining pillar (GEMS/DSSA); External monetization exploration

### Key Milestones:

Milestone	Target	Success Criteria
M1: MVP Launch	Month 6	Dashboard + AI Assistant functional; 80% SQE SOPs digitized
M2: Pilot Complete	Month 12	50% audit time reduction; Zero missed deadlines; 90% adoption
M3: SMMA Rollout	Month 18	20+ subsidiaries live; Cross-entity benchmarking operational
M4: Mining Pilot	Month 24	GEMS/DSSA pilot launched; Environmental compliance module

## 6.3 Key Stakeholders

### Internal:

Stakeholder	Role	Engagement
SMMA C-Level	Executive Sponsor	Monthly steering committee; budget approval
SQE Leadership	Product Owner	Weekly reviews; resource allocation
Engineering Team	Builder	Daily standups; sprint planning
Compliance Officers	Domain Expert + User	Requirements validation; beta testing
Legal/Compliance	Reviewer	Regulatory alignment; PDP Law compliance

#### External:

Stakeholder	Role	Engagement
Pilot Subsidiary	First customer	Co-development; feedback loop
OJK/BI/MOE	Regulators	Compliance validation; potential partnership
LLM Providers	Technology partner	API integration; SLA management
Auditors (External)	Validator	Audit trail requirements; acceptance testing

## 6.4 Metrics of Success

#### AI Performance:

Metric	Target
Deviation Detection Accuracy	95%+ precision
Deviation Detection Recall	90%+ recall
AI Assistant Response Accuracy	90%+ (RAG-grounded)
Response Latency	< 3 seconds (dashboard); < 5 seconds (AI assistant)
False Positive Rate	< 10%

#### Business Impact:

Metric	Baseline	Target
Audit Preparation Time	~4 weeks	< 1 week (70% reduction)
Compliance FTE Effort	100% (current)	70% (30% reduction)
Missed Compliance Deadlines	X per year	Zero
Potential Fines Avoided	N/A	Rp 10B+ exposure reduction
User Adoption	N/A	90% monthly active users
NPS Score	N/A	40+
ROI	N/A	5:1 within 12 months

## 7. Simple PRD - Core AI Feature

**Focus:** Real-Time Deviation Detection & Alert System

## 7.1 Feature Overview

Attribute	Description
Feature Name	Real-Time Deviation Detection & Alert System
Purpose	Continuously monitor operational processes and detect compliance deviations before they become violations
User Problem	Compliance issues are discovered during audits (reactive), not before - leading to fines, remediation costs, and operational disruption
Target User	Compliance Officers, Department Managers, C-Level Executives

## 7.2 Acceptance Criteria

ID	Criteria (Given/When/Then)
AC-1	Given a process/transaction occurs, When AI detects deviation from SOP, Then system generates alert within 5 minutes with severity level and confidence score
AC-2	Given an alert is generated, When confidence < 85%, Then alert is automatically escalated to human review queue
AC-3	Given an alert is generated, When user clicks "Explain", Then AI provides reasoning using SHAP/LIME methodology with cited SOP references
AC-4	Given multiple alerts exist, When Compliance Officer views dashboard, Then alerts are prioritized by risk score (severity × confidence × business impact)
AC-5	Given alert is reviewed, When user takes action (acknowledge/escalate/dismiss), Then decision is logged in immutable audit trail with timestamp and user ID
AC-6	Given user dismisses alert as false positive, When feedback is submitted, Then system logs feedback for model improvement

## 7.3 Key AI-Driven Functionality

How AI Works (User Perspective):



Step	User Action	AI Response	User Sees
1	Normal work (transaction, document upload)	AI continuously monitors against SOP rules	Nothing (seamless)
2	-	AI detects potential deviation	Alert notification with severity badge
3	Click alert to view details	AI retrieves context and generates explanation	Alert card: what happened, why flagged, confidence %
4	Click "Explain"	SHAP/LIME analysis + RAG retrieval	Visual explanation: "This was flagged because X exceeds threshold Y per SOP Z"
5	Take action (Acknowledge/Escalate/Dismiss)	Log decision; update model if feedback provided	Confirmation; audit trail entry

### AI Decision Transparency:

Every alert includes:

- **What:** Description of the detected deviation
- **Why:** AI reasoning with SHAP/LIME feature importance
- **Source:** Cited SOP section and regulatory reference

- Confidence: Percentage score (triggers human review if < 85%)
- Recommended Action: AI-suggested next steps

## 7.4 High-Level AI Technical Considerations

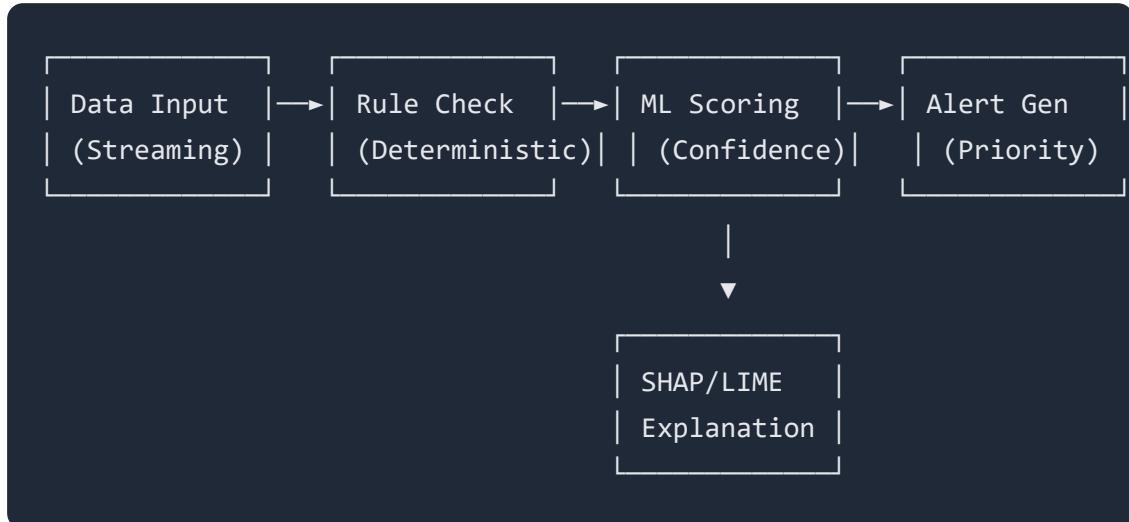
### Data Feeds:

Data	Source	Frequency
Process/Transaction Logs	ERP systems, Core Banking	Real-time streaming
Document Uploads	Document management system	Event-triggered
SOP Rules	COMPAS Rules Engine	Cached; updated on SOP changes
Regulatory Requirements	Regulatory DB + Knowledge Graph	Daily sync
Historical Decisions	Audit Trail	Batch (model retraining)

### Core AI Approach:

Component	Approach	Rationale
Rule Matching	Rule-based engine	Deterministic; high accuracy for known rules; explainable
Anomaly Detection	Isolation Forest + Autoencoder	Catches unknown deviations; learns from data
Severity Classification	Gradient Boosting (XGBoost)	Proven accuracy; feature importance for explainability
Explainability	SHAP (global) + LIME (local)	Industry standard; regulatory acceptance
RAG for Context	LLM + Vector DB (Pinecone/Weaviate)	Grounds explanations in actual SOP text; prevents hallucination

### AI Pipeline:



## 7.5 Negative Cases (AI Failure Modes) & Mitigation

Failure Mode	Impact	Probability	Mitigation	Fallback
False Positive (Alert Fatigue)	Medium - Users ignore alerts; miss real issues	Medium	Confidence threshold tuning; user feedback loop; weekly false positive review	Allow users to mark false positives; auto-suppress repeat false positives after review
False Negative (Missed Violation)	High - Actual compliance breach goes undetected	Low	Conservative thresholds; regular model validation against known cases; parallel manual sampling	Periodic random audit of transactions not flagged; human spot-checks
Model Drift	Medium - Accuracy degrades over time	Medium	Automated drift monitoring; scheduled quarterly retraining; version control	Alert when accuracy drops below threshold; automatic rollback to previous model
Explanation Hallucination	High - AI cites non-existent SOP or gives wrong reasoning	Low	RAG architecture grounds all explanations in actual documents; confidence scoring	All explanations include source links; users can verify; low-confidence

Failure Mode	Impact	Probability	Mitigation	Fallback
				explanations flagged

## 7.6 Quality Measurement

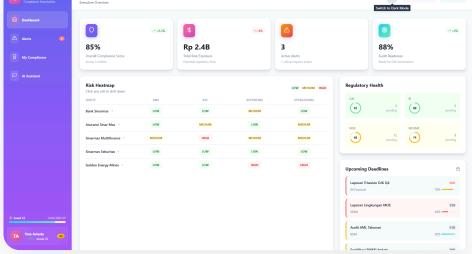
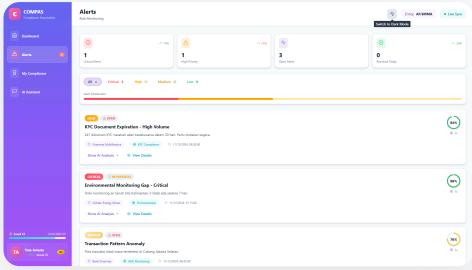
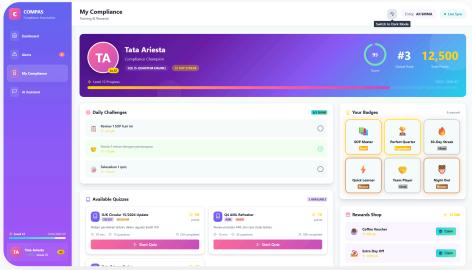
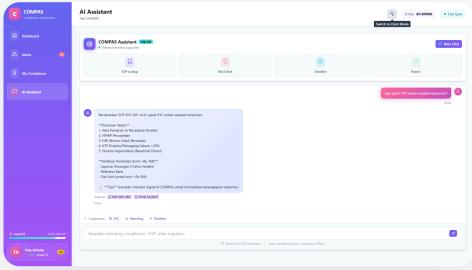
Metric	Target	Measurement
Precision	> 95%	TP / (TP + FP) - Weekly evaluation against labeled data
Recall	> 90%	TP / (TP + FN) - Monthly audit of undetected violations
F1 Score	> 0.92	Harmonic mean of precision and recall
Alert Response Time	< 5 minutes	Time from event to alert generation
Explanation Accuracy	> 90%	Human evaluation of explanation correctness (sample)
User Satisfaction	> 4.0/5.0	Post-action survey; monthly NPS
False Positive Rate	< 10%	User-reported false positives / total alerts

## 7.7 Non-Functional Requirements (AI-Specific)

Category	Requirement
Compliance	OJK data handling requirements; PDP Law 2023 (consent, data minimization, retention limits); ISO 27001 alignment
Explainability	SHAP/LIME for all ML decisions; Confidence scoring (0-100%); Source citation for all explanations
Auditability	7-year log retention; Immutable audit trail; Model versioning with decision lineage; Who-what-when-why for every alert action
Latency	Dashboard load < 3 seconds; Alert generation < 5 minutes from event; AI explanation < 3 seconds
Security	AES-256 encryption at rest; TLS 1.3 in transit; RBAC with entity-level isolation; PII masking in logs
Availability	99.9% uptime SLA; RTO < 4 hours; RPO < 1 hour; Active-passive failover

## 8. Screen Inventory (Sampling)

*Screenshot/mockup untuk fitur utama*

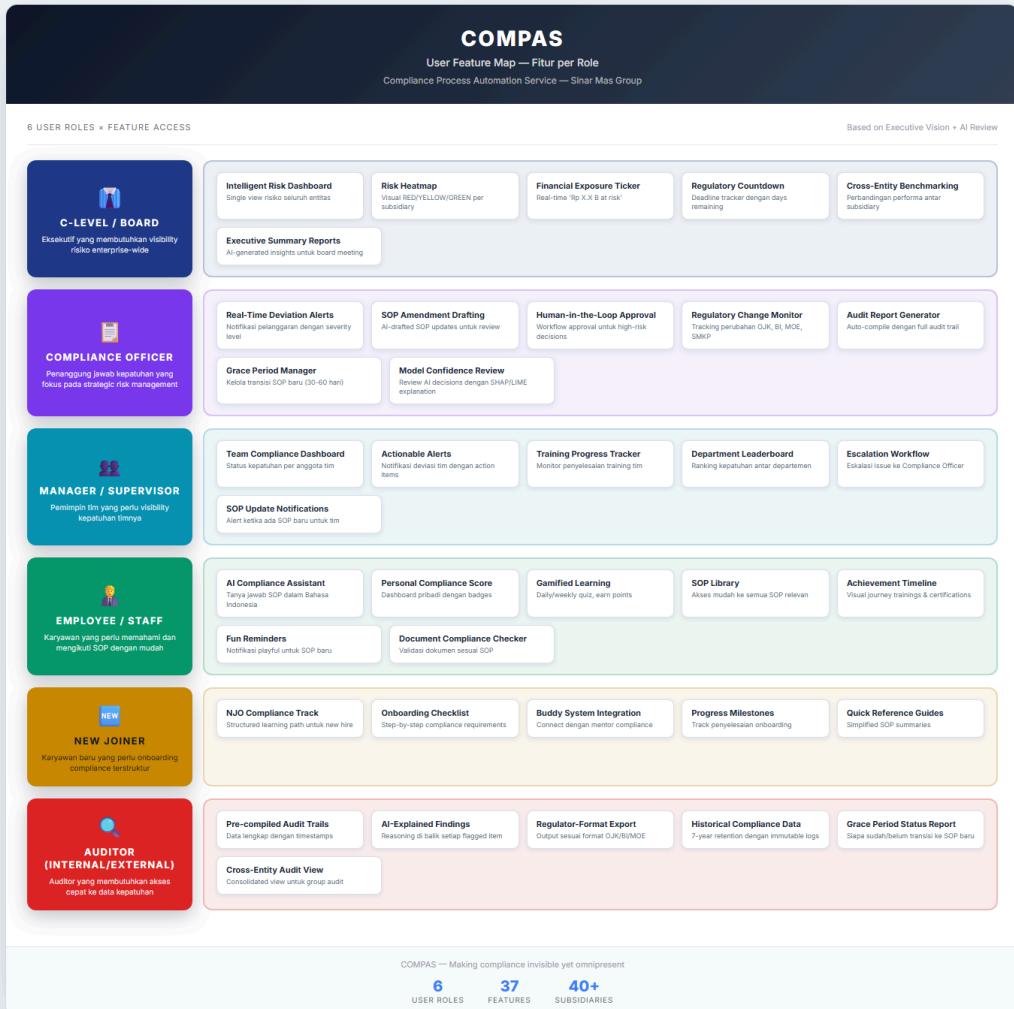
Screen	Description	Screenshot
Executive Dashboard	C-Level single view with risk heatmap, financial exposure ticker, regulatory countdown	
Alert Management	Real-time deviation alerts with severity, confidence, and AI explanation	
Compliance Engagement	Personal compliance score, achievements, training modules	
AI Assistant	Natural language compliance Q&A in Bahasa Indonesia	

## Enterprise Architecture Overview



*5-Layer Architecture: Channel & Experience → Application & Services → Integration → Data & Storage → Governance & Security*

## Role-Based Access



*Role access matrix showing permissions for C-Level, Compliance Officers, Managers, Employees, and Auditors*

## Appendix

### A. Glossary

Term	Definition
<b>COMPAS</b>	Compliance Process Automation Service
<b>RAG</b>	Retrieval-Augmented Generation - AI architecture that grounds LLM responses in retrieved documents
<b>SHAP</b>	SHapley Additive exPlanations - Method to explain ML model predictions
<b>LIME</b>	Local Interpretable Model-agnostic Explanations - Method to explain individual predictions
<b>SOP</b>	Standard Operating Procedure
<b>OJK</b>	Otoritas Jasa Keuangan (Financial Services Authority of Indonesia)
<b>BI</b>	Bank Indonesia (Central Bank)
<b>MOE</b>	Ministry of Environment
<b>PDP Law</b>	Personal Data Protection Law (UU PDP 2023)
<b>SMMA</b>	Sinar Mas Multiartha (Financial Services pillar)
<b>GRC</b>	Governance, Risk, and Compliance
<b>RegTech</b>	Regulatory Technology

## B. References

Document	Description
EXECUTIVE_VISION.md	Original product vision document
AI REVIEW SESSION.md	AI peer review feedback (DeepSeek, Qwen, Grok)
compas_ea.html	Enterprise architecture visualization
COMPAS_FLOWCHARTS.html	Detailed process flowcharts
[SQE] PM AI_Case Study_Updated.pdf	Case study requirements

## C. Revision History

Version	Date	Author	Changes
0.1	Dec 2024	Banat Zata	Initial draft
0.2	Dec 2024	Banat Zata	Incorporated AI review feedback
1.0	Dec 2024	Banat Zata	Final version for case study submission

*"Be the golden bridge that people want to pass and could pass to make their lives and activities easier."*

— Tata

*COMPAS PRD v1.0 | December 2024 | Prepared for SQE Senior Product Manager - AI & Enterprise Solutions Case Study*