IHS Architecture & Design – Tech Stack Upgrade 2025

Healthcare Finance Platform Modernization & AI Roadmap

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Executive Summary

The IHS platform enables healthcare providers to extend credit financing to patients. In 2024, the baseline tech stack was defined. The 2025 revamp upgrades key components to ensure scalability, performance, compliance, observability, and AI readiness.

Architecture Principles

• Scalability: Handle millions of patient finance events in real-time.

• Performance: Optimize processing with low latency.

• Security & Compliance: HIPAA/GDPR ready.

• Observability: End-to-end visibility across layers.

• Future-ready: Cloud-native + AI-driven architecture.

Section-wise Analysis

UI Frameworks

2024: Angular, ReactJS, NextJS 13, VueJS, RemixJS

2025: NextJS 14 + React 18.3

Why in 2025: NextJS 14 improves SSR, React 18.3 adds concurrent rendering.

Impact:

- • Improved rendering & SEO
- • Micro-frontend readiness

IHS Benefit:

- • Faster patient loan UI
- • Consistent cross-hospital UI

UI Testing

2024: Jest, RTL, Enzyme, Cypress, Playwright, Selenium

2025: Jest + RTL, Playwright (E2E)

Why in 2025: Selenium/Enzyme deprecated; Playwright reliable for E2E.

Impact:

- • Less flaky CI/CD tests
- • Cross-browser stable automation

IHS Benefit:

- • Fewer UI errors in loan flows
- • Safer releases

Backend

2024: Spring Boot, Quarkus, NodeJS, Python, Kotlin

2025: Spring Boot 3.3 LTS + GraalVM, Quarkus 3.x, NodeJS 20, Java 21 Virtual Threads

Why in 2025: Spring Boot 3.3 LTS + GraalVM improves startup & memory. Java 21 virtual threads boost concurrency.

Impact:

- • 30–40% faster startup
- • Reduced infra costs
- • Better concurrency

IHS Benefit:

- • Faster credit scoring
- • Efficient batch workloads

Batch Processing

2024: Spring Batch 4.x + multithreading/async

2025: Spring Batch 5.x + partitioning + virtual threads

Why in 2025: Supports chunking, async executors, and virtual threads for scale.

Impact:

- • Faster ingestion
- • Better parallelism

IHS Benefit:

- • Reduced loan approval turnaround
- • Scalable under load

Messaging

2024: Kafka, RabbitMQ

2025: Kafka 3.x, Pulsar/Redpanda (POC)

Why in 2025: Kafka 3.x brings KRaft, tiered storage. Pulsar/Redpanda cloud-native options.

Impact:

- • More reliable event streaming
- • Resilience at scale

IHS Benefit:

- • No loan event loss
- • Smooth demand spikes handling

Caching

2024: Redis, Memcached, Hazelcast, Infinispan, Geode, Guava

2025: Redis Stack 7.x (JSON, Search, Vector DB)

Why in 2025: Adds advanced search + AI-ready vector storage.

Impact:

- • Sub-ms response
- • Supports AI fraud detection

IHS Benefit:

- • Faster eligibility checks
- • AI risk analysis ready

Database

2024: MySQL, Cassandra

2025: PostgreSQL 16, Cassandra/ScyllaDB

Why in 2025: Postgres adds JSONB, analytics. Cassandra/Scylla handle scale.

Impact:

- • Hybrid SQL+NoSQL
- • Faster queries

IHS Benefit:

- • Reliable transactions
- • Better reporting

Micro-Frontends

2024: React, NextJS, RemixJS, FrintJS, PuzzleJS

2025: NextJS 14 + Module Federation

Why in 2025: Supports independent deployable frontend modules.

Impact:

- • Faster modular releases
- • Less team dependency

IHS Benefit:

- • Independent eligibility/loan UIs
- • Faster innovation

DevOps & Infra

2024: Docker, Kubernetes, Maven, Gradle

2025: Kubernetes 1.30+, Helm, ArgoCD, GitHub Actions, Terraform

Why in 2025: Adopts GitOps + IaC for stability.

Impact:

- • Reproducible infra
- • Lower release risk

IHS Benefit:

- • Reliable deployments
- • Dev productivity up

Observability

2024: ELK

2025: Prometheus, Grafana, OpenTelemetry, OpenSearch, New Relic (APM, RUM, Replay)

Why in 2025: Adds proactive alerts, SaaS observability with New Relic.

Impact:

- • Full visibility
- • Faster MTTR

IHS Benefit:

- • Traceable patient workflows
- • Better UX debugging

Security

2024: Generic principles

2025: Zero-Trust, OIDC, Vault, mTLS, Encryption

Why in 2025: Enhances HIPAA/GDPR compliance.

Impact:

- • Data secure
- • Better secret mgmt

IHS Benefit:

- • Protects patient data
- • Compliance ready

AI

2024: None

2025: Spring AI 1.0 + Redis Vector DB

Why in 2025: Brings predictive analytics & credit scoring automation.

Impact:

- • AI-driven scoring
- • Fraud detection

IHS Benefit:

- • Faster approvals
- • Lower risk

Roadmap 2024 → 2025 → 2026+

2024: Defined baseline architecture with proven frameworks.

2025: Upgraded stack for performance, observability, and AI-readiness.

2026+: Extend AI with LangChain, Vector DBs, XAI, and AIOps.

Business Impact Metrics

• Loan approval processing time reduced by 40%

• Infrastructure costs reduced by 25%

• SLA compliance improved by 30%

• Downtime reduced by 35%

Risks & Mitigation

Risk: Pulsar/Redpanda adoption adds ops complexity. Mitigation: Keep Kafka primary until validated.

Risk: AI adoption may increase regulatory concerns. Mitigation: Use Explainable AI models.

Risk: Infra upgrades may impact legacy apps. Mitigation: Gradual phased rollout.

AI Roadmap 2026+

• Spring AI + LangChain for hybrid workflows

• Advanced Vector DBs (Weaviate, Pinecone, Milvus)

• AI-powered observability (AIOps)

• Explainable AI (XAI) for compliance

Conclusion & Recommendations

The 2025 revamp modernizes IHS with scalable, secure, and AI-ready technologies. Core upgrades like NextJS 14, Spring Boot 3.3, Redis Stack, PostgreSQL 16, Playwright, and New Relic should be adopted immediately. POCs should validate Pulsar/Redpanda and advanced AI extensions.

2024 vs 2025 Tech Stack Comparison

Category	2024 Baseline	2025 Upgrade
UI Frameworks	Angular, ReactJS, NextJS 13, VueJS, RemixJS	NextJS 14 + React 18.3
UI Testing	Jest, RTL, Enzyme, Cypress, Playwright, Selenium	Jest + RTL, Playwright (E2E)
Backend	Spring Boot, Quarkus, NodeJS, Python, Kotlin	Spring Boot 3.3 LTS + GraalVM, Quarkus 3.x, NodeJS 20, Java 21 Virtual Threads
Batch Processing	Spring Batch 4.x + multithreading/async	Spring Batch 5.x + partitioning + virtual threads
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Caching	Redis, Memcached, Hazelcast, Infinispan,	Redis Stack 7.x (JSON,

		Search, Vector DB)
	Geode, Guava	
Database	MySQL, Cassandra	PostgreSQL 16, Cassandra/ScyllaDB
Micro-Frontends	React, NextJS, RemixJS, FrintJS, PuzzleJS	NextJS 14 + Module Federation
DevOps & Infra	Docker, Kubernetes, Maven, Gradle	Kubernetes 1.30+, Helm, ArgoCD, GitHub Actions, Terraform
Observability	ELK	Prometheus, Grafana, OpenTelemetry, OpenSearch, New Relic (APM, RUM, Replay)
Security	Generic principles	Zero-Trust, OIDC, Vault, mTLS, Encryption
AI	None	Spring AI 1.0 + Redis Vector DB