

# Enterprise Remittance Platform

## Multi-Brand International Money Transfer System — Architecture Case Study

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Role	Backend Architect & Technical Lead	Stack	NestJS   TypeORM   MySQL 8
Duration	2 years (2023 – 2025)	Markets	EU   USA   UAE   Canada
Platform type	Multi-brand remittance SaaS	Schema size	115+ tables across 8 modules

### Project Overview

This project involved a full ground-up re-architecture of a legacy Oracle-based remittance system into a modern, multi-brand, multi-jurisdiction SaaS platform. The platform enables three distinct international remittance brands to operate simultaneously under a shared backend infrastructure, each mapped to a separate legal entity and regulatory framework across the EU, United States, UAE, and Canada.

I served as sole backend architect and technical lead — responsible for all database schema design, API architecture, third-party integrations, compliance systems, and DevOps configuration throughout the full 2-year engagement.

### The Challenge

- Migrate a decade-old Oracle/legacy remittance system to a modern Node.js SaaS without disrupting live operations
- Design a single backend that supports multiple brands, legal entities, and currencies simultaneously
- Meet regulatory compliance requirements across four different jurisdictions simultaneously (EU, US, UAE, Canada)
- Build an enterprise-grade KYC/AML compliance layer integrated with third-party identity verification
- Handle high-volume transaction reporting with 17M+ rows while maintaining query performance under load

### Technical Architecture

Layer	Technology	Detail
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Backend Framework	NestJS + TypeScript	Modular architecture with layered Controller → Service → Repository pattern
Database	MySQL 8	115+ tables, UUID as BINARY(16), composite covering indexes, partitioned audit logs
ORM	TypeORM	Custom repositories, raw query optimization, zero-downtime migration patterns
Message Queue	RabbitMQ	Async notification pipeline — email, SMS, and in-app alerts across brands
Secrets Management	HashiCorp Vault	KV v2 secrets engine, ACL policy management, dynamic token-based auth
Authentication	SAML 2.0 / SSO	Market-specific SSO, one-time Redis tokens for cross-application authentication
KYC / Identity	Third-party KYC API	Document verification, biometric face match, AML screening integration
Deployment	Docker + Reverse Proxy	Containerized microservices, PM2 process management, Cloudflare tunnel
Frontend	Angular	Admin portal with WebView integration for mobile payment app flows

## Database Schema — Modules Designed

Full schema designed across 8 major modules totalling 115+ tables:

- **User Management** — Corporate group hierarchy, legal entities, business units, locations, roles, and permissions
- **Customer Management** — Compliance-grade customer profiles, PII encryption, UUID BINARY(16) storage, KYC status tracking
- **Compliance (KYC/AML)** — Risk-based screening, third-party KYC integration, sanction list checks, risk scoring
- **Remittance Engine** — Multi-currency FX rate engine, send money flows, international payment network corridor integrations
- **Audit & Change Tracking** — Partitioned change log tables with JSON snapshots, password histories, FX rate histories
- **Notifications** — RabbitMQ-based pipeline, multi-channel delivery (email, SMS, in-app), multi-brand routing

- **Approval Workflow** — Multi-level approval chains across business units with configurable routing rules
- **Reporting** — 17M+ row transaction report tables with composite covering indexes and performance optimization

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## Key Technical Deliverables

- Full legacy-to-modern migration strategy — schema redesign, data type mapping, business logic rewrite in TypeScript
- FX rate engine with configurable per-brand markup rules and historical rate tracking
- Zero-downtime migration framework for schema changes on live production tables
- PII encryption strategy with field-level encryption for sensitive customer data in MySQL
- FATCA-compliant customer schema with generated column workaround for nullable unique index enforcement
- Comprehensive API security implementation — JWT rotation, rate limiting, CORS remediation, IP allowlisting
- Cross-application SSO using one-time tokens stored in Redis with configurable TTL
- Full data dictionary (115+ tables) prepared for regulatory and client stakeholder review

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## Compliance & Regulatory Coverage

Platform designed to meet multi-jurisdictional regulatory requirements simultaneously:

Regulation	Technical Implementation
FATF / AML	Risk-based screening, transaction monitoring hooks, immutable audit trails
FATCA	US person identification fields, tax status tracking in customer schema
GDPR	PII encryption at rest, data retention policies, right-to-erasure architecture
KYC / eIDAS	Biometric + document verification, market-specific digital identity (SAML 2.0)
Multi-jurisdiction	Separate legal entity mapping per market — EU, USA, Canada regulatory frameworks

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## Scale & Impact

<b>115+</b>	<b>17M+</b>	<b>4</b>	<b>3</b>
Database tables designed	Rows in transaction reporting table	Regulatory jurisdictions	Brands on one shared platform

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## What I Can Do For Your Project

- Design and build compliance-ready fintech backends from scratch — payments, remittance, lending, KYC
- Architect multi-tenant SaaS platforms with complex organizational hierarchies and permission systems
- Migrate legacy systems (Oracle, MSSQL) to modern NestJS + MySQL/PostgreSQL architecture
- Integrate third-party financial services — KYC providers, payment gateways, FX data feeds
- Build high-performance database schemas optimized for financial transaction volumes
- Implement enterprise security — Vault secrets management, SAML SSO, field-level PII encryption

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