



# From Legacy Infrastructure to Enterprise Cloud **Using a Co-existence Framework**

## Client overview

The Reserve Bank of India (RBI) is the central bank of one of the world's largest G20 economies and operates as the systemic backbone of India's financial infrastructure. With a balance sheet size of approximately USD 0.92 trillion, RBI manages the nation's monetary policy, maintains foreign exchange reserves, facilitates public debt issuance and servicing (bonds and bills), manages the entire currency lifecycle, and provides national-scale payment and receipt services for **51+ government entities** while regulating the banking industry to ensure financial stability.

RBI's central banking operations support a vast ecosystem comprising **450+ member financial institutions**, government bodies across central and state levels, and national payment and

settlement infrastructures. The institution processes **USD 666+ billion in payments and USD 588+ billion in receipts annually**, operating one of the most complex and high-volume central banking environments globally.

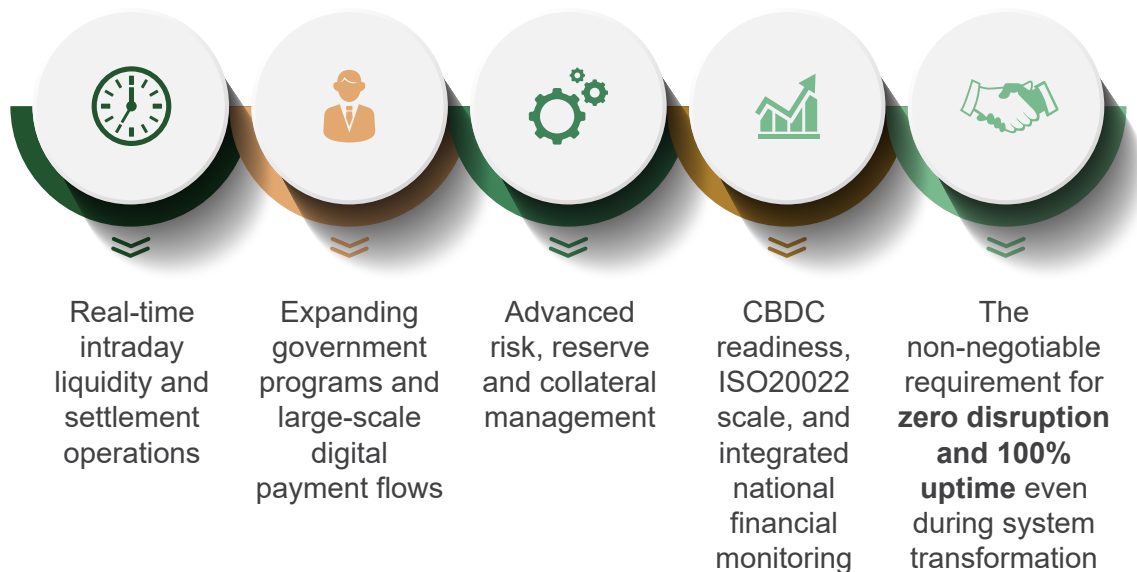
In 2011, RBI embarked on a modernization journey by transforming four large mainframe systems into Intellect Quantum (eKuber 1.0) deployed on HP Superdome. In 2023, this was further evolved into the next-generation **Intellect Quantum (eKuber 2.0)** built on eMACH.ai architecture, with seven **MVPs released over a 21-month period using a carefully architected co-existence framework**, establishing RBI as one of the most technologically progressive central banks worldwide.

## Challenges

RBI operates mission-critical national financial infrastructure that must deliver 24x7x365 uninterrupted operations while enabling continuous policy execution, liquidity management, government disbursements, public debt servicing, and currency lifecycle management. Over time, explosive growth in

digital payments, government transactions, and settlement volumes pushed annual transaction volumes close to, and beyond, one billion transactions per year, creating unprecedented demands on scalability, resilience, security, and cost efficiency.

The earlier monolithic mainframe-centric architecture, despite prior modernization efforts, faced increasing limitations in handling:



RBI required a future-ready, highly composable, cloud-native architecture that could be enhanced continuously without system redeployment, while accommodating **thousands of government accounts under each entity** and enabling seamless onboarding of new functional modules with minimal or no operational impact.

## Solution

To address these systemic challenges, RBI adopted the next-generation **Intellect Quantum (eKuber 2.0)**, the world's first and only digital banking platform purpose-built exclusively for central banks, engineered on **eMACH.ai (Events-driven, Microservices-based, API-first, Cloud-native, Headless with embedded AI)** architecture and deployed on RBI's private enterprise cloud.

The transformation was executed through a **21-month co-existence upgrade journey** from

eKuber 1.0 to eKuber 2.0, enabling continuous policy implementation with **zero disruption and 100% uptime** across national financial operations. The solution is deployed on a **multi-zone, self-healing, containerized Tanzu enterprise cloud**, with IBM Z16 infrastructure supporting high-performance databases, fully automated DevSecOps pipelines, rolling upgrades, automated workload failover, and continuous delivery using Kubernetes Blue/Green hot deployments.

## Functional Scope Powered by Intellect Quantum

RBI's entire central banking ecosystem is supported through an integrated, real-time platform delivering:

### Banking Services

- Online portal with 300+ services for 450+ FIs
- Vault/Teller Management
- Continuous clearing & remittances
- Agency banking for government transactions
- Comprehensive fees and charges management

### Credit / Market Operations

- Monetary policy tools & market operations
- Fully automated intraday liquidity and RTGS settlements
- Advanced collateral management

### Government Services

- National Treasury Single Account (TSA)
- Budget-linked government accounts
- Automated surplus/deficit management
- Advanced sweeping & pooling for thousands of government accounts
- Support for foreign borrowing and sovereign gold bonds

### Currency & Vault Management

- End-to-end digital currency lifecycle management with real-time monitoring

### Reserve Portfolio Management

- FX, FI, MM, Derivatives, Limits, IMF SDR, ACU, deal simulation
- Fully automated deal lifecycle and multidimensional risk analytics

### Enterprise General Ledger

- Monetary policy tools & market operations
- Fully automated intraday liquidity and RTGS settlements
- Advanced collateral management

### Depository & Public Debt Management

- Full lifecycle management for central, state and municipal bonds/bills
- Depository and underwriting support

### Trade Finance

- End-to-end LC lifecycle and export credit refinance

### National Payments & Settlements

- GST and government payments/receipts
- CBDC-ready payment and settlement infrastructure

## Transformation Highlights

Achieved **100% uptime** with continuous policy implementation during migration.

RBI is now among the **first central banks globally** to operate complete central banking functions on an enterprise cloud.

**85%+ Straight-Through Processing (STP)** across operations.

Fully managed cloud infrastructure with 24x7x365 operational support from Intellect.

High-availability, multi-cluster, multi-site deployment delivering superior scalability, resilience, security, and operational agility.

Enhanced real-time dashboards, **70+ contextual business dashboards**, multilingual user experience, in-built chatbot, simplified 3-click access to data, and flexible ad-hoc reporting.

Continuous composability, new modules can be added or configured without redeployment.

Enhanced cybersecurity with multi-layered data, transport, storage, access and integration security frameworks certified by leading security organizations.

## Metrics at a Glance

Indicator	Scale & Performance
Annual Transactions	~1.2 Billion
Govt Payments/Receipts	~997 Million per year
Value of ePayments/eReceipts	~USD 1.35 Trillion (~₹113 Trillion)
Cost per Transaction	~₹0.39 (~USD 0.0043)
Infrastructure Footprint	72-core Dell x86 Tanzu Cloud + 39 IFLs IBM Z16
Benchmark Throughput	113M+ txns/day, 30M+ ISO20022 msgs/day
Ecosystem Coverage	450+ FIs, 51+ Govt Entities
Architecture	eMACH.ai, microservices, API-first, cloud-native
STP Coverage	85%+
Key Components	60+ business components, 70+ microservices, 350+ services, 750+ user journeys

This positions RBI not only as one of the world’s largest central banks by volume, but also as one of the most technologically advanced, cost-efficient and operationally resilient central banks globally, powered end-to-end by Intellect Quantum on eMACH.ai.

