

Aadhaar - World's Largest Biometric Identity System Using MapR NoSQL DB

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DATA TECHNOLOGIES

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Unique Identity Authority of India: Vision

To empower residents of India with a unique identity and a digital platform to authenticate anytime, anywhere.

Why does India need AADHAAR?



- **1.3+ billion** residents → **1.5B+ in 2030**
 - 640,000 villages, ~60% lives under \$2/day
 - ~75% literacy, <3% pays Income Tax, <20% banking
 - **~800 million mobile, ~200-300 mn migrant workers**
- Govt. spends about **\$25-40 bn** on direct subsidies
 - Residents have **no standard identity** document
 - Most programs plagued with ghost and multiple identities causing **leakage of 30-40%**

Aadhaar's Bold Vision

What Aadhaar Will Do

Common “national identity” for every “resident”

- Biometric-backed identity to eliminate duplicates
- “Verifiable online identity” for portability

Ecosystem using open APIs

- Aadhaar-enabled bank account and payment platform
- Aadhaar-enabled electronic, paperless KYC (Know Your Customer)

How Aadhaar Does It

Enrollment

- One time in a person's lifetime
- Minimal demographics
- Multi-modal biometrics (fingerprints, iris)
- 12-digit unique Aadhaar number assigned

Authentication

- Verify “you are who you claim to be”
- Open API based
- Multi-device, multi-factor, multi-modal

Requirements from Authentication and Auditing System

Million registrations/day

Trillion matches - for integrity

Can't go down → NameNode issues unacceptable

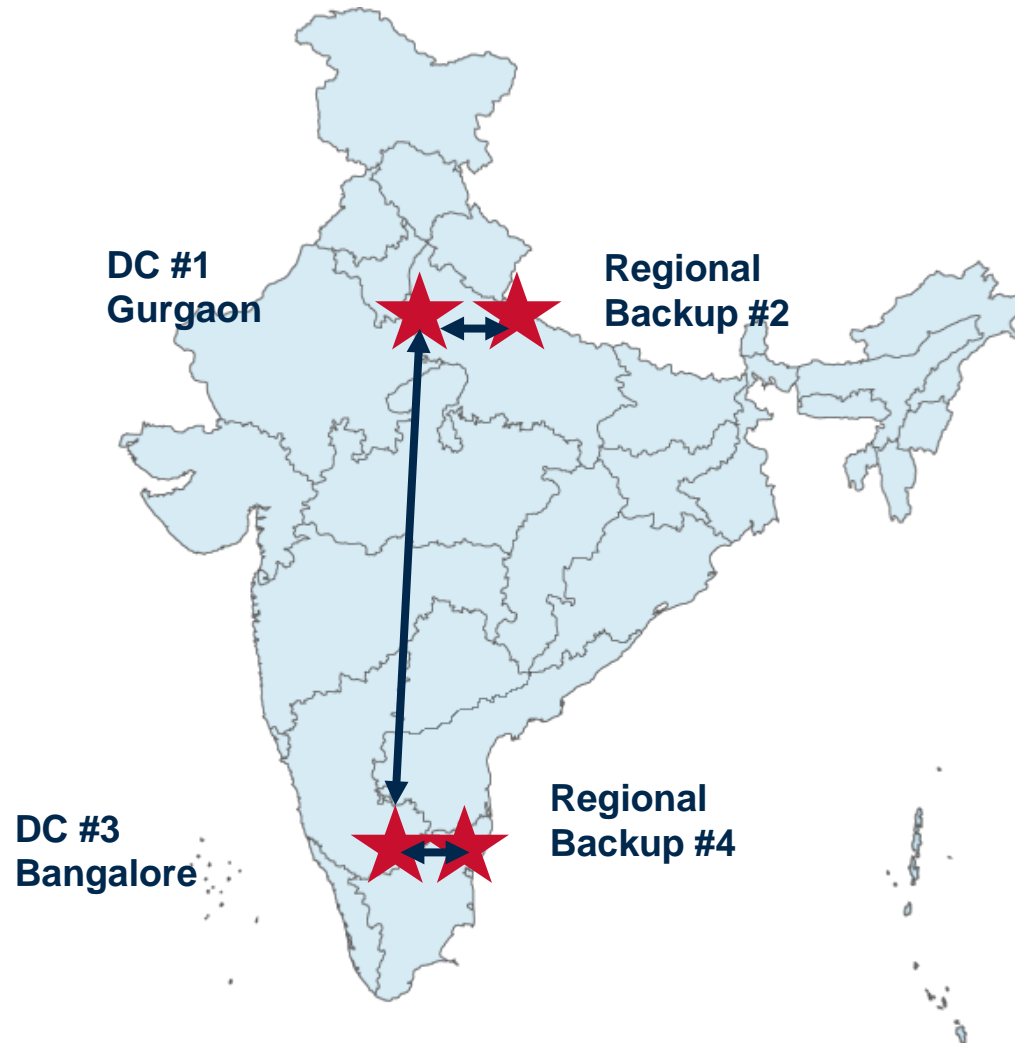
Detect duplicates, fraud continuously → Very high performance

Hundreds of millions of authentications per day with high peaks

Sub-second response → 99%ile guarantees from DB
> 100 million auths per day (~10 hours)

Multi-Data Center system for Aadhar

- Real Time Replicated across geography
 - Resiliency
 - Load balancing
 - Backup

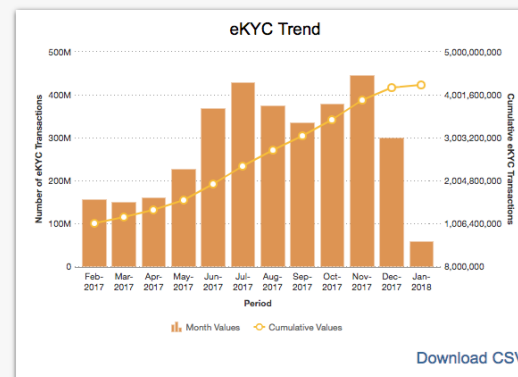
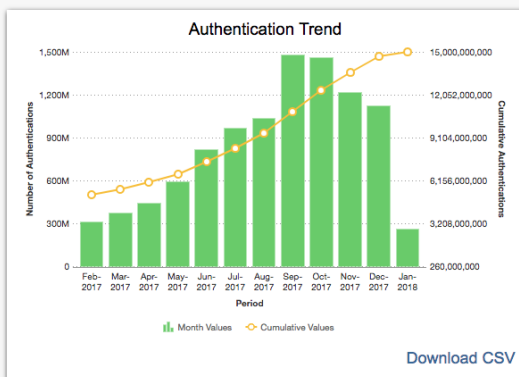
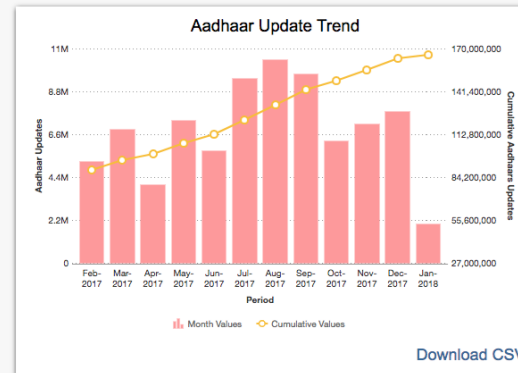
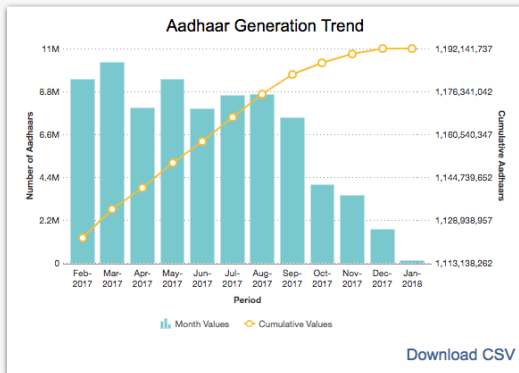
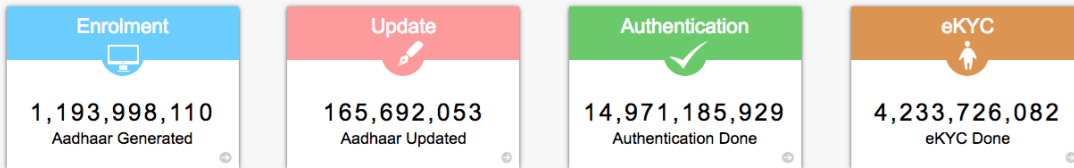


How's It Doing in Production?

https://www.uidai.gov.in/aadhaar_dashboard/



Welcome to AADHAAR Dashboard



Approximately 250M transactions per day - expect to grow to 500-600 million

~180TB of MapR-DB data, 49TB of biometric and geographic info

10s of app invoking authentication services

Sub-second SLAs – serving 140 ms to 170 ms at peaks

Multi data centers – Real Time Replicated

MapR DataBase - Key Technical Features



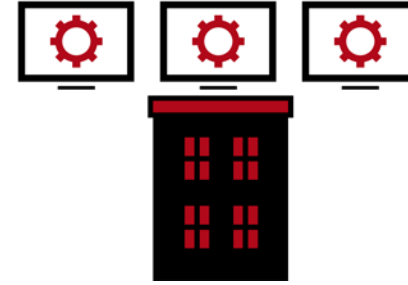
Extreme Performance and Effortless Horizontal Scale



Strong Consistency No Data Loss



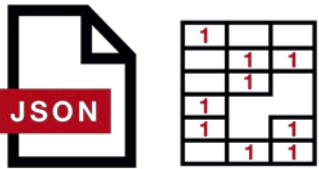
Extremely High Availability



Optimized Multi-Tenancy for 1000s of Apps



Global Multi-Master Replication



Multi-Model Flexibility



Native JSON Simplicity with Expressive Queries



In-Place SQL and Advanced Analytics/ML



Integrated Streaming for Real-Time Data Ingest, Processing, and Integration



Robust Security and Fine-Grained Access Control

Thanks