

National Blockchain Framework - Strengthening Governance through Blockchain Technology

Mains: *GS II - Government Policies and Interventions for Development in various sectors.*

Why in News?

Recently, India is infusing the blockchain technology in many aspects of governance through the National blockchain framework.

What is the National blockchain framework (NBF)?

- **Launched on** - National Blockchain Framework was launched in September 2024 with a 64.76 crore rupees budget.
- **Crucial landmark for governance** - It marks India's strategic step towards developing a secure, transparent, and scalable digital governance infrastructure.
- It provides a unified architecture to deploy blockchain-based applications across public sectors, ensuring trust, transparency, and accountability in governance.
- As of 21 October 2025, over 34 crore documents have been verified on blockchain platforms deployed under the NBF.

What is blockchain technology?

- **Definition** - Blockchain is a distributed, transparent, secure, and immutable digital ledger that records transactions across a network of computers. It ensures data integrity and eliminates the need for intermediaries.
- Types of Blockchain -
 - **Public Blockchain** - In this network, all nodes can access records, verify transactions, perform proof-of-work, and add new blocks.
 - **Private Blockchain** - It is a permissioned blockchain, restricted to selected participants within an organization.
 - The controlling entity determines the levels of security, authorization, and access, making it ideal for government applications.
 - By design, it enhances trust among participants while ensuring data confidentiality and operational efficiency.
 - **Consortium Blockchain** - In this network, the blockchain is semi-decentralized, governed jointly by multiple organizations for shared data management and validation.
 - **Hybrid Blockchain** - It is a blend of public and private blockchains allowing selective data access.

- **Core strengths** - Transparency, Immutability, Decentralization, and Trust, these form the foundation of the NBF.

Why blockchain for governance?

- **Centralised database** - India's administrative systems rely heavily on centralized databases, prone to fraud, data breaches, and inefficiency.
- **Potential of blockchain** - Blockchain's tamper-resistant distributed architecture ensures:
 - Verifiable trust without intermediaries,
 - Reduced corruption,
 - Faster service delivery,
 - Enhanced data integrity.

What are the key components of the national blockchain framework?

- **Vishvasya Blockchain Stack** - It serves as the technical backbone of the NBF.
- It is a modular and indigenous platform developed by the National Informatics Centre (NIC).
- It has the following features:
 - **Blockchain-as-a-Service (BaaS)** - It allows departments to deploy blockchain applications without creating their own infrastructure.
 - **Distributed Infrastructure** - It is deployed across NIC Data Centres in Bhubaneswar, Pune, and Hyderabad, ensuring fault tolerance and scalability.
 - **Permissioned Blockchain** - Only verified participants can validate transactions.
 - **Open APIs** - Ensures smooth integration with e-Governance platforms.
- **NBFLite - Sandbox for Startups and Academia** - It is a lightweight version of the blockchain stack for innovation and experimentation.
- It enables startups, researchers, and students to:
 - Build prototypes without large-scale deployment,
 - Use smart contract templates in governance areas such as Supply Chain and Digital Certificates.
- This promotes capacity building and innovation in the blockchain ecosystem.
- **Praamaanik - App Verification System** - It is developed to counter malicious and fraudulent mobile apps.
- Praamaanik uses blockchain to:
 - Verify authenticity and source of applications,
 - Match app data with blockchain records,
 - Ensure trust and safety in the digital marketplace.
- **National Blockchain Portal** - It is a centralized platform that documents India's blockchain strategy, promotes standardization, and cross-sector adoption.
- It supports both governance and industry use cases, showcasing India as a global blockchain leader.

What are uses of blockchain in governance?

- **Certificates and Document Chain** - It solves the problem of fraudulent documents and delays in verification.

- **Certificate Chain** - It is used by CBSE for storing academic certificates securely.
- **Document Chain** - It is a standardized system for government-issued documents (caste, income, birth/death certificates, etc.).
- As of October 2025, 34 crore documents verified, including 48,000 on Document Chain.
- **Logistics Chain** - It enables traceability and transparency across supply chains.
- It is used in Aushada, Karnataka's medicine supply chain system.
- Tracks movement from manufacturer to hospital, ensuring quality and authenticity.
- Helps patients verify drug details, preventing spurious medicines.
- **Judiciary Chain** - It introduced to digitize and secure judicial processes.
- It records judicial data with time-stamped immutability.
- It enables electronic notices, summons, and bail orders.
- 665 judiciary documents verified as of October 2025.
- **Inter-Operable Criminal Justice System (ICJS)** - It integrates the entire criminal justice ecosystem from police to judiciary.
- Creates a unified blockchain platform for case records and evidence.
- 39,000+ ICJS documents verified on the blockchain (Oct 2025).
- **Property Chain** - It addresses land and property disputes through transparent transaction records.
- Stores full property ownership history on blockchain.
- Reduces litigation, prevents fraudulent transfers, and speeds up land registration.
- Over 34 crore property-related documents verified via blockchain.
- **Future prospects** - The government is exploring new blockchain-based Proof of Concepts (PoCs) in various domains:
 - **Land Records** - Secure ownership verification
 - **Blood Bank** - Transparent donation tracking
 - **GST Chain** - Real-time tax data monitoring
 - **Public Distribution System (PDS)** - Prevents leakages and fraud in food supply
- These initiatives aim to promote interoperability, citizen trust, and digital transformation.

What are the institutional and regulatory support?

- **National Strategy on Blockchain** - It is developed by MeitY, this strategy outlines short-term and long-term goals, including:
 - Integration across public sectors,
 - Development of national standards, and
 - Building interoperability between blockchain systems.
- **Centre of Excellence (CoE) in Blockchain Technology** - It is set up by National Informatics Centre (NIC).
- The CoE provides:
 - Consultancy, training, and support for pilot projects,
 - ICT infrastructure for blockchain adoption,
 - Collaboration with global platforms like Hyperledger Fabric, Ethereum, and Sawtooth.

- **Telecom Regulatory Authority of India (TRAI)** - It implemented Distributed Ledger Technology (DLT) for telecom regulation.
- It registers Principal Entities and Telemarketers for SMS tracking.
- It reduces spam and fraud.
- 1.13 lakh entities registered with DLT across sectors in coordination with RBI, SEBI, NIC, and C-DAC.
- **Reserve Bank of India (RBI)** - It is using blockchain for Digital Rupee (e-Rupee) pilots since December 2022.
- It enables instant, transparent, and traceable financial transactions.
- It promotes financial inclusion and secure digital payments.
- **National Securities Depository Limited (NSDL)** - It adopted blockchain for Debenture Covenant Monitoring.
- It enables tracking of asset charges and covenant compliance.
- It provides tamper-proof, time-stamped audit trails for investor confidence.

What is the capacity building in blockchain technology?

- **Skill Development Programmes** - To ensure sustainable adoption, MeitY and its partners have introduced multiple training and education programs.
- The ministry has conducted 214+ programs, training 21,000+ officials.
- It focusses on practical blockchain application in governance.
- **PG Diploma in FinTech & Blockchain Development (PG-DFBD)** - It is A 900-hour comprehensive course covering Blockchain, FinTech, AI/ML, Cybersecurity, and Regulations.
- It trains professionals for careers in emerging technologies.
- **BLEND Programme by C-DAC** - It is an online training for engineering students and professionals.
- It covers blockchain architecture, components, and real-world use cases.
- **FutureSkills PRIME** - It is a national reskilling initiative by MeitY.
 - It trains youth and professionals in 10 emerging technologies, including blockchain.
 - It strengthens India's digital workforce.

What lies ahead?

- The National Blockchain Framework reflects India's commitment to Digital India and Aatmanirbhar Bharat.
- By embedding trust and transparency into digital systems, the NBF is revolutionizing governance and service delivery, fostering innovation and skill development, and positioning India as a global leader in blockchain governance.
- With over 34 crore verified documents and expanding use cases across governance, judiciary, and finance, India is building an interoperable blockchain ecosystem that ensures inclusive, efficient, and accountable digital growth.

Reference

[PIB| National Blockchain Framework](#)



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