# Blockchain - Bringing Accountability in the Public Distribution System

Introduction:

- Public Distribution System (PDS) used by Central and State governments in India for subsidized food grain distribution.

- Prone to losses due to corruption and physical losses during storage and transport.

- Blockchain proposed as a decentralized solution to replace the current centralized system.

- Introduces an intelligent scheme for commodity tracking using IoT sensors.

Objectives:

- Identify and verify commodity arrival and dispatch using IoT sensors.

- Record valid transactions in a tamper-proof blockchain.

- Implement a hierarchical blockchain approach to reduce data storage and allow for aggregate information at higher levels.

Methodology:

- Warehouses and fair-price shops equipped with IoT sensors for monitoring commodities.

- Sensors trigger transactions for events like arrival, dispatch, and weight.

- Transactions validated through smart contracts and recorded in a tamper-proof blockchain.

- Hierarchical blockchain approach used to summarize local transactions and reduce data storage.

Mode of Operation:

- Three types of transactions: Commodity Arrival, Commodity Dispatch, Summarize Operation.

- Each transaction triggers a smart contract for validation.

- Conditions for validation include matching arrival and dispatch records and aggregation of summarize operations.

- 60% consensus required for validation; valid transactions written into the block.

Consensus Mechanism:

- Proof of Stake consensus mechanism chosen to reduce computation load.

- Nodes treated equally or designated based on criteria like age or random selection to write blocks.

- Chosen node writes the block to the blockchain, ensuring consistency among all nodes.

Conclusion:

- Proposed system ensures transparency and prevents tampering in PDS transactions.

- Integration of IoT sensors provides a complete tracking system during transit and storage, reducing the scope of theft.

- Blockchain-based decentralized model enhances trust and accountability in the PDS system.