Project Design Phase-I

Solution Architecture

Date	29 October 2023
Team ID	NM2023TMID03930
Project Name	Biometric security system for voting platform
Maximum Marks	4 Marks

Solution Architecture:

- Users register their biometric data (e.g. fingerprint, facial scan) to validate their identity. This biometric data is stored securely on the block chain.

- When a user goes to vote, they provide a biometric sample at the voting station. This is compared to the stored biometric data to verify their identity.

- Once verified, the user can cast their vote which is recorded on the block chain as a transaction. The vote is   encrypted before being added to the block chain.

- The block chain network maintains a decentralized ledger of all votes cast. The encryption ensures votes remain private while the decentralization provides security and immutability against tampering.

- Biometric samples and data are validated using AI/ML algorithms to protect against spoofing attacks. The decentralized network of nodes must reach consensus to add new votes to the block chain.

- Access control policies enforced through smart contracts ensure only authorized voters can participate and votes can only be cast during designated voting periods.

- Results can be tallied by authorized entities by decrypting vote transactions on the blockchain. The decentralized nature provides transparency and verifiability of results.

Development phases:

- Planning - Requirements gathering, design and architecture.
- Development - Coding smart contracts and ML models, building apps and blockchain network.
- Testing - Rigorously testing each component before deployment.
- Deployment - Deploying apps, dashboards, blockchain network in production.
- Maintenance - Managing updates, improvements and support.

Key requirements:

biometric registration and verification, anonymous encrypted voting transactions, decentralized blockchain ledger, smart contracts, AI/ML anti-spoofing mechanisms, consensus mechanisms, and encryption/decryption of votes. The architecture prioritizes privacy, security, transparency, and accessibility.
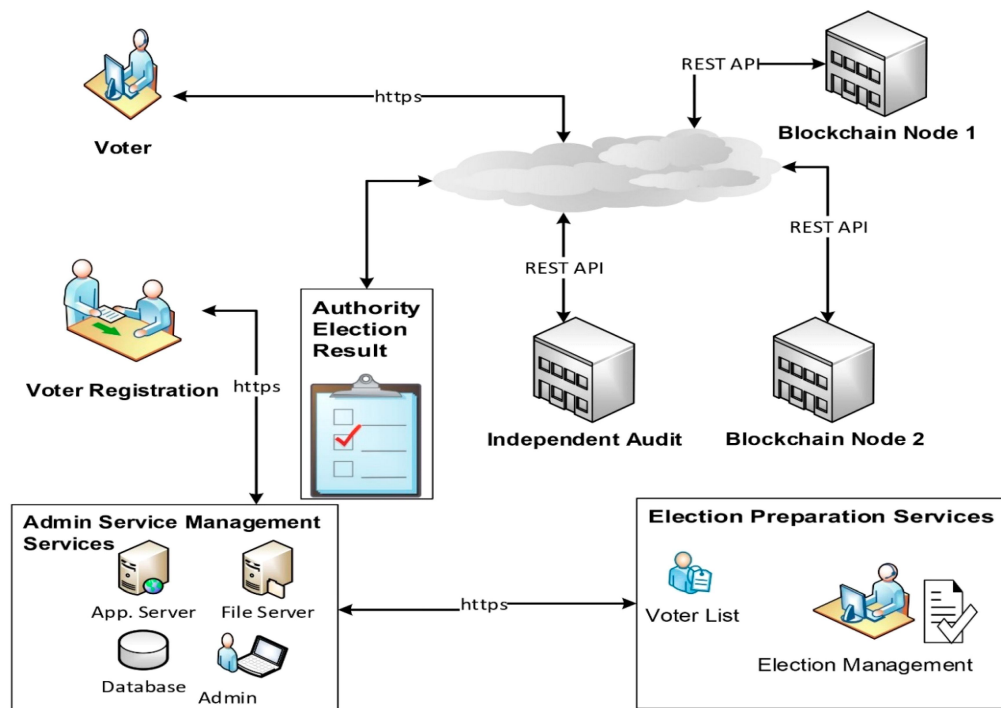

Figure 1: Solution Architecture for Block chain Based Smart Real Estate Management