Building E-voting system using blockchain

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Problem Statement

- Voting should be very secure with a decentralised server
- A voter should have the ability to verify his vote anytime
- It should be accessible and tamper proof

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CURRENT SOLUTIONS

Paper Ballot	Paper Ballots cost a lot of amount per vote and have the issue of having damaged votes.
EVM	EVMs provide ease of access and lower cost, but they are still prone to tampering.
HEAD COUNT	Simple but only practical for a limited participants such a Board Meeting.

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Our Solution: Blockchain

Blockchain with a decentralised server .....

Decentralized

No Central Server.
No Single Point of Failure.

Immutable

Formed by a complicated string of numbers.
Impossible to be altered.

Transparent

Verifiable and Trusted.
Provides voters a sense of assurance.

Blockchain

A blockchain, is a growing list of records, called blocks, that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree). By design, a blockchain is resistant to modification of its data. This is because once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks

Existing System: #1

Implementing Electronic Voting System With Blockchain Technology

Kaudare, A., Hazra, M., Shelar, A., & Sabnis, M. (2020). 2020 International Conference for Emerging Technology (INCET). **doi:10.1109/incet49848.2020.9154116**

The Solution proposed in this system provided a Secure System which provided a Secure way to conduct elections.
Their Solution ensured the following:

1. Transparency
2. The integrity of Ballot
3. Privacy of Voter
4. Accessible to every voter
5. One Voter One Vote

Their Solution proposed registering of voters in the registration phase and verification by multiple nodes. Similar process to apply for candidacy for an election. During the voting phase all eligible voters will be given a one time key to cast their vote, which will increment the vote count of the selected candidate.

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System #1: Pros & Cons

1. Voters need to register once.
2. Uses Hyperledger Fabric making it more performant.
3. The System is controlled by central authority it is possible to give access to only eligible stakeholders.
4. The nodes of the network are distributed at-least one in each district.

1. Requires trust in the central authority for accessibility and fair treatment of all stakeholder.
2. User cannot verify his vote after casting it.

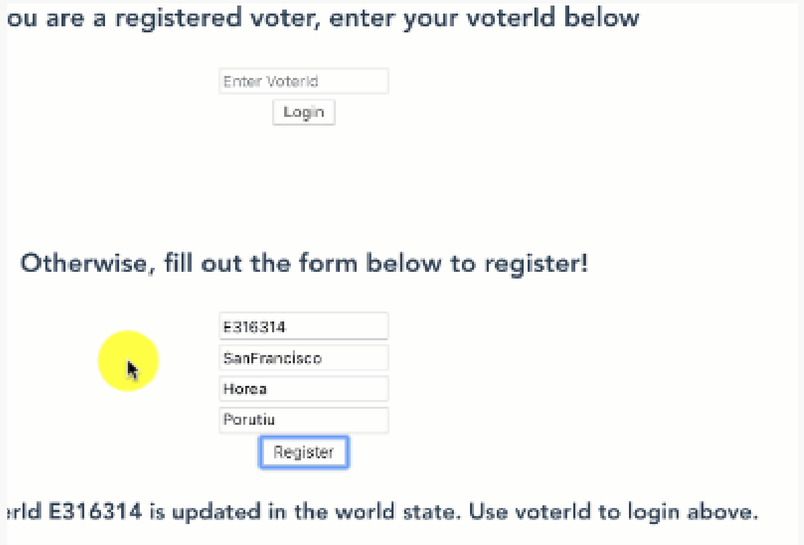
Existing System: #2

IBM/evote

https://github.com/IBM/evote

A voting application that leverages Hyperledger Fabric and the IBM Blockchain Platform to record and tally ballots.

We aim to build a web-app in which the voter can register with their drivers license, get a unique voterId which is used to login to the app, and cast the vote. The vote is tallied on the blockchain, and the web-app shows the current standings of the polls.



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System #2: Pros & Cons

1. User can verify his vote after casting it.
2. Deployed on IBM Kuberenetes gives you node at a very fast speed
3. Voters need to register once.
4. Uses Hyperledger Fabric making it more performant.
5. IBM Blockchain is completely decentralised and takes the core values of blockchain

1. IBM Blockchain has a very tedious way of renewing certificates often taking way longer time than needed
2. Requires a paid account as well as need to buy other services for deployment and with the cost of kubernetes is very costly

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Our Plan

We wish to create a voting solution which preserves the core values of an Election.

Accessible	The election should be accessible to each eligible individual and his/her vote should have equal worth.
Transparent & Verifiable	The Voting System should be transparent hence providing the individual trust on the system as well as the Election Results. The system should also allow the users to check their casted vote for verification
Integrity (Tamperproof)	The System should be resilient towards malpractices and attacks, hence providing security and trust to the individual.

OUR PLAN

Blockchain Platform	Ethereum, Hyperledger, IBM Blockchain
Blockchain Type	Public, Permissioned, Flexible

We plan to Implement all three core values i.e. Accessibility, Transparency and Integrity with our solution.

We are currently in process of selecting a blockchain platform which meets our requirements and is performant.

References

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Thank You

We mean it.