

A Peer-To-Peer based System with Blockchain for Secured Voting Scheme (E-Voting)

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Abstract: In today's world, when information safety is essential, blockchain is supreme for distributing that information because it gives instantly, provides, and completely unambiguous information stored on an immutable (unchangeable) ledger that can be accessed only by authorized network members. Blockchain increases trust, safety, clarity (Transparency), and the traceability of information transferred across a network. Today voting systems tolerate different safety threats and similarly distributed denial of service attacks (DDoS). Polling booth capturing, vote modification, and unfairly, gaining unlawful (unofficial) access to a computer system. The main objective of a similar fashion would be to deliver a decentralized (single organization cannot handle it) design to run and boost a voting system that is openly and separately (Independently) confirmable. The benefit that we get using of E-voting scheme would be to lessen election expenditures involving material, employee salary, and logistics records. If a voter is not physically present (out of the station) then he can vote remotely. That is it enhances a great degree of attendance. E-voting can be beneficial because anybody can effortlessly access the election. The security of E-voting in terms of verification (Authentication), clone (duplicate) votes, and non-repudiation of votes, is very less. E-voting is being studied hugely, and most of the execution is verified and even used for a while. That's why very few executions (Implementation) are reliable sufficiently and are still in use.

Keywords: Blockchain, E-voting System, I-Voting, Blockchain Technology : Cryptographic keys, Peer-to-Peer Network, Digital Ledger

I. INTRODUCTION

Electronic Voting (E-Voting) Indicates voting using Electronic System and it Taking Care of the Votes given by the user and also counts the votes Accurately. The E-voting System is based on Blockchain Technology. In this we Purpose a new E-Voting Protocol. that refers to the blockchain as a transparent ballot box. This Protocol System Has been Designed to Stick to the fundamentals of E-Voting System Properties as well as has property decentralization and it allows the voter to change or update their vote during the permissible Voting Period.

Technology has many Positive impacts on our Social life. It is designing a 24-hour globally Connected Architecture to facilitate ease of access to a variety of resources and services. Moreover, technology like the internet has also a fertile ground for innovation and creativity and one such innovation is blockchain. E-voting Scheme is an application of Blockchain Technology.

The objective of the scheme would be to provide a decentralized architecture to run and it supports a voting Scheme that is fair and independently verifiable. We propose here a new e-voting protocol that employs blockchain technology as a transparent ballot box. We propose an e-voting scheme based on blockchain technology that meets the fundamental e-voting properties while, at the same time, it provides a degree of decentralization and placing as much standard of the process in the hands of the voters as was deemed possible

To design and implement an e-voting system using blockchain technology.

We combine the blockchain paradigm into an e-voting procedure and come up with a feasible and general e-voting protocol. Implement a system that provides a secure and flexible voting mechanism, satisfies almost all of the main requirements for an e-voting system, and weakens the power of the election organizer.

Our balloting system offers features that are not present in the current balloting system. While the current system only allows voters to vote at registered polling booths, our system enables users to verify their votes. Additionally, our

system places importance on the None Of The Above (NOTA) option, and if a citizen fails to vote, they receive a notification via SMS. To ensure data security, the data is double encrypted before being sent to the blockchain. Finally, the votes are counted based on the candidate's constituency for the final results. The registration process for our balloting system is straightforward. The admin interacts with the authentication server through a web application to register voters. The authentication server stores user and candidate information, such as Aadhaar number, constituency, mobile number, name, email ID, and other essential details in the database. To initiate the registration process, the admin must enter their username and password. Once authenticated, the admin can begin the registration process. The voter provides their Aadhaar number, which is used to verify their identity. The voter then enters their constituency, name, mobile number, email ID, and other necessary details. Once all the required details are entered, the admin approves the registration. The voter receives a notification via SMS to confirm their registration.

II. LITERATURE SURVEY

1]. Paper Name : Issues and Effectiveness of Blockchain Technology on Digital Voting

Author: Gupta A, Patel J. Gupta M, Gupta

Voting is nothing but choosing an excellent candidate from Democratic Country. Blockchain is a technology that comes from the concept of Bitcoin. We know that Bitcoin is a Digital Currency we can Transfer the funds of central banks. Blockchain has some risks which have some issues detected and technology Risks like Scalability, Mining Centralization, Cyberattacks. In this Paper Blockchain concepts are appreciated by the linked list in Data Structure. Later key addresses are warehoused in previous keys and they are linked to each other. Finally we Conclude from our Review that Electronic voting from blockchain Technology has some issues and effectiveness but our focus is how we can make this technique more effective and we can use this technique in our daily life. Our Country is also fully focused for future use and many efforts are done to overcome these issues.

2]. Paper Name : Electronic Voting Machine based on Blockchain Technology and Aadhar verification

Author : Navya A, Roopini R, Sai. Niranjan A.

The voting System Nowadays needed a registration with voter id with which voters can vote. The balloters can vote when they provide voter id to the booth. The major disadvantage from the offline balloting system is bogus votes .To overcome this we use some Authentication standards like Aadhar verification. We know Aadhar has a unique Identification Authority which every Person enrolled in it. The proposed system reduces the whole Man power in Booth and also reduces the whole man power used in the counting process. All these actions are performed automatically. Once authentication is done then next problems arise is the data manipulation, Security and Transparency of each vote can be overcome by blockchain technology. From this Review we can conclude that the E-voting through Blockchain technology. a nation which has a less voting percentage will struggle to choose a right leader for the nation. it is a very essential identity to deploy a election process is highly.

3] Paper Name: Design of Distributed voting System

Author: Meter, Christian

In this we describe the general Structure of Electronic voting System being Used so for many countries are participated in the development of Secure E-Voting system and we pick the most relevant around the globe analysis starts from the Cryptographic primitives over the whole voting Process. we Focus on peer to peer approach of an E-voting system. with the help of Blockchain technology the main contribution to this topic is Advanced version of proof- of-stake. which make it possible to build a secure blockchain without needing Computational power to find specific hashes needed for the proof-of-work, which is used for the Bitcoin control. it is secured platform and ease of usability analysis .this system presents the Design of Voting System which is Distributed. this electronic voting System is easy to use and it is secure ideal traditional election. it is made to eliminate human errors.

III. PROBLEM STATEMENT OF SYSTEM

- **Decentralized Authentication:** In the proposed e-voting system, the traditional centralized authentication model is replaced with a decentralized approach. Each eligible voter is issued a digital identity in the form of a unique cryptographic key, which is securely stored on their personal device, such as a mobile phone or a smart card. This eliminates the need for a central authentication server, reducing the risk of a single point of failure and unauthorized access.
- **Peer-to-Peer (P2P) Network:** The e-voting system operates on a P2P network, where all participating nodes have equal privileges and responsibilities. Voters connect to the P2P network through their devices and directly interact with other voters and the blockchain without the need for intermediaries. This ensures a distributed and resilient system that is resistant to single-point failures and tampering.
- **Blockchain Technology:** The P2P network is built on a blockchain, which is a decentralized and transparent ledger that securely records all voting transactions. Each vote is digitally signed by the voter's private key and recorded as a transaction on the blockchain, ensuring its integrity and authenticity.
- **Secure Voting Process:** To cast their vote, a voter digitally signs their ballot using their private key and broadcasts it to the P2P network. The ballot is encrypted to ensure privacy and confidentiality. The other nodes in the network verify the digital signature and the eligibility of the voter before adding the vote as a transaction to the blockchain. Once a vote is recorded on the blockchain, it becomes immutable and tamper-proof, ensuring the integrity of the voting process.
- **Transparency and Auditability:** The blockchain provides transparency and auditability to the e-voting system. All transactions, including votes, are publicly recorded on the blockchain, allowing anyone to verify the results and ensuring the system's transparency. Additionally, the blockchain enables auditing of the voting process as the entire history of transactions is recorded and can be audited for any discrepancies or irregularities.

IV. IMPLEMENTATION DETAILS OF MODULE

4.1 Process in System

Our balloting system offers features that are not present in the current balloting system. While the current system only allows voters to vote at registered polling booths, our system enables users to verify their votes. Additionally, our system places importance on the None Of The Above (NOTA) option, and if a citizen fails to vote, they receive a notification via SMS. To ensure data security, the data is double encrypted before being sent to the blockchain. Finally, the votes are counted based on the candidate's constituency for the final results.

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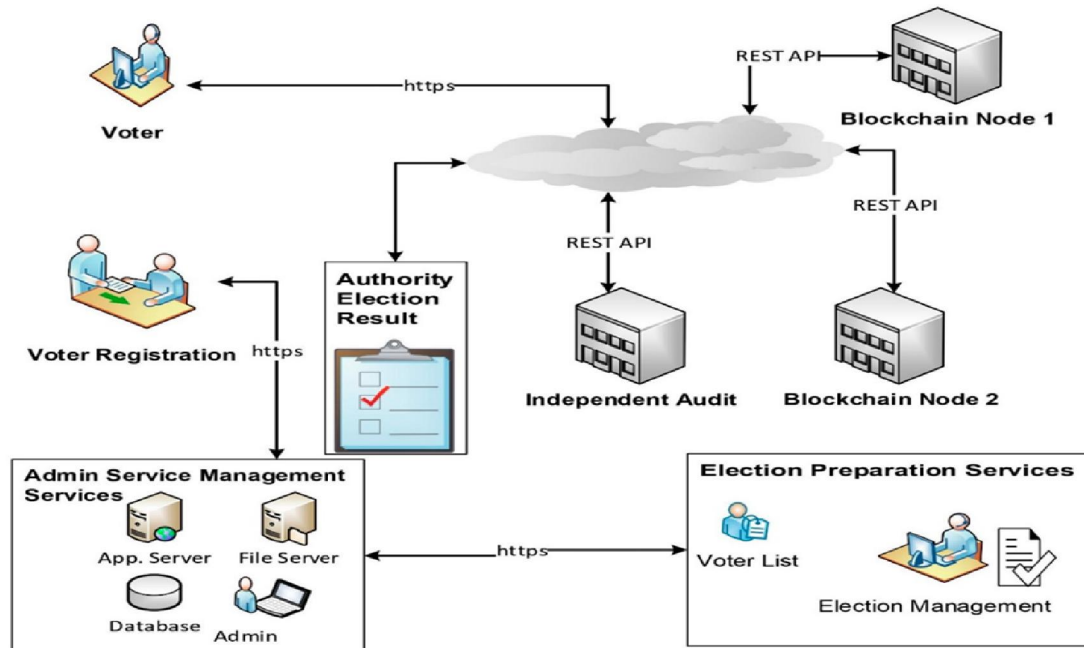
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4.2 Voting Process

Our balloting system offers numerous benefits over the current system, such as the ability to verify votes, double encryption of data, and constituency-based vote counting. The registration process is simple, and with the use of Aadhaar verification, the system ensures that only eligible voters can register to vote.

Our balloting system offers a user-friendly web application that can be accessed from any nearby booth with an internet connection. On the day of voting, users can log in to the voting server using their Aadhar number and the OTP generated to their registered mobile number. If the OTP matches, the user can proceed to log in to the application. The candidate details are displayed to the user based on their constituency, and a radio button is provided for the user to select the candidate of their choice. Once the candidate is chosen, the application asks for confirmation of the vote. If the user confirms their vote, the data is sent to the blockchain for storage.

Once the vote is polled, the vote log is stored for the candidate and is double-encrypted using AES and RSA algorithms. The key is then sent to a block on the blockchain, which runs on port 8545. The blockchain returns a hash code and block number, which are retrieved and stored in the database. Each vote is considered a transaction and is verified using the arbitration server. Remix, an open-source browser-based compiler and IDE, is used to write solidity contracts and debug transactions.



To count the votes, the block number is inputted into the blockchain, and the data is double-decrypted. The maximum count of the parties is calculated, and if the None of the Above (NOTA) option exceeds 50%, the candidates for that constituency are retrieved and stored in the blocked candidates list. If a citizen fails to vote, a warning SMS is sent to justify their reason. If the reason is invalid, necessary action will be taken by the government.

V. CONCLUSION

The aim of this study is to investigate and evaluate the recent study of blockchain-based E-voting schemes. The artifact explains today's E-voting study using blockchain technology. A set of inefficiency in recent E-Voting systems is recognized and addressed. A number of experts accept that blockchain may be a good choice for a decentralized E-Voting scheme.

Today's voting schemes is having a large number of issues, generates to political disturbances in a country. The E-voting system reduces most of the drawbacks of the recent(Traditional)system by supplying security, trust, privacy, and transparency where voters are authorized to verify their votes. The E-voting scheme is economical as compared to recent electronic voting machines.

Blockchain technology needs the most experienced software developer as well as management expertise. As an outcome, E-voting systems should start implemented in restricted areas prior to broadening (Expanded). Many security issues currently exist on the internet and voting machines (polling machines).

This examination expresses that blockchain systems have many issues that are necessary to be pointed out and that is still most of the technical issues or challenges. That is why it is necessary to understand that blockchain-based E-voting technology is still developing as an E-voting option.

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