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# BLOCKCHAIN BASED E-VOTING SYSTEM IMPLEMENTATION AND EVALUATION

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## INTRODUCTION

People may express their views via voting in elections, which are an essential part of a democratic society. Because our democracy depends on free and fair elections, they must be conducted in a way that the public can feel confident in. Voting methods have seen a great deal of change in this context. Efforts to make the system more secure, verifiable, and open are driving this advancement. Blockchain technology is a potential new tool for the development of secure apps because of its strong cryptographic foundations. All transactions are recorded and distributed on the Blockchain, which has resembled a data structure from its inception. Data stored in a distributed decentralised database is protected against unauthorised manipulation, tampering, or alteration in any form. Voting is safe and simple with our decentralised, transparent, and secure method. It securely mines blocks and converts votes into transactions. For one thing, the ability to cast a vote from any place is one of the many perks of a block chain voting system. Using blockchain technology, the voting process may be made more secure, transparent, immutable, and reliable.

## ABSTRACT

Because it is faster and more accurate than conventional paper balloting, electronic voting, sometimes known as "e-voting," has been used since the 1970s. However, broad adoption of these systems is still hindered by issues related to performance. Tolerating possible shortcomings is strength of theirs Blockchain is a new technology that has the potential to revolutionise the world. so that electronic voting methods are more durable in general There is an attempt to maximise the benefits of this article. The Blockchain voting system must be based on cryptography and be open to scrutiny in order to be successful. End-to-end verifiability is

accomplished using the proposed method, which fits the fundamental requirements for electronic voting systems. The article outlines and includes examples of the proposed e-voting process. It was built on top of the Multichain Platform. There is a lot of detail in the research.

## E-VOTING BACKGROUND AND REQUIREMENTS

This interest in using computer technology and voting equipment to produce high-quality, precise results that correctly reflect people's ideas has been around for a long time. It has been tested in the real world to aid with the electoral process. Paper ballots were first permitted to be counted by the computer counting equipment in the early stages. On a central computer, each polling location's cards were scanned and tallied (Kadam et al, 2015; Rockwell, 2017; Hao et al, 2010). Despite the reservations of computer specialists, Direct Recording Electronics (DRE) voting procedures quickly gained widespread. Voters will have an easier time casting their votes if the voting process is more easily understood. With the advent of blockchain technology's end-to-end verifiability, it has lately been utilised to create electronic voting systems. Blockchain is a viable alternative to traditional e-voting systems because of its privacy- and non-repudiation-protecting features. Using the blockchain's potential to increase e-voting efficiency is also explored in this article. An in-depth review of these systems and comparisons to other methods are then offered.

## E-Voting Requirements and Compliance by the Proposed System

Each criterion is briefly described, along with an explanation of how the solution we suggest meets it.

### Privacy - Keeping an individual’s vote secret

Because of blockchain's cryptographic capabilities, it is possible to maintain voter anonymity. Additionally, when a voter joins the blockchain, it creates a voter hash, which is the voter's unique identity in the blockchain and is protected against abuse because of its collision-resistant property. It is thus critical that votes be traceable in order to protect anxious voters.

### Eligibility - Allowing only registered voters to vote, with each such votervoting only once

In order to establish their eligibility, all

eligible users must register using unique identifiers such as government-issued papers.

### Receipt Freeness - Voters should be unable to prove to a third party that they voted in a particular way

A cryptographic hash is generated for each time a voter selects their favourite choice (transaction). Verifiability, or the ability to identify whether a vote was tallied, is essential here. However, obtaining this hash does not give you access to a person's voting record.

### Convenience - Voters must be able to vote easily, and everyone who is eligible must be able to vote

Using a web-based platform, the voting procedure is simple and does not need any user participation. If you don't have to remember a login or password, fingerprinting may be used as an authentication method. The whole procedure is also interconnected, making it possible for the user to interact with it without difficulty.

### Verifiability - The ability to trust the vote tallying process

After properly casting a vote, a user receives a cryptographic hash including their unique transaction ID. This transaction ID may be used to determine whether or not a user's vote was tallied during the voting process. A user can't see how their vote was cast, which has been utilised to minimise dangers when individuals are stressed. The previous research shows how well the proposed system performs in light of the unique requirements of electronic voting. Blockchain's distinguishing traits and their crucial significance in the success of a functional e-voting system are also highlighted in this article. The results presented here add considerably to existing knowledge about leveraging blockchain technology to establish a secure digital voting system.

## PROPOSED SYSTEM

The idea behind this proposed system is to use Block chain technology to create a voting mechanism. It's a secure, transparent, and decentralised voting system that is safe and secure. Transactions and blocks are mined in a safe and efficient way. A block chain-based voting system has two advantages: the ability to vote from any place and the ability to avoid vote

manipulation. Voting requires nothing more than a smartphone or a computer. An individual voter is issued a unique user ID and password. Ethereum, the "digital money," is distributed to each voter as a "voting chance." Voters may cast their votes up to a certain deadline.

A decentralised architecture, open, fair, and independently verifiable voting, and an optimised election process that allows for security, speed, cost effectiveness, transparency, and enhanced identity verification are among the goals of incorporating Blockchain technology into the solution.

## IMPLEMENTATION AND EVALUATION

A web-based application was chosen to serve as the system's front end, allowing users to converse in a more informal setting. Because of Section 2's e-voting requirements, we wanted to examine how the system operated and if any issues would arise if it were used in a real campaign. Nodes in the network reflected changes to the public ledger and appraised the system's usefulness in the process of numerous transactions, such as approving, verifying, and mining them into the blockchain.

## CONCLUSION:

The proposed e-voting system relies on blockchain technology. You may cast your ballot via any Internet-enabled device, as long as you are a registered voter. Voting participation and public trust in governments are expected to rise as a result of the Blockchain-based voting system. The existing system has a number of faults. Since transparency and minimal impediments are vital, having an open voting system is essential. The proposed system, after taking all of these factors into account, is a comprehensive solution that fits all of the needs. For this endeavour, we're working to improve blockchain technology's ability to resist the "double spending" issue, which translates to "double voting" when it comes to electronic voting systems. As a result of successful demonstrations of transactions being altered, we've decided to further investigate the use of blockchain technology in order to prevent this from happening again. We think that in order to achieve an end-to-end verifiable e-voting scheme, an effective methodology for establishing trustworthy provenance for e-voting systems is essential. In order to assist the current blockchain-based infrastructure in achieving this aim, an additional provenance layer is being built.

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