

# Decentralized Blockchain Based E-Voting System

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**Abstract** - Create security in electronic voting that gives the integrity and confidentiality of existing voting schemes while providing the transparency and flexibility that electronic provides, that was a long time ago. In this incomplete article, we evaluate the implementation of blockchain as a service to enable electronic voting. Article proposes a new electronic voting based on blockchain, which solves some of the limitations of existing systems, evaluates some popular blockchain frameworks, and aims to create a blockchain-based electronic voting system. In particular, we evaluate the potential of information classification technology through the disclosure of scientific data; i.e. voting processes and the use of the value of the blockchain.

**Key Words:** Security, integrity, confidentiality, voting, blockchain, transparency, flexibility.

## 1. INTRODUCTION

This Electronic voting systems have been the subject of research over the years to reduce the cost of voting while ensuring fair voting through conference technology. Replacing the traditional pen and paper with the new voting system has the potential to limit fraud while making the voting process traceable and verifiable.

Blockchain may be a conveyed, unchanging, incontrovertible, public record. This unused innovation has three fundamental highlights:

- [1] Sustainable: The record is decentralized, duplicated and disseminated over numerous areas. This guarantees high availability (by dispensing with a single point of disappointment) and gives third-party unquestionable status as all hubs keep up the consensus adaptation of the record.
- [2] Distributed Reconciliation: A distributed consensus process for deciding who can add the next new transaction

to the ledger. Most network nodes must be approved before any new requests are made for entries to become part of the list.

These functions are partially enabled by advanced encryption techniques that provide greater security than previously known data storage. Therefore, many, including us [3], believe that blockchain technology has the potential to be effective as a tool for implementing new voting systems today.

This paper assesses the utilize of blockchain as a serviceto actualize an electronic voting (e-voting) framework.

## 2. LITERATURE SURVEY

### 2.1 Background History

Electronic voting has been an area of research focus for many years by using computing machines and equipment for casting votes and producing high quality and precise results in accordance with the sentiments of the participating voters. Various attempts have been adopted in practice to support election process. Initially computer counting system allowed the voter to cast vote on papers. Later on, those cards went through the process of scanning and tallying at every polling cell on a central server (Kadam et al, 2015; Rockwell, 2017; Hao et al, 2010). Direct Recording Electronic (DRE) voting systems were put in place later on which were admired and acknowledged greatly by the voters in-spite of the resistance from computer scientists. If the voting system is well understood by the voters, the system's usability can be increased remarkably. When the candidate selection procedure is completed, DRE systems present the final selection to the voter before actually casting it (in case if the voter wants to change his opinion) and after the final selection, the ballot casting is completed (Multichain, 2017; Dalia et al, 2012).

More recently, distributed ledger technologies such as blockchain have been used to achieve e-voting systems primarily due to their advantages in terms of end-to-end

verifiability. With properties such as anonymity, privacy protection and non-repudiation, blockchain is a very attractive alternative to contemporary e-voting systems. The research presented in this paper also attempts to leverage these properties of blockchain to achieve an efficient e-voting system. A detailed analysis of such systems is presented in the next section along with the identification of comparison with these approaches.

### 2.2 Related work

In (Kiayias & Yung, 2002), a self-tallying voting system is proposed that does not require any trusted third parties for vote aggregation and any private channel for voter-to-voter privacy. The proposed protocol involves extensive computation. In (Hao et al, 2010) a two round protocol is proposed that computes the tally in two rounds without using a private channel or a trusted third party. The protocol is efficient in terms of amputation and bandwidth consumption but is neither robust nor fair in certain conditions (Dalia et al, 2012). In (Dalia et al, 2012) a protocol is proposed to improve the robustness and fairness of the two round protocol (Hao et al, 2010). In (Shahandashti & Hao, 2016), authors propose E2E verifiable voting system named DRE-ip (DRE-i with enhanced privacy), that overcomes limitations of DRE-i (Chaum et al, 2008). Instead of pre-computing ciphertexts, DRE-ip encrypts the vote on the fly during voting process. DRE-ip achieves E2E verifiability without TAs, but at the same time provides a significantly stronger privacy guarantee than DRE-i. In (Chaum, 2004) end-to-end verifiability is achieved through the Mixnet protocol (Chaum, 1981) that recovers the plaintext ballot in an unlikable manner by randomizing the ciphertext through a chain of mix servers.

### 2.3 Assessing blockchain executions

As we mentioned at the beginning of this section, we use private Blockchain infrastructure in our work to ensure the confidentiality, security and transparency of electronic voting and to ensure that elections cannot be voted on. In this subsection, we cover our blockchain project to implement and deploy our voting smart contract. These are Exonum, Quorum and Geth.

I. *Exonum*: The Exonum blockchain is end-to-end and its entire implementation is done in the Rust programming language. Exonum is built specifically for private blockchains. It has a special Byzantine algorithm for reaching consensus on the network. Exonum can support up to 5000 transactions per second. Unfortunately, one limitation of the framework is that Rust is the only programming language in the current version, limiting developers to those built into that language. Exonum plans to introduce Java bindings and platform-independent interface annotations in the future to make Exonum more developer-friendly.

II. *Quorum*: An Ethereum-based distributed ledger with a private exchange/contract and a new consensus process. This is a fork of Geth and will be updated as Geth is released. Groups have changed the way they reach consensus and become more susceptible to the collective action-based consensus algorithm. Using this feature makes it possible to support hundreds of transactions per second.

III. *Go-Ethereum*: Go-Ethereum is one of three implementations of the Ethereum protocol. It executes smart contracts exactly as programmed, without the possibility of downtime, censorship, fraud, or third-party interference. The framework supports external development of the Geth protocol and is the most advanced of the models we evaluated. The transaction fee depends on whether the blockchain is used as a public or private network. Because of these features, Geth is the framework we chose to do our work on, and a similar blockchain framework could be considered for the machine like this one with the same features as Geth.

## 3. SYSTEM IMPLEMENTATION

### 3.1 Software

Sr.No	Hardware	Specification
1	System	Core i5 1.80 GHz Processor
2	Hard Disk	512 GB
3	RAM	4 GB

### 3.2 Hardware

Sr.No	Software	Specification
1	Operating System	Windows 10
2	Technology Used	PHP
3	Database Used	MySQL

### 3.3 Implementation details

The description of modules is given below: This proposed system consists of 2 main modules, which are listed below.

#### 1. ADMINISTRATIVE MODULE

Online Voting is a voting system by which any Voter can use his/her voting rights from anywhere in India.

Online voting for association contains:-

- Voter's information in database.
- Voter's Names with ID.
- Voter's vote in a database.
- Calculation of total number of votes

Various operational works that are done in the system are:-

- Recording information of the Voter in Voter database.
- Checking of information filled by voter.
- Discard the false information.
- Each information is maintained by admin.

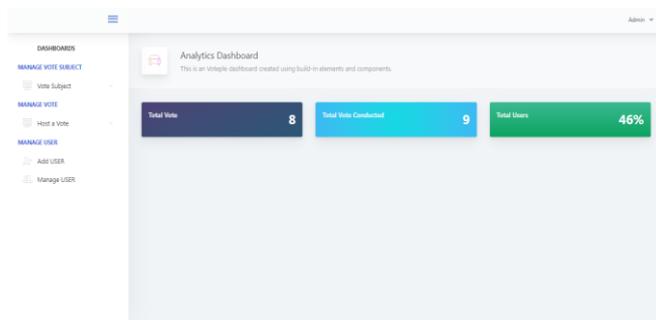


Fig -1: User Panel

#### 2. USER/VOTER MODULE

The user after their registration only can login for voting. The user will view nominee details with their image before they can vote. After knowing the nominee details the user can login for voting. They should vote for board of director and the manager in the association. The count will taken for each voting. After voting the particular person/user cannot login to vote again

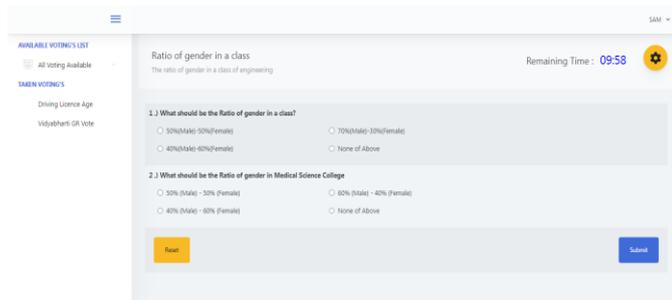


Fig -2: Admin Panel

Fig -1: Figure

### 4. ADVANTAGES & LIMITATIONS

#### 4.1 Advantages

The advantages of online voting systems include increased efficiency, improved accuracy, and greater voter engagement compared to paper ballots.

- Increased Efficiency

One of the most significant advantages of online voting systems is incredible efficiency. With an online system, you can send out electronic ballots to all of your voters in just a few clicks. And once the voting period is over, the system will automatically tally the results, so you don't have to do it yourself, saving your organization a lot of time and money.

- Improved Accuracy

Another advantage of online voting systems is that they tend to be more accurate than traditional paper-based systems. But with an online voting system, the votes are tallied automatically, so there's no chance for human error, giving you peace of mind knowing that your results are accurate.

- Greater Turnout And Voter Engagement

Another advantage of online voting is that it can increase voter turnout because it's more convenient for voters to cast their ballots online than to have to go to a physical polling place.

In addition, online elections can also improve voter engagement. It can be easy for voters to feel disconnected from the process of traditional voting. But with online voting, they can see the results in real-time, making them feel more engaged in the process.

#### 4.2 Limitations

The two major concerns about online voting systems are election security and transparency.

- The Security Of Online Voting Systems

One of the most significant disadvantages of online voting systems is that they're not as secure as traditional paper-based systems because there's always the potential for hackers to tamper with the results. To improve election security, you should look for a system that uses encryption to protect the data. The system must get tested by independent security experts.

For example, we secure our online voting system using 256-bit encryption—the same level of security that major banks offer. Plus, we don't share user and voter data, which means your elections stay private and confidential.

- Lack Of Transparency

Another disadvantage of online voting is that it can lack transparency. With traditional paper-based voting, voters can see people counting the ballots. But with online voting, the process is entirely electronic, making it harder to verify the results. It's essential to look for an online voting system that offers transparency features. For example, some systems provide a live election results page where voters can see the results as they roll in.

Our voting system also offers election audit, which means the votes cast using our system are auditable. We also provide independent verification, where an independent, third-party accountant ensures the election process is fair.

## 5. CONCLUSIONS

This online Voting system will manage the Voter's information by which voter can login and use his voting rights. The system will incorporate all features of voting system. It provides the tools for maintaining voter's vote to every party and it count total no. of every party. There is a DATABASE which is maintained by the ELECTION COMMISSION OF INDIA in which all the names of voter with complete information is stored.

In this user who is above 18 years's register his/her information on the database and when he/she want to vote he/she has to login by his id and password and can vote to any party only single time. Voting detail store in database and the result is displayed by calculation. By online voting system percentage of voting is increases. It decreases the cost and time of voting process. It is very easy to use and it is very less time consuming. It is very easy to debug.

The traditional method of manual voting system has few drawbacks. This method is obviously not efficient as it wastes the voter's energy and quite slow in term of completion. This smart system involves the voter's can cast their vote easily, and can be implemented to the entire India..

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