

## Online Voting System Through Blockchain

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**Abstract** -The security of electronic voting system has always been a matter of high concern. In this proposed paper, we have used blockchain era to put in force on-line balloting system [1]. The paper proposed a balloting system primarily based totally on blockchain that forwards a number of the restrictions in modern-day structures and assesses a number of the popular blockchain systems in the path of composing a setup of blockchain- primarily based totally on-line balloting system [2]. In precise, we determine the potentiality of allotted ledger technologies, which upgrades the safety and reduces the price of web website hosting a national election [3].

**Key Words:** Blockchain, Smart Contracts, Electronic voting, Privacy, Ethereum

### 1. INTRODUCTION

Nowadays, there are plenty of things we do on the internet, from shopping to event organizing. With the fast improvement of the web technologies, most of traditional offline services including mail, payment, are shifting to online medium. Then why not voting online too?

In traditional voting when the tenure of the elected representative is over, hundreds of thousands of electorates have to give their votes for his or her subsequent political representatives [4]. Voters have to go to a definitive place at a definitive time to perform voting, online voting allows them to cast their vote at any time of the day from any place, just with the need of an internet connection [5]. Many of the eligible electorates are not capable of reaching to the polling station and casting their votes. Many people don't have time to vote, whether or not it's because of a job, to travels, or to dwelling a long way far from a vote casting center. Choosing online voting will more likely boost the participation [6].

For online voting system, you avert the demand for all the substantial infrastructure customarily desired on a traditional voting. Running an elective course online does not mean that you have to dump conventional voting methods. Those who can't go for online voting, they can go for conventional voting, by that we will not lose their participation. It will also

help in rapid and smooth votes computation without any human error [7].

For putting in a covered digital vote casting machine that offers the equity and privateness of modern-day vote casting, whilst imparting the transparency and flexibility presented via way of means of digital systems, we're the usage of blockchain technology. The proposed blockchain – primarily based totally application, improvements the safety and reduces the value of web website hosting a national election [8].

### 2. PROPOSED SYSTEM

This phase proposes an e-balloting system helping the balloting necessities and blockchain as a service. Here the evaluation of the prevailing system and the organization structure of the system problem are presented [9]. It includes specific methods which were used in order to achieve the objectives of the project.

#### 3.1 Blockchain setup

To guarantee the privateness and safety necessities for e-vote casting, and to ensure that the election device shouldn't allow coerced vote casting, electorate will be vote casting in a supervised environment. In this work, we setup a Go - Ethereum permissioned Proof - of - Authority (POA) blockchain to gain the goals, POA makes use of a set of rules via a consensus mechanism primarily based totally on identification as a stake that provides relatively speedy transactions [10].

#### 3.2 Smart Contracts

Smart contracts are self-executable codes, which can be written inside blockchains. Smart contracts assist to perform agreements and transactions without the requirement of significant authority in a relied way on dealing with many of the unknown parties [11].

#### 3.3 Details of the Protocol

Participants within an election are divided into 3-tuples which are; Voters which contains all registered users, Organizers/Election administrators, whose duty is to hold the election, interact, and record voter's information, Inspectors/mining nodes are introduced in order to limit the organizers' power [12].

### 4. IMPLEMENTATION DETAILS

Implementation details has been divided into three phases [13].

#### 4.1 Pre-voting Phase

- 1) Voters are registered through the portal for eligible to cast their vote.
- 2) Public key issued to voter at the time of registration.
- 3) Authorized channel put the information of the voters in the voter set.

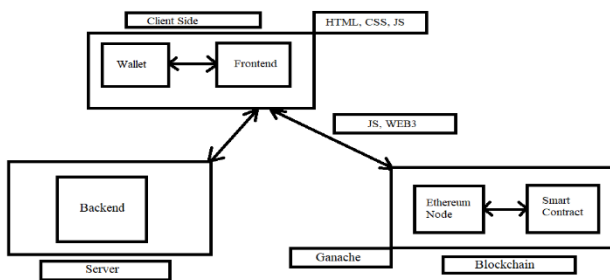
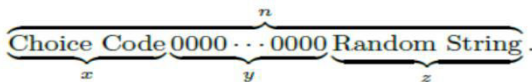


Fig.4.1.1

#### 4.2 Voting Process

##### Vote format

- i) By the following string (vote string) we can formulate a correct voting message:



- ii) First 'x bits are the selection code' i.e the candidate number that's used to identify the candidate, observed with the aid of using y-bit 0 string, that's an indication of a well-fashioned vote. And last is the z-bit random string. It distinguishes different votes which incorporate the same selection code [14].

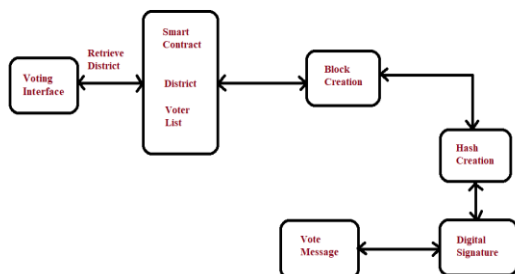


Fig.4.2.1

##### Voter verification and block added to blockchain

- 1) Voter creates 2 messages with signature and sent it to channel.
- 2) Then channel (organizer) verifies the voter has voted yet or not. Once it is verified voter get back the message.

- 3) Then voter has to send the other mgs to channel (inspector) which also verify the voter and check that same mgs has been sent to the organizer as well, If not it is rejected [15].
- 4) Both digitally signature the mgs to confirm the voter is verified
- 5) Voter create the mgs with vote, organizer signature, inspector signature
- 6) The mgs were sent with asymmetric key to organizer through blockchain.
- 7) Once the vote is recorded, voting is completed
- 8) The organizer generates a brand-new block with the preceding block's hash value and the details of vote is delivered into the blockchain [16].

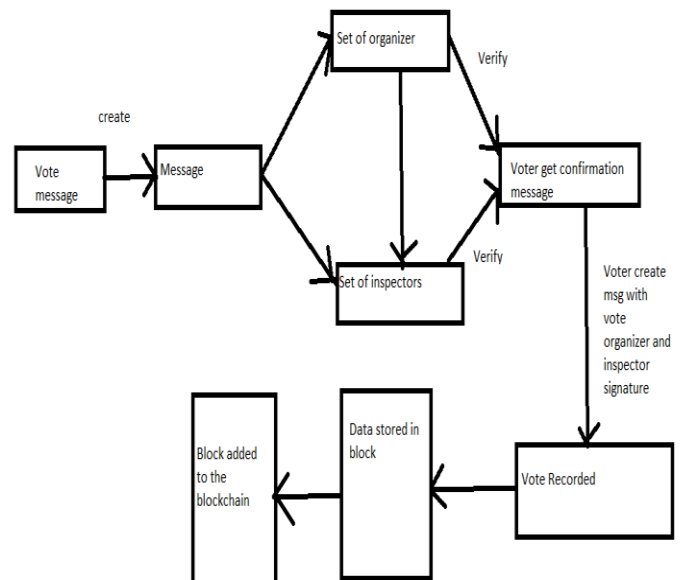


Fig.4.2.2

#### 4.3 Post - Voting Phase

- 1) After the balloting process, the organizer wishes to gather all valid votes.
- 2) Organizer creates a set AllBallots i.e a collection of all ballots received.
- 3) Organizer runs Algorithm to obtain the set 'Validvote' which includes the entire valid vote [17].
- 4) On receiving the set Validvote, begin the tally to provide the end result of the election.

### 5. DISCUSSION

In this online voting system based on blockchain system we have met all the necessary criteria of digital voting [18]. The voter can select candidate of their preference from the list available. All votes are stored in the form of blocks and linked together by cryptography [19].

## 6. CONCLUSION AND FUTURE WORK:

The main purpose of implementing online voting system is to make electoral process cheaper, faster, easier and to ensure maximum voter participation [20]. In contrast to traditional voting system blockchain technology provides a new arrangement to headway to more cost and time efficient electoral system with increasing security measures.

The proposed system can be further upgraded by adding fingerprint verification or face recognition.

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