

Blockchain-Based Decentralized Voting System

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Problem Statement

- Traditional voting systems rely on centralized databases, which create single points of failure.
- Data tampering and unauthorized access can compromise election integrity.
- Lack of transparency reduces public trust in electoral outcomes.
- Manual verification and dependency on intermediaries slow down the process.
- Ensuring both voter anonymity and data security is challenging in existing systems.

Significance of Blockchain in the Voting Domain

- Blockchain technology revolutionizes the voting process by introducing transparency, decentralization, and immutability.
- Each vote is treated as a transaction, validated through consensus, and permanently recorded in the blockchain ledger.

Key Advantages:

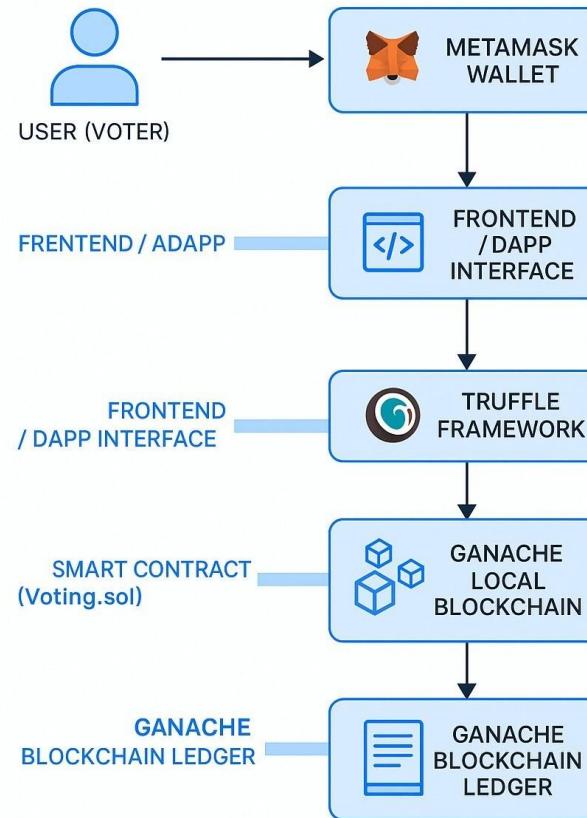
- **Transparency:** Every vote is publicly verifiable on the blockchain.
- **Security:** Cryptographic mechanisms prevent tampering and duplication.
- **Immutability:** Once recorded, votes cannot be altered or deleted.
- **Decentralization:** Removes single points of failure and centralized control.
- **Auditability:** Enables real-time monitoring and verifiable election results

Stakeholders and Their Roles

Stakeholder	Role / Responsibility
Election Commission	Deploys the smart contract and initializes the voting period.
Voters	Authenticate using MetaMask and cast votes securely on the blockchain.
Candidates	Participate in the election; their vote counts are updated via smart contract logic.
Auditors / Observers	Verify transactions on the blockchain and validate election results.

Architecture Diagram:

Architecture of Blocentralized Voting System
implementing Truffle, Ganache and MetaMask



Experiment 6

Deployed Contracts 1

VOTINGSYSTEM AT 0xD91...39

Balance: 0 ETH

ADDCANDIDATE

_name: Jatin

Calldata Parameters transact addCandidate

15
16
17
18
19
20
21
22
23
24

Adding Candidate

VOTINGSYSTEM AT 0xD91...39

Balance: 0 ETH

ADDCANDIDATE

_name: Alice

Calldata Parameters transact addCandidate

17
18
19
20
21
22
23
24

Adding Candidate

CANDIDATES

: 1

Calldata Parameters call

0: uint256: id 1

1: string: name Jatin

2: uint256: voteCount 2

Cast Vote

VOTE

_candidateld: 1

Calldata Parameters transact vote - t

Check Votes using candidates(id) function

getWinner

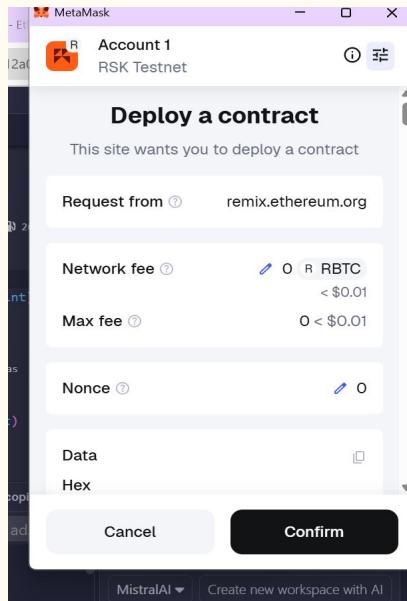
getWinner - call

0: string: winnerName Jatin

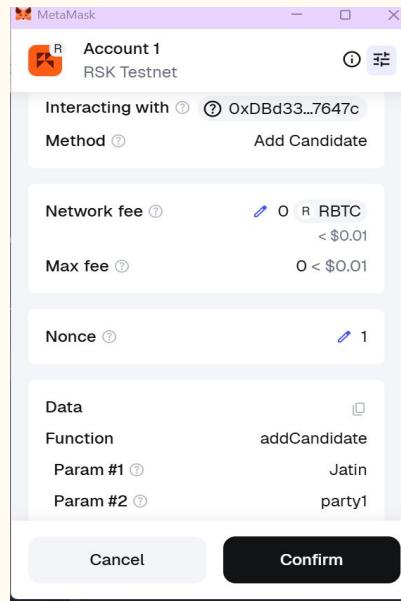
1: uint256: winnerVotes 2

Declare Winner using getWinner()

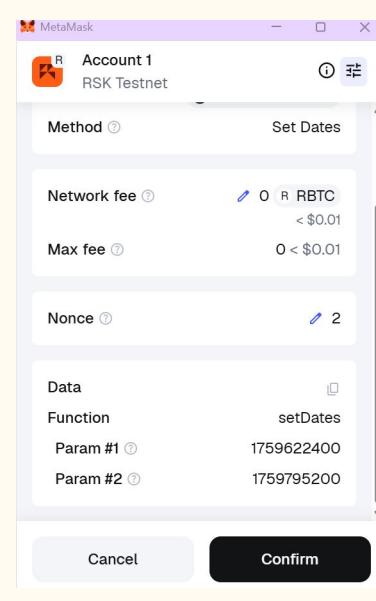
Experiment 7



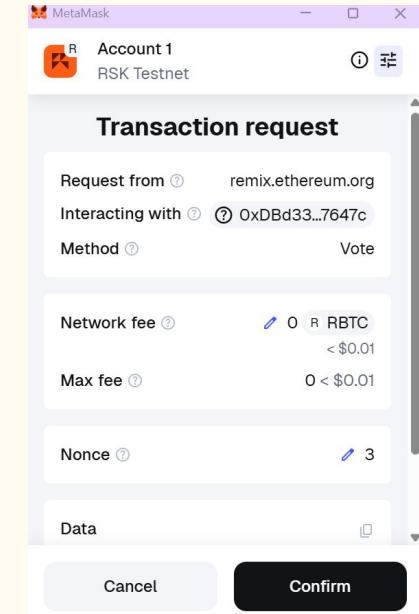
Deploying the contract with metamask



Adding a candidate



Set voting dates



Vote

Experiment 8

Decentralized Voting Using Ethereum Blockchain

Add Candidate

Name	Narendra Modi	Party	BJP
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Add Candidate

Define Voting Dates

Start date	05 - 10 - 2025	End date	06 - 10 - 2025
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Define Dates

Admin Localhost 7545

Network fee 0.0166 ETH \$75.64

Speed Max fee 0.0188

Nonce 9

Data Function setDates

Param #1 1759622400

Param #2 1759708800

Cancel Confirm

Decentralized Voting Using Ethereum Blockchain

Add Candidate

Name	Rahul Gandhi	Party	INC
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Add Candidate

Define Voting Dates

Start date	dd-mm-yyyy	End date	dd-mm-yyyy
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Define Dates

Admin Localhost 7545

Request from HTTP 127.0.0.1:8080

Interacting with 0x1683B...94B76

Method Add Candidate

Network fee 0.0166 ETH \$75.56

Speed Max fee 0.0181

Nonce 12

Cancel Confirm

Decentralized Voting Using Ethereum Blockchain

Welcome for Voting

Voting Dates: Sun Oct 05 2025 - Tue Oct 07 2025

Name	Party	Total Vote
Rahul Gandhi	INC	1
Narendra Modi	BJP	1

Please select one of the candidates and click the vote button.

Vote

Conclusion

- Successfully implemented a Decentralized Voting System using Truffle, Ganache, and MetaMask.
- Ensured security, transparency, and immutability of votes through blockchain technology.
- Demonstrated wallet-based authentication and smart contract automation for vote recording.
- Eliminated the need for intermediaries, ensuring a trustless and tamper-proof process.
- Showcased how local blockchain networks can simulate real-world decentralized systems.
- Proved the potential of blockchain for future large-scale e-governance and secure digital elections.