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.

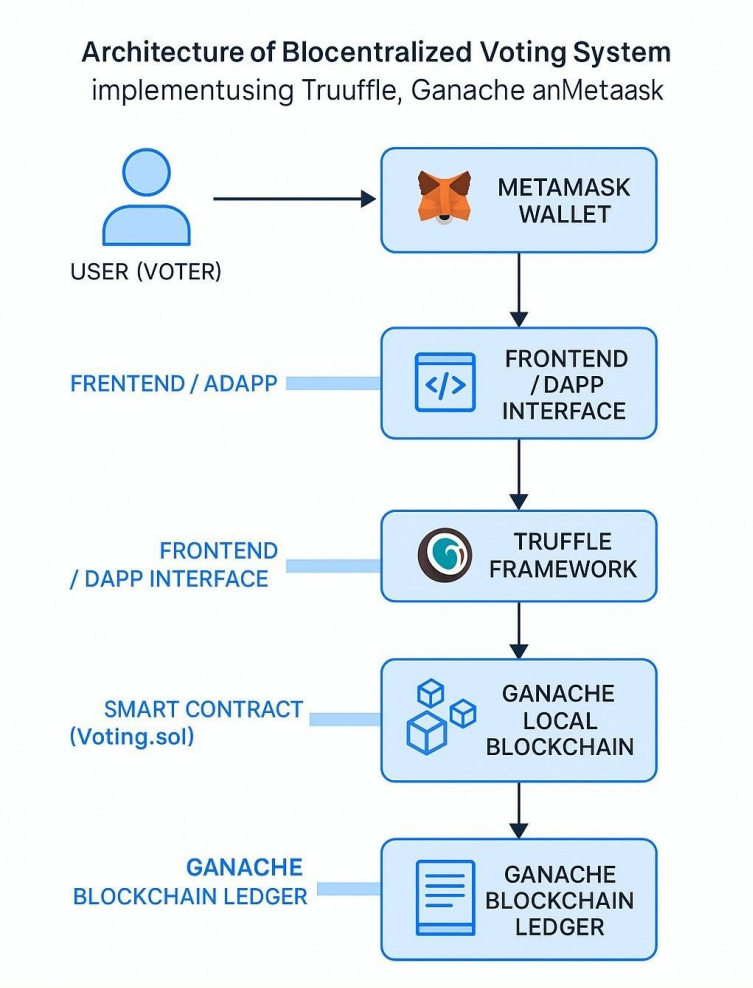
Key Advantages:

- **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

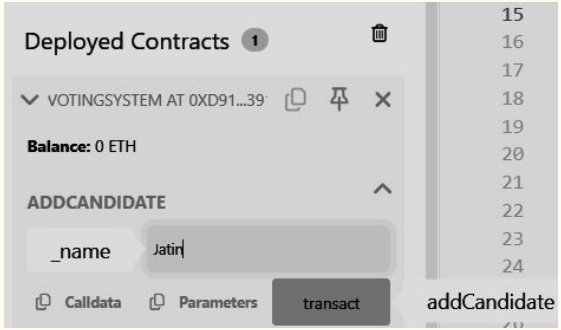
Stakeholders and Their Roles

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.

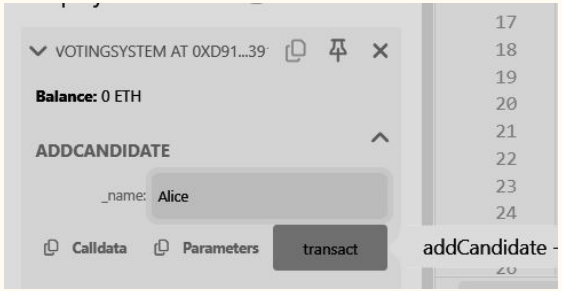
Architecture Diagram:



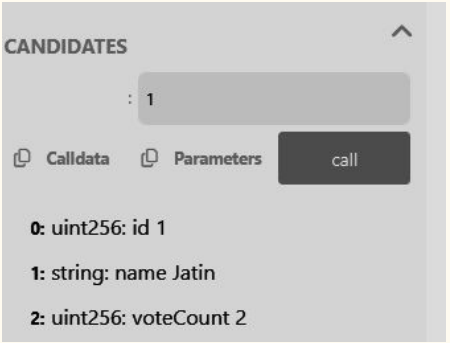
Experiment 6



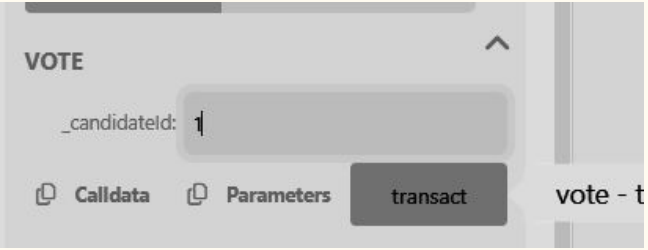
Adding Candidate



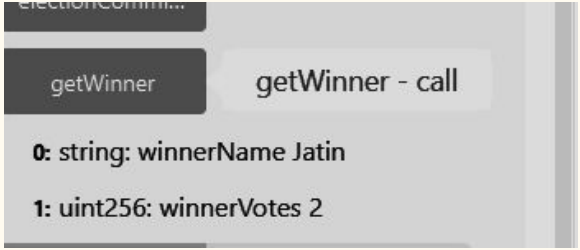
Adding Candidate



Cast Vote

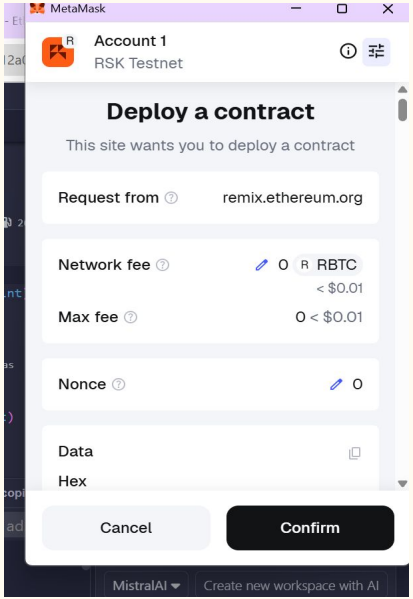


Check Votes using candidates(id) function

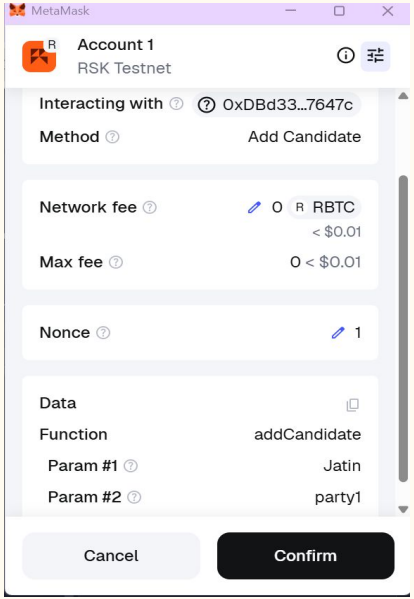


Declare Winner using getWinner()

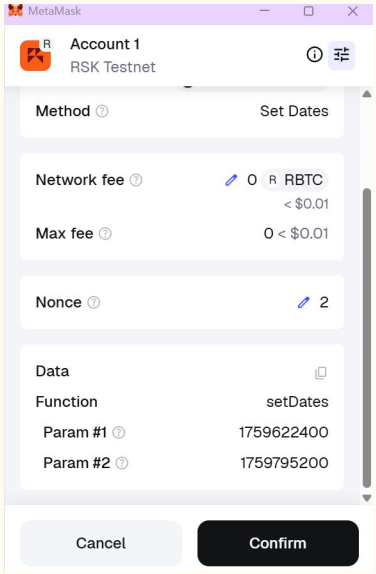
Experiment 7



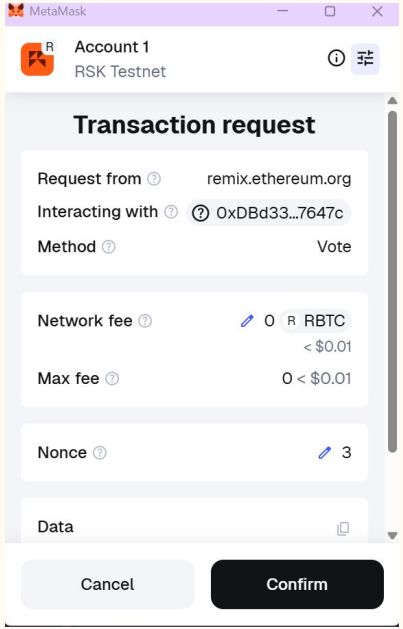
Deploying the contract with metamask



Adding a candidate

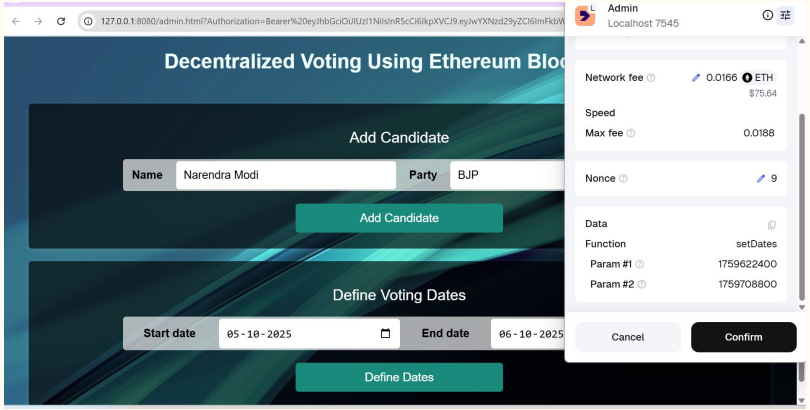


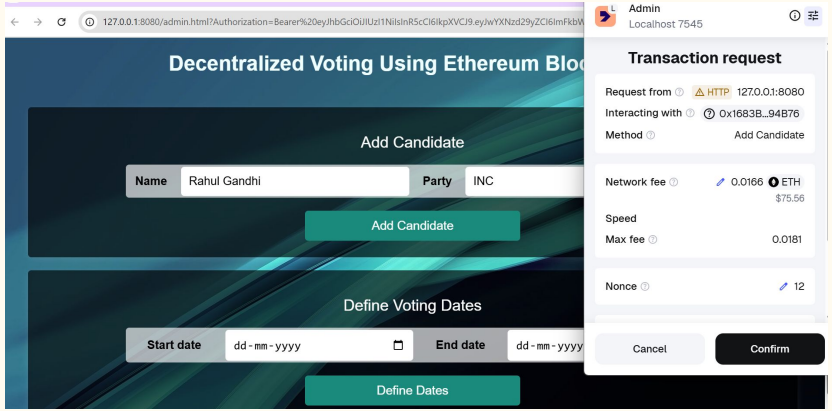
Set voting dates

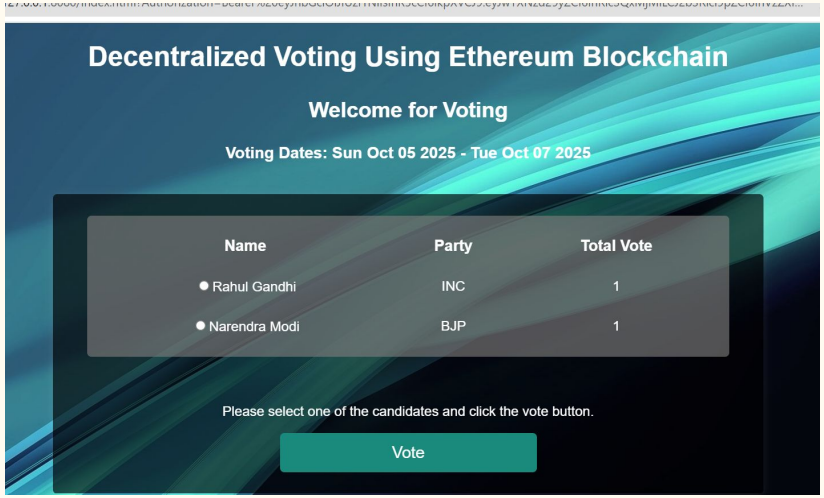


Vote

Experiment 8







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.