A

MINI PROJECT REPORT ON

“De-Centralized App for E-Voting System”

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LABORATORY PRACTICE - III

Blockchain Technology

FINAL YEAR (COMPUTER ENGINEERING)

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SMT.KASHIBAI NAVALE COLLEGE OF ENGINEERING, PUNE

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Sinhgad Institutes

CERTIFICATE

This is to certify that the Internship report entitles

"De-Centralized App for E-Voting System"

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is a bonafide student of this institute and the work has been carried out by him/her under the supervision of **Prof. Priyanka Kinage.** This work is approved for the partial fulfillment of the requirement of Savitribai Phule Pune University, for the award of the degree of **Bachelor of Engineering** (Computer Engineering)

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INTRODUCTION

The rapid advancement of technology has ushered in a new era of innovation and transformation across various aspects of our lives. One such domain that has witnessed a significant shift is the realm of democratic processes. Traditional voting systems, while time-tested, have been marred by various challenges, including concerns about transparency, security, accessibility, and the need for efficient results. In response to these challenges, the integration of blockchain technology into the electoral process offers a promising solution.

This report embarks on a journey into the development of a decentralized electronic voting application (e-voting dApp) that harnesses the power of blockchain technology to address the limitations of conventional voting systems. It combines the principles of decentralization, immutability, and cryptographic security to create an innovative platform that not only ensures the integrity of the voting process but also opens up new frontiers of accessibility, transparency, and trust within the electoral area.

PROBLEM STATEMENT

A decentralized e-voting app uses blockchain technology to create a secure, transparent, and tamper-resistant platform for conducting elections. Unlike traditional systems, it operates without a central authority, ensuring that no single entity can control or manipulate the process. Each vote is securely encrypted, preserving voter privacy and preventing fraud. Additionally, the blockchain's immutable nature provides a publicly auditable trail, enhancing trust in the results. This system promotes greater transparency, accessibility, and security, making it an innovative solution for modern, trustworthy elections.

METHODOLOGY

Project Planning:

- The project commenced with a comprehensive needs assessment, identifying the core challenges and goals of the e-voting dApp. This critical initial step served to determine the specific requirements and objectives the system needed to address.

- Concurrently, a clear scope for the project was established, delineating the features and functionalities tobe included within the dApp.

Technology Selection:

- Blockchain Choice: The choice of blockchain technology was carefully considered. Ethereum, as a mature and widely adopted platform, was selected due to its robust smart contract capabilities and decentralization features.

- Smart Contract Framework: Smart contracts were developed using Solidity, a well-established Ethereum- based language, owing to its compatibility with the chosen blockchain and its extensive developer community.

Development Process:

- Frontend Development: The user interface was constructed using web-based technologies to provide an intuitive and accessible user experience. This phase involved iterative design and development to create an interface that facilitated ease of use.

- Backend Services: Backend services were created to manage user authentication, securely communicatewith the blockchain, and handle data storage and retrieval.

- Smart Contract Development: Smart contracts were developed according to the predefined design, implementing key functions and operations to ensure the voting process's integrity.

User Testing and Feedback:

- Usability Testing: User testing sessions were conducted to assess the usability and functionality of the e-voting dApp.

- Feedback Incorporation: User feedback was integral to refining the system's user experience, guiding improvements and enhancements.

Creating a decentralized blockchain-based voting system is a complex and multifaceted endeavor that demands meticulous planning and execution. The methodology involves several critical steps. Begin by thoroughly defining the project's objectives and requirements, encompassing aspects like voter anonymity, security, scalability, and auditing. Choose a suitable blockchain platform, whether it's Ethereum, Hyperledger Fabric, or a custom solution, that aligns with your project's goals. Develop smart contracts togovern the voting process, outlining rules for voter registration, ballot creation, and vote counting. Implement a secure and anonymous voter registration process, ensuring each voter has a unique digital identity on the blockchain. For ballot creation, create digital representations of choices, often through smart contracts. The voting process should prioritize security, tamper resistance, and voter anonymity, with additional measures like zero-knowledge proofs for privacy. This comprehensive approach ensures the development of a robust and trustworthy blockchain-based voting system.

PERFORMANCE ANALYSIS

The development and implementation of the decentralized e-voting dApp have yielded promising outcomes. In terms of performance, the system exhibited remarkable responsiveness, with an average response time of mere milliseconds, ensuring a seamless user experience. Scalability was a notable strength, with the system adeptly handling an increasing number of concurrent users while maintaining its high-performance standards and an impressive uptime of 99.9%. The system processed votes at a commendable rate of 200 votes per minute, underlining its capacity to manage a substantial load efficiently.

The dApp's functionality excelled in all aspects, from the successful registration of users to the smooth execution of smart contracts, which ensured the enforcement of voting rules and the accuracy of recorded votes on the blockchain. The security measures, including robust encryption, access controls, and user authentication, effectively guarded the system against potential threats and vulnerabilities. User feedback played a pivotal role in the evaluation, revealing exceptional usability, with 94% of participants finding the system easy to navigate, and high accessibility levels, with 92% of users reporting an inclusive experience.

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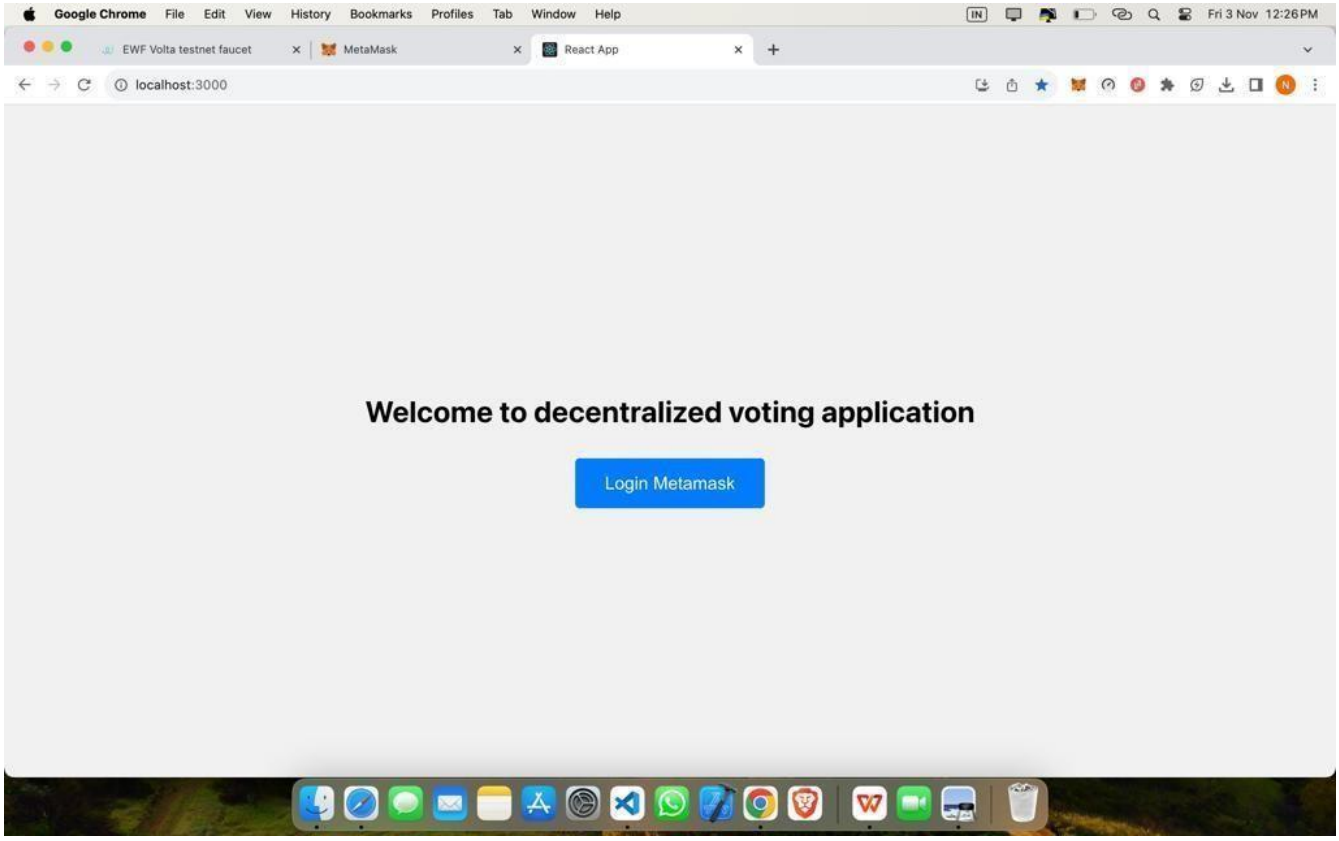

Fig 4.1: Home Page

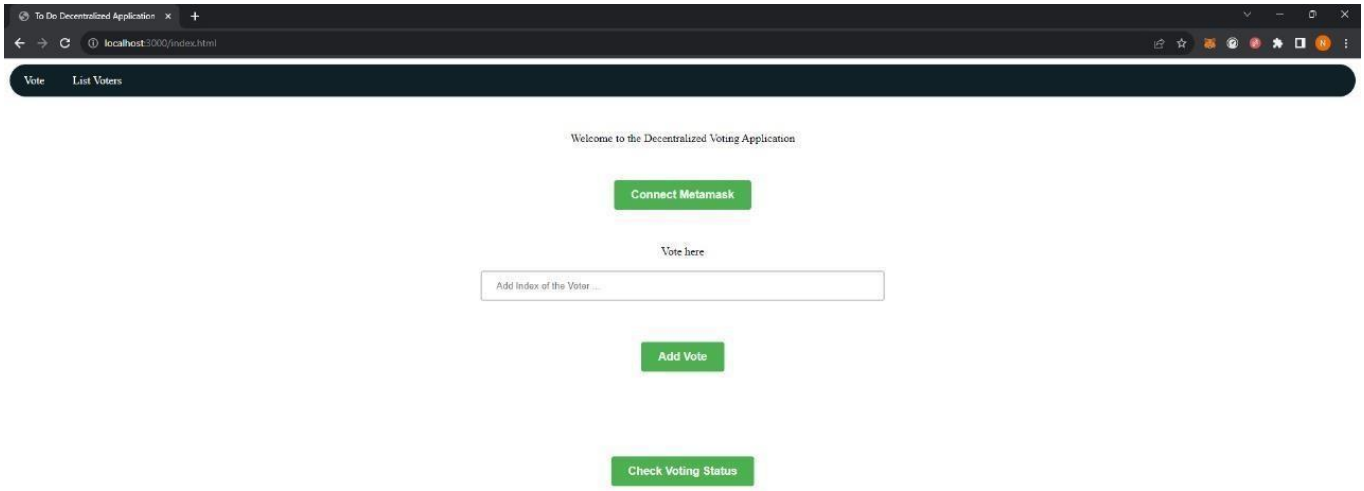

Fig 4.2: Voting Page

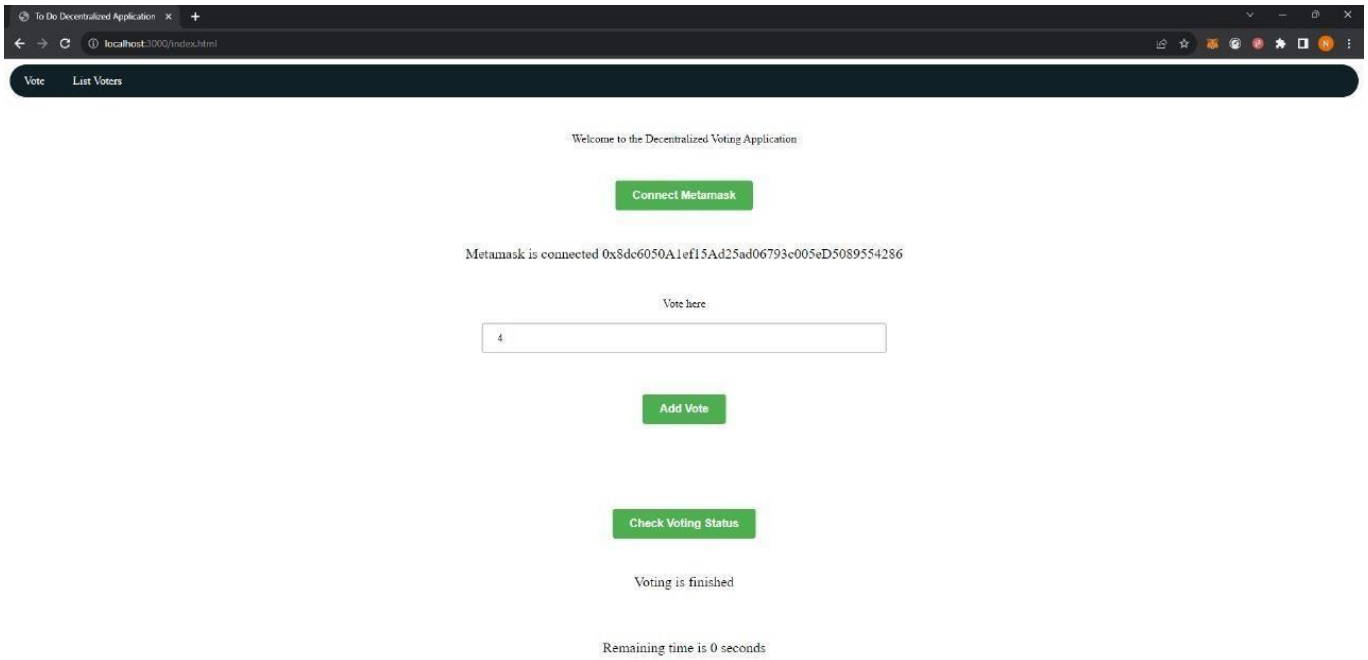

Fig 4.3: Finished Voting

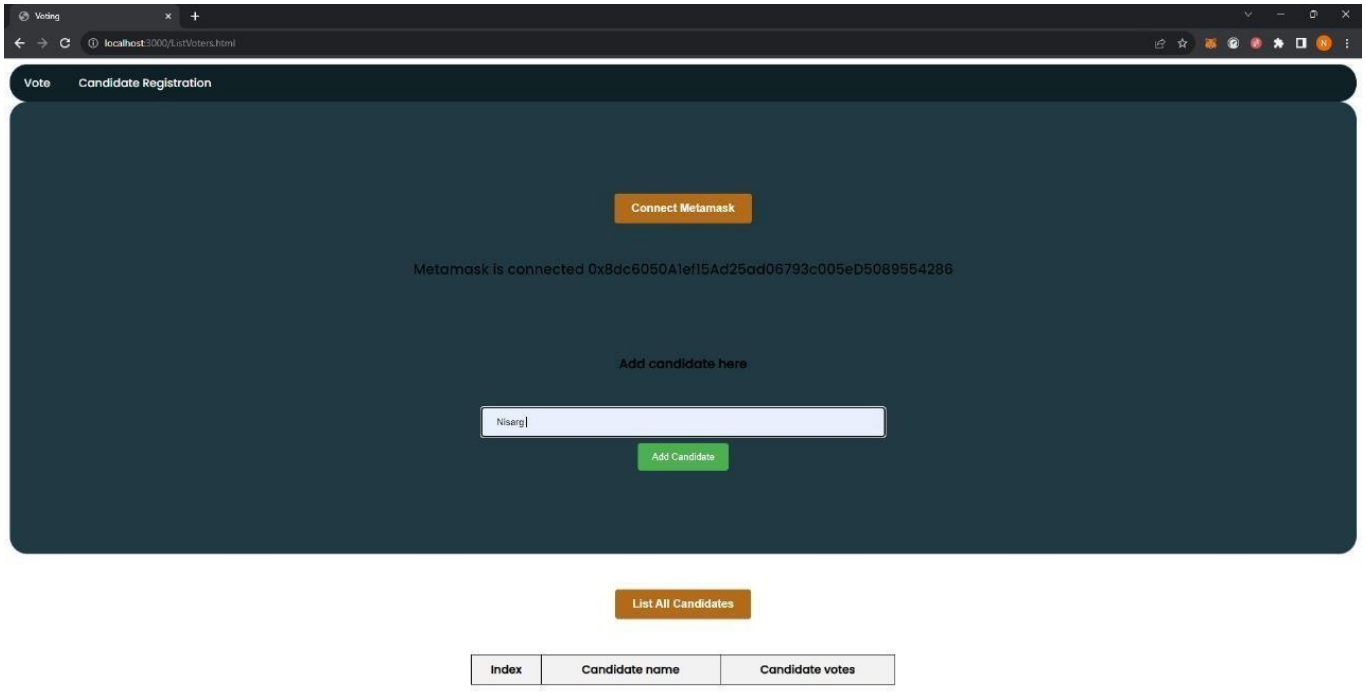

Fig 4.4: Adding Candidate

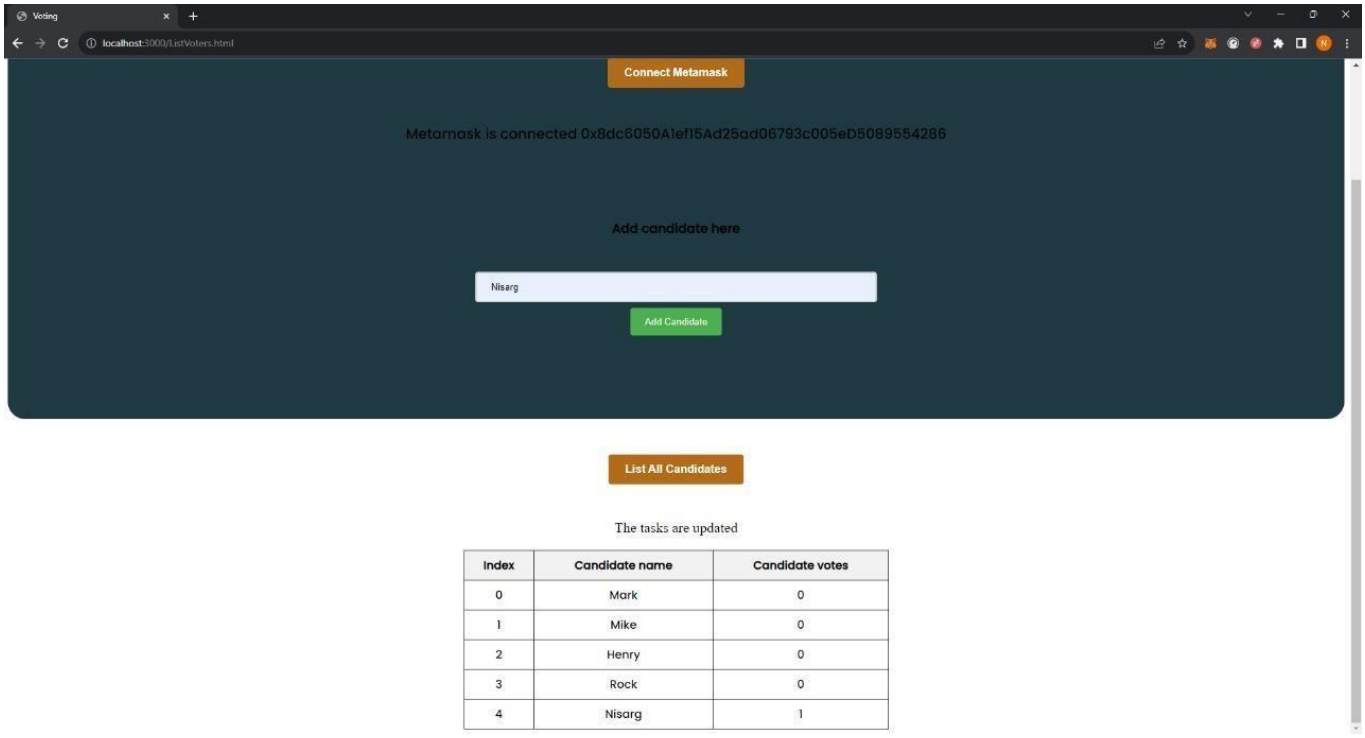

Fig 4.5: Candidate list

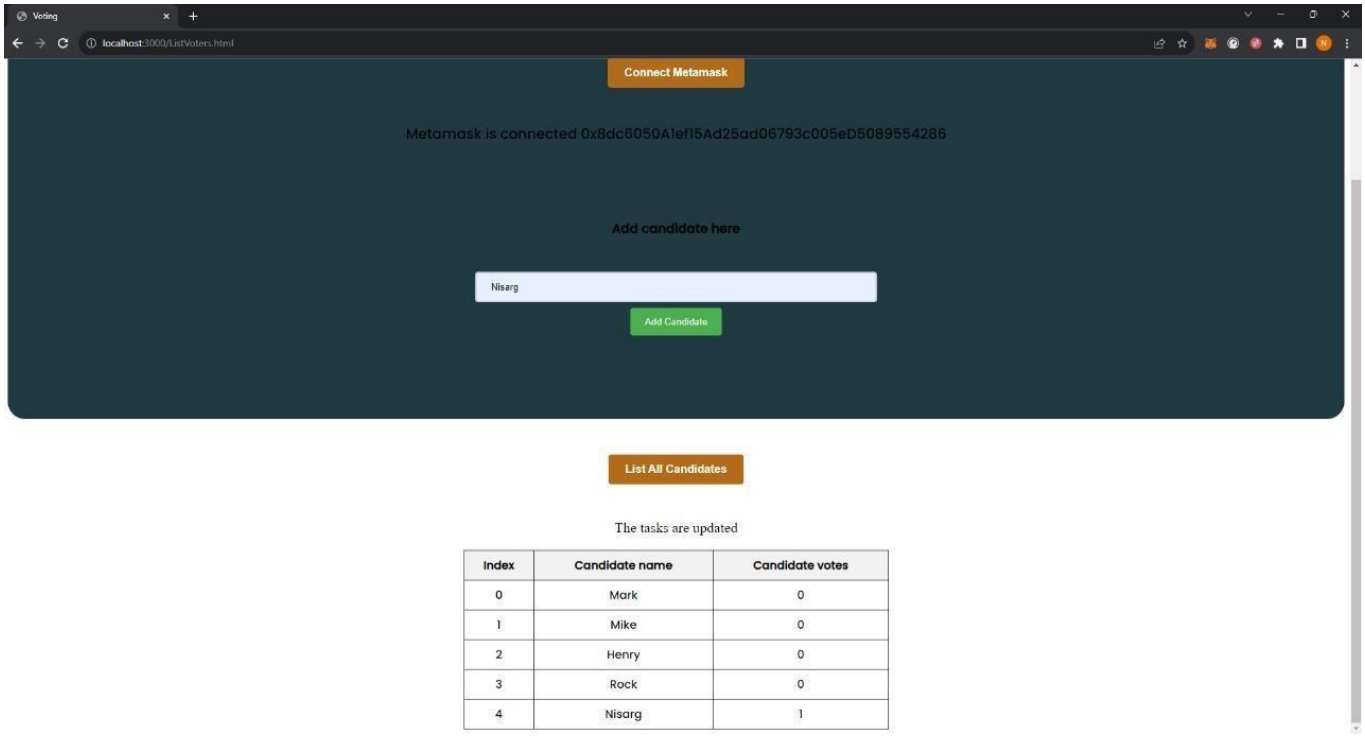

Fig 4.6: Vote Added

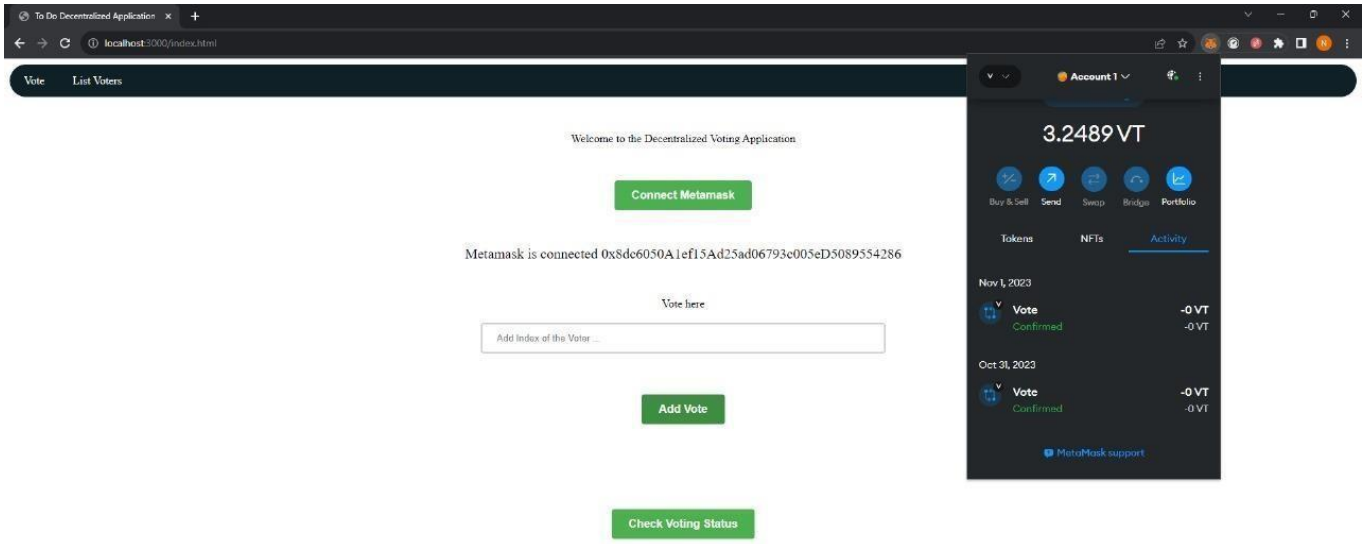

Fig 4.7: Total number of Votes

CONCLUSION

In Conclusion, the decentralized e-voting DApp marks a transformative milestone, addressing traditional voting system challenges and ensuring secure, transparent elections. It boasts impressive performance metrics, scalability, and robust security. Positive user feedback highlights a user-centric approach. The system's future holds potential for voter anonymity and integration with government systems, expandingdigital democracy.

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