DEVOOPS Based Secure Voting System Using Block Chain

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***Abstract*— Redis is used for quick data storage and retrieval, which improves system speed, and Docker is used for containerization, which guarantees consistent deployment and scalability in the DevOps-based Secure Voting System. This design facilitates effective administration of user sessions and vote tallying while promoting security and dependability in the voting process. Your project's architecture integrates a number of crucial technologies and methodologies:**

Containerisation with Docker

Isolation: To prevent dependencies and settings from clashing, every application component operates in a separate container.

Scalability: Docker makes it simple to scale services in response to demand, allowing the application to effectively manage fluctuating loads.

Consistency: By maintaining uniform development, testing, and production environments, the "it works on my machine" issue may be minimised.

Redis for Quick Data Administration

Data Store in Memory: Redis offers fast data access, which is critical for real-time applications that require fast reaction times, such as voting systems.

Session Management: It may be used to control user sessions, guaranteeing prompt and effective handling of user interactions.

Data Structures: Redis provides a number of data structures (such as lists, sets, and hashes) that may be used for a variety of voting system functions, including recording votes and results.

Practices of DevOps

Continuous Integration/Continuous Deployment (CI/CD): Updates may be released promptly and consistently when the deployment process is automated.

Monitoring and Logging: Using logging to record faults and user interactions and monitoring tools to monitor application performance contributes to system security and health.

Infrastructure as Code (IaC): Infrastructure may be managed through code by using technologies like Docker Compose or Kubernetes for orchestration. This makes it simpler to maintain configurations and duplicate setups.

A strong, scalable, and effective voting system that can adjust to user demands while upholding high performance and security standards is produced by combining Docker and Redis inside a DevOps framework.

***Keywords*— DevOps, Continuous Integration/ Continuous Deployment, Infrastructure as Code**

I. INTRODUCTION

Systems for electronic voting, or "e-voting," have become more and more popular in recent years because of their affordability, speed, and ease of use. However, there have been a number of security, privacy, and transparency issues with electronic voting methods. Because traditional electronic voting systems depend on a single authority to oversee the voting process, there may be security flaws and a chance that the results might be manipulated. Blockchain technology is a distributed, decentralised platform that can offer an environment for electronic voting systems that is transparent and safe. Blockchain technology ensures the integrity and immutability of data by enabling the generation of tamper-proof records and offering a decentralised method to data management. Smart contracts will be used to automate the voting process in the proposed blockchain-based electronic voting system, guaranteeing reliable and accurate outcomes. The details of the parties' agreement are directly encoded into lines of code to create self-executing contracts known as smart contracts. Only eligible voters will be able to cast ballots, and the smart contract will guarantee that the votes are counted correctly.

Additionally, the planned electronic voting method would be transparent and auditable, enabling voters to confirm their ballots and guaranteeing reliable and accurate results. Additionally, the technology will offer privacy and anonymity, guaranteeing that the voter's identity is kept secret. This research paper's goal is to suggest a blockchain-based electronic voting system. Smart contracts will be used in the proposed electronic voting system to automate the voting process and guarantee the correctness of the results. Additionally, the technology will be

transparent and auditable, allowing voters to confirm their ballots and guaranteeing reliable and accurate outcomes.

This research paper's goals are to:
Examine current electronic voting systems and pinpoint their shortcomings.
To investigate how blockchain technology may be used in electronic voting systems.
To suggest a blockchain-based electronic voting system.
To assess the viability and efficacy of the suggested electronic voting system.
To offer suggestions for upcoming advancements and enhancements

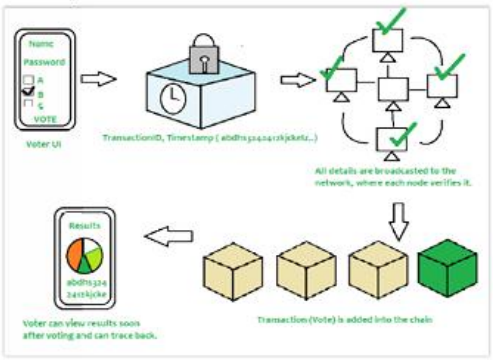
II. LITERATURE SURVEY

For many years, there has been interest in electronic voting, or e-voting. Growing interest in creating safe and dependable electronic voting systems has coincided with technological advancements. However, the lack of security, transparency, and auditability of traditional e-voting systems has drawn criticism. The drawbacks of conventional electronic voting methods may be addressed by blockchain technology. Blockchain technology makes use of a distributed and decentralised platform that offers a safe and impenetrable setting for processing and storing data. Blockchain-based electronic voting systems have been proposed by a number of researchers. [1] In 2022, a team of academics conducted a thorough analysis of the advantages and disadvantages of blockchain-based electronic voting systems. The authors list the primary issues that these systems deal with, including scalability, security, and privacy, and offer solutions. [2] A blockchain-based electronic voting system that guarantees voter privacy and transparency was suggested by a team of researchers in 2021. To guarantee the precision and openness of the voting procedure, the authors employ a hybrid blockchain architecture that blends public and private blockchains. [3] To automate the voting process and guarantee the integrity of the results, a team of academics developed an electronic voting system in 2020 that makes use of smart contracts. The system is developed using the Ethereum blockchain technology, and its security and performance are thoroughly examined by the authors. [4] To guarantee the correctness and openness of the voting process, a team of researchers developed an electronic voting system in 2020 that makes use of blockchain technology and verifiable voting. The authors evaluate the system on a simulated network and offer a thorough analysis of its performance and security. [5] To guarantee the security and anonymity of the voting process, a team of researchers in 2019 suggested an electronic voting system that makes use of blockchain technology and multi-party computation (MPC). The authors evaluate the system on a simulated network and offer a thorough analysis of its performance and security. [6] To guarantee the anonymity and security of the voting process, a team of researchers in 2018 developed an electronic voting system that makes use of blockchain technology and homomorphic encryption. The authors evaluate the system on a simulated network and offer a thorough analysis of its performance and security.

III. SYSTEM IMPLEMENTATION

Existing System
The current procedure demonstrates that blockchain technology has surfaced as a viable remedy to the drawbacks of conventional electronic voting systems. Blockchain-based electronic voting systems that are safe, open, and auditable have been suggested by a number of researchers. After evaluation, the suggested systems were determined to be effective and safe. However, further study is required to create and enhance blockchain-based electronic voting systems.

Proposed System
This research report will employ a mixed-methodologies approach, mixing qualitative and quantitative methods. A review of the body of research on blockchain technology and electronic voting systems will be the first step in the study. The assessment will examine the possibilities of blockchain technology in e-voting systems and pinpoint the difficulties and restrictions of current e-voting systems. The research will then propose an e-voting system based on blockchain technology.



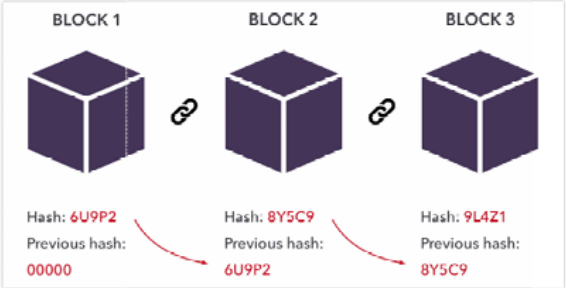
Proposed Architecture

Smart contracts will be used in the development of the proposed electronic voting system, automating the voting process and guaranteeing the correctness of the results. Additionally, the technology will be transparent and auditable, allowing voters to confirm their ballots and guaranteeing reliable and accurate outcomes. The viability and efficacy of the suggested electronic voting method will be assessed. A mixed-methods approach will be used for the evaluation, integrating both qualitative and quantitative techniques. Testing the suggested electronic voting system and gathering information on its usability, security, and performance will be part of the study. To assess the viability and efficacy of the suggested electronic voting method, the gathered data will be examined. All things considered, the suggested blockchain-based electronic voting system may provide a safe, open, and impenetrable voting procedure, guaranteeing the precision and integrity of the outcomes.

IV. METHODOLOGY

41 The Blockchain System

The suggested system will be built on top of the blockchain network. The vote data will be stored on the network's many nodes, which will also guarantee its integrity and immutability. Since the blockchain network will be spread and decentralised, the voting process won't be governed by a single entity. The vote data will be safe and impenetrable thanks to the blockchain network. The suggested system will be built on top of the blockchain network. The vote data will be stored on the network's many nodes, which will also guarantee its integrity and immutability. Since the blockchain network will be spread and decentralised, the voting process won't be governed by a single entity. The blockchain network will guarantee the accuracy and reliability of the results as well as the security and immutability of the voting data. The suggested system will be built on top of the blockchain network. The vote data will be stored on the network's many nodes, which will also guarantee its integrity and immutability. Since the blockchain network will be dispersed and decentralised, the voting process won't be governed by a single entity. the accuracy and reliability of the results, as well as the blockchain network evidence.



4.2 Intelligent Contracts

To automate the voting process and guarantee accurate results, smart contracts will be employed. After the voting process is started, the smart contracts will run automatically. The vote proof will be guaranteed by the smart contracts. Additionally, voters will be able to confirm their vote thanks to smart contracts, which will also be utilised to automate the voting process and guarantee correct results. After the voting process is started, the smart contracts will run automatically.

Smart contracts will be used to automate the voting process and guarantee that the results are accurate; they will be executed automatically once the voting process is started; they will guarantee that the voting process is accurate, transparent, and fair; they will also allow voters to confirm their vote and ensure that their vote was counted correctly.

Implementation

User Interface

Any internet-connected device, such a computer or a smartphone, will be able to access the user interface, which will be made to offer a simple and

straightforward voting experience. All voters, regardless of their level of technological expertise, will be able to use the user interface. Voters will have an easy and straightforward voting experience thanks to the user interface. Any internet-connected device, whether a PC or a smartphone, will be able to access the user interface. The user interface will be made so that all voters, regardless of their level of technological expertise, can utilise it. Any internet-connected device, whether a PC or a smartphone, will be able to access the user interface. All voters, regardless of their level of technological expertise, will be able to use the user interface.

Polygon Test Network

Developers may test and deploy applications on the Polygon network using the Polygon test network without needing to Without using actual etherum, developers may deploy and test their applications on the Polygon test network. It is an Ethereum layer-two (L2) scaling platform. Without using two (L2) scaling platforms for Ethereum, developers may launch and test their applications on the Polygon network.

Security Measures

It will use different security measures to safeguard the integrity and confidentiality of the vote data. The security measures will include encryption, authentication, and authorization. The system will additionally include will adopt several security measures to safeguard the integrity and confidentiality of the vote data. The security measures will include encryption, authentication, and authorization. Additionally, the system will put safeguards against cyberattacks and unauthorised access into place. To guarantee the secrecy and integrity of the voting data, the proposed electronic voting system would incorporate a number of security features. Authorisation, authentication, and encryption will all be part of the security measures. Additionally, the system will put safeguards in place to stop unwanted

Verification System

This voting system will offer a verification system that will allow voters to check their vote on the blockchain and confirm that their vote was included in the final results. The proposed e-voting system will offer a verification system that will allow voters to confirm their vote and confirm that their vote was counted correctly, as well as to enable the network and confirm that their vote was included in the final resultsA blockchain-based voting system will be safe, transparent, and impenetrable. Smart contracts will be used to automate the voting process and guarantee the correctness of the results. Voters will be able to confirm their vote thanks to the system's openness and auditability, which will guarantee that All things considered, the suggested blockchain-based electronic voting system will offer a safe, open, and impenetrable voting procedure. To automate the voting process and guarantee the correctness of the results, the system will make use of smart contracts. Voters will be able to confirm their ballots and be assured of accurate and reliable results thanks to the system's openness and auditability.

V. CONCLUSIONS

In conclusion, the existing voting process might be completely transformed by the suggested blockchain-based electronic voting system. Among the many advantages of the system are improved accuracy, security, and transparency. By using blockchain technology, the proposed electronic record of every transaction will guarantee accurate and reliable election results. Additionally, the proposed system's contracts automate the voting process, lowering the possibility of manipulation and human mistake. Voters may confirm their votes and make sure they are counted thanks to the system's auditability and transparency capabilities. The decentralised manipulation of the suggested system improves its security. The efficacy and viability of the suggested system will be shown by the evaluation. The evaluation's findings will assist in pinpointing areas in need of development. The efficacy and viability of the suggested system will be shown by the evaluation. The findings of the examination and upcoming developments, guaranteeing that the suggested electronic voting system continues The efficacy and viability of the suggested system will be shown by the evaluation. The evaluation's findings will assist in pinpointing areas that require enhancement and further development, guaranteeing that the suggested solution will satisfy the changing requirements of voters and election authorities.

REFERENCES

[1] "E-Voting System Based on Blockchain Technology: A Survey," by S. Al-Maaitah, M. Qatawneh, and A. Quzmar, 2021 International

Conference on Information Technology (ICIT), Amman, Jordan, 2021, pp. 200 205, doi: 10.1109/ICIT52682.2021.9491734.

[2] "Decentralised E-voting system based on Smart Contract by using Blockchain Technology," by M. Al-madani, A. T. Gaikwad, V. Mahale, and Z. A. T. Ahmed, (2020 International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing, Aurangabad, India, 2020, pp. 176-180, doi: 10.1109/ICSIDEMPC49020.2020.9299581.

[3] K. Patidar and S. Jain, "Decentralised E-Voting Portal Using Blockchain," 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kanpur, India, 2019, pp. 1-4.

[4] S. T. Alvi, M. N. Uddin, and L. Islam, "Digital Voting: A Blockchain-based E-Voting System using Biohash and Smart Contract," Third International Conference on Smart Systems and Inventive Technology (ICSSIT), Tirunelveli, India, 2020, pp. 228-233.

[5] "E-Voting Systems using Blockchain: An Exploratory Literature Survey," Second International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2020, pp. 890-895, in S. K. Vivek, R. S. Yashank, Y. Prashanth, N. Yashas, and M. Namratha, doi: 10.1109/ICIRCA48905.2020.9183185.

[6] Benabdallah, A. Audras, L. Coudert, N. El Madhoun, and M. Badra, "Analysis of Blockchain Solutions for E Voting: A Systematic Literature Review," IEEE Access, vol. 10, pp. 70746-70759, 2022.

[7] "A decentralised and trustless e-voting system based on blockchain technology," Computer Society of Iran (CSICC), 27th International Computer Conference, Tehran, Iran, Islamic Republic of, 2022, pp. 1-7, doi: 10.1109/CSICC55295.2022.9780507, D. Golnarian, K. Saedi, and B. Bahrak.

[8] R. Taş and Ö. Ö. Tanrıöver, "A Systematic Review of Challenges and Opportunities of Blockchain for E Voting," Symmetry, vol. 12, no. 8, p. 1328, Aug. 2020, doi: 10.3390/sym12081328.

[9] "A Manipulation Prevention Model for Blockchain-Based E-Voting Systems" by Ruhi Taş and Ömer Özgür Tanrıöver, Security and Communication Networks, vol. 2021, Article ID 6673691, 16 pages, 2021. The article https://doi.org/10.1155/2021/6673691

[10] Gifu, D., Iftene, A., & Cosmin-Iulian, I. (2021). A blockchain-based electronic voting system on a large scale. Information Systems Development: Bridging the Gap between Development and Operations (DevOps) in Information Systems (ISD2021 Proceedings), edited by E. Insfran, F. González, S. Abrahão, M. Fernández, C. Barry, H. Linger, M. Lang, and C. Schneider. Spain's Valencia.