

Event ticket management with blockchain implementation

¹Narne Srinivasarao, ²Pentyala Devakinandan, ³Sadineni Srujan,
⁴Mr. Dr. K. P. Kaliyamurthie

Department of Computer Science and Engineering,
Bharath Institute of Science & Technology,
affiliated to Bharath Institute of Higher Education and Research,
Chennai, Tamil Nadu, India.

Abstract—Event ticket management is an essential part of event planning that ensures efficient ticket sales and distribution. However, traditional ticketing systems are often marred by issues such as ticket scalping, counterfeit tickets, and lack of transparency. Blockchain technology, with its decentralized and secure nature, offers a promising solution to these challenges. This paper proposes an event ticket management system with blockchain implementation, where each ticket is represented with unique digital token on the blockchain. The system ensures that each ticket can only be sold once, eliminating the problem of ticket scalping and ensuring that the ticket purchaser gets a genuine ticket. Furthermore, the system provides transparency and auditable data on ticket sales and distribution, thus enhancing accountability and preventing fraudulent activities. The proposed system also includes smart contract that automatically executes the terms of the ticket purchase agreement, eliminating the need for intermediaries and reducing transaction costs. Overall, the proposed system offers a secure, transparent, and efficient solution to event ticket management.

Keywords: Event ticket management, blockchain technology, digital tokens, ticket scalping, transparency, accountability, smart contract, intermediaries, transaction costs.

I. INTRODUCTION:

Event ticket management is a critical aspect of event planning that ensures a smooth and efficient ticket sales process. However, traditional ticketing systems are often plagued by issues such as ticket scalping, counterfeit tickets, and lack of transparency. These challenges pose significant risks to the success of the event and the satisfaction of attendees.

Blockchain technology has emerged as a potential solution to address these challenges in the ticketing industry. The decentralized and secure nature of the blockchain makes it an ideal candidate for developing a transparent and tamper-proof event ticket management system.

This paper proposes an event ticket management system with blockchain implementation, where each ticket is represented by a unique digital token on the blockchain. The system ensures that each ticket can only be sold once, eliminating the problem of ticket scalping and ensuring that the ticket purchaser gets a genuine ticket. The proposed system also provides transparent and auditable data on ticket sales and distribution, enhancing accountability and preventing fraudulent activities.

Moreover, the proposed system includes a smart contract that automatically executes the terms of the ticket purchase agreement, eliminating the need for intermediaries and reducing transaction costs. This system offers a secure, transparent, and efficient solution to event ticket management, benefiting both event organizers and attendees alike.

In the following sections, we will delve into the details of the proposed system, including the technical aspects of implementing the blockchain-based ticketing solution. We will also discuss the benefits and limitations of the system and how it can be further improved to meet the evolving needs of the event industry.

II. LITERATURE REVIEW

[1] Naipeng dong, "A blockchain-based decentralized booking system", 2020.

The article "A blockchain-based decentralized booking system" published in The Knowledge Engineering Review in 2020 proposes a decentralized booking system based on blockchain technology. The authors, Zhu et al., highlight the limitations of current centralized booking systems, such as privacy and security issues, as well as the high fees charged by intermediaries. They argue that blockchain technology can address these challenges by providing a decentralized, transparent, and secure platform for booking services. The proposed system uses smart contracts to automate the booking process, eliminating the need for intermediaries and reducing transaction costs. Each booking transaction is recorded on the blockchain, ensuring transparency and preventing fraud. The system also uses a reputation-based mechanism to incentivize users to behave honestly and maintain their reputation on the platform.

[2] Mengxuan Liu, "A Hybrid Blockchain-Based Event Ticketing System", 2021.

The paper "A Hybrid Blockchain-Based Event Ticketing System" was published in 2021 by researchers from the Department of Computer Science at the University of Saskatchewan. The study proposes a hybrid blockchain-based event ticketing system that combines both public and private blockchains to address the limitations of traditional event ticketing systems. The proposed system uses a public blockchain to store ticket information and a private blockchain to store confidential information, such as personal information of ticket holders. The use of a public blockchain ensures transparency and immutability, while the use of a private

blockchain ensures privacy and security. The system uses smart contracts to automate the ticketing process, including ticket issuance, transfer, and redemption. The smart contracts also enforce ticketing rules and prevent ticket scalping and fraud. The system is designed to be user-friendly, with a mobile application that allows users to purchase and manage their tickets. The authors evaluated the performance of their proposed system through a simulation study. The results show that the system can handle a large number of transactions with low latency and high throughput, demonstrating the feasibility of the proposed system in real-world settings.

[3] Kumar ET.AL. "Online Ticket Booking using Block Chain". 2019.

The article "Online Ticket Booking using Block Chain" published in the International Journal of Engineering Science and Computing in February 2019 proposes a blockchain-based online ticket booking system. The authors, Kumar et al., argue that the current online ticket booking systems have several limitations, such as a lack of transparency and security, which can be addressed through the use of blockchain technology. The proposed system uses a private blockchain to store ticket information and a public blockchain to verify and validate transactions. The use of a private blockchain ensures the privacy and security of ticket information, while the use of a public blockchain ensures transparency and immutability. The system uses smart contracts to automate the ticketing process, including ticket issuance, transfer, and redemption. The smart contracts also enforce ticketing rules and prevent ticket scalping and fraud. The system is designed to be user-friendly, with a mobile application that allows users to purchase and manage their tickets.

[4] Wang ET. AL. "Implementation of a Blockchain-Based Event Reselling System", 2019.

The article "Implementation of a Blockchain-Based Event Reselling System" proposes a blockchain-based solution to address the issues related to the secondary ticketing market, specifically the problem of ticket scalping. The study was published in the Journal of Information Security and Applications in 2019 by Wang et al. The authors propose a system that uses smart contracts on the Ethereum blockchain to create a transparent, decentralized, and secure platform for reselling event tickets. The smart contracts are designed to enforce rules for ticket transfer and reselling, including price caps and a cap on the number of times a ticket can be resold. The system also uses a reputation-based mechanism to incentivize honest behavior among users. The reputation score of each user is recorded on the blockchain, and users with high scores are given priority in the ticket allocation process. The authors evaluate the performance of their proposed system through a proof-of-concept implementation on the Ethereum blockchain. They compare the performance of their system with that of a traditional centralized ticketing system, demonstrating the advantages of their blockchain-based system in terms of transparency, security, and efficiency.

[5] Aji NugrahaDebby, "Improving multi-sport event ticketing accounting information system design through implementing RFID and blockchain technologies within COVID-19 health protocols", 2021.

The study proposes an improved ticketing accounting information system design for multi-sport events, which integrates RFID and blockchain technologies while adhering to COVID-19 health protocols. The authors argue that the current ticketing accounting information systems for multi-sport events have several limitations, such as a lack of transparency, accuracy, and security. They propose an integrated system that utilizes RFID and blockchain technologies to provide real-time tracking, monitoring, and validation of ticket transactions. The system utilizes RFID tags attached to tickets to track their movements and validate their authenticity. The data from the RFID tags is stored on a blockchain, which provides transparency, security, and immutability. The system also utilizes smart contracts to automate the ticketing process, including ticket issuance, transfer, and redemption. The authors evaluate the feasibility of their proposed system by conducting a case study of a multi-sport event in Indonesia. The results show that the system can effectively track ticket movements and validate ticket authenticity, providing transparency and security in the ticketing process. The system also adheres to COVID-19 health protocols by reducing physical contact during the ticketing process. The study concludes that the integration of RFID and blockchain technologies can improve the ticketing accounting information system design for multi-sport events, providing real-time tracking, monitoring, and validation of ticket transactions while ensuring transparency, security, and accuracy. The authors suggest that their proposed system can be extended to other applications, such as airline ticketing and hotel booking, to provide a more secure and efficient platform for booking services. However, they acknowledge the need for further research to address the scalability and interoperability challenges of blockchain-based systems in real-world settings.

III. SYSTEM ANALYSIS

Proposed system

A proposed system for event ticket management with blockchain implementation would involve using a decentralized platform to sell and manage event tickets. The platform would be based on a blockchain network, which would enable secure and transparent transactions, reducing the risk of fraud and ticket scalping.

The system would utilize smart contracts to automate the ticketing process, including ticket issuance, transfer, and redemption. The smart contracts would include rules for ticket transfer and reselling, including price caps and a cap on the number of times a ticket can be resold. The platform would also use a reputation-based mechanism to incentivize honest behavior among users. The reputation score of each user would be recorded on the blockchain, and users with high scores would be given priority in the ticket allocation process.

To ensure the security and privacy of user data, the system would use encryption and other security measures to protect personal information. Users would also be required to verify their identity through a KYC (know your customer) process, which would reduce the risk of fraudulent activity. The platform would provide real-time tracking and monitoring of ticket transactions,

enabling event organizers to have greater visibility into the ticketing process. The system would also provide real-time updates to users, including notifications of ticket availability, price changes, and other important information.

Overall, a blockchain-based system for event ticket management would provide greater transparency, security, and efficiency in the ticketing process, reducing the risk of fraud and ticket scalping while improving the user experience for both event organizers and attendees.

IV. SYSTEM REQUIREMENTS

The software requirements for an event ticket management system with blockchain implementation would include the following:

1. **Blockchain Platform:** The system would require a blockchain platform, such as Ethereum or Hyperledger Fabric, to develop and deploy smart contracts and manage the decentralized ledger.
2. **Smart Contract Development Tools:** The system would require smart contract development tools, such as Solidity for Ethereum or Chaincode for Hyperledger Fabric, to write, test, and deploy smart contracts.
3. **Web Development Framework:** The system would require a web development framework, such as React or Angular, to build the user interface and enable users to browse events, purchase tickets, and manage their tickets.
4. **Payment Gateway Integration:** The system would require payment gateway integration tools, such as Stripe or PayPal, to enable users to make payments using multiple payment methods, including credit/debit cards, cryptocurrency, and other digital payment methods.
5. **Identity Verification Tools:** The system would require identity verification tools, such as Know Your Customer (KYC) verification services, to verify user identities and ensure compliance with regulations.
6. **Security Tools:** The system would require security tools, such as encryption tools and firewalls, to protect user data and transaction data from unauthorized access and cyber attacks.
7. **Reporting and Analytics Tools:** The system would require reporting and analytics tools, such as Google Analytics or Mixpanel, to provide insights into ticket sales, attendance, and other important metrics.
8. **Integration Tools:** The system would require integration tools, such as Application Programming Interfaces (APIs), to integrate with existing event management systems and ensure seamless operations and data synchronization.
9. **Testing Tools:** The system would require testing tools, such as Truffle for Ethereum or Fabric Test Network for Hyperledger Fabric, to test the smart contracts and ensure that the system is functioning as intended.

Overall, the software requirements for an event ticket management system with blockchain implementation would include a range of development tools and software components to ensure that the system is secure, scalable, and user-friendly.

V. SOFTWARE REQUIREMENTS

Applications:

- Metamask
- Ganachi
- Vs code
- Remix
- Github

Packages:

- Truffle
- Web3
- Bootstrap
- Node.js
- Npm

Languages:

- Solidity
- JavaScript

VI. SMART CONTRACT

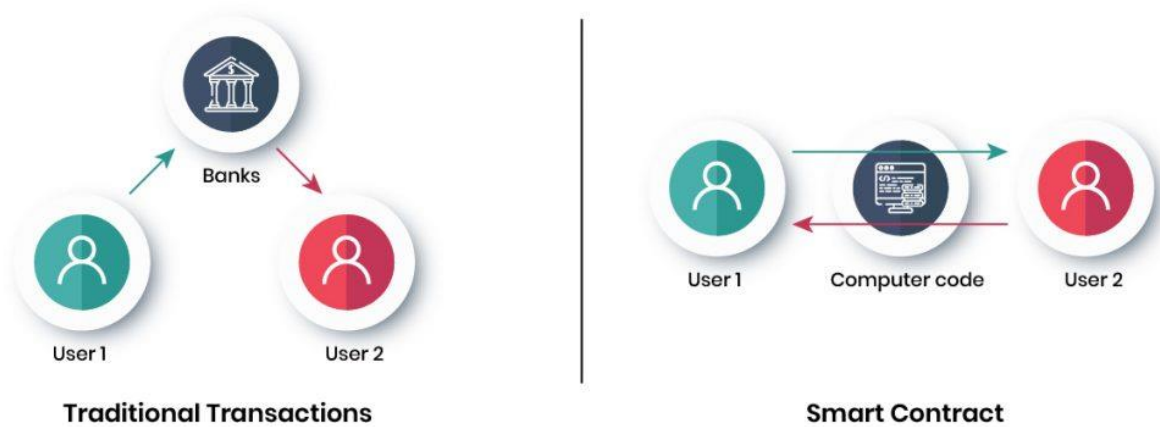
A smart contract for an event ticket management system with blockchain implementation could include the following functions:

1. **Ticket Issuance:** The smart contract would issue tickets to customers who purchase them through the system. The contract would generate a unique digital ticket that is associated with the customer's account and the event details.
2. **Ticket Transfer:** The smart contract would allow customers to transfer their tickets to others. The contract would validate the transfer and update the ownership of the ticket in the blockchain ledger.
3. **Ticket Resale:** The smart contract would allow customers to resell their tickets to others, subject to certain rules and regulations. The contract would enforce rules around ticket resale, such as a limit on the resale price, to prevent scalping and fraud.
Ticket Redemption: The smart contract would allow event organizers to validate tickets at the event venue. The contract would check the validity of the ticket and update the status of the ticket in the blockchain ledger.
4. **Payment Handling:** The smart contract would handle payments for ticket purchases and resales. The contract would ensure that the correct amount is transferred to the correct parties, such as the event organizer and the ticket seller.
5. **Refunds:** The smart contract would allow for refunds in the event of canceled or postponed events. The contract would refund the appropriate amount to customers based on the terms and conditions of the event.

- 6. Ticket Expiration: The smart contract would set an expiration date for the ticket, after which it would no longer be valid. The contract would enforce this expiration date and prevent the use of expired tickets.
- 7. Ticket Verification: The smart contract would provide a secure and transparent verification process for event organizers, ensuring that only valid tickets are allowed into the event.

Overall, a smart contract for an event ticket management system with blockchain implementation would automate and streamline the ticketing process while ensuring transparency, security, and compliance with regulations.

How Smart Contracts Work?



VII.SYSTEM DESIGN

System architecture

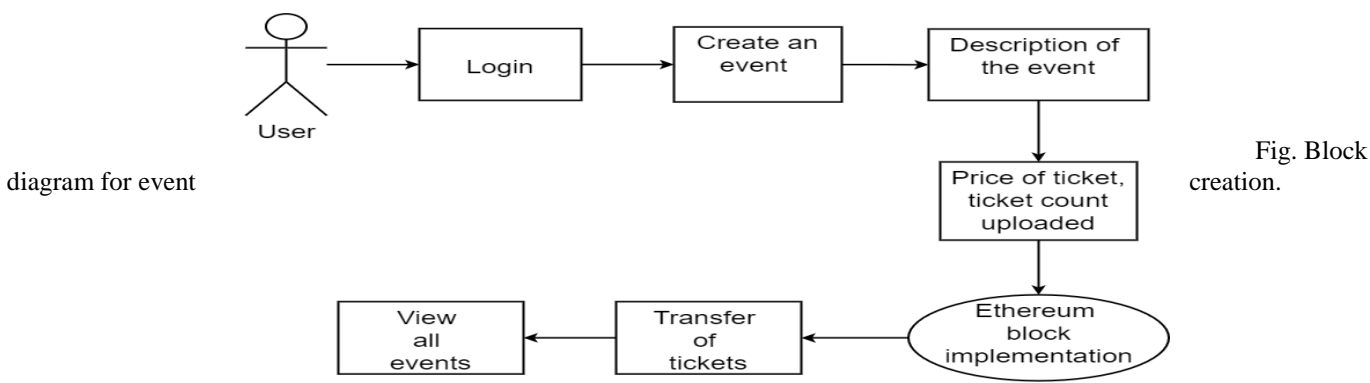
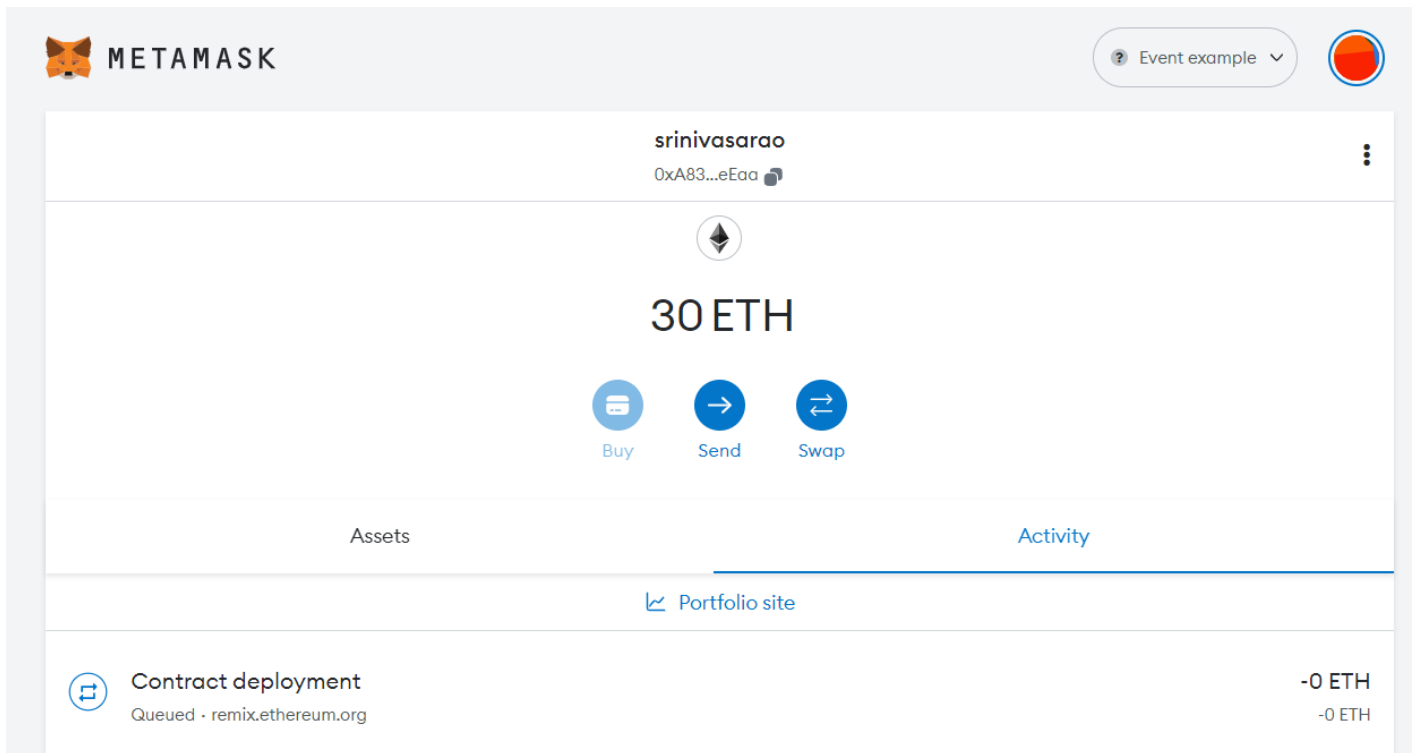


Fig. Block creation.

VIII. METHODOLOGY

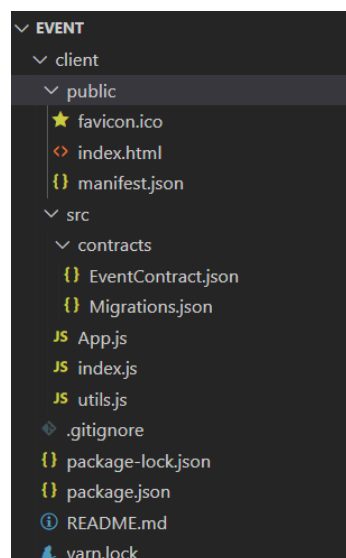
Smart Contract

- We need to write a smart contract based on the needs and requirements that we have for the software.
- We need to use ERC721 when we are writing the solidity smart contract.
- We need to code all the features that are needed into the Smart contract.
- Once the smart contract was written, we will compile and run it.
- We will then deploy the smart contract into the metamask account.



FrontEnd Application:

- We should first open visual studios code and install all the system requirements.
- We should initiate npm to start our coding
- After coding the entire application, give the application the metamask address for connection.
- We should launch and start the application.
- It will direct and open itself in <https://localhost:7545>



IX. MODULES

This has many modules.

Event Organization**Create event**

Name

Date

Price

Ticket count

- User can create an event by entering the event name, date , price of each tickets and total ticket count.

Transfer tickets

Event Id

Amount

To

- User can transfer their tickets from their account to another account by entering their account details and total amount of tickets to transfer. This can be only if user holds the ticket.

Events

Id	Admin	Name	Date	Price	Ticket remaining	Total tickets	Buy
0	0x311c66c25f0424cBa642E28C60a74e88Ec17DD72	Event1	2/28/2022, 5:30:00 AM	280	6	10	<input type="text" value="1"/> <input type="button" value="Submit"/>

- Here user can view all events details as shown above and they can buy the ticket by entering the count and buy it with ethers (metamask wallet).

CONCLUSION:

In conclusion, implementing blockchain technology in event ticket management has numerous benefits. It offers a secure and transparent way of managing event tickets by ensuring that they are not duplicated, counterfeited or resold. Additionally, it reduces the involvement of intermediaries, which leads to reduced costs and increased efficiency. Blockchain also allows for faster transactions and better record-keeping, leading to increased accountability and trust among event organizers, ticket sellers, and buyers. Overall, the implementation of blockchain in event ticket management has the potential to revolutionize the industry by creating a more secure, reliable, and efficient way of managing events.

FUTURE SCOPE:

The future scope for Event ticket management with blockchain implementation is vast and promising. Here are some potential areas of growth and development. They are Enhanced Security, Decentralized Ticketing System, Improved Transparency, etc.. Overall, the future of event ticket management with blockchain implementation is promising, and the technology has the potential to transform the event industry by providing a more secure, reliable, and efficient way of managing events.

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