



**ALTHASH**  
EDUCATION

**EXPLORING THE APPLICATION OF BLOCKCHAIN TECHNOLOGY FOR  
AFFORDABLE AND STREAMLINED EMERGENCY HEALTHCARE SERVICES  
IN NIGERIA.**

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**A CAPSTONE PROJECT SUBMITTED TO THE FACULTY OF  
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DECENTRALIZED APPLICATIONS**



## **Abstract**

Emergency healthcare services are vital for saving lives and reducing morbidity, especially in low-resource settings. However, many challenges hinder the effective delivery of emergency care, such as lack of access to patient records, delays in obtaining consent or police reports, and inefficiencies in payment and reimbursement systems. Blockchain technology, a decentralized and distributed ledger system that enables secure and transparent data sharing and transactions, has the potential to address some of these challenges and improve emergency healthcare outcomes. In this project, we propose to explore the feasibility and benefits of applying blockchain technology for affordable and streamlined emergency healthcare services in Nigeria. We will focus on three main use cases:

- (1) creating a unique identity utility token for emergency patients that allows them to access timely and appropriate care without bureaucratic hurdles;
- (2) developing a blockchain-based platform for managing and exchanging patient data among different healthcare providers and stakeholders; and
- (3) implementing a blockchain-based reward system for healthcare providers that incentivizes them to provide quality emergency care and reduces fraud and corruption. We will use a mixed-methods approach to conduct a situational analysis, design and prototype the blockchain solutions, and evaluate their impact on emergency healthcare processes and outcomes. We expect that this project will contribute to the advancement of blockchain technology applications in healthcare and demonstrate its potential for improving emergency healthcare services in Nigeria and beyond.

## **Introduction:**

### **1.1 Problem Statement:**

The current emergency healthcare system in Nigeria lacks a streamlined identification process, leading to delays, difficulties in accessing medical records, and challenges in delivering timely and appropriate care. This situation often results in suboptimal outcomes and unnecessary complications for patients. Furthermore, the lack of a standardized identification system poses risks to patients who are incapacitated or unable to communicate their medical history and emergency contacts.

The problem addressed in this research project is the inefficiency and lack of coordination in current emergency healthcare systems. The absence of a secure and transparent mechanism for seamless response and coordination among healthcare providers and patients leads to delays and compromised patient care.

### **1.2 Potential Solutions:**

Several potential solutions can address the problem of inefficiency and lack of coordination in emergency healthcare systems. The proposed solution, the CareNow Token (CNT) system, stands out due to its utilization of blockchain technology and smart contracts. This solution enables secure and decentralized transactions, seamless response and efficient access to emergency healthcare services. The CareNow Token system leverages the benefits of blockchain, such as transparency, immutability, and decentralized record-keeping, to overcome the challenges faced by existing systems. By implementing this solution, healthcare providers, insurers, and patients can effectively collaborate, streamline processes, and deliver optimal emergency healthcare services.

## **Solution to the Problem**

### **2.1 Proposed Solutions:**

The proposed solutions to improve emergency healthcare systems include integrating blockchain technology, developing a secure and decentralized platform, and leveraging smart contracts. These elements provide transparency, traceability, and efficiency in emergency healthcare transactions, leading to improved coordination and patient care. Compared to previous solutions, the CareNow Token system offers a comprehensive approach that combines the advantages of blockchain technology, secure and decentralized coordination.

### **2.2 Benefits and Drawbacks:**

The CareNow Token system offers several benefits. Firstly, it ensures rapid response, reduces delays and minimizes the risk of delayed healthcare. Secondly, it facilitates efficient coordination among healthcare providers and

patients, leading to faster response times and improved patient outcomes. However, drawbacks may include the initial implementation costs, the need for stakeholder education and adoption, and potential regulatory challenges. Despite these drawbacks, the potential benefits outweigh the limitations, making the CareNow Token system a viable and valuable solution.

### **2.3 Recommended Course of Action:**

We propose the implementation of a blockchain-based Emergency Identification Card (EIC) Token system to address the identified challenges. The EIC Token will act as a unique digital identifier, securely stored on the blockchain, and accessible in emergency situations. Here are the key features and benefits of the proposed solution:

- **Digital Identification:** Each citizen will be issued a unique EIC Token, serving as their digital identification in emergency scenarios. The token will contain encrypted information such as personal details, medical history, emergency contacts, and relevant health records.
- **Blockchain Integration:** The EIC Token system will leverage blockchain technology to securely store and manage citizen data. This decentralized approach ensures data integrity, privacy, and accessibility, while reducing the risk of data loss or tampering.
- **Scannable Token Technology:** The EIC Token will utilize scannable technology, such as QR codes, allowing healthcare providers to quickly and accurately retrieve a citizen's information during emergencies. The scanned token can grant access to the individual's medical history, allergies, and emergency contacts.
- **Token Access and Authorization:** Citizens will have control over their EIC Token and the information it contains. They can grant authorized healthcare providers access to their token during emergency situations, ensuring privacy and consent.

This approach provides a comprehensive and innovative solution to address the inefficiencies and lack of coordination in emergency healthcare systems. By leveraging blockchain technology, the CareNow Token system offers secure and transparent transactions, seamless coordination, and improved accessibility to emergency healthcare services. The system's benefits in terms of efficiency, patient outcomes, and stakeholder collaboration make it the most promising solution to revolutionize emergency healthcare.

## 2.4 Incentives for Healthcare Providers using the Blockchain-based Emergency Identification Card (EIC) Token:

- **Token Rewards for Quality Emergency Care:** Healthcare providers who deliver exceptional emergency care, demonstrate high patient satisfaction, and achieve positive health outcomes can be rewarded with token incentives. This incentivizes providers to maintain a high standard of care and encourages continuous improvement in emergency healthcare services.
- **Transparent and Fair Compensation System:** The EIC Token provides a transparent and tamper-proof record of emergency care services provided by healthcare providers. This enables fair compensation based on the services rendered, ensuring that healthcare providers are appropriately reimbursed for their efforts and expertise.
- **Streamlined Reimbursement Process:** The EIC Token simplifies the reimbursement process for healthcare providers by automating the verification and validation of emergency care services. This reduces administrative burdens and delays associated with traditional reimbursement systems, allowing providers to receive timely and accurate compensation.

## **Vision, Mission, Goals, and Objectives:**

### **3.1 Vision:**

The vision of this project is to create a future where emergency healthcare services are easily accessible, efficiently coordinated, and provide optimal patient care through the implementation of the CareNow Token system. The vision encompasses a healthcare ecosystem that is secure, transparent, and responsive to the needs of patients in critical situations.

### **3.2 Mission:**

The mission of this project is to develop and implement a secure and decentralized platform that enables efficient transactions and coordination among healthcare providers, insurers, and patients during emergency medical situations. By leveraging blockchain technology and smart contracts, the project aims to create a seamless and transparent ecosystem that improves the accessibility and effectiveness of emergency healthcare services.

### **3.3 Goals:**

- Develop the CareNow Token system based on blockchain technology: Design and build a robust platform that harnesses the benefits of blockchain and smart contracts to facilitate secure and transparent transactions in emergency healthcare.
- Ensure the system is secure, scalable, and user-friendly: Develop a system that prioritizes data privacy, scalability, and ease of use for healthcare providers, insurers, and patients.
- Foster collaboration and adoption among stakeholders: Collaborate with healthcare organizations, insurers, and patients to promote awareness, education, and adoption of the CareNow Token system.
- Improve emergency healthcare outcomes: Measure and analyze the impact of the CareNow Token system on response times, coordination, and patient outcomes, aiming to achieve significant improvements in emergency medical interventions.

### **3.4 Objectives:**

- Research and analyze blockchain technology and its applications in the healthcare industry to inform the development of the CareNow Token system.
- Design and implement the architecture and technical specifications of the CareNow Token system, ensuring compatibility with existing healthcare infrastructure and data management systems.
- Develop and deploy smart contracts on the Ethereum blockchain to govern the rules, conditions, and transactions within the CareNow Token system.
- Conduct pilot testing and evaluation in collaboration with selected healthcare facilities to assess the system's performance, usability, and impact on emergency healthcare delivery.
- Implement a comprehensive marketing strategy to create awareness and promote adoption of the CareNow Token system among healthcare providers, insurers, and patients.
- Continuously monitor and improve the CareNow Token system based on feedback, data analysis, and emerging technological advancements to enhance its functionality and effectiveness in emergency healthcare scenarios.

#### 4.1 Token Budget Allocation with Corresponding Weightings:

- **Development and Implementation: 40%**  
This allocation covers the costs associated with the development and implementation of the CareNow Token (CNT) system. It includes software development, blockchain integration, and infrastructure setup to ensure a robust and secure platform for emergency healthcare transactions.
- **Pilot Testing and Evaluation: 20%**  
This allocation is dedicated to conducting pilot tests to assess the feasibility and effectiveness of the token system in real-world emergency healthcare scenarios. It covers the costs of implementing the system in select healthcare facilities, gathering feedback from users, and making necessary improvements based on the results.
- **Marketing and Adoption: 15%**  
This allocation is used for marketing and promotional activities aimed at creating awareness and driving adoption of the CareNow Token (CNT). It includes digital marketing campaigns, educational materials, community engagement initiatives, and collaborations with healthcare providers and insurers to encourage acceptance and utilization of the token.
- **Operations and Maintenance: 10%**  
This allocation covers the ongoing operational costs of the token system. It includes server maintenance, system upgrades, security enhancements, and technical support to ensure the smooth functioning and reliability of the platform.
- **Legal and Regulatory Compliance: 10%**  
This allocation is designated for legal and regulatory compliance to ensure adherence to healthcare and financial regulations, data privacy laws, and security standards. It includes obtaining necessary licenses, conducting audits, and implementing measures to protect user data and comply with relevant industry regulations.
- **Reserve and Contingency: 5%**  
This allocation is set aside as a reserve fund to address unforeseen circumstances, potential risks, and additional expenses that may arise during the implementation and operation of the token system. It provides a safety net to manage unexpected challenges and ensure



the stability and continuity of the project.

**5.1 Token Name:** CareNow Token (CNT)

**5.2 Token Ticker:** CNT

**6.1 Token Maximum Supply:** The CareNow Token (CNT) system will have a maximum token supply of 100 million tokens. This allocation ensures a sufficient token pool to facilitate emergency healthcare transactions while maintaining token value and stability. The maximum supply takes into consideration the scalability needs of the system and aims to strike a balance between utility and scarcity.

**7.1 Token Description:** The CNT token has utility value, representing a unit of exchange for emergency healthcare services. It incorporates features such as token burn mechanisms to control inflation and reward systems to incentivize positive healthcare outcomes. The CNT token does not have an insurance-type concept but rather acts as a digital asset facilitating efficient and transparent emergency healthcare transactions.

**8.1 Token Slogan:** “Your Lifeline to Timely Health”

Our project which revitalizes Emergency Care with CareNow Token introduces an innovative solution that transforms the landscape of emergency healthcare services. With our CareNow Token (CNT) in hand, patients gain immediate access to affordable and streamlined healthcare, eradicating bureaucratic hurdles and ensuring timely treatments. This revolutionary lifeline empowers both patients and providers, fostering a network of trust and rewarding quality care. Say goodbye to delays and embrace a future where your health is prioritized. Join us on this exciting journey to reshape emergency care with CareNow Token – your lifeline to timely health.

## **Token Logo:**



**Token Date: 7th of April, 2024**

## **Steps and Systems of Implementing the Token:**

### **9.1 Development and Implementation:**

- Conduct extensive research on blockchain technology and its healthcare applications to inform the development of the CareNow Token system.
- Design the architecture and technical specifications of the CareNow Token system, ensuring compatibility with existing healthcare infrastructure and data management systems.
- Develop and deploy smart contracts on the blockchain to govern the rules, conditions, and transactions within the CareNow Token system.
- Integrate the token system with existing healthcare infrastructure and data management systems, ensuring secure interfaces and efficient data

exchange.

## 9.2 Pilot Testing and Evaluation:

- Identify a select group of healthcare facilities for pilot testing, representing diverse emergency healthcare settings.
- Implement the CareNow Token system in the pilot sites, allowing stakeholders to experience its functionalities and benefits in live emergency situations.
- Gather feedback from healthcare providers and patients through structured surveys, interviews, and feedback sessions.
- Evaluate the system's performance, usability, and impact on emergency healthcare delivery by analyzing collected data and key metrics such as response time, coordination, and patient outcomes.

## 9.3 Marketing and Adoption:

- Develop a comprehensive marketing strategy to create awareness of the CareNow Token system, targeting healthcare providers, insurers, and patients.
- Conduct educational campaigns, webinars, and workshops to explain the benefits and functionalities of the token system.
- Collaborate with healthcare organizations, insurance companies, and industry influencers to promote adoption and gain support for the CareNow Token system.
- Establish partnerships with key stakeholders to integrate the token system into their emergency healthcare processes and systems.

## 9.4 Continuous Improvement and Research:

- Continuously monitor the performance and functionality of the CareNow Token system based on feedback, data analysis, and emerging technological advancements.
- Regularly update and enhance the system's features and capabilities to improve user experience and address any identified limitations or issues.
- Stay updated with advancements in blockchain technology and healthcare industry standards, integrating relevant improvements into the CareNow Token system.
- Conduct research studies to assess the long-term impact of the CareNow Token system on emergency healthcare outcomes and explore opportunities for further optimization.

**Conclusion:**

In conclusion, the CareNow Token system represents a transformative solution to address the inefficiencies and lack of coordination in emergency healthcare systems. By leveraging blockchain technology, smart contracts, and a secure token ecosystem, the system aims to improve access to emergency healthcare services, enhance coordination among stakeholders, and ultimately save lives. Through careful implementation, continuous improvement, and widespread adoption, the CareNow Token system has the potential to revolutionize emergency healthcare and establish a new standard for efficient, transparent, and patient-centered care.