

CAP

Blockchain And Artificial Intelligence Humanitarian App

Project Information

- Project Name: CAP
- Project Github Url: <https://github.com/mendsalbert/cap1.0>
- App:
 - User as civilian
 - User as NGO
 - User as first respondent
- Team:
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Problem Statement

In conflict zones, traditional communication and aid delivery systems struggle to meet urgent needs. CAP aims to provide a holistic solution by leveraging technology to streamline assistance, communication, and support.

Solutions Provided: CAP

In response to the identified challenges, CAP introduces a suite of solutions to empower users and aid organizations in navigating the complexities of conflict zones. Firstly, the platform facilitates real-time assistance by allowing users to request vital supplies, such as medical aid, food, and blood, connecting them seamlessly with NGOs and first responders who can

swiftly deliver these critical items. This not only addresses the immediate needs of affected individuals but also streamlines the aid delivery process.

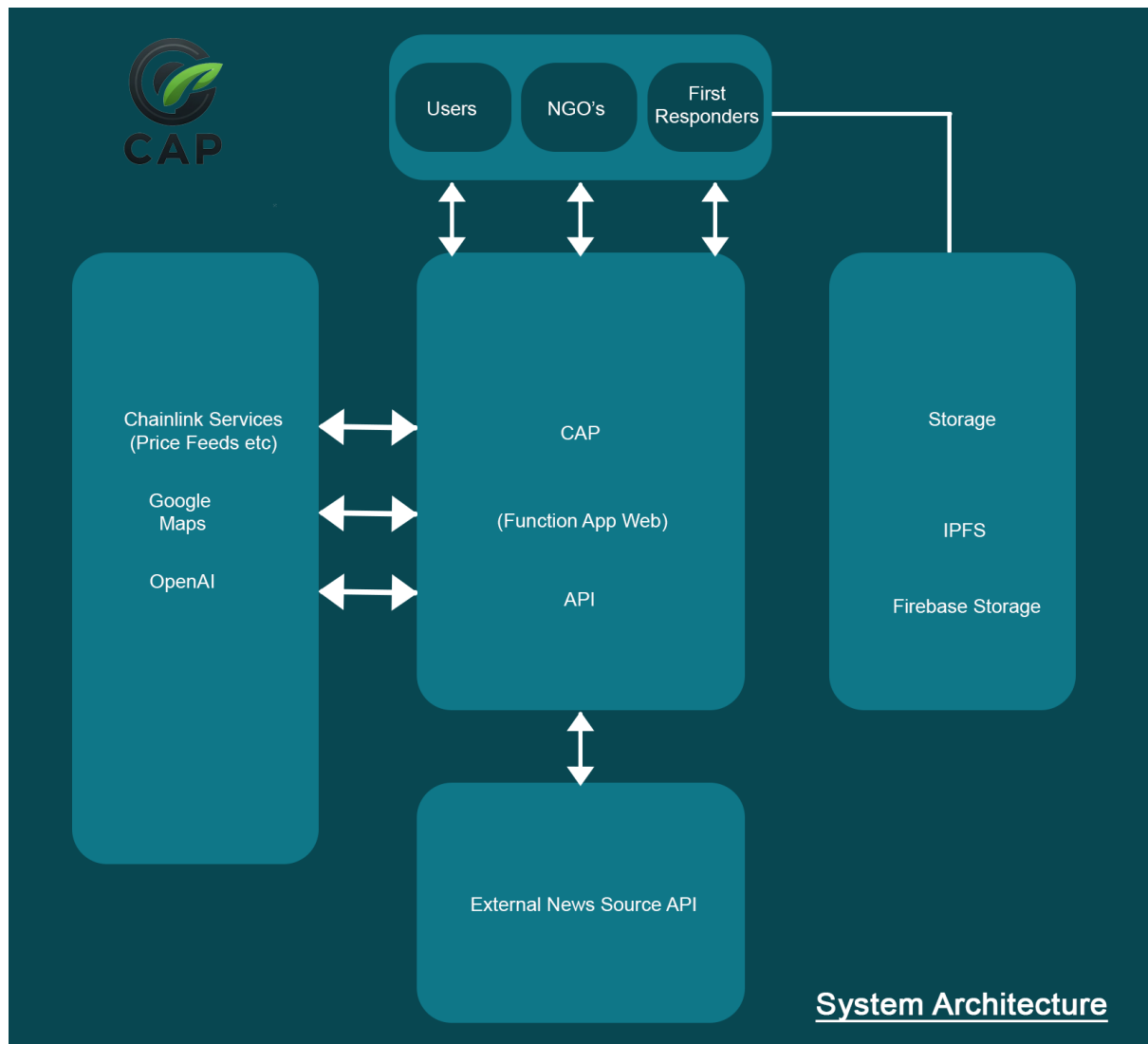
To address the issue of uncertainty surrounding the impact of donations, CAP adopts a transparent approach to fundraising. The donation system integrated into the platform ensures that users can witness the real-time utilization of their funds, providing a clear understanding of how their contributions directly contribute to alleviating the challenges faced by those in war-torn regions.

Recognizing the critical importance of information in crisis situations, CAP incorporates an AI-driven assistance feature. This functionality empowers users with real-time information about the war zone, safety tips, and relevant news updates. By leveraging artificial intelligence, CAP not only enhances the user experience but also equips individuals with the knowledge needed to make informed decisions during challenging times.

In addition to direct aid, CAP introduces innovative avenues for support through carbon footprint campaigns initiated by NGOs. These campaigns allow users to contribute crypto donations to plant or remove trees, thereby addressing environmental concerns and providing a sustainable fundraising model for NGOs engaged in humanitarian efforts.

Through this comprehensive approach, CAP endeavors to create a dynamic and responsive ecosystem that not only meets the immediate needs of individuals in conflict zones but also addresses the broader challenges associated with aid delivery, transparency, and environmental sustainability.

Architecture & Technology Stack



CAP's architecture is designed to seamlessly integrate frontend and backend technologies, blockchain, decentralized file storage, and AI.

In the frontend development of the CAP application, we employ a modern tech stack to ensure a seamless user experience. Leveraging Next.js and JavaScript, we create a responsive and dynamic user interface that enables smooth navigation and real-time updates. The integration of the Google Maps API adds a crucial visual element, providing users with a

clear representation of their location within a war zone or non-conflict area. Tailwind CSS is employed for efficient styling, contributing to a visually appealing and user-friendly design.

Node.js forms the backbone of CAP's backend, facilitating robust server-side logic and efficient handling of requests. The microservices architecture enhances scalability and maintainability, ensuring that different components of the application can operate independently. The backend is responsible for orchestrating the communication between users, NGOs, and first responders. Git and GitHub are integral to version control, enabling collaborative development and streamlined code management.

For secure and decentralized file storage, CAP utilizes a hybrid approach, integrating the InterPlanetary File System (IPFS) with Filecoin and Firebase Storage. This combination ensures that critical data, such as user information and transaction records, is stored in a distributed, tamper-resistant, and cloud-based manner. The use of IPFS, Filecoin, and Firebase Storage contributes to the overall resilience and reliability of the file storage system, safeguarding important information in a decentralized and secure manner.

Ethereum smart contracts play a pivotal role in the CAP ecosystem. Hardhat, a development environment for Ethereum, is utilized for building and testing smart contracts. Chainlink services are integrated to facilitate secure and reliable interactions between the CAP application and external data sources. Blockchain technology ensures transparency, traceability, and immutability in the donation and carbon footprint campaigns initiated by NGOs, instilling trust in the fundraising process.

To power the AI-driven features within CAP, the OpenAI API is employed. This API enables real-time interactions with artificial intelligence, providing users with up-to-date information about the war zone, safety tips, and relevant news updates. The seamless integration of the OpenAI API enhances the overall user experience by delivering intelligent and context-aware responses to user queries. The frontend interacts with the AI backend to dynamically incorporate AI-generated insights into the user interface.

Technology Stack & Tools

- Open AI API
- Google map
- Chainlink services
- IPFS (filecoin)
- Firebase storage
- Hardhat
- Ethereum smart contract
- Javascript
- Nextjs
- Tailwindcss
- Nodejs
- Git
- Github
- Microservices

Chainlink services

- Chainlink Price Feeds: This service is integral for converting various cryptocurrencies into USDT (Tether). Chainlink Price Feeds offer reliable, secure, and accurate price reference data, essential for our application's financial transactions and conversions.
- Chainlink External Adapters: We utilize these adapters to connect our Chainlink nodes with external data sources and APIs. This capability is crucial for our application, as it allows us to access real-time, undiluted news sources, ensuring that our users are promptly informed with trustworthy information.
- Chainlink Keepers: This decentralized service is a cornerstone of our application, automating smart contract triggers for efficient and timely operations. We specifically employ Chainlink Keepers for the critical function of transferring funds to first responders and managing donations, ensuring these transactions are executed accurately and without delay.
- Chainlink VRF (Verifiable Random Function): We incorporate Chainlink VRF to integrate a layer of randomness into our application. This feature provides a fair and unbiased source of randomness, which is vital for certain aspects of our application that require an element of unpredictability to function optimally.

Features

Features for Users:

- Interactive Map: Users are greeted with a real-time map, indicating their location in a war zone. If not in a war zone, they are prompted to contribute through donations.
- Request Assistance: Users can request specific items such as ambulances, medical equipment, or food from NGOs, streamlining the process of aid delivery.

- News Section: A dedicated section provides users with trending updates on the war, fostering awareness and keeping them informed.
- AI Assistance: An AI-powered tab allows users to interact with the system for real-time information and assistance.

Features for NGOs:

- Campaign Management: NGOs can initiate and manage donation campaigns, ensuring efficient fundraising for their humanitarian efforts.
- Carbon Footprint Initiatives: NGOs can launch campaigns to reduce CO2 emissions, inviting crypto donations to support tree planting and environmental conservation.
- Inventory Management: NGOs can efficiently manage and stockpile essential items, ensuring readiness for future assistance requests.
- Donation Impact Tracking: Tools are provided to showcase the impact of donation campaigns, fostering transparency and building trust with donors.

Features for First Responders:

- Efficient Delivery Tasks: First responders have a user-friendly interface for managing and prioritizing delivery tasks, ensuring timely and effective aid distribution.
- Task Tracking: A tracking system allows first responders to monitor and update the status of requested items, providing users with real-time information on their deliveries.
- Communication Hub: The app serves as a central communication hub, connecting first responders with NGOs and users for seamless coordination.
- Security Measures: Robust security features are in place to protect sensitive information, ensuring the safety and privacy of both responders and users.

Learning and Challenges

The team learned a lot on exploring Chainlink Network and OpenAI API. The documentation from <https://docs.chain.link> and <https://platform.openai.com/docs/introduction> provides great use for development of the Platform.

The most challenging parts are:

- Setting up Testnet node. The team encountered some error regarding seeding nodes.
- OpenAI API restrictions. The team encountered some unexpected restrictions on OpenAI API.

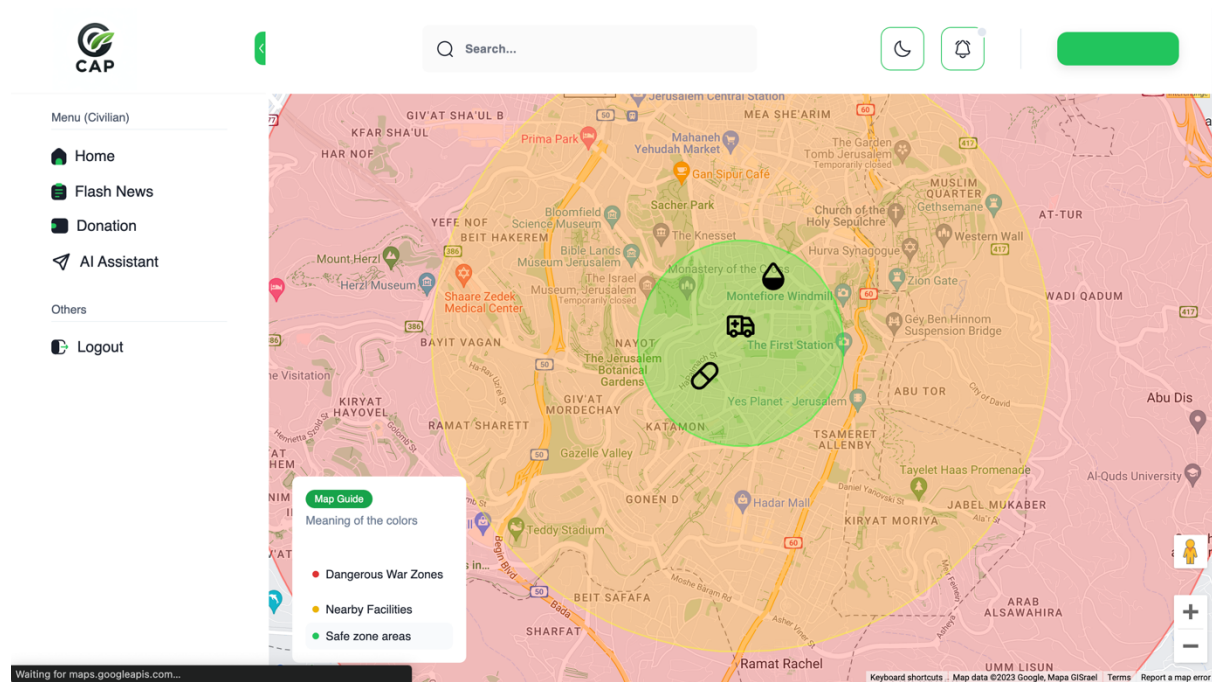
But those mentioned challenges did not stop the team to bring CAP to life.

What's next for CAP

The team is looking forward to make this project available for public use hence will keeping updating areas where necessary.

The team is very open for feedback & comments to improve the Platform.

User as Civilian



Interactive Map: Upon entering the CAP application, civilians (users) are greeted with an interactive and real-time map. This map provides a visual representation of their location, especially highlighting whether they are situated in a war zone. If users find themselves outside conflict areas, the platform prompts them to contribute through donations, seamlessly integrating geographical information into the user experience.

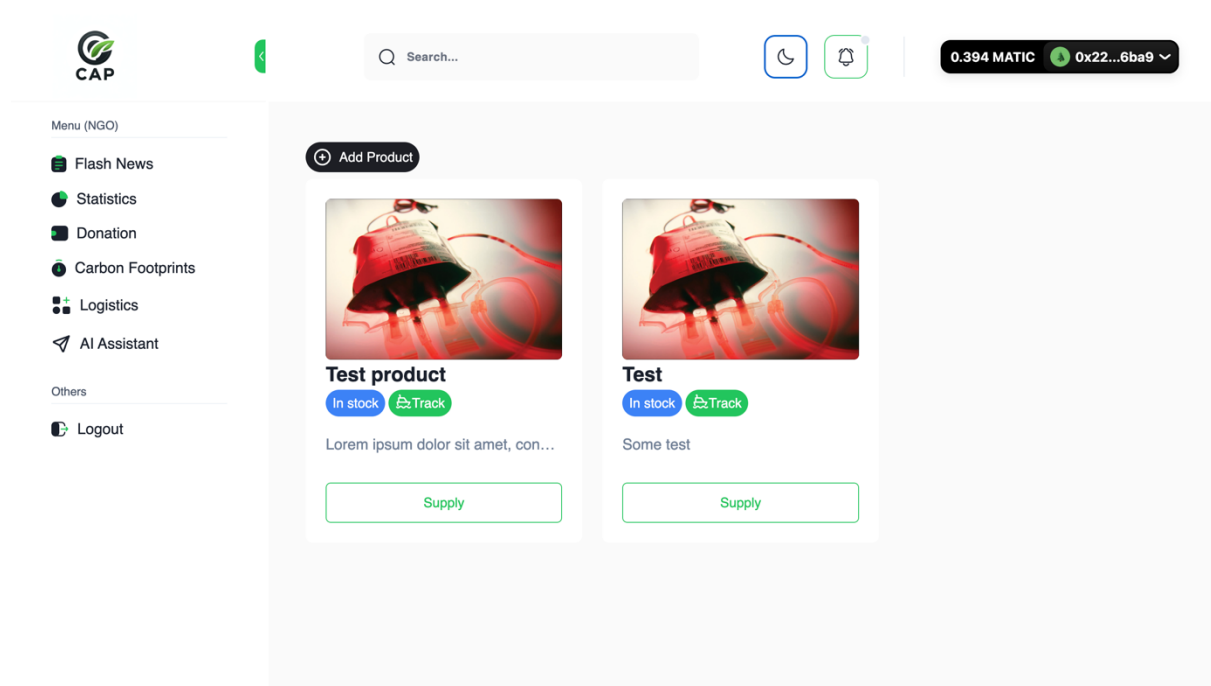
Request Assistance: CAP empowers civilians (users) to request specific items crucial for survival, such as ambulances, medical equipment, or food, directly through the application. This feature streamlines the process of aid delivery, connecting users in need with NGOs and first responders. The goal is to provide swift and targeted assistance to address the immediate needs of affected individuals in conflict zones.

News Section: A dedicated news section keeps civilians (users) informed with trending updates on the war. This feature serves not only to foster awareness but also to ensure that users stay well-informed about the rapidly evolving situation. By providing real-time

information, CAP enables users to make informed decisions, contributing to their safety and overall well-being.

AI Assistance: CAP incorporates an AI-powered tab, allowing civilians (users) to interact with the system for real-time information and assistance. Leveraging the OpenAI API, this feature provides users with intelligent and context-aware responses, enhancing the overall user experience. Users can rely on AI-driven insights to stay updated on the war zone, safety tips, and relevant news updates.

User as NGO



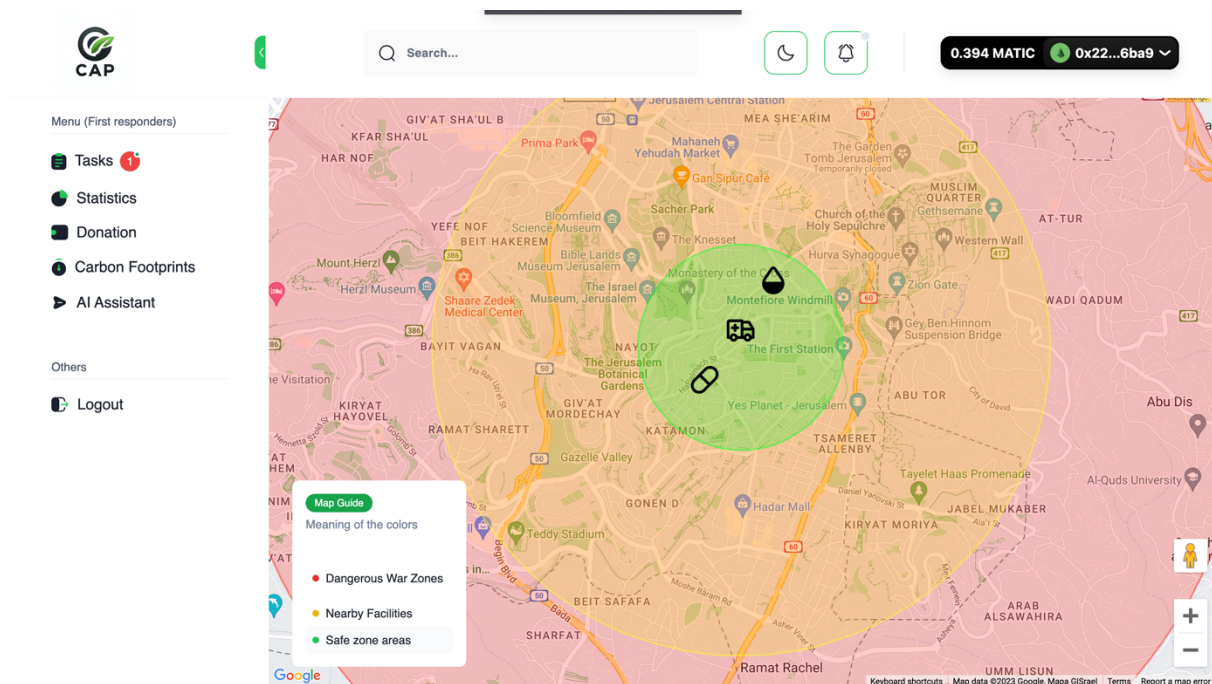
Campaign Management: NGOs play a pivotal role in orchestrating fundraising efforts, and CAP provides a robust platform for efficient campaign management. NGOs can initiate and oversee donation campaigns seamlessly, tailoring their outreach to specific humanitarian needs. This feature empowers NGOs to strategize and execute impactful campaigns, ensuring a steady flow of support for their initiatives.

Carbon Footprint Initiatives: Recognizing the growing emphasis on environmental sustainability, CAP introduces a dedicated feature for NGOs to launch carbon footprint initiatives. This functionality enables NGOs to advocate for eco-friendly practices by reducing CO2 emissions. Users can contribute crypto donations to support tree planting and other environmental conservation efforts, fostering a holistic approach to humanitarian work that addresses both immediate needs and long-term sustainability.

Inventory Management: Efficient management of inventory is critical for NGOs to respond promptly to emerging challenges. CAP provides a comprehensive inventory management system, allowing NGOs to monitor and replenish essential items swiftly. This feature enhances the readiness of NGOs to meet the demands of users and first responders, ensuring a well-organized and well-stocked resource pool for timely aid delivery.

Donation Impact Tracking: Transparency is paramount in building trust with donors. CAP equips NGOs with tools for tracking and showcasing the impact of donation campaigns. NGOs can provide real-time updates on how funds are utilized, demonstrating the tangible results of contributions. This not only fosters transparency but also strengthens the connection between NGOs and their supporters, encouraging sustained engagement and trust in the donation process.

User as First Respondent



Efficient Delivery Tasks: First responders benefit from an intuitive and efficient interface designed to manage and prioritize delivery tasks. This feature ensures that the distribution of critical supplies, including blood, food, and medicine, is carried out with precision and timeliness. By streamlining these tasks, first responders can optimize their efforts and respond promptly to the needs of individuals in conflict zones.

Task Tracking: A comprehensive task tracking system empowers first responders to monitor and update the status of requested items in real-time. This functionality provides transparency to both the responders and the users, allowing for clear visibility into the progress of aid deliveries. Users can stay informed about the whereabouts of their requested items, fostering trust and confidence in the aid delivery process.

Communication Hub: The application serves as a central communication hub for first responders, facilitating seamless coordination between them, NGOs, and users. Effective communication is paramount in crisis situations, and this feature ensures that vital

information is relayed promptly. Whether it's coordinating logistics or providing updates on delivery routes, the communication hub enhances the overall efficiency of the response efforts.

Security Measures: Robust security features are implemented to safeguard sensitive information, prioritizing the safety and privacy of both first responders and users. The security measures encompass secure data transmission, encryption protocols, and access controls. By prioritizing security, the platform ensures the integrity of the information exchanged, building trust among all stakeholders involved in the aid delivery process.

Conclusion

CAP represents a significant advancement in leveraging technology for humanitarian assistance in conflict zones. By addressing the immediate needs of individuals, fostering transparent fundraising, and incorporating innovative technologies, CAP demonstrates the potential of technological solutions in alleviating challenges faced in crisis situations. The successful development of CAP underscores the importance of collaborative efforts and continuous improvement in technology-driven humanitarian initiatives.