

Blockchain-Enhanced Crowdfunding dApp Solution

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1. Motivation and Overview:

1.1 Motivation:

The motivation for this project is rooted in the limitations of traditional crowdfunding platforms which include issues such as global accessibility, high fees, and opaque operations. For instance, GoFundMe is unable to process donations from Cuba, Iran, China, Russia, and several others (GoFundMe, 2023a). To illustrate the issue of high fees, consider that Indiegogo charges 5% (Indiegogo, 2023), Patreon's fee is between 5% to 12% (Patreon, 2023), and GoFundMe charges 2.9% + \$0.30 per transaction and it has TipGoFundMe which defaults at 15% (GoFundMe, 2023b). Blockchain offers a promising solution to address these challenges. This project has the potential to democratize access to funding and allow ideas and innovations, regardless of their origin or geographical location, to have the opportunity to thrive.

1.2 Overview of the dApp:

The proposed decentralized application (dApp) is designed to operate on the Solana blockchain platform. The dApp aims to provide a more transparent and cost-efficient solution for both project creators and backers.

Key Features:

1. **Campaign Creation:** Users are able to easily create new campaigns. The required fields include the campaign name and the campaign description.
2. **Campaign View:** Backers can browse through a variety of active campaigns. Information in each campaign panel displays the campaign ID, the total fund raised, the campaign name, and the campaign description.
3. **Donation:** Backers can contribute to their favorite campaigns.
4. **Withdrawal:** Campaign owners are able to withdraw funds directly into their wallets.
5. **Decentralized and Transparent Operations:** Unlike traditional platforms, dApp runs on the blockchain network, ensuring all transactions are transparent and immutable.
6. **Global Accessibility:** This dApp is a borderless crowdfunding platform. This global reach allows backers to contribute to projects they believe in without geographical constraints or complex networking of intermediary financial institutions.
7. **Lower Transaction Costs and Service Fees:** This dApp reduces the need for intermediaries, significantly reducing transaction costs (approximately \$0.0015 per transaction as per Solana Beach, 2023). In addition, there is no fee written into the smart contract like a traditional crowdfunding platform.

2. Implementation:

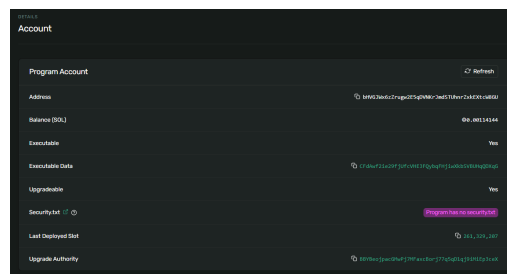
Technologies

1. *Solana Blockchain:* The application utilizes the Solana blockchain for decentralized crowdfunding, ensuring transparency and security.

2. *Anchor Framework*: Anchor simplifies smart contract development for Solana, providing abstractions for program structure, accounts, and interactions.
3. *React*: The frontend is built with React, a popular JavaScript library for building user interfaces, enabling a dynamic and responsive user experience.
4. *Phantom Wallet*: The recommended wallet for interacting with Solana-based DApps.

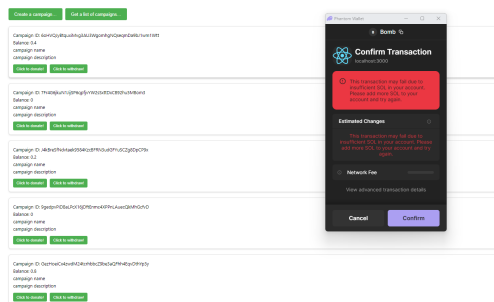
Smart Contract (Rust):

The smart contract is written in Rust using the Anchor framework, which simplifies Solana program development. The smart contract defines a Campaign struct to represent a crowdfunding campaign, including details like the admin's public key, campaign name, description, and the total amount donated. Three main operations are defined in the smart contract: create (to create a new campaign), withdraw (admin withdraws funds), and donate (users donate funds).



React Frontend (JavaScript):

The frontend is a React application that interacts with the Solana blockchain using the Anchor framework for programmatic access. It uses the **@project-serum/anchor library** to create a connection to the Solana network, deploy the smart contract, and interact with program accounts. The UI includes functionalities such as connecting a wallet (Phantom wallet is recommended), creating a new campaign, listing existing campaigns, donating to campaigns, and withdrawing funds (for admins). The frontend keeps track of the connected wallet address, and users can perform actions based on their wallet status.



Workflow and Architecture (See Figure 1 and Figure 2):

1. Users connect their wallets using the Phantom wallet.
2. Users can create new crowdfunding campaigns, providing a name and description.
3. The frontend fetches and displays a list of existing campaigns.
4. Users can donate funds to a selected campaign.
5. Admins (campaign creators) can withdraw funds from their campaigns.

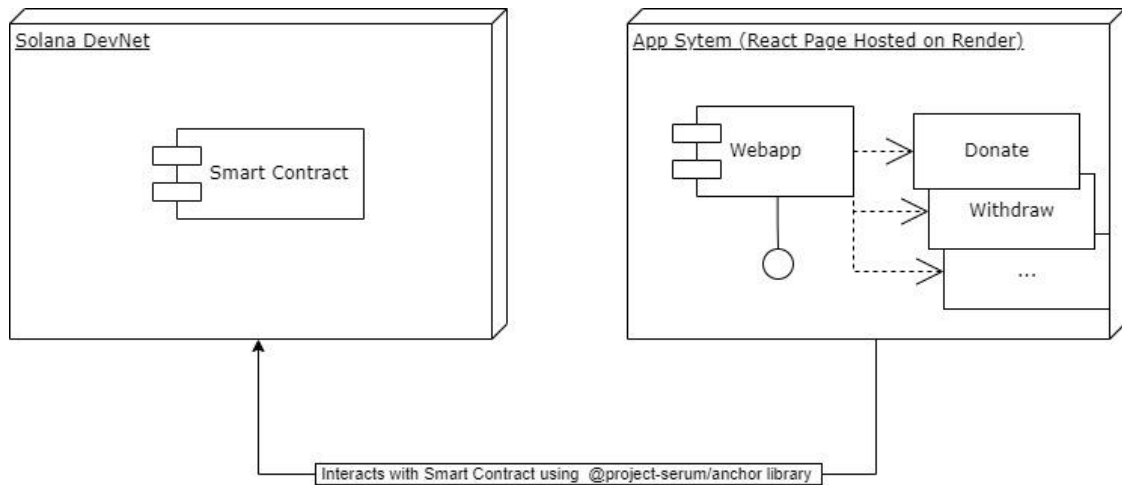


Figure 1: Architecture

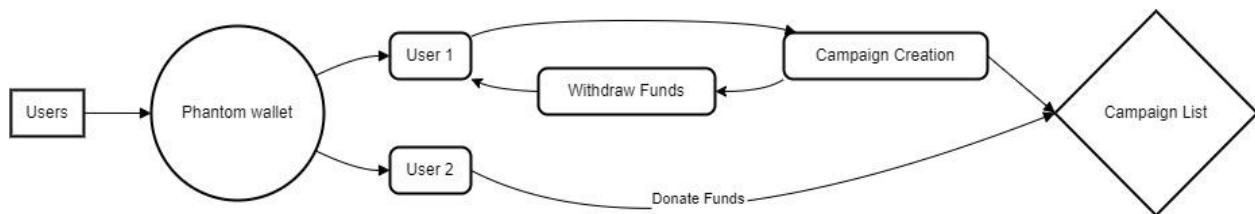


Figure 2: Workflow

Overall, the application leverages Solana's blockchain capabilities, Anchor's developer-friendly tools, and React's user interface capabilities to create a decentralized crowdfunding platform. Users can seamlessly connect their wallets, create and contribute to campaigns, and track campaign details in real-time.

3. Future Steps:

1. **Increased Tokenization:** The tokenization of assets has the potential to revolutionize fundraising. Tokenized securities, real estate, and other assets can be bought and sold on blockchain platforms, enabling fractional ownership and increased liquidity.
2. **Cross-Chain Compatibility:** Interoperability between different blockchain networks could become crucial. Projects that can leverage multiple blockchains may have an advantage in terms of flexibility and user accessibility.
3. **NFTs in Crowdfunding:** Non-fungible tokens (NFTs) have gained significant attention in the digital art and collectibles space. In the context of crowdfunding, NFTs could represent unique perks or access rights for backers, providing additional incentives for participation.
4. **Decentralized Autonomous Organizations (DAOs):** DAOs, which are organizations run by smart contracts and governed by token holders, are likely to play a role in decentralized crowdfunding. They allow for more democratic decision-making and transparency in project governance.

4. References:

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5. Declaration:

I acknowledge the use of GPT3.5 to edit grammar and generate an outline for this write-up.

I entered the following prompt: “Provide an outline for a 3-page writeup on creating a dApp” and “Edit English: [paper content]”

I used the output to plan the outline and to edit my writing.