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Crowd Funding Platform Using Blockchain

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Abstract: *The research presented here examines the potential of developing a decentralized, secure, and effective crowdfunding platform using blockchain technology. The study looks at the present issues facing conventional crowdfunding platforms, such as their exorbitant costs, accessibility restrictions, and lack of transparency. The suggested solution is a blockchain-based crowdfunding platform that enables people and organizations to launch campaigns and obtain funding from a worldwide network of investors. The platform automates crowdsourcing by using smart contracts, doing away with middlemen, and bringing down transaction costs.*
The paper examines the advantages of using blockchain technology for crowdfunding, including improved security, transparency, and accessibility.

Keywords: *Blockchain, Smart Contract, Crowd Funding, Decentralized Application*

I.Introduction

A strategy to raise capital through the combined efforts of friends, family, clients, and individual investors is crowdfunding. This method taps into the group efforts of a sizable group of people, mostly online via social media and crowdfunding platforms, and uses their networks to increase reach and visibility.

In the past, if you wanted to raise money to start a company or introduce a new product, you would have been required to polish your business plan, market research, and samples before presenting your idea to a small group of wealthy individuals or institutions. These financing options, which included banks, angel investors, and working capital companies, severely constrained your options to a select group of important actors. With you and your proposal at the broad end of the funnel and your audience of investors at the closed end, this funding strategy will be visualized as a funnel. If you don't direct that conduit to the right investor or company at the right moment, it will move slowly and cost you money.

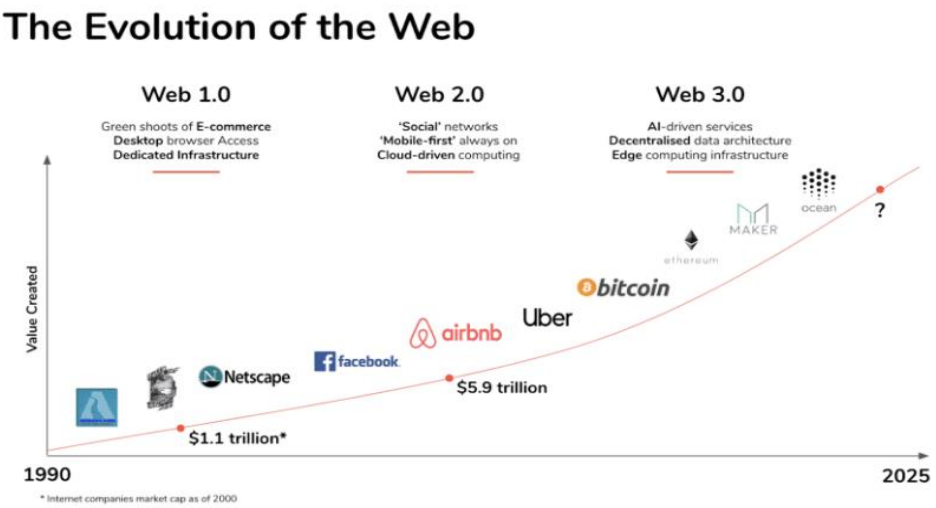
On the other side, crowdfunding platforms turn that conduit on its head. This method significantly streamlines the standard model by giving you, the bourgeois, one place to make, display, and share your proposal materials. In the past, you would spend months screening prospective donors through your personal network while also spending your own time and money to present yourself to them.

With crowdfunding, you can more easily get your opportunity in front of many interested parties and give them a variety of ways to help you develop your company and get funds or donations.

II. Web Evolution from 1.0 to 3.0

There have been three main phases of development for the World Wide Web and the Internet: Web 1.0, Web 2.0, and Web 3.0.

• The phrase "static web," sometimes known as "Web 1.0," refers to the initial years of the internet, when most websites were static and read-only. At this time, websites were mostly used to convey information, with little interaction from users. The characteristics of Web 1.0 were basic HTML webpages, slow dial-up connections, and a lack of multimedia content.



- The "social web," also known as Web 2.0, first appeared in the early 2000s and added a new degree of interaction and teamwork to the internet. With the advent of social media platforms, blogs, wikis, and other interactive applications, websites during this period became more dynamic and user-driven. User-generated material, social networking, and personalized experiences were the defining features of Web 2.0.
- The "semantic web," also referred to as Web 3.0, is the next stage of the internet's growth and is currently under construction. A higher focus on machine-to-machine communication, artificial intelligence, and the use of blockchain technology are characteristics of Web 3.0. A more intelligent and decentralized web with safe data sharing and processing using cutting-edge technologies like machine learning and natural language processing is the aim of Web 3.0. In addition to enabling new kinds of apps and services that were previously impractical, Web 3.0 is anticipated to bring new levels of transparency, privacy, and security to the internet.

III. Blockchain

Blockchain is a distributed, decentralized ledger system that securely, transparently, and immutably records transactions. It comprises a network of computers, or nodes, which work together to keep a shared database of documents or blocks, each containing several transactions.

The primary benefit of blockchain is its capacity to document transactions in a secure and impenetrable manner without the need for a central authority or middleman. A sequence of blocks that cannot be changed or removed without the network's consensus is formed by each block in the chain being cryptographically linked to the one before it. As a result, it is very hard to infiltrate, cheat, or corrupt.

Although cryptocurrencies like Bitcoin and Ethereum are frequently linked to blockchain technology, this technology has uses outside of just financial operations. It can be used for many things, including voting systems, supply chain management, and digital identity verification.

Cryptographic hash functions can be used for authentication and sign-in in a blockchain-based system. Here is a brief explanation of how it operates:

1. User registration: A user registers for an account on the blockchain-based website and enters personal data like their name and email address.
2. The platform creates an individual hash of the user's information using a cryptographic hash algorithm, such as SHA-256. The hash function uses the user's data as input and produces a fixed-length output that serves as the user's distinctive identifier.
3. The platform saves the hash of the user's information, along with other pertinent information like the user's public key, on the blockchain.

4. Signing in and verification: The user must enter their personal information to sign in to the website. This data is hashed using the same cryptographic hash function that they used to register. Next, the platform compares the given data's hash to a hash that is stored on the blockchain. A user is given access to the platform if the two hashes agree.

Cryptographic hash functions guarantee that the user's data is securely kept and that unauthorized parties can't access or change it. In addition to making, it simple to identify and validate users without the need to store their personal information on the blockchain, the hash function creates a unique identifier for each user.

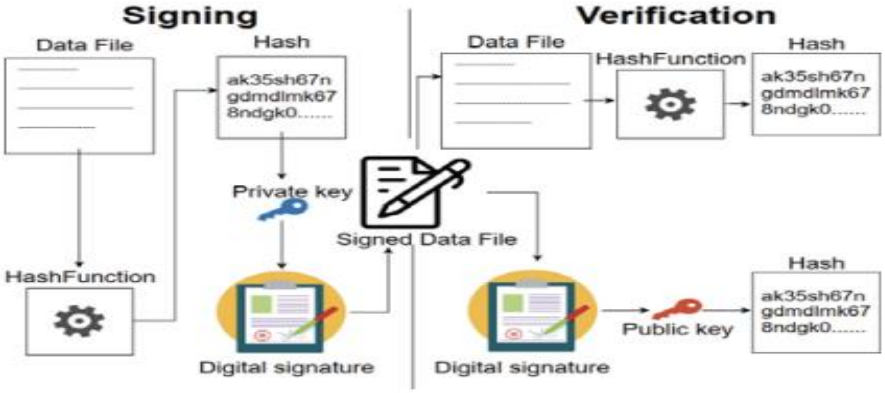


Fig. -4: Signing & Verification

IV.Block

A block is a digital record that is part of a blockchain and includes a collection of verified transactions. Each block is produced using a procedure called mining, which entails using the network's powerful computers to solve a challenging mathematical issue.

Typically, a block's construction consists of the following components:

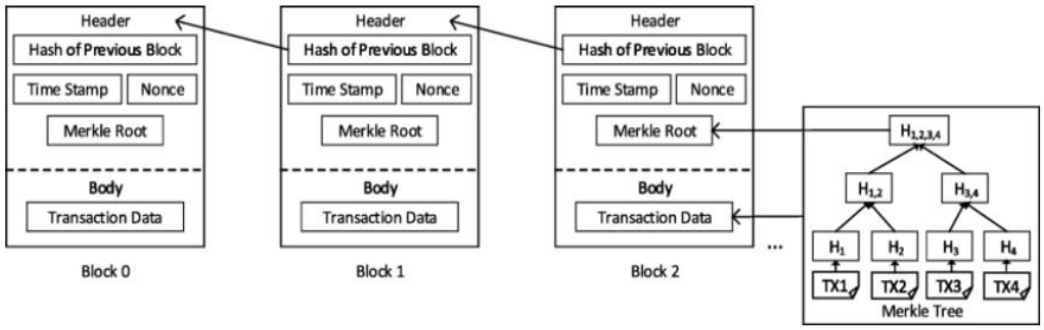
1. **Block header**: Block Number, Date, and a Special Code Called the Block Hash are all contained in the block header, which is the first block of information.

2. **Transactions**: The block includes a list of added to the blockchain and validate transactions.

3. **Nonce**: During the mining process, a nonce is a random number that is added to the block header. To complete the cryptographic conundrum and add the block to the blockchain, miners employ the nonce.

4. **Merkle Root**: The Merkle root generates a hash of every transaction in the block to assist ensure the correctness of the data in the block.

A block is regarded to be immutable once it is added to the blockchain and cannot be changed or removed without network consensus. A chain of blocks known as the blockchain serves as a permanent and secure record of all transactions made on the network because each block in it is cryptographically connected to the one before it.



V. Types of Blockchain

The three main forms of blockchain are public, private, and consortium.

1. **Public blockchain**: A public blockchain is an open, decentralized ledger that allows for contributions from anybody as well as the ability to validate transactions and add new blocks. Ethereum and Bitcoin are two examples of public blockchains. These blockchains are supported by a large node network and are widely utilized for coinage.

2. **Private Blockchain**: Only users who have been granted access to the network are permitted to participate in a private blockchain. Private blockchains are widely used by business applications that demand secrecy and control. These blockchains can operate more quickly and efficiently than public blockchains since they have fewer nodes and operate on a private system.

3. **Consortium blockchain**: A consortium blockchain combines both public and private blockchains. It is managed by a coalition of organizations that agree to work together on network maintenance. Consortium blockchains are widely employed in industries where several stakeholders must work together safely and openly, such as banking, healthcare, and supply chain management.

The term "blockchain" is used to describe several distinct distributed ledger technologies, such as sidechains, which are separate chains connected to the main blockchain, and hybrid blockchains, which incorporate the best aspects of both public and private blockchains.

VI. Crowdfunding

Crowdfunding is a method of obtaining funding for a project or business venture from many different individuals, usually through an online platform. Instead of requesting large sums from a select few investors or lenders, it entails asking many people for modest contributions.

Crowdfunding can take many various forms, such as equity crowdfunding, donation-based crowdfunding, and crowdfunding for rewards.

1. Donation-based crowdsourcing entails requesting contributions from people who back a certain cause or project without anticipating a financial reward.
2. Reward-based crowdfunding entails providing rewards or incentives to individuals who contribute to a project or business endeavour, such as early access to a product or service.
3. Equity crowdfunding refers to the sale of shares or ownership interests in a business to contributors who help finance the endeavour.

Crowdfunding has grown to be a well-liked method for business owners, startups, and social enterprises to collect money and cultivate a support network for their initiatives.

VII. Smart Contract

A self-executing digital contract known as a "smart contract" enables parties to carry out deals and implement agreements directly between themselves. It is a computer program that automatically carries out a contract's terms when specific requirements are fulfilled.

Smart contracts are often made using blockchain technology, which provides a secure and decentralized way to store and verify transaction data. They operate using an "if-then" logic where the fulfillment of conditions is a necessity for the implementation of actions.

If a certain financial goal is attained in a crowdfunding campaign, for example, a smart contract might be used to instantly deliver the funds to the project's developer. The smart contract would contain the terms and conditions of the crowdfunding campaign, including the amount of money that must be raised, how long the campaign would last, and the reward or equity shares that will be granted to investors.

Once a smart contract is published on the blockchain, it cannot be altered or removed, providing increased security and transparency for all stakeholders. In a variety of industries, including banking, real estate, supply chain management, and others, smart contracts may be used to automate and simplify complex transactions and agreements.

VIII. Tools and Languages Used

- HTML: HTML (Hypertext Markup Language) is the industry-standard markup language for creating online pages and applications. It offers the structure and content of web pages and discusses the elements and parts that make up a web page, such as headings, paragraphs, links, photos, videos, and forms.

- CSS: The style language CSS (Cascading Style Sheets) is used to specify how websites and apps look graphically. It provides a way to distinguish between the display and content of a web page, allowing designers and developers to create consistent and visually acceptable designs for a variety of websites and platforms.

- JavaScript: Web pages and apps that are dynamic and interactive are made using the programming language JavaScript. A web page's behaviour and content can be changed after it has been loaded using this client-side scripting language, which operates in the web browser. It can also be used to communicate with external resources like databases and APIs, enabling developers to build web apps that are dynamic, and data-driven.

- React JS: An open-source JavaScript framework called ReactJS (or just React) is used to create user interfaces. A group of engineers is now responsible for maintaining it after Facebook created it. React gives programmers the ability to build reusable user interface (UI) components that can be combined to create complex user interfaces.

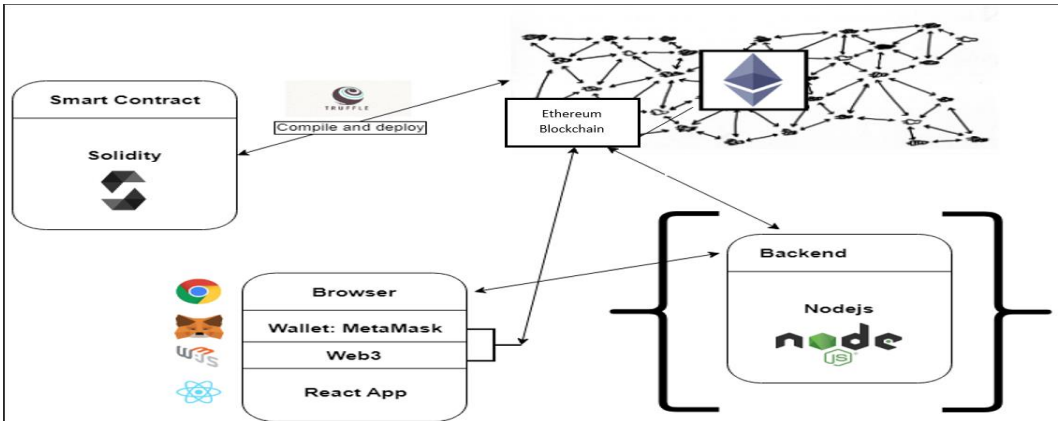
- Node JS: Developers can execute JavaScript on the server side using Node.js (or simply Node), an open-source, cross-platform JavaScript runtime environment. Node.js is a lightweight and effective framework for creating scalable network apps because it offers an event-driven, non-blocking I/O model. It uses Google Chrome's V8 JavaScript engine to run JavaScript code, and it offers a wealth of modules and libraries that programmers can use to create web servers, command-line tools, APIs, and other kinds of apps.

- Solidity: The Ethereum blockchain uses the high-level computer language Solidity to create smart contracts. It is a language focused on contracts that can be used to build digital contracts that can be carried out using the Ethereum Virtual

Machine. (EVM). The Ethereum blockchain hosts Solidity-based smart contracts, rendering them decentralized and unchangeable. This guarantees a high degree of transparency and security because the code and its output cannot be altered by any one party.

- MetaMask: With the help of the well-known browser extension and cryptocurrency wallet MetaMask, users can engage with the Ethereum blockchain and its decentralized applications (dApps) right from their web browser. Chrome, Firefox, Brave, and other well-known online browsers all have extensions for MetaMask. Users can use it to send and receive ether and ERC-20 tokens, establish, and manage Ethereum accounts.

- Görli Testnet: An Ethereum prototype network called the Görli Testnet was introduced in 2019. It is a cross-client proof-of-authority (PoA) network that employs the Clique consensus algorithm and is made to evaluate smart contracts, decentralized applications (dApps), and network upgrades for the Ethereum platform in a safe and affordable setting. Users can purchase Görli Ether (GETH) for testing reasons from a variety of faucets or exchanges. Görli utilises real Ether as its native currency.



IX. Proposed Decentralized Crowdfunding Platform

Comparison between the traditional method and our crowdfunding dApp :

Although the idea of crowdfunding has been around for centuries in various forms, it has only recently become more well-known due to the development of internet platforms. Crowdfunding campaigns were usually carried out through specialized platforms, as well as through social media and email campaigns, before the development of blockchain technology.

Before the invention of the blockchain, some instances of well-known crowdfunding websites include Kickstarter, Indiegogo, and GoFundMe. Through these platforms, users could establish a fundraising target and provide incentives or benefits to those who contributed to the cause. Usually, money was transferred using a conventional payment means like PayPal or credit cards. Although websites like Kickstarter have been effective in assisting many projects in getting off the ground, this model has some drawbacks when compared to crowdfunding websites that are based on blockchain technology. Here are a few:

1. Centralization: Traditional crowdsourcing websites like Kickstarter are centralized, which means that one organization controls them and oversees the website's administration. This can cause problems with censorship, control, and transparency because platform owners have a lot of influence over what initiatives can receive funding and how they are run.

2. Fees: Websites like Kickstarter charge a fee for their services, which can reduce the amount of money a project can collect. For smaller projects, these fees, which can be as high as 5%, might be substantial.

3. Limited payment options: Conventional crowdfunding sites typically only accept credit cards or other conventional payment methods as forms of payment. For some backers who might not have access to these payment methods, this can be a barrier to entry.

4. Lack of transparency: Because conventional crowdfunding platforms are centralized, it can be challenging for backers to keep track of how their money is being used and make sure the project is being run in an open and accountable manner.

Traditional crowdfunding platforms lack several possible benefits that our blockchain-based platform have:

1. Decentralization: Platforms built on blockchains are decentralized, which means they aren't run by a singular organization. Increased accountability, transparency, and control over the crowdfunding procedure may result from this.

2. Lower operating costs: As blockchain-based platforms do not need intermediaries to process payments, they can run at lower operating costs than conventional platforms.

3. Cryptocurrency payments can be made on blockchain-based platforms, which may be a more convenient choice for some supporters.

4. Smart contracts: Blockchain-based platforms can use smart contracts to automate the crowdfunding process and make sure that money is only released when specific requirements are satisfied, adding an extra degree of security and transparency.

Overall, while traditional crowdfunding platforms like Kickstarter have been successful in the past, but they have many disadvantages which are overcome by our blockchain-based crowdfunding platform.

Working of the blockchain-based crowdfunding platform :

The working of the blockchain-based crowdfunding dApp is as follows:

- Project developers would create a project proposal on the dApp platform that detailed their project, its financing goals, deadline, and image regarding the same. After that, the campaign gets created and now the investors can see their campaigns.

- Investors who want to contribute to the project can peruse the projects that are presently available on the site and choose which ones to support by using ether as a digital asset to the project's smart contract address, for that the investor has to open a particular campaign in which they want to invest. After that, they have to enter the amount of donation and then click on fund campaign. Following the fund campaign button clicks, the user must confirm the purchase on MetaMask.

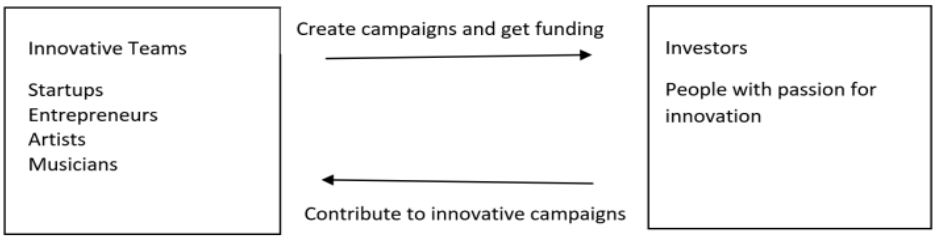
- When a funding goal is achieved, the smart contract will automatically carry out the terms of the crowdfunding agreement, such as releasing funds to the project creator or allocating rewards or equity shares to investors in accordance with the terms of the agreement.

- The list of investor’s hash along with their donated amount is visible on the created campaign page, which helps the other investors to know that other people have also donated over the same campaign.

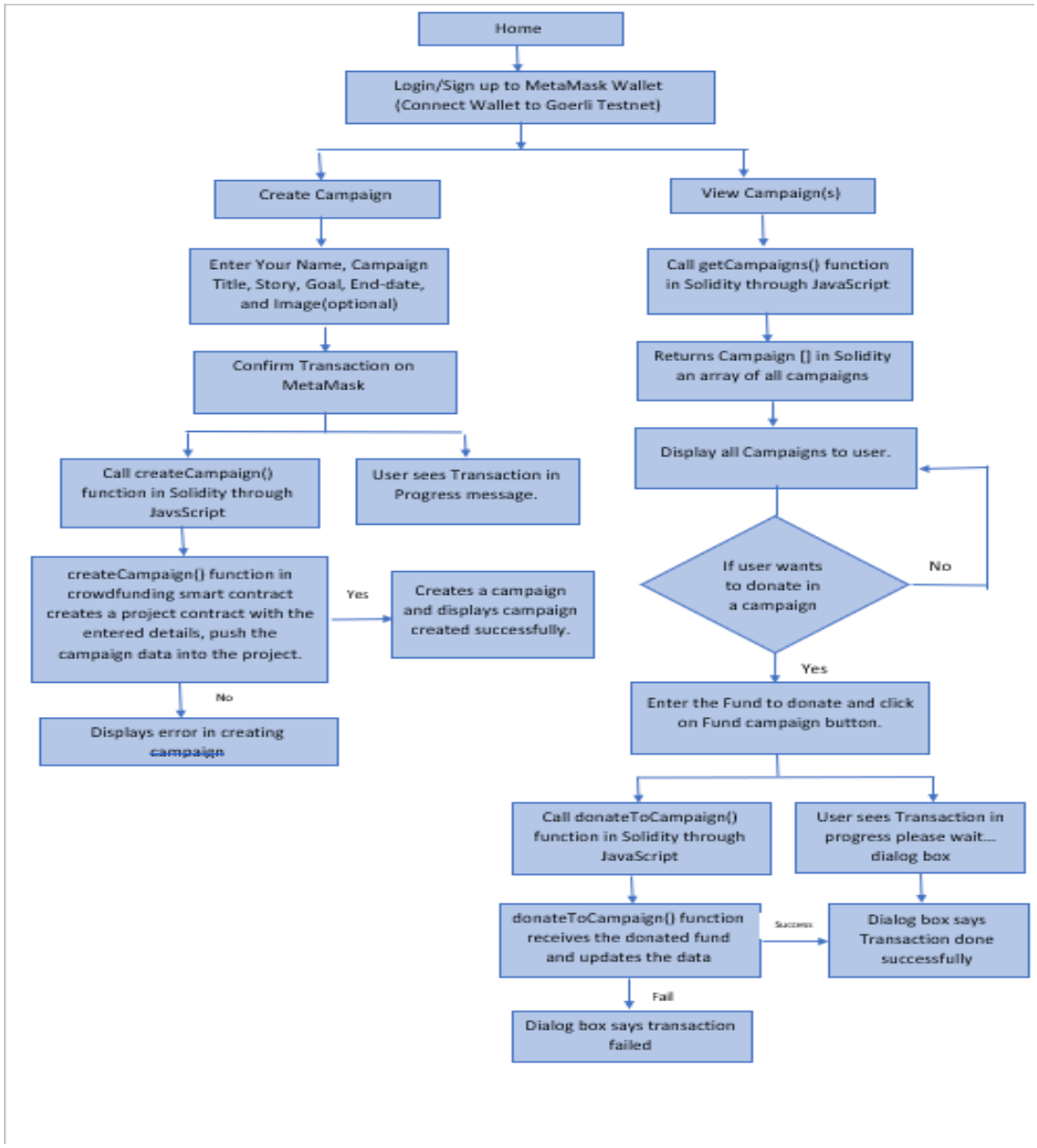
- Users who donated will be able to request their refunds straight from the website for projects that were unsuccessful (unable to raise the desired amount within the allotted time frame).

- The campaign starter should be able to view all the projects they have donated to as well as all of the campaigns they have begun.

- Blockchain records of the platform's transactions would give all parties concerned security and transparency.



Data Flow Diagram blockchain-based crowdfunding platform :



X. Conclusion

In conclusion, the application of blockchain technology to crowdfunding platforms has the potential to completely alter the way we finance ventures and projects. Blockchain enables a decentralized, public platform that boosts crowdfunding effectiveness, lowers transaction costs, and offers greater security.

By utilizing smart contracts, blockchain technology can give funders and project creators more control and guarantee that funds are used for their intended purposes can give funders and project creators more control and guarantee that funds are used for their intended purposes by utilizing smart contracts. The alternative solution based on peer-to-peer network managing the campaign transactions seems ripe given the current solutions in the crowdfunding world developed and managed by intermediary companies that have a say on various campaign parameters. This initiative investigates methods to get rid of middlemen in a crowdfunding platform use case. This was accomplished with the aid of smart contracts, which acted as a guide for the transaction implementation in the crowdfunding dApp program installed on the Ethereum network. Users can establish and contribute ether to projects that interest them thanks to this interaction.

Overall, blockchain-based crowdfunding has a lot of possible advantages, and it's a fascinating field of the invention that deserves further investigation.

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