

## BLOCKCHAIN BASED DECENTRALIZED CROWDFUNDING PLATFORM USING SMART CONTRACTS & IPFS

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### ABSTRACT

The Blockchain-Based Decentralized Crowdfunding Platform Using Smart Contracts And Ipfs is designed to address the limitations of traditional crowdfunding systems by eliminating the need for intermediaries. Using Ethereum smart contracts, the platform ensures that project creation, fund collection, goal validation, deadlines, and fund disbursement are handled automatically and transparently. This not only builds trust among contributors but also reduces transaction costs and the risk of fraud. Contributors can fund projects directly using their crypto wallets, and if a campaign fails to meet its goal by the deadline, smart contracts automatically trigger refunds.

To enhance security and data availability, the platform integrates IPFS (InterPlanetary File System) for decentralized storage of project-related content such as descriptions, media, and documents. The combination of blockchain and IPFS ensures tamper-proof record keeping and distributed access to information. The front-end interface, built with modern web technologies like react and Web3.js, enables users to interact easily with the blockchain. Overall, the system provides a transparent, trustless, and efficient solution for managing crowdfunding campaigns in a decentralized manner.

### I. INTRODUCTION

#### Overview

The Crowdfunding has emerged as one of the most influential and widely adopted methods for raising funds in the digital era. It enables individuals, startups, entrepreneurs, and organizations to collect financial support from a large number of contributors through online platforms. Crowdfunding has been successfully applied across various domains such as business startups, social welfare initiatives, educational programs, healthcare support, creative arts, and technological innovations. Traditional crowdfunding platforms operate using centralized architectures, where a single authority manages campaign listings, user authentication, fund collection, transaction validation, and fund disbursement.

Although centralized crowdfunding systems provide ease of use and wide accessibility, they introduce several inherent limitations that significantly impact transparency, trust, and operational efficiency. Contributors are required to place complete trust in both the platform and the project creators, as there is limited visibility into how the collected funds are

utilized after the fundraising phase is completed. In many cases, contributors have no mechanism to verify whether the funds are being used for the intended purpose. Furthermore, centralized systems are highly susceptible to security vulnerabilities such as data breaches, unauthorized access, record manipulation, and single points of failure. These risks become especially critical when handling sensitive financial information and large volumes of monetary transactions, potentially leading to financial losses and reduced user confidence in the system.

Another significant drawback of traditional crowdfunding platforms is the involvement of intermediaries. Centralized platforms typically charge service fees, transaction fees, and payment processing charges, which significantly reduce the amount of funds received by project creators. Additionally, fund transfers are often delayed due to manual verification, administrative procedures, or policy enforcement by the platform. These inefficiencies negatively impact both contributors and creators, reducing trust and discouraging participation.

Blockchain technology offers a revolutionary solution to address these challenges by introducing a decentralized and trustless framework. Blockchain is a distributed ledger system that securely and immutably records transactions using advanced cryptographic techniques. Each transaction is validated by a network of nodes through consensus mechanisms and permanently stored in blocks that are cryptographically linked to one another. Once recorded, the data cannot be altered or deleted, thereby ensuring high levels of transparency, traceability, data integrity, and reliability across the entire system.

The integration of blockchain with crowdfunding systems enables the creation of decentralized applications (DApps) that eliminate the need for intermediaries. Smart contracts, which are self-executing programs deployed on the blockchain, automate fundraising logic such as contribution tracking, deadline enforcement, goal verification, fund release, and refunds. This automation ensures fairness, reduces human intervention, and minimizes the risk of fraud. The proposed project focuses on developing a blockchain-based decentralized crowdfunding platform that enhances security, transparency, and trust while providing an efficient and scalable fundraising solution.

#### Motivation

The motivation behind this project stems from the

increasing demand for transparent, secure, and decentralized financial systems. Traditional crowdfunding platforms operate on centralized infrastructures that require users to trust a third party with their funds and personal data. In many cases, contributors are unaware of how funds are managed after being collected, leading to concerns regarding misuse, mismanagement, or delayed fund utilization.

With the rapid growth of blockchain technology and cryptocurrencies, there is a strong motivation to leverage decentralized systems that promote trustless interactions. Blockchain eliminates the need for intermediaries by enabling direct peer-to-peer transactions between contributors and project creators. Every transaction is publicly verifiable, ensuring accountability and transparency.

Smart contracts further enhance motivation by automating the execution of predefined rules without requiring manual oversight. These contracts ensure that funds are released only when specific conditions, such as achieving funding goals or meeting deadlines, are satisfied. If conditions are not met, contributors are automatically refunded, protecting their interests.

Another key motivating factor is cost efficiency. By removing intermediaries and automating operations, blockchain-based crowdfunding significantly reduces transaction and platform fees. This ensures that a higher percentage of funds reach the intended recipients. Additionally, decentralized platforms are resistant to censorship and unauthorized interference, empowering users with greater control over their campaigns and contributions.

#### **Problem Definition**

Despite the success of conventional crowdfunding platforms, several persistent problems limit their effectiveness. One of the primary issues is the lack of transparency in fund management. Contributors must rely on periodic updates provided by project creators, with no independent mechanism to verify how funds are being used. This lack of accountability increases the risk of fraud and fund misuse.

Centralized control also poses a significant problem. Platform administrators have the authority to suspend campaigns, freeze funds, or modify platform policies without user consent. Such control undermines user trust and restricts financial freedom. Additionally, centralized databases are vulnerable to cyberattacks, data breaches, and system failures, which can compromise sensitive information and disrupt platform operations.

Another major challenge associated with centralized crowdfunding platforms is the inefficiency in fund disbursement processes. The involvement of intermediaries and reliance on manual verification mechanisms often lead to significant delays in releasing funds to project creators,

thereby preventing timely access to financial resources. Additionally, high platform service fees and transaction charges further reduce the overall effectiveness of fundraising efforts, particularly discouraging participation from small-scale creators and individual contributors.

These limitations emphasize the need for a decentralized, transparent, and automated crowdfunding system that ensures secure financial transactions, fair and efficient fund management, and real-time visibility of fund utilization for all stakeholders involved.

#### **Objective of the Project**

The primary objective of this project is to ensure complete transparency in the crowdfunding process by recording all transactions on an immutable and tamper-proof blockchain ledger. This approach guarantees that all financial activities are permanently stored and can be independently verified by participants, thereby increasing trust and accountability.

Another objective is to automate the entire crowdfunding workflow using smart contracts. By embedding predefined rules directly into the blockchain, the system minimizes human intervention, reduces operational delays, and ensures accurate execution of campaign logic such as fund collection, goal validation, and refunds.

The project also focuses on enhancing system security through cryptographic authentication, decentralized architecture, and secure transaction validation mechanisms. These measures protect sensitive financial data, prevent unauthorized access, and reduce the risk of data manipulation or system failure. Additionally, the use of digital signatures ensures that only authorized users can initiate and approve transactions. The decentralized nature of the system eliminates single points of failure, thereby improving overall system resilience. Continuous verification of transactions across network nodes further strengthens trust and reliability within the platform.

Reducing operational and transaction costs is another key objective of the system. By eliminating centralized platform fees and third-party involvement, the proposed solution provides a cost-effective fundraising platform that benefits both project creators and contributors.

Additionally, the system aims to provide contributors with real-time access to campaign funding status, transaction history, and contribution details. This real-time visibility enables informed decision-making and increases confidence in the crowdfunding process.

Finally, the project seeks to develop a user-friendly and intuitive interface that allows users to interact seamlessly with blockchain-based functionalities. The interface is designed to simplify complex blockchain operations, making the platform accessible even to users with limited technical knowledge.

#### **Limitations of the Project**

While the proposed system offers numerous advantages, it also faces certain limitations. Blockchain networks may

experience scalability issues, transaction delays, and fluctuating gas fees during periods of high network congestion. Users are required to possess basic knowledge of blockchain technology and cryptocurrency wallets, which may limit adoption among non-technical users.

Cryptocurrency price volatility can affect the stability of fundraising values, while smart contract vulnerabilities may pose security risks if not adequately tested. Additionally, legal and regulatory uncertainties surrounding blockchain-based fundraising can impact deployment in certain regions. Furthermore, limited user awareness and technical understanding of blockchain technology may slow adoption among non-technical users and small-scale contributors.

Despite these limitations, continuous advancements in blockchain scalability solutions, user education, and regulatory frameworks can help mitigate these challenges over time.

## II. LITERATURE SURVEY

### INTRODUCTION

Crowdfunding has become a widely adopted method for raising funds by collecting small contributions from a large number of individuals through online platforms. It has enabled startups, entrepreneurs, social initiatives, and creative projects to secure financial support without relying on traditional financial institutions. Popular platforms such as Kickstarter, GoFundMe, and Indiegogo provide centralized infrastructures where project creators can publish campaigns and contributors can pledge funds. While these platforms have simplified fundraising and expanded accessibility, they are heavily dependent on centralized authorities that control data, funds, and decision-making processes.

Despite their popularity, centralized crowdfunding systems face several critical challenges. Contributors must place complete trust in the platform and project creators, as there is limited transparency regarding fund utilization and project progress after funds are collected. High platform service fees and transaction charges significantly reduce the actual amount received by project creators. Additionally, fund disbursement often involves manual verification and intermediary approval, leading to delays and inefficiencies. Centralized systems are also vulnerable to data breaches, unauthorized access, record manipulation, and single points of failure, which can compromise sensitive financial information and undermine user trust.

Blockchain technology offers a revolutionary solution to address these limitations. Blockchain is a decentralized and distributed ledger system that records transactions securely and immutably using cryptographic techniques. Each transaction is validated by a network of nodes through consensus mechanisms and permanently stored in blocks linked using cryptographic hashes. Once recorded, data cannot be altered or deleted, ensuring transparency, traceability, and integrity of information. These characteristics make blockchain an ideal technology for

applications requiring trust, security, and accountability without relying on centralized intermediaries.

Ethereum, a widely used blockchain platform, extends blockchain capabilities through smart contracts—self-executing programs that automatically enforce predefined rules and conditions. Smart contracts eliminate the need for manual intervention by automating key processes such as fund collection, goal verification, deadline enforcement, and refund execution. In a crowdfunding context, smart contracts ensure that funds are released to project creators only when predefined conditions are met, and contributors are automatically refunded if a campaign fails to reach its goal.

This project proposes a Blockchain-Based Decentralized Crowdfunding Platform that leverages Ethereum smart contracts to provide a transparent, secure, and trustless fundraising ecosystem. Unlike traditional systems, this platform removes intermediaries and allows direct peer-to-peer interaction between contributors and project creators. All transactions are recorded on the blockchain, providing real-time visibility into campaign progress and fund movement. The immutable nature of blockchain ensures that records cannot be manipulated, thereby preventing fraud and misuse of funds.

To further enhance decentralization, the system integrates IPFS (InterPlanetary File System) for storing large project-related data such as descriptions, images, and documents. IPFS distributes data across a peer-to-peer network rather than storing it on a centralized server, improving data availability, resilience, and censorship resistance. The front-end interface is developed using modern web technologies such as React and Web3.js, enabling users to interact seamlessly with the blockchain through browser wallets like MetaMask.

## III. SYSTEM ANALYSIS

### EXISTING SYSTEM

Traditional crowdfunding platforms such as Kickstarter, Indiegogo, and GoFundMe have transformed the way individuals, startups, and organizations raise funds for innovative ideas, social causes, and creative projects. These platforms provide a centralized environment where project creators can create campaigns, describe their ideas, set funding goals, and collect contributions from backers across the globe. The platforms act as intermediaries that manage campaign hosting, payment processing, fund storage, and eventual fund disbursement.

In the existing system, contributors are required to trust both the platform and the project creator. All transactions are processed through centralized servers and payment gateways, and the platform maintains full control over campaign approvals, fund handling, and policy enforcement. Although these systems are user-friendly and widely adopted, their centralized architecture introduces several limitations related to transparency, security, efficiency, and trust.

### Disadvantages Of Existing System

Traditional crowdfunding platforms operate using centralized architectures where a single organization manages user data, fundraising campaigns, and financial transactions. In these systems, project creators and contributors must rely entirely on the platform to securely store funds, enforce campaign rules, and ensure proper fund disbursement. Such dependency on centralized authorities introduces multiple risks and inefficiencies that affect trust, transparency, and overall system reliability.

Centralized platforms typically store sensitive financial and personal data in centralized databases, making them vulnerable to cyberattacks, data breaches, unauthorized access, and manipulation of records. A single point of failure can disrupt the entire system, leading to loss of data, delayed transactions, or denial of service. Additionally, contributors have limited visibility into how funds are utilized after collection, as financial operations are controlled by the platform and project creators, reducing transparency and accountability.

### DISADVANTAGES

- Traditional crowdfunding systems rely on centralized verification and manual processes, which result in delayed fund disbursement and slow campaign execution, often preventing timely access to funds for project creators.
- Centralized crowdfunding platforms lack transparency and accountability, as contributors have limited visibility into how funds are utilized after collection. Users must rely on platform authorities and project creators, which increases the risk of fund misuse, delayed disbursement, and manipulation of financial records.

### PROPOSED SYSTEM

The proposed system introduces a blockchain-based decentralized crowdfunding platform designed to overcome the limitations of traditional centralized crowdfunding systems. By leveraging blockchain technology and smart contracts, the system eliminates the need for intermediaries and establishes a secure, transparent, and automated fundraising environment. All crowdfunding activities, including campaign creation, fund collection, validation, and disbursement, are governed by smart contracts deployed on the Ethereum blockchain.

In the proposed system, each crowdfunding campaign is represented as a smart contract that defines predefined rules such as funding goals, campaign deadlines, contribution limits, and refund conditions. Once deployed, these smart contracts execute automatically without human intervention. Contributions made by users are recorded as immutable blockchain transactions, ensuring transparency and traceability throughout the campaign lifecycle. Since blockchain records cannot be altered or deleted, the system guarantees data integrity and prevents manipulation or

unauthorized changes.

The decentralized architecture ensures that funds are directly transferred and securely stored within smart contracts, rather than being controlled by a centralized authority. If a campaign successfully meets its funding goal within the specified deadline, the smart contract automatically releases the funds to the project creator. If the goal is not met, the contract initiates an automated refund process, returning contributions to the respective contributors without manual processing. This mechanism enhances trust, fairness, and accountability.

Security is significantly improved through cryptographic authentication and decentralized consensus mechanisms. Users interact with the system using blockchain wallets, enabling secure identity verification without exposing sensitive personal or financial data. Since there is no centralized database, the risk of data breaches, single points of failure, and unauthorized access is minimized. Each transaction is verified by the blockchain network, ensuring authenticity and preventing double spending or fraudulent activities.

The proposed system also reduces operational and transaction costs by eliminating platform fees and third-party payment intermediaries. Contributors and creators benefit from lower costs, faster transactions, and increased efficiency. Real-time access to campaign status, transaction history, and funding progress is provided through a user-friendly web interface that seamlessly integrates with blockchain functionality.

Overall, the proposed blockchain-based crowdfunding system ensures transparency, security, automation, and decentralization, offering a reliable and trust-free platform for fundraising activities while empowering both contributors and project creators.

### Advantages Of Proposed System

The proposed blockchain-based crowdfunding system adopts a decentralized architecture that eliminates the need for intermediaries, thereby reducing dependency on centralized authorities and avoiding single points of failure. By leveraging blockchain technology, all transactions are recorded on an immutable and tamper-proof distributed ledger, ensuring complete transparency, traceability, and data integrity. Contributors can independently verify funding activities in real time, which significantly improves accountability and trust between project creators and contributors. The decentralized consensus mechanism further ensures that transactions are validated securely without the risk of manipulation or unauthorized alterations. In addition, the integration of smart contracts automates key crowdfunding operations such as campaign creation, fund collection, goal validation, deadline enforcement, and refund processing. This automation minimizes human intervention, reduces processing delays, and eliminates operational errors. Enhanced security is achieved through cryptographic authentication and decentralized validation, protecting sensitive financial data from fraud and

cyberattacks. The absence of centralized platform fees reduces overall transaction costs, making the system more accessible to both creators and contributors, while real-time visibility into funding status improves user engagement and confidence in the system.

#### IV. SYSTEM ARCHITECTURE

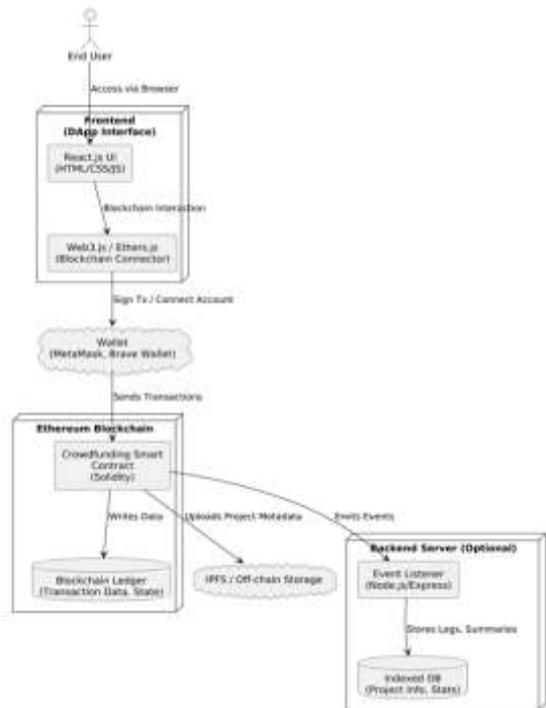


Fig 1. SYSTEM ARCHITECTURE

#### V. MODULES DESCRIPTION:

The Blockchain-Based Crowdfunding DApp is composed of several interdependent modules that work cohesively to deliver a secure, decentralized, and user-friendly crowdfunding platform. Each module is designed with separation of concerns in mind to ensure modularity, maintainability, and scalability.

##### 1. User Authentication & Wallet Connection Module

###### Functionality:

- This module handles the onboarding of users and connects their Ethereum wallet (e.g., MetaMask).
- Ensures that only users with valid wallets can access DApp features like contributing, creating projects, or requesting refunds.

###### Process:

- On login, the DApp prompts the user to connect MetaMask.
- Once connected, the Ethereum address is used as the user's unique identity across the platform.
- No password is stored; all authentication is done through the wallet signature mechanism.

##### 2. Smart Contract Interaction Module

###### Functionality:

- Facilitates communication between the frontend and the Ethereum smart contract deployed using Solidity.
- Ensures that every critical action (like fund

contribution, project creation, etc.) is executed as a blockchain transaction.

###### Features:

- Uses Web3.js or Ethers.js to send/receive data from the contract.
- Manages gas fees, transaction hashes, and confirmations.

###### Role in System:

- Acts as the bridge that ensures the trustless execution of business logic as per the decentralized model.

##### 3. Project Creation Module (for Creators)

###### Functionality:

- Allows registered users to create a new crowdfunding campaign.
- Collects necessary project metadata such as title, description, goal amount, deadline, and optional image/document via IPFS.

###### Backend Logic:

- Interacts with the smart contract's createProject() function.
- Stores the project data in the blockchain ledger.

###### Validation:

- Deadline must be in the future.
- Goal amount must be a positive value.

##### 4. Project Listing & Viewing Module

###### Functionality:

- Displays all existing projects fetched from the blockchain.
- Allows users to view project details, including funding status, deadlines, and creator information.

###### Visuals:

- Organized cards or tables in the frontend UI.
- Filters like "Recently Added", "Most Funded", or "Expiring Soon".

###### Data Handling:

- Data fetched via getAllProjects() or similar read-only contract calls.

##### 5. Contribution Module (for Backers/Users)

###### Functionality:

- Enables users to fund projects using ETH.
- Contributions are tracked per user and linked to specific projects.

###### Process:

- Backend calls contributeToProject() with ETH sent in the transaction.
- Updates the project's balance and emits a funding event.

###### Security:

- Prevents contributions after the deadline or if the goal is already met.

##### 6. Fund Release Module (for Project Creators)

###### Functionality:

- Once the goal is achieved before the deadline, the

project creator can withdraw funds.

**Backend Logic:**

- Calls releaseFunds() to transfer ETH to the creator’s address.
- Funds are locked in the smart contract until conditions are met.
- Only the original project creator can withdraw.
- Project must be fully funded.

**7. Refund Module (for Backers)**

**Functionality:**

- Allows contributors to reclaim their funds if a project does not meet its funding goal within the specified deadline.

**Contract Logic:**

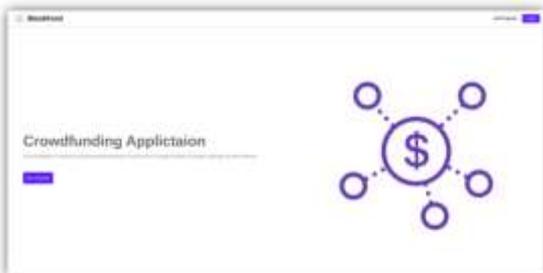
- requestRefund() checks whether:
- The project is expired.
- The funding goal wasn’t met.
- The user has contributed.
- If valid, sends ETH back to the contributor’s wallet.

**Prevention:**

- Once funds are released to the creator, no refunds can be made.

Each module contributes to the decentralized and trustless behavior of the DApp. Collectively, they form a robust crowdfunding platform that offers transparency, immutability, and user empowerment through blockchain technology.

**VI. OUTPUT SCREENS**



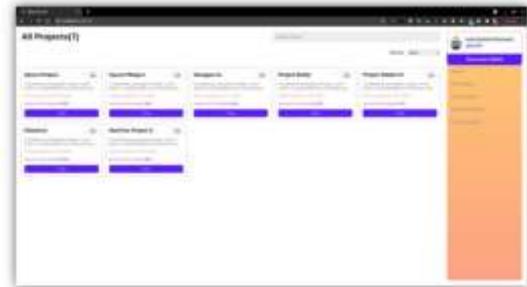
**Fig 2: Output Screen 1**



**Fig 3: Output Screen 2**



**Fig 4: Output Screen 3**



**Fig 5: Output Screen 4**



**Fig 6: Output Screen 5**



**Fig 7: Output Screen 6**

**VII. CONCLUSION & FUTURE SCOPE**

**CONCLUSION**

The Blockchain-Based Crowdfunding DApp offers a transparent, secure, and decentralized platform for raising and contributing funds. By utilizing Ethereum smart contracts, it removes intermediaries and ensures that transactions are trustless, verifiable, and immutable. Contributors can support projects confidently, track their progress, and request refunds if goals aren't achieved — all handled autonomously by the smart contract logic. Project creators benefit from global access to potential funders without platform fees or restrictions, while

contributors enjoy increased transparency and control. The integration of blockchain and Web3 technologies ensures both security and usability.

This project demonstrates how blockchain can transform traditional crowdfunding by promoting accountability and decentralization. As adoption of such technologies continues to grow, platforms like this DApp pave the way for more efficient and trust-based fundraising systems in the future.

#### FUTURE SCOPE

The proposed blockchain-based crowdfunding platform has strong potential for future development. In upcoming iterations, the system can support multiple cryptocurrencies, allowing contributors to choose their preferred digital asset. The integration of Know Your Customer (KYC) protocols can ensure identity verification and reduce fraud, building greater trust among users.

Implementing milestone-based funding—where funds are released in stages based on progress—can increase accountability for project creators. The system can also evolve into a decentralized autonomous organization (DAO), enabling community-driven governance where backers vote on approvals and disbursements.

Further enhancements could include analytics dashboards, NFT-based contributor rewards, and integration with mobile DApp browsers like MetaMask. As blockchain adoption rises, this platform could become a powerful and transparent alternative to traditional crowdfunding systems, empowering both innovators and supporters globally.

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