

# Design of Smart Contract and transactions for Start-up project based on ethereum blockchain

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**Abstract** - Many implementation of blockchain technology are widely available today. This Project explains how blockchain technology improves efficiency and build faith in funding process of startup process which affect today's business and industries.Designing Block chain based a decentralized, distributed ledger, which records transactions or events of funding process in Start-up is discussed. Start –ups facing an issue of raising a required fund. Although there are many sources are available to entrepreneurs who wish to begin new businesses or expand existing ones, like family, friends, friends of friends, bank loan, use of internet, online crowd funding platform and many more. However, to look at the proper distribution and utilization of money and to keep track of it is main problem. This proposed system may provide the solution through the use of blockchain technology for issues related to crowdfunding contract. Through the notion of smart contract automated interaction between and existing transaction system is discussed. A solution for the issues like security, abuse of investor and illegal transactions in crowdfunding process is prompted in this project.The idea behind model is to use ethereum based smart contract for securely and effectively handling connection between fundraisers, vendors and project manager/idea person. Blockchain enabled distributed platforms is used to avoid fraud and to view proper utilization and distribution of money raised by different contributors

**Keywords** —*blockchain, crowdfunding ethereum, Start-up, smart contract*

## I. INTRODUCTION

Blockchain is an enabling technology for peoples and firms to collaborate with trust and transparency. It is decentralized public ledger, which give access to everyone [3]. Start-ups are the life of our economy and innovation across the world, which results in creating jobs, new products, and dreams. They are led by entrepreneurs who work effortlessly to bring their brilliant ideas which are different from others, making that idea a business success. There are some challenges in relation with the start-up process such as with new players turning out each day, availability of a plethora of products, increased specialise in funding and stringent regulations. 29% start-ups in India, which fail because they run out of money, 18% start-ups fail due to cost issues, and another 8% do not seem to be ready to attract interest of investors.65percentage of the venture capitalists revealed that funding might be a major roadblock for a start-up. Funding is a particularly significant aspect in line with meeting the vision of a business. Most of the Start-up fails due to funding or improper distribution of funding.

There are many sources of funds available to entrepreneurs who wish to start out new businesses or expand existing

ones, like family, friends, friends of friends, bank loan, use of internet, online crowdfunding platform etc. Crowdfunding is a new platform through which small firm lift the funds from web. It provides financing option with faster speed, low cost and less hurdles.At present, Crowdfunding has gained much importance with most businesses for raising funds typically for business start-ups[5]. Start-ups usually fail because of different fund raising problems such as stress of using family and friend's money. Bank loans having problem of payback of certain amount and seizing of assets to pay off your debt. The most vital problem .It is difficult for tiny business or start-ups to get loans from banks, or investments from venture capitals.

There are challenges with Crowdfunding about abuse, trust and confidentiality and the adoption of blockchain technology in Crowdfunding contracts could provide the much-needed solution [14]. A solution for the issues like security, abuse of investor and illegal transactions in crowdfunding process is prompted in this project [5].

The proposed system will solve these problems by using blockchain technology to realize the trust and to view proper distribution of money by creating smart contract for

spending the money raised by the peoples. Blockchain technology provides cheaper, easy, and secure and a convenient means for the exchange of information. With the help of Blockchain technology proposed design will provide the solution to all crowdfunding problem. The main aim is to demonstration of blockchain technology for handling relation between fundraisers, platform and investors very securely and effectively [6].

The organisation of this thesis is organised in following way. Section1 gives introduction about startups, challenges of startup and need of this project. Section 2 focuses on literature review which gives the better understanding of different concepts related to blockchain technology, smart contract, ethereum and startups. Section 3 describes proposed system and simulation environment required for successful running of this application. Section 4 describes expected result.

### 1.1.1 SMART CONTRACT

A smart contract can be explained as a set of rules which is intended to digitally facilitate the transfer of digital currencies or assets between parties under certain conditions. Smart contract is secure computer program having self-verification, self-executing and tamper resistant properties. Smart contracts are used for exchange of value without need of third party. The smart contract helps you exchange money, property, shares or anything of value in a transparent way avoiding the services of a middleman. The smart contract runs in EVM. Solidity programming language is used to implement smart contracts [4].

### 1.1.2 ETHEREUM

Vitalik Buterin described ethereum initially in late 2013. This idea having goal of building decentralized applications. Formal development of the ethereum software project began in early 2014 through Swiss Company. Ethereum is a programmable blockchain that works using Eth as the base cryptocurrency for using the system. Eth is used for payment of cost for saved or processed information. Ethereum is used as base for many block chain application. Ethereum offers its user a comprehensive environment to create their own functionality with the help of decentralized app called as Dapps. Ethereum uses solidity programming language [12].

### 1.2 PROBLEM STATEMENT:

To analyse fraud under contract and transactions during communication between founders /entrepreneurs and contributors; and provide secured web based mechanism against it using blockchain technology for developing better confidentiality between them under startup projects.

### 1.3 OBJECTIVES OF THE PROJECT

1. To develop ethereum based smart contracts, which help to provide better and secured communication between founders/entrepreneurs, and contributors using blockchain based distributed platform.
2. To create virtual money wallet for founders/entrepreneurs and contributors which helps in further mutual money transaction.
3. To design of a blockchain-distributed platform for analyses fraud under contracts and transactions during communication between entrepreneurs and contributors to secure funding process.
4. To develop website for startup projects publicity of particular founders /entrepreneurs for demonstrating product ideas and attract contributors to raise required funds.
5. To develop initial level of security for access of web application to founders/entrepreneurs as well as contributors by providing legal registration process. (Safe login credentials).
6. To provide secured channel to the contributors towards selected startup products as per contract using blockchain platform.
7. To provide transaction report for various transactions completed under this process to get details any time.

## II. LITERATURE REVIEW

Many investigations have been done on blockchain in last few years and day by day it's increasing. Chatterjee Rishav et.al (2017): discuss that blockchain has many advantages and we can apply blockchain in various fields. Since blockchain is in its early stage of development it requires more exploration.[3]. Raikwar Mayank et.al (2018): proposed a design for execution of transaction in insurance process.. This paper proposes blockchain-based framework for implementing insurance transaction processes as smart contracts using Hyper ledger fabric [1]. Hongjiang Zhao et.al (2018): States that there are challenges with Crowdfunding in relation to abuse, trust and confidentiality. Author presented how block chain technology in Crowdfunding contracts can provide the required solution [14]. Bosco.F.et.al (2018): this paper present study of developing private ethereum blockchain that enables series of service for renewable energy sources (RES) investments. This shows a real case of application bt in financial sector. The implementation of trustable, price based, addressing RES financial peer-to-peer (P2P) addressing RES financial investors and district energy consumers is discussed [9]. Kumar Bhabendu et.al (2018): discuss that Smart contract is secure computer program having self-verification, self-executing and tamper resistant

properties. In real time application along with blockchain technology smart contract performs task with low cost and provide more level of security. The overall architecture, workflow and taxonomy of smart contract is clearly discussed in this paper [4]. A white paper on blockchain states that Blockchain has shown its potential for transforming traditional industry with its key characteristics. This Paper gives an overview of blockchain technologies including blockchain Architecture, application, solution and how blockchain technology will help in different financial sectors[8].Gebert Micael(2017):discuss discuss that crowdfunding is critical utility for small market enterprises .New venture always having threat of employment crisis and insecurity,therefore its strongly needed for government to facilitate access to funds by small enterprises.Blockchain technology provides a ray of hope for recovery crowdfunding across the world[5].Knezevic Dusko(2018): conduct research on how blockchain technology platform has impact on financial sector and other industries.The aim of this research is to understand functions, working and advantages of blockchain technology for business and economic transactions [12].Rouhani Sara et.al (2017): discuss about Ethereum blockchain platform which does not have any limit for block size, unlike Bitcoin. Nevertheless, there are other difficulties in processing unlimited transactions such as Ethereum blockchain code runs by different clients, and they run on different speed and present the different level of performance. This paper studies analysis of Ethereum transactions on a private blockchain to obtain the better understanding of the effect of different clients on Ethereum performance [13].Hegedus Peter (2018): describes that smart contract are special programs that run on blockchain and it supports ethereum platform. This Paper proposed the usage of well-known static OO metrics to the smart contracts written in the Solidity contract-oriented language. These metrics developed together with the programming languages themselves .There are no tools for calculating such metrics [13].Zinca Daniel et.al (2018): describes a system for paying road tax at an international level with the help of ethereum based blockchain technology.In this author presented a web based application for creation of new ethereum blockchain account .This system will be used to payment of road tax subscription and checking validity of the same [10].

### III. METHODOLOGY

#### 3.1 PROPOSED SOLUTION

There are challenges with Crowdfunding in relation to abuse, trust and confidentiality, and the adoption of blockchain technology in Crowdfunding contracts could provide the much-needed solution. The idea behind this proposed model is implementation of smart contracts for processes of strat-up Company by using blockchain enabled

distributed platform.it is used for execution of smart contract and storage of the result.

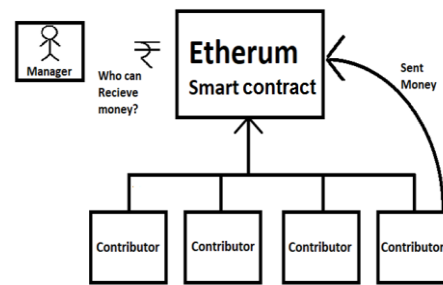


Figure 1: Proposed System with Ethereum based smart Contract

#### 3.1.1. Main Entities in the Project

1. Primary Entity in model is Idea person/ Project manager who come with an idea for launching a new project.
2. Contributor: Who are going to finance or give the money to start-ups.
3. Vendor: The one who is supply/Provide the materials /products required for launching the project.
4. Private Account: If malicious attack happens, the money could store in the private account.

The proposed system uses smart contract for transaction between contributors ,vendors and project managers .it also provides secure, distributed and decentralised ledger for all.smart contract contain rules for transaction ,verification logic for execution.. A simple scenario where the main process is money distribution is considered while designs the proposed system. Blockchain maintain execution and result of each transaction and insures the flow of money.

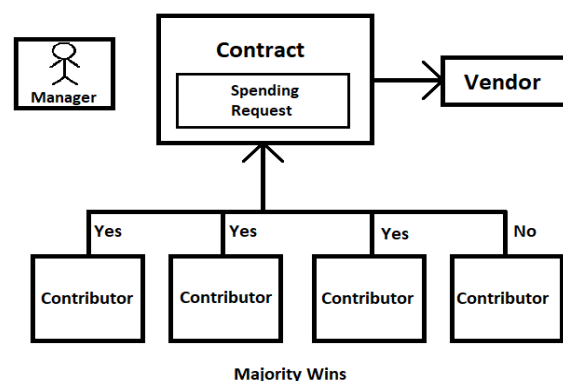


Figure 2: Voting Mechanism for utilization of money

In the startup process, blockchain technology is applied to see the transparent and overall process of funding/Investment by building the application using ethereum. In case of some malicious attack where a person will take that money and go away, Use of smart contract

with ethereum control how money sent and where money being sent or not being sent in someone private account and directly send it to vendors account. Spending request attempts to withdraw money from the contract and send to an external address. Spending request is based on voting mechanism.

### 3.2 SIMULATION ENVIRONMENT

The proposed system demonstrates the use of blockchain technology to create an interactive web application based on ethereum generally termed as dapps (Decentralized Application). The starting point will be User Interface through which user will interact with ethereum network (Rinkeby-Test Network). The FrontEnd will be designed and developed with latest technologies such as HTML, CSS, Javascript, Frameworks like ReactJs and for testing jest will be used. MVC (Model-View-Controller) approach as well as two tier architecture will be followed. The Front End server will be hosted separately over a particular location. As blockchain technology is used, the backend part i.e the controller (Business Logic) and model (Persistence/Database Logic) part will be stored at client side because blockchain is fully peer to peer network. The backend Development will be carried out with latest technology such as Nodejs and to create smart Contract over ethereum network we will be using solidity language to write logic. The testing will be done with the help of test framework called as MOCHA.

The connection between frontend server and backend (Ethereum Network) will be done through Web3.js which is a library that allows javascript code to communicate with ethereum network through metamask which is an extension so that browser can communicate with ethereum network.

The project flow will be like user will interact with frontend (UI) with help of browser. If user wants to perform any operations events will be triggered and accordingly pages will be served from the frontend server. If the events are related to transactions then through web3.js along with metamask the browser will communicate with ethereum network and according show the result on the screen. For example if the manager is the user who request for funds will be redirected to different page, After the completion of entering the details related to that project the manager will perform a transaction through smart contract which is deployed at backend. The other nodes will be notified/updated about the request made by the manager. The UI page differ from the one that manager accessed. The other nodes will also trigger events and transaction will take place and data will be updated based on the events triggered.

## IV. EXPECTED RESULTS

Under this project web application will provide various product ideas developed by founders/entrepreneurs and it helps proper publicity of proposed product result in attracting contributors globally. The registration of contributors allows founders to verify legality of contributors. This project will provide a way to create a new Ethereum blockchain account, easy interaction between project manager, vendor and contributors. Web application will show proper contribution and utilization of money with the help of ethereum network and smart contract with the help of solidity programming.

## V. CONCLUSION

The proposed design provides secure, distributed and decentralizes ledger for execution of transaction between contributors, vendors and project manager with help of smart contract. The aim is to provide control over the money raised by the investors. Our design identify use of smart contracts that govern the rules for transaction. Blockchain technology is being used to see the transparent and overall process of funding/Investment by building the application using etherum. The proposed system will report of some malicious attack with the help of smart contract with ethereum and provides a good control on how money being sent and where money being sent based on voting mechanism.

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