StartCHAIN: Crowdfunding using Blockchain Technology

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Abstract—When entrepreneurs want to start a business or have an amazing start up idea, they require capital. The founders therefore approach banks for loans to raise funds. But banks generally try to avoid investing in start-ups, the reason being the high risk of failure associated with it. Crowdfunding helps to solve this issue as it is a solicitation of funds from multiple investors for a cause or a business idea. Even though there exists many platforms which provide crowdfunding, the users try to avoid such platforms due to high fees, mediators and blind trust. The proposed system will use blockchain technology which is a distributed ledger that is cryptographically secure, append-only, immutable, and updatable only via consensus or agreement among peers(FICCI-PwC, 2018). The main objective behind using a private blockchain is to provide speedy transactions, non-repudiation and high security by having both peer to peer and centralized system. This paper presents the crowdfunding scenario in India and also in other countries. It examines the modified regulatory framework being adopted in different countries of the world, including India so as to facilitate the growth and development of this innovative financial source. Finally the paper highlights the crucial details of the proposed system so as to expand the size and scope of crowdfunding in India.

Index Terms—crowdfunding, blockchain, ledger, founder, backer, miners, transactions

I. INTRODUCTION

The concept of crowdfunding came into light in the year 1997 when a British rock bank needed funds for their reunion tour and with the help of their fans donation they successfully did it. Since then crowdfunding has been growing and has been the reason of success for many activities ranging from a small project for a school experiment to a huge project idea. So what is Crowdfunding? According to the SEBI consultation paper on crowdfunding in India defines Crowd funding is solicitation of funds (small amount) from multiple investors through a web based platform or social networking site for a specific project, business venture or social cause. [1]. One might think the concept is very similar to the concept of charity, however the concept changes here a little bit. In Crowdfunding people fund projects or events with the objective of earning some return either in form of monetary or intangible way. It basically replaces banks with a large group of people to become a source of funds. With the invention of the internet it has become much easier as well faster for people to float their idea/cause and raise funds for the same. Since the process of loan sanctioning or providing financial support is time consuming and has a series of steps, crowdfunding helps entrepreneurs by raising fund for their innovative idea or event and that too in a very short amount of time. There are 4 basic models of crowdfunding which have been among the investors [2]:

1) Donation Model: In this model, investors financially contribute to the development of a project without expecting anything in return.
2) Peer-to-Peer (P2P) lending Model: In this model, investors usually lend money in a project which carries a fixed rate of interest and the principal amount is repaid back to them after a given number of years.
3) Equity Model: Investors and individuals financially contribute to a project to gain an equity stake in that project. This crowdfunding technique is often used to raise money for the launch of the company, and not just supporting the cause, but mainly the growth of the enterprise.
4) Reward-based crowdfunding: Rewards based crowdfunding involves gathering of funds from investors and in return they receive some existing or future tangible reward as a return or consideration.

With the growth of crowdfunding and the internet there have been various online platforms which support and promote crowdfunding. However such platforms levy a certain amount as the mediators between the founder and the investor(backer). The users have no option but to blindly trust the mediators. The users are in constant worry with the security and authenticity of transactions. Blockchain technology solves all

the above issues by providing very high security as well as transparency. Blockchain serves as an immutable ledger which allows transactions to take place in decentralized manner hence removing the entire load on mediators and preventing them from being biased. In simple words blockchain is a chain of blocks which hold the information and are immutable. Blockchain-based applications are springing up, covering numerous fields including financial services, reputation system, Internet of Things (IoT), and so on. Blockchain is a sequence of blocks, which holds a complete list of transaction records like conventional public ledger. The figures 1 illustrates an example of a blockchain. With a previous block hash contained in the block header, a block has only one parent block. The first block of a blockchain is called genesis block which has no parent block [3]. Blockchain could be regarded as a public ledger and all committed transactions are stored in a list of blocks. This chain grows as new blocks are appended to it continuously [3]. Asymmetric cryptography and distributed consensus algorithms have been implemented for user security and ledger consistency. Blockchain technology generally has key characteristics of decentralization, persistency, efficiency, anonymity and audibility [3].
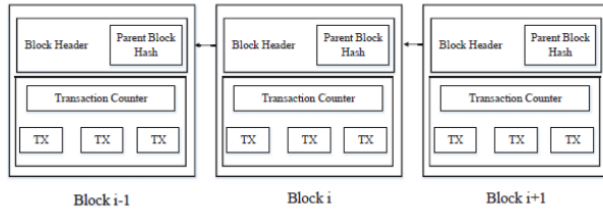

Fig. 1. Example of Blockchain

The rest of the paper distribution is as follows: In section II we review various existing system across the globe and in India for crowdfunding. Some of the platforms use blockchain technology while others use normal client server model based platforms. Section III provides a detailed process of StartCHAIN and multichain platform. It also speaks of how multichain platform is used in our system to achieve successful transaction of assets between founder and backer. Lastly we conclude with the result that we achieve and speak about the future of StartCHAIN and multichain.

II. LITERATURE SURVEY

A. Crowdfunding across the globe

The lack of proper funding is the biggest issue holding back new innovation and projects that have the potential to change and improve our society. Online platform uses internet-based technologies and collective knowledge of communities to determine which projects should receive funding while providing real-time proposed ideas [6].These platforms in spite of providing more opportunities for newly occurred founder of creative ideas, they are rejecting most of it and selecting only those that fit limited and self-serving

criteria. Different restrictions and limitations are imposed for e.g. emerging markets, less economically developed countries are denied for access and projects based on limited fields like creativity, charity, etc are only approved. Allowing minimum number of backers, founders, types of projects and taking minimum service charges of around 5-10 percentage, somewhere these platforms are not achieving the main goal of crowdfunding [6].

I. Acorn :
Acorn is providing blockchain based crowdfunding platform built to support more innovative founders, where they never reject a legal and ethical project. If founders can find backers, then they deserve a platform that will support them. The purpose of using blockchain is to provide crowdfunding platforms free and more open. With high transaction fees and service charges, drain on startups looking for funding was being seen [8]. To avoid this Acorn proposed usage of ICO which aims to eradicate 5% of transaction fees and also with that there will be no need of funding via outside investors like it is done in a traditional system, where funds come from outside equity shareholders who want returns through company profits. This makes them allocate resources only to where they can achieve the most earnings,charging fees and conceivably giving rise to more restrictive project approval criteria. At Acorn, this is different - There is no obligation to generate platform profits for outside shareholders [8]. ICO participants and other token holders, including the company, are rewarded by growth of the OAK(token of acorn platform) ecosystem. Acorn intend to achieve this growth by offering crowdfunding for free and a much less restrictive project approval policy.

II. YouToken :
YouToken is a blockchain-based decentralized crowdfunding platform built as an Ethereum-based decentralized application [9]. It is a unique platform where people's idea are accepted and converted into financial tokens.Using this platform, an investor can contribute/donate money to an entrepreneurs campaign in a way similar to buying and investing in stocks on the stock market. The main advantage of YouToken platform is its user verification process is fast and secure. It is designed in such a way that investors are protected from fraudulent activities and also cannot perform them. It uses the latest AI-based KYC technologies to verify user identity in seconds and prevent creators from encountering roadblocks such as spending too much time on paperwork [10]. All creators' data is stored via Ethereum blockchain. YouToken offers 4 type of smart contracts based on the 4 type of crowd funding model: donation, debt, revenue share or equity model. Entrepreneurs can use any of these smart contract in order for transfer of funds from one party to another. These smart contracts regulate the transfer of asset between the founder and the backer via a voting process. Investors decide whether or not the project step was completed, so that the process can move on to the next step. If the investors vote completed, then the entrepreneur

receives the next portion of funds. If they vote not completed, then the remaining unused funds from crowdsale are returned to the investors [10].

B. Crowdfunding in India

Despite having a traditional capital investment system like venture capital funds and private equity investors, SMEs or start-ups face difficulty in raising money. That is where crowdfunding methods help business ventures in gathering investments. In developed countries like Australia, United Kingdom, Netherland, Italy, and the United States Crowdfunding concepts have emerged immensely. Collectively, the US, UK, and China make up 96% of the overall financial reward crowdfunding market, with USA accounting for 51%, China for 28% and the UK for 17% [5]. Crowdfunding was mainly started in the US and UK but then with the help of government and developed organizations crowdfunding could become a useful resource in developing countries like India as well [4]. The concept of crowdfunding is already known in India since the places of worship are built using public donations but accepting Internet-based crowdfunding is a little difficult task for people due to lower trust in doing things online. However, India is the most promising economy in the world. And one of the biggest countries having NGOs. These NGOs provide a better and sustainable environment for crowdfunding. According to new companies act every company will have to spend at least 2% of its earnings on corporate social responsibility. Which will then help to improve the crowdfunding scenario in India. The National Crowdfunding Association of India helps to promote, educate, support and establish the Indian crowdfunding market where the general public to people interested in investments can take membership. Though the concepts of Web-based crowdfunding are not widely accepted in India, there are successful projects of crowdfunding accomplished in this country which creates a new vision towards this field. For eg: Onirs film I am Major, 1976s Manthan Film of Bollywood industry, Dhirubhais Textile business in Gujarat, Goa Project [6], Teach for India campaign sets successful examples. There are approximately 15 crowdfunding platforms in India compared to other countries like in the US there are around 344 platforms. Crowdfunding platforms in India are mainly based on donation and reward based crowdfunding. Since equity based crowdfunding is considered as unauthorized, unregulated and illegal in India according to SEBI(Security and Exchange Board of India). SEBI aims to protect the interests of investors in the country and due to various risks associated with equity crowdfunding it has classified the same as illegal. There are some other regulators proposed by SEBI, which every crowdfunding platform and involved founders and backers has to follow [6].

III. THE PROPOSED SYSTEM

MultiChain is an off the shelf platform for the creation and deployment of private blockchains, either within or between organizations [7]. It aims to overcome a key obstacle to the deployment of blockchain technology in the institutional financial sector, by providing the privacy and control required in an easy to use package. MultiChain solves the related problems of mining, privacy and openness via integrated management of user permissions. The core aim is threefold :

1) To ensure that the blockchains activity is only visible to chosen participants
2) To introduce controls over which transactions are permitted
3) To enable mining to take place securely without proof of work and its associated costs

Once a blockchain is private, problems relating to scale are easily resolved, since the chains participants can control the maximum block size. In addition, as a closed system, the blockchain will only contain transactions which are of interest to those participants [7]. Thus some of the prominent features that makes Multichain an apt blockchain technology to be used for the proposed system are :

1) Private blockchain technology
2) Interactive command mode
3) Faster signature verification
4) Permission management
5) Smart filters and richer data streams
6) Quick deployments
7) Supported languages- Python, C, JavaScript, PHP, Ruby

StartCHAIN is a platform to promote crowdfunding for start-ups with the help of blockchain technology. Founders and backers are the intended end users of this product. The founders can create a campaign to raise funds for their innovative start-up idea while backers can invest in the project which seems reliable and profitable to them. StartCHAIN will provide direct communication between project developers and individual investors which will increase the speed of the transaction process and will not create any longer delays. Thus, this platform aims on providing transparency, low latency and reliability to both founders and backers. The proposed system consist of two phases stated as follows :

Phase I - Backer-Founder Agreement :
In this phase the first the Founder logs into the system and post a campaign which contains the details of the project or start-up idea, funds required, milestones of the project etc. The backer also logs into the system and browses for a campaign which might interest the backer. Once such a campaign is found the backer contacts the founder and a meeting is set up between the backer and founder outside of the system. In this way the founder and backer both are aware who is who. Once fixed they use the platform for transaction and hence move to Phase II. Fig 2 explains the process of Phase I.

Phase II - Transfer of Funds :
After the agreement is completed the main process is transferring of funds from backer to the founder. For this the
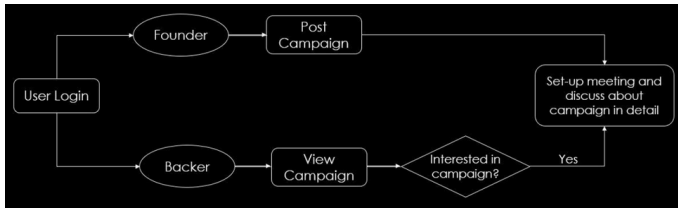
Fig. 2. Phase I: Agreement of Backer and Founder

backer requests funds from the admin as it might not have any funds. If the backer is a valid node the admin issues assets as the fund for the backer. The Backer on receiving the assets, it initiates the transaction of transferring required assets to the founder. The miners validate the block of transaction. If it is valid then the transaction is completed and the wallets of both founder and backer are updated. This completes the transfer and Phase II.Fig 3 depicts the flow of Phase II.
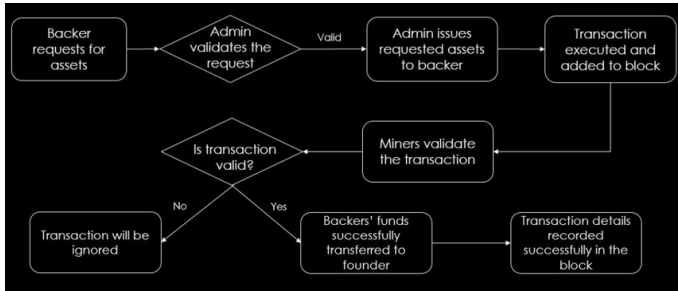

Fig. 3. Phase II: Transfer of Funds.

Some of the important features of StartCHAIN supported via Multichain are :

A. The Handshaking Process

The process of hand-shaking in MultiChain occurs when the nodes in a blockchain connect with each other. The identity of each node represents itself with an address with a list of permissions.Therefore each node which it represents sends a message to the other users. The P2P connection aborts if they do not receive any satisfying results from the process. Handshaking process makes sure the node which is connected is known to founder/backer/admin/miners. Unknown node wont be able to add into the multichain network. It will get eliminated during this process if its not present in the permitted list. This is how founder or investor will know the node to which they are connected, cryptographic identity is known to the node. [7]

B. Permission Management

Each node will be having some permissions associated with it. For eg: send, receive, connect,issue etc. This will ensure that only validated node can be able to send or receive request. Founder of the project while retrieving funds will have to send request to investor, if that request is accepted than only founder

will be able to spend that money. This is how investors will be able to build trust on founder by keeping track on the money invested by them and also on the growth of the project. In crowdfunding, there will be many creators with their project ideas. So for funding to ensure that none of the creator is left out we will impose restrictions on investors through available scheme (permissions) that only for x no. of projects they can invest. This is how we will try to drive investors interest on the other projects too. [7]

C. Streams

Streams can be used to store data on blockchain in the form of transactions, which is unknown to users. But every read, write, subscribe, etc to stream is recorded. There are many useful advantages but the one most useful for crowdfunding is the way stream performs smart contracts. It overcomes shortcoming which are present in bitcoin protocol [7]. And it is implemented on top of blockchain rather than lowest transaction level. Each item in a stream has the following characteristics :

1) One or more publishers who have digitally signed that item.
2) An optional key for convenient later retrieval.
3) Some data, which can range from a small piece of text to many megabytes of raw binary.
4) A timestamp, which is taken from the header of the block in which the item is confirmed.

D. Smart Filters

Smart Filter is the additional key functionality provided by Multichain 2.0. It is useful for creating custom rules regarding transactions and streams. This custom rule is nothing but the piece of code written in javascript and run within a deterministic version of Googles V8 JavaScript engine, which is embedded directly within MultiChain 2.0. Smart filter code is embedded in the blockchain. So the code can be applied to any transactions run within the blockchain.

In the StratCHAIN application we are going to apply some custom rules related to transaction filters. It will help us in validating transactions by examining its inputs, outputs and metadata. Any transaction which will not pass this filter will be independently rejected by every node. Below are the two filters to be applied in the StartCHAIN application:

1) Limit Asset Transfer: As mentioned in phase 2 of the proposed system, after issuing assets(funds) from the admin, backer will transfer assets to the founder. No backer can transfer an asset amount more than it acquires but there is a possibility that backer transfers an amount more than the founder needed. To avoid such conflicts we will introduce a transaction filter which will limit this transfer amount. It will not let the backer transfer more than the required amount.
2) Miner fee: Currently in multichain miners are mining block without getting any additional fee. But with the

help of filter we can check on transaction whether the additional fee is added for miners or not.

IV. CONCLUSION

Realising the growth of crowdfunding in the world and in India, fundraising through contributions from public through internet based platforms is relatively an innovative concept. The crowdfunding platform acting as intermediary helps the startups showcase their prospective business venture or prototype before thousands of global investors. A prospective startup can thus be connected with diverse investors and is benefited by soliciting their ideas through provision of funds. To provide more support for innovative founders, StartCHAIN will provide a blockchain based crowdfunding system, built using Multichain, which will never reject a legal and ethical project. Based on the literature review, analysis of features of Multichain, we believe that blockchain technology has high value and good prospects in resolving the problems of crowdfunding and optimizing its process. Crowdfunding shareholders are scattered over wide regions, making it important to connect to trusted founders around the world. Multichain platform offers a more secure, efficient, and low-cost solution in establishing a private reliable connection between the founders and stakeholders ignoring any geographical limitations. Also the transactions in crowdfunding and funds transfer are complex at the operational level. A peer-to-peer Multichain platform provides secure electronic transactions, significantly simplifying the process of transaction and transfer. This facilitates fund circulation and activate the crowdfunding market. At present, the blockchain application in capital management is still in the exploratory stage; there are many legal and technical issues to be resolved. Economic efficiency and social benefits can be achieved through technical innovation and applications.

REFERENCES

[1] K.Neelavathi and Swetha Chavali, "A Study on Crowd Funding as a new concept of raising capital", IOSR Journal of Business and Management, International Conference on Paradigm Shift in Taxation, Accounting, Finance and Insurance, 2017.

[2] Dr. Manoj Kumar Joshi, "Crowdfunding For Startups in India", aWEshkar Vol. XXIV Issue 1 March 2018 WeSchool.

[3] Jhaveri, Hetal & Choksi, Anjali,"CROWDFUNDING AT INDIA: A STUDY OF INDIAN ONLINE CROWDFUNDING PLATFORMS.", IFRSA BUSINESS REVIEW, 2014.

[4] Zhiyuan TIAN, Lei GUAN & MeilinSHI,"The Key Factors of Successful Internet Crowdfunding Projects An Empirical Study Based on Different Platforms", 1109/ICSSSM, 2018.

[5] Dr. Manoj Kumar Joshi, "Crowdfunding For Startups in India", aWEshkar Vol. XXIV Issue 1, March 2018.

[6] Zibin Zheng, Shaoan Xie, Hongning Dai, Xiangping Chen and Huaimin Wang, "An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends", 2017 IEEE 6th International Congress on Big Data, IEEE Computer Society

[7] Dr Gideon Greenspan, "MultiChain Private Blockchain White Paper", 2015.

[8] Acorn, "Acorn Collective: The First Completely Free and Open-Access Blockchain Crowdfunding Platform", Whitepaper, January 2018.

[9] https://www.youtoken.io/

[10] YouToken team, "YOUTOKEN: Blockchain Crowdfunding Platform that converts Human Intelligence into a Financial Asset.", Whitepaper, August 8, 2018

[11] Gebert, Michael, "APPLICATION OF BLOCKCHAIN TECHNOLOGY IN CROWDFUNDING", New European Newspaper Article, 2017.