

Framework for a crypto-will platform that can smoothen the process of writing a Will

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Abstract

Writing a will, even in the modern world, faces many taboos. To add to that, writing of a will can get intimidating and tedious as it not only involves many laws and regulations but also costs money and time. This study proposes the application of blockchain technology along with smart contracts and cryptography to create secure online crypto-wills on an app. The study also provides an architecture for making crypto wills on the blockchain network. The creation of a blockchain can encrypt the will, making it impossible to tamper with, and also eliminating the chances of losing a will. This technology uses consensus algorithms to confirm consistency and records transaction details in blocks to ensure the efficacy of the transactions being recorded. The proposed blockchain architecture focuses on authenticity, effectiveness, and cost reduction. Asset registry of the users along with their wills are saved in blocks, which provide complete security and are tamper-proof. In addition to this, a smart contract enables the disbursement of the will at the right time with the capability of direct disbursements of assets in the future. This mechanism guarantees the integrity of data, unforgeability, irreversibility of information, the ability to resist counterfeiting attacks, nonrepudiation, and public verifiability. To add to that, blockchain can provide better evidence of the intent of the testator which is a major cause of contesting wills in courts today.

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1. Introduction

Will is a legal document that gives one the power to decide what to do with one's estate post one's death. Although the law allows a Will to be drafted in a simple manner and can even be handwritten, it can get extremely difficult to prove the authenticity and the intent of the writer if the Will is contested by someone upon the death of the testator. Contest to a Will is an exhaustive experience for the heirs or beneficiaries and the cases can last over decades; as far as resolution among family members is not attainable. Thus, even a simple Will can have hidden complexities because the person who is writing the Will, would not be alive to explain the meaning of his/her intentions. Besides, between the time of writing a Will and the demise of the writer, both, the assets, and relationships could undergo a change, hence the Will needs to withstand the test of time as well.

Therefore, this research paper aims to suggest a framework for a solution leveraging the new age blockchain technology and smart contracts in the area of estate planning and writing crypto Wills in order to overcome the challenges of the current will-making process, increase awareness and adoption of *will* making, lower costs and aid the society at large by bringing

down the majority of the civil cases in the judiciary system in India. The paper also intends to propose a minimum viable product to implement the arrived solution, making drafting of wills easy, if not compulsory, capturing the intent of the person writing the will which has not been done so far.

Blockchain technology has been popularly known for the information security that it offers.[1] Real estate can benefit immensely if blockchain technology can be used for creating smart contracts that can automatically get executed at the due time.[2] Fraudulent transactions in real estate can also be avoided with the deployment of blockchain technology.[3] Blockchain and cryptography has been successfully deployed in many industries such as online payments [1], food safety industry[4][5][6]. , and e-governance services.[7] The privacy-conscious user authentication capability of blockchain can also be leveraged in estate-related transactions and record keeping [8][9].

However, the adoption of blockchain technology among the real estate buyers and sellers is at very nascent stage now, and needs to be worked upon by building an ecosystem that is conducive to it [10]. Thus, while the literature is rich with the examples of how blockchain has benefitted many sectors, its impact on real estate transactions has not been discussed. Therefore, this study proposes a framework and a minimum viable product that can make willing easier for common man

2. How the features of blockchain technology can solve challenges of a Traditional Will

The features of blockchain technology listed below naturally solve most of the challenges of a traditional will.

Programmable – a blockchain is completely automated. It can program any type of smart contract which can be created on the blockchain platform and executed when the conditions are met, without either party involved in the same backing out. This function can help write the will based on a smart contract that can get executed i.e., the will can be shared with the beneficiaries and executor/s at the time of death of the testator.

Secure – All the records are individually encrypted and added into a block. This block further has encryption which is linked to the next block. Thus, if any attempt is made in changing the block, then immediately the system will throw an error, and the node trying to corrupt the system will be kicked out by all others; keeping the original blockchain intact. This, rules out any chance of tampering with the original will.

Anonymous – The identity of all participants is either kept anonymous or pseudonymous i.e., given a false name. Hence, the testator can continue to keep the content of the will a secret if he or she wishes to do so.

Unanimous – All network participants are required to agree to the validity of each of the records being added to the blockchain network. This is done via the use of a consensus mechanism.

Distributed – in order to maintain complete transparency in the system, all the network users have an encrypted copy of the ledger. Since there is no single point of storage, this feature would help make the will indestructible.

Immutability – Any records validated and added to the system cannot be changed and are thus immutable. Of course, the testator can update his/her will at any time and call the previous will null and void but no one else can erase or change the will from the system.

Timestamped – Every block records a transaction time and provides a time stamp. The exact date and time of the *Will* would be recorded in the system. This would not only help validate the time but also the intent and free will of the testator.

Inbuilt Cryptographic support for security – Every transaction has a digital signature. This allows users or entities to participate without actually revealing their original identities. The use of digital signatures also prevents initiators of transactions to back out claims. Thus, makes nonrepudiation another built-in feature.

Introduction to Crypto Wills

In traditional wills, often, interpreting the testator's intent gets difficult. To add to that, in many cases, wills are stifled, counterfeited, or executed in a non-intended way. In order to combat these challenges and others, mentioned in the earlier section, I propose the concept of a blockchain-based cryptographic will, or crypto will in short, where the testator wishes to bequeath all assets to his/her heirs/beneficiary. A cryptographic will needs to be unforgeable, authentic, sound, correct, and maintain privacy. Cryptography supports the building of cryptographic wills which meets all these requirements. As a matter of fact, crypto-wills tend to be of radical improvement over traditional wills as they do not rely on any third party for validating the intent and wish of the testator along with complete elimination of fraud and misrepresentation. This is made possible due to the built-in cryptographic mechanisms

In addition to the above, these wills need to be easily updatable at any given point during the lifetime of the testator. The update could be of the assets, beneficiaries, share, executors, or any other aspect of the will. At the same time, the crypto wills need to be irrevocable or irreversible after the death of the testator. It is also important to Provide guaranteed access to the legitimate beneficiaries upon whom the assets of the testator are bequeathed. The wills should be privacy-preserving and no beneficiary or executor or third party should know about the contents of the will before the death of the testator. Technology should be robust. No cyber-attack should be able to expose the contents of the crypto-will or extract asset information or any data.

Based on the secondary research conducted, there are no known solutions made available to the public or test groups to achieve cryptographic wills for bequeathing all types of assets. Therefore, in this dissertation, I put forth the concept of crypto wills and a business idea around the same. A research study talked about crypto-based willing platform for bequeathing only crypto assets like cryptocurrencies, NFTs, Defy, Dapps, etc[11]. While the paper lays a good foundation, it does not cover all assets. For an adult in India, typical assets would include property – residential or commercial, fixed deposits, Insurance policies, and other financial investments. It becomes important to be able to cover all of these in the crypto will to simplify and increase the acceptability/ usability of the app.

To summarize, the cryptographic wills would enable the testators to pass along assets to their chosen beneficiaries in a privacy-preserving manner. Through crypto wills backed by smart contracts on a blockchain, seamless ownership transfer is a possibility. The distribution of one's wealth, post one's demise, is possible in a simple manner.

The intent is to collate information on all assets – physical, financial & digital – into a single asset register in one file. This asset registry will be secured with an encrypted key or the private key on the blockchain and parts of it will be distributed amongst beneficiaries listed in the Will. Inheritance via blockchain technology is a futuristic proposal if looked at from a progressive rather than a dormant viewpoint. Many financial institutions and governments are moving towards developing blockchain-based solutions for the delivery of services, but lawyers have lagged. However, there are a few legal circles, attorneys have become interested in “smart contracts” and the possibility of using blockchain to create a more accurate record of real property deeds. But most lawyers have not yet devoted the required time and energy needed to understand the

functioning of a blockchain in order to develop systems that would use the technology successfully.

This report aims at demonstrating how blockchain could make wills cheaper to prepare, less susceptible to tampering, and even be able to capture the clear intent of the testator. By uniting blockchain technology with the innovations of the best aspects of electronic will legislation, a blockchain will serve as a reliable, authentic, and secure record of a decedent's last wishes for the disposition of his/her property.

Blockchain has the potential to transform estate planning practices altogether. Blockchain could both provide evidence surrounding the circumstances of a will's execution and authenticate a will—and indeed a full range of legal documents, such as waivers, ordinary contracts, deeds, or just about any instrument that requires a signature to be binding. Although no nation is adequately equipped for the execution of blockchain or crypto-wills, it has the unrealized potential to influence inheritance laws with an undercurrent of convenience in the future. Of course, amendment in estate laws would be required, with scrutiny on legality and the addition of blockchain-based crypto-wills.

Defining the steps required to draft a will

It is very important to understand the correct process in order to select a particular blockchain application, for the generation of crypto wills.

The traditional process of drafting a *Will* involves 8 steps as follows

- Construction of the will is done by the testator alone or with the help of lawyers
- Defining both the assets and their beneficiary or beneficiaries
- An executor needs to be appointed, who would execute the will in the absence of the testator.
- A minimum of 2 witnesses need to sign the will
- The will can then be notarized and registered.
- Chartered accountant's copy of the will needs to be kept in a safe physical location.
- The information about the location of the last and final *Will* needs to be shared with the executor.

4.1 *Proposed Crypto-Will Process*

The proposed process of drafting via a *crypto-will* involves only 4 steps thereby bringing the steps down by half.

The testator or writer, codes the *will*, listing the assets and the beneficiaries.

The testator and the beneficiaries are secured via a crypto address to ensure their utmost privacy is maintained.

Any changes in the will are flagged. Based on consensus only they are over-written.

Following the death of the testator the will is automatically executed via the Smart Contract. Thus, no dependency on an executor or any other person.

4.2 *Defining the functionality of the digital solution*

It is important to define the functionality of the app-based solution such that it solves the problems discussed in section 1. For this project, I have defined the MVP (Minimum Viable Product) to have the below functionality:

- Individuals can write a Will on the app
- Store it on the blockchain
- At the time of the death of the Testator the Will should be released to the beneficiaries.
- If the beneficiary dies before the testator, then the will needs to be updated.
- Check on ownership of the assets on a periodic basis.
- Addition or deletion of assets.
- Beneficiaries can be Resident Indians or NRIs / charity / pets.
- Minors should have Guardians required by default.
- Assets can be movable or immovable assets – In India
- Assets Abroad (especially immovable) will need regulator support in that country and can be added at a later stage.
- Can be used as a B2C app or as a B2B app.

5. Implications of the study

Bringing in blockchain technology would provide a sound solution, a multifold upgrade to the current method of writing a *will*, and complete elimination of third-party verification and execution. In addition to that, the technology is robust in nature, preserving the privacy of the testator along with the beneficiary keeping in anonymous or pseudonymous. The data/*will* is stored in a distributed ledger after all network participants have achieved a consensus. All the records are individually encrypted and added into a block. The block further has encryption which is linked to the next block that rules out any chance of tampering with the original will. The exact date and time of the *Will* get recorded in the system. This would not only help validate the time but also the intent and free *will* of the testator.

6. Limitations of the Proposed Framework

The most prominent limitation of the proposed willing platform is the regulatory environment. It will be extremely important to work closely with the regulators and prove to them the power of the willing platform as a social solution to not just smoothen the process of distribution of assets but also to bring in lower litigations on the property, thus reducing the burden on the judiciary system.

While the architecture proposes integration, it would be required to build an eco- system around which open integrations are facilitated with required parties, like banks, land records, hospitals, insurance, civil registration offices (recording birth and death), and so on. The good news is that India is already focusing on bringing in the aggregator system for ease of financial data concentration.

A will supersedes all succession laws in India except for the Muslim Succession Law. Since the Muslim Succession Law clearly states that a Muslim can will only 1/3rd of his assets, the current system would not be able to capture the same. As a workaround, the testator or user would have to plan on his own to make a will only for 1/3rd of his assets.

It is important for the willing platform to act as as an unbiased executor of the will for the testator or user. The platform has no vested interest, whatsoever in the testator's assets or the beneficiaries. Moreover, the platform maintains anonymity therefore the platform itself would also not know what is written and stored in the Will. The willing platform is a

neutral party to the smart contract being built and stored on the Ethereum blockchain.

The current architecture is built assuming a private blockchain however, in the near future if there may arise a need to integrate with the fintech aggregator eco-system or any other third parties, then the data thus shared can be added to another public blockchain part of the Ethereum consortium architecture, so that the data can be consumed from their directly. In order to have more integrations in place in the future, the government could also provide public blockchain and the current architecture is agile enough to be able to incorporate that. Additionally, if in the future, other providers want to do business with the willing platform, then there is a provision for them to introduce their own nodes in the system for the same.

7. Conclusion

In today's era, people are more dependent on apps than ever before. Having a simple blockchain-based will-writing app can be a game changer. It can make asset distribution easy afterlife by allowing one to create the most secure crypto-will company by anonymously capturing and executing the *will* exactly the way the writer intended to. This study has proposed a solution leveraging the new-age blockchain technology and smart contracts in the area of estate planning and writing crypto-wills in order to overcome the challenges of the current Will-making process. Additionally, the proposed solution would solve a big problem of the judiciary system at the societal level.

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