

Why do we need Blockchain Estate Registry?

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Abstract. *Blockchain enthusiasts discuss ideas of blockchain use in real estate. We can observe several initiatives and pilots in this space around the world. Joining this conversation this paper discusses opportunities that blockchain technology opens on the way of applying this technology, e.g., in Blockchain Estate Registry as an alternative to the existing model of the centralised property registry. So, what are the advantages and disadvantages of the blockchain use as the system for managing property rights and what use cases can be illustrated to support it?*

Keywords: blockchain estate registry, real estate, smart contracts, fractional ownership

I. Intro

Recent years appeared academic papers that discuss different ideas how blockchain can be useful for real estate [1]. Several project the world, such as in the Republic of Georgia [2], in the UK [3] and in UAE [4], in Sweden [5] have tested or are testing DLT technologies and reporting interim conclusions. There are some arguments which are discussed many times such as decentralization and an ability to develop relationships in a trustless environment. This paper is focused on developing particular use cases and economic scenarios. This is a conceptual paper, which purpose is to develop hypothesis what transformation can bring blockchain technology in transactions in real estate.

The next section gives the context for this discussion referring to academic papers, government reports and existing pilots in the world. The third section discusses methodology and develops a framework for the research. The fourth section illustrates use cases and economic scenarios and draws conclusions about their transformative potential.

II. Framework and the state of the art of the blockchain use in real estate

The framework of this discussion will be the concept of Blockchain Estate Registry, presented in two academic papers [6] and [7]. Even though academic literature contains plenty of studies that discuss aspects of the blockchain use in real estate, so far there are no other papers that systematically conceptualise the idea of a new generation of public property registry that is created on blockchain.

The concept was presented at the Australian Senate in 2021, the conclusions made in this research became the basis for recommendations of the Senate Select Committee on Australia as a Technology and Financial Centre presented in the Second Interim report [8]. The Australian legislators recommended the National Cabinet to consider supporting a blockchain land registry initiative as a pilot project for Commonwealth State cooperation on RegTech.

The mentioned study conceptualised the idea of using blockchain to manage property rights. Its core element is title tokens. The concept looks at blockchain as a kind of database which has distinguishing features. On the contrary to the conventional electronic database of property rights where transactions are managed through the registry operators (registrars, conveyancers), on blockchain property owners can commit transactions themselves, directly on the ledger. Hence, the concept proposes to use blockchain tokens as records that represent property rights. The users can interact with their property records through the mechanism of private and public keys, known as asymmetric cryptography (which at the same time is the core element of blockchain transactions), where a token is attached to the user's public key, which plays the role of the address, and user's private key that can authorise a transaction (schematically illustrated in Fig. 1).

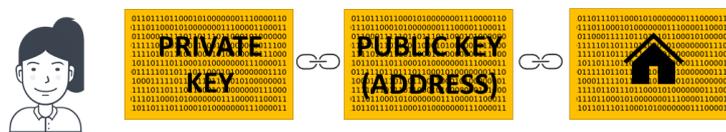


Fig. 1. Basic scheme of a property record on the blockchain

The title token contains reference to another blockchain record – the initial transaction in which a registrar confirms (certifies) the title token, confirming that this record represents the property right it refers to. Consensually, the registrar can update this certificate record on their end if legal circumstances change (for example, the user lost private key to the title token).

The concept proposes to develop the registry as a super structure across a bundle of creditable public blockchains using cross-blockchain protocol. The protocol itself accommodates two other crucial elements of the system. The first one is Smart Laws, which are discussed as filters applied to blockchain transactions. These filters contain formalised rules of legal compliance. Therefore, those transactions which do not comply with the regulations are filtered out. Incompliant and mistaken transactions even being published on blockchain (as public blockchain is uncensored), are filtered out through these algorithms as the registry is a logical extraction of real estate transactions from all variety of transactions that happen on public blockchain. The second element is Digital Authorities, which are conventional public bodies that manage root addresses of the registry. Root addresses, according to the concept are initially embedded in the filters. Such addresses use the authorities to create individual blockchain records that are applied as filters for title token records. This mechanism allows resolve all possible legal complications on the blockchain: loss of private keys by users, legal dispute over the property, inheritance etc. High level root address perform governance functions, such grating accesses for registrars and resetting the system if needed.

Stakeholders. — To have a logical structure in this research, we need to identify stakeholders and then, based on use cases, address the advantages and disadvantages of applying blockchain for each group.

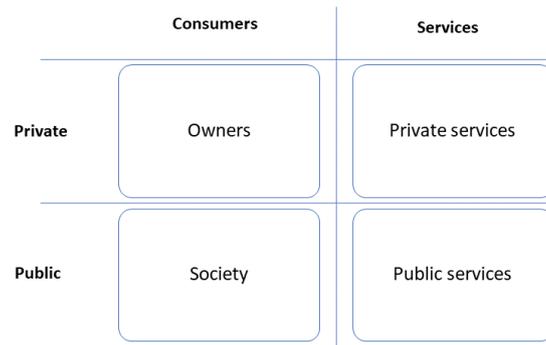


Figure 2. Stakeholders of real estate

The first group is proprietors – property owners and interested parties. “Interested” means all who are not owners but deal with property owners and/or have some interest in the property. For example, a potential buyer of a property, a tenant, or a bank that lends money and holds the property as collateral in the mortgage.

The second block of groups is those who provide services. Here we have a group with private interest and public interest. Group One includes all possible commercial providers that facilitate real estate deals and assist in its management: brokers, lawyers, notaries, conveyancers, insurers, land surveyors, and so on.

Group Two is a government that provides public services of registration of titles and deeds through its public agencies such as a land registry office. Public bodies do not have a commercial interest in providing services; even though people pay fees normally, it is just a reasonable compensation of the expenses. The important thing here is that they work in the name of public interests. The system of public property registry is of general public interest because that creates an order in the society. That is what makes the society civilized. We know who owns what; the registry ensures that private property – the free economy's holy grail - is safe. And it is not only about the protection of private property. The modern registries play such an important role in economic planning, or specifically, in urban planning. Because they keep all necessary cadastral (planning) data that lets governments plan development and improve public well-being. Public registries are so important for so many reasons that it is hard to undervalue them.

And the last group that neither has an interest in the property nor provides any services but has an interest in having the property registration system. That is the whole society that benefits from a transparent property management system based on the rule of law ensured by institutional components such as the system of public bodies. So, this is a group of public interest, meaning that we all benefit from an effective system of governance. It is important to distinguish this group from the group of the public sector. Because in the first one – they provide public services (e.g., urban planning, architecture and building permits etc.), while this group – the society – consumes the results of these services. Even though the first one presents the interests of the latter, they are not the same.

III. Economic scenarios and use cases

Let us illustrate a typical transaction that can occur in this system. Alice sells her property to Bob. What we notice in blockchain application Alice directly interacts with her property record in a digital form through her private keys that can authorise a transaction. Secondly, the title transfer and payment (payment in a digital form, for instance exchange of the title token on another token – CBDC, stablecoin or cryptocurrency) happens in one transaction, i.e., an atomic swap, illustrated in Fig 3.

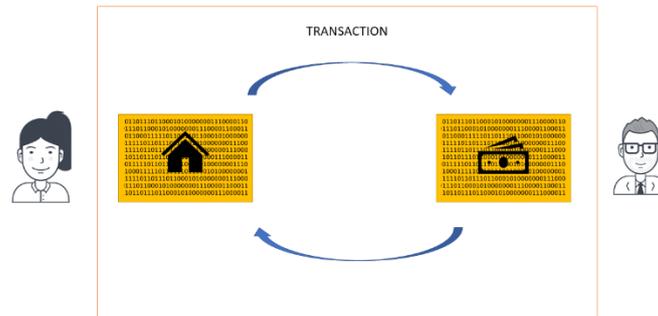


Figure 3. Atomic swap – an exclusive exchange of cryptoassets

They do not need anyone to control the deed and settle it down. Normally, in conventional relationships, they would need an escrow account and a trusted third party that releases the payment once the title deed is officially registered (Fig. 4).

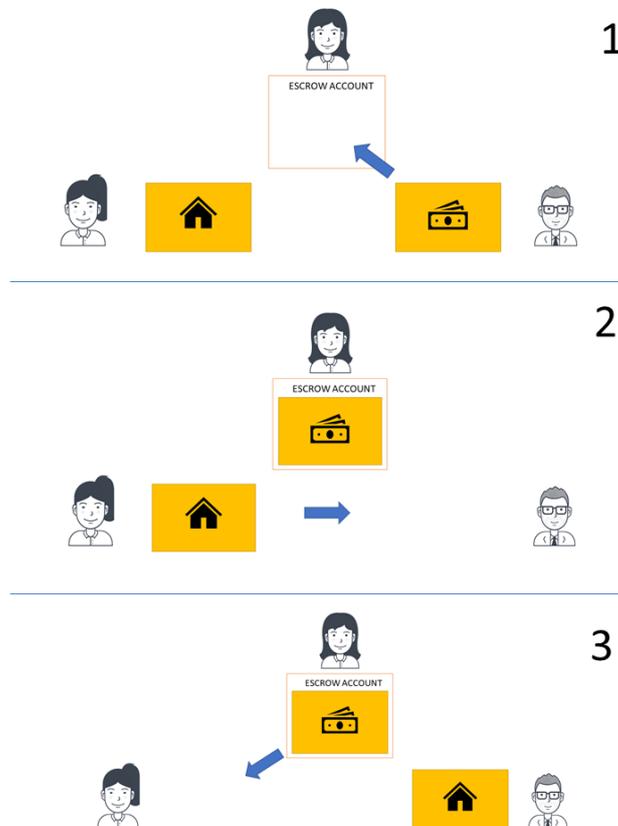


Fig 4. Title deed through escrow account and trusted third party

But if Alice and Bob decided to commit a transaction on the blockchain, Alice just needs to transfer her Title token to Bob, while Bob pays in return within the transaction. So, the seller will not be able embezzle money without transferring the property. The blockchain cuts the middleman, as there is no practical need for it anymore.

Here appears another shortcut. The blockchain transaction with a Title token that represents the title right does not need any further registration elsewhere. The blockchain is the registry. At the bottom, blockchain is just a kind of database, and there is nothing wrong with using it as an alternative to the centralised database. More so, blockchain as a database outperforms its centralized “relative.” Specifically, in data protection. In the blockchain, the records are irrevocable and immutable. No other type of database can ensure such a level of credibility to electronic records. We could not identify any country in the world that would allow direct access of users to the registry as centralized database comparatively to blockchain are fragile. They require a lot of protection to ensure that data is safe and consistent. The costs of mitigating risks letting millions of people directly manage their records in the same database are so high that no government has decided yet that it is worthwhile. While the blockchain is designed in a way that it can withstand the most severe DDOS attacks, Man-in-The-Middle attacks, and a bunch of other threats which the centralized system is not capable of by its design.

My empirical experience as a legal practitioner for more than ten years gives grounds to assert that fair number of deeds are simple and typical. Having verified digital identity and step-by-step formalized legal procedure, it is feasible to automate the transaction. Very similar happened with company registration. Nowadays, usually those who want to create a company, do not write a company constitution and other documents from scratch. So-called “replaceable rules,” i.e., regulations that establish typical rules for establishing a company, eliminate most of complicated legal work. Therefore, it is possible to create a company without lawyers and registrars. Similar standardization in real estate transactions would allow to automate significant number of deals.

For all typical deals can be designed model smart contracts. Users will be able to open an online marketplace, find a sample deed and follow the smart guide designed to exclude possible mistakes, which otherwise people would do. Of course, it will be hard to automate every transaction and situation, but the system can be designed to let people do if they know what they are doing and do not let people commit transactions which require the attention of a professional. So, complicated situations should be resolved by those who have that authority.

The title token needs to be initially certified. Therefore, the very first record associated with the title token will be a certificate token by the registrar (Fig. 5).

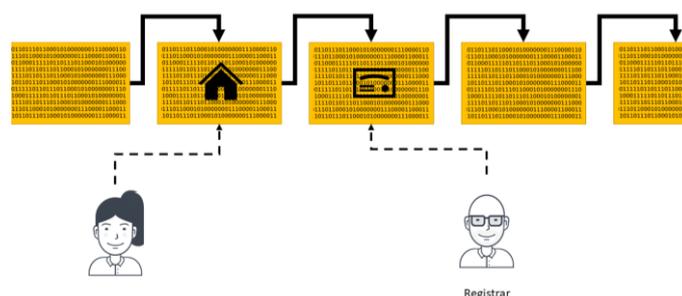


Fig. 6. Certification of a title token

The advantage of this system is that everything is transparent and immutable; once the registry authorities confirm it for any further transaction, it does not need a registration again. Thus, Bob buys the title token from Alice; he knows that it truly represents the property right that it refers to, and there is no need to register the transaction once the token gets transferred to Bob's address. Then Bob can sell to Dave, and again they do not go to the registry office; transactions are irrevocable and the token, even being transferred to Dave, preserves that connection with the initial certification (acknowledgment) of the property right done by the registrar for Alice (Fig. 7).

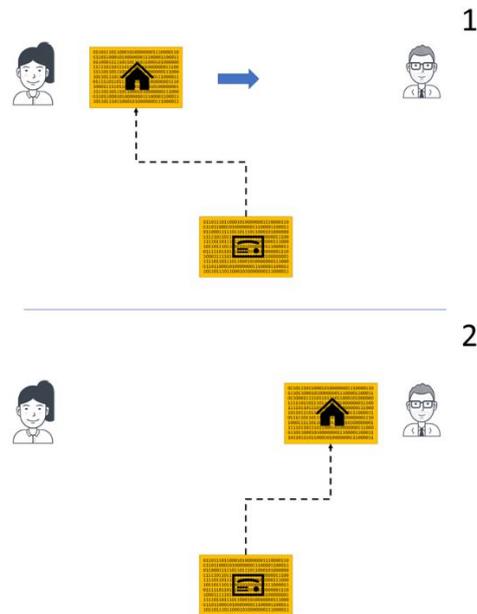


Fig 7. Connection with the certificate record

Proprietors and interested parties win from this: as they reduce their transaction costs. There are no intermediate registrations; the tokens circulate in the system free from bureaucracy.

The user needs a registrar or a conveyancer only a couple of times through the lifespan of tokens – to acknowledge the property right to get it transferred from the centralized database and then only when (and if) they encounter a legal complication. Other than that, the proprietors directly manage their rights on the registry using model smart contracts. There is no need for brokers and lawyers, you may have all of them, but it is not that crucial like in traditional transactions.

Such a reduction of transaction costs might create a premise for significant market transformation, e.g., exponential growth of real estate transactions and new forms of economic activities, new markets, new types of transactions and investment schemes. Besides, less bureaucracy relief taxpayers from burden of maintaining large public administration.

With blockchain the society gets a transparent property registry that allows creating an accountable system of permits and public services. Permits, such as a building permit, an architecture permit, environment or historical heritage, any concessions and authorizations, can be attached to title tokens. This will make the process transparent for both the owners and the authorities.

At the same we need conclude that there will negative consequences for those who provide public and commercial services. Therefore, implementation of such a system would require a balanced approach in social policy for those who lose their jobs.

Use cases. — Fractional ownership through tokenization of property opens a lot of economic scenarios. With this system, users can create millions of tokens that represent legal rights on one piece of property.

The advantage of such a system is again transaction costs. Small property investments are not reasonable in the conventional system or overcomplicated because of extensive paperwork. With blockchain such transactions will require only network blockchain fees.

Fractional ownership opens new opportunities for more effective investing in property. Say Alice has a plot of land represented by title tokens. She creates a smart contract for real estate development and contributes her tokens to it. She creates investment tokens on top of it, and people buy them. This is how they get money for the development. Once new property units are built, the smart contract transforms their investments into strata tokens. Some of the units (strata tokens) they can sell or rent out. In all these steps of development tokens, both – investment tokens during the development, and then the property tokens, can circulate in the economy, changing their owners. This might create such an important quality for the property investment – liquidity.

Another use case is “unbanked mortgage.” In this scenario Alice wants to buy a property. For example, it costs one million dollars. She commits her down payment, for example, one hundred thousand dollars. Then a credible professional does due diligence, evaluates risks (verifying if Alice can pay the mortgage), and attaches his report transaction to the smart contract. So, this is how investment tokens appear. Investors buy these tokens on the free market, so to say investing in Alice’s loan. Once she reaches the target amount (one million), she buys her dream house. The title token is transferred to her smart contract. So now, the smart contract controls how Alice pays her mortgage back. Investors regularly receive payments and interest at an agreed rate. If Alice stops paying, the smart contract will put up her title for auction.

In this scheme, Alice owns her title tokens, but they are locked in until she pays her debt back. Creditors own their investment tokens that give the right to loan and interest payments, which is an analogy of mortgage bonds in the traditional market. They can trade these tokens on the market. Banks are not necessarily excluded from this scheme; they also can become investors – meaning that they can also lend money and acquire these tokens, trade them if they want to. This application makes the market open, competitive, and more effective in terms of transaction costs.

Mortgage commitments restrain owners in lifechanging decisions such as a move to another city, as selling a mortgaged house requires a lot of paperwork and costs. If we look at this problem from the perspective of the proposed system, we will see that automated smart contract can make sale of mortgage much easier.

Though this scenario requires additional attention. If Alice sells her mortgaged property, certain proceeds from the sale will be directed to the creditor. The rest what left is her wealth which she deposited. If extraction of this wealth becomes easier due to the use of automated smart contract, such asset will become more liquid. The line between rent and mortgage might be erased as owners

can change houses where they live as if they rent this property; the difference is that instead of paying rent, they will be paying interest and accrue a portion of their income into a liquid property.

IV. Conclusions

The proposed scenarios and their advantages have speculative nature as there is no empirical evidence. There is no way we can test it out in a laboratory environment without involving real economic agents, as transactions with real estate have only one legitimate regime of functioning – through the existing land registration procedures, hence anything out of this perimeter has no right to exist and makes no sense. To study what changes it makes there should be a pilot in a regulatory sandbox letting economic relationships develop therein.

The proposed concept of Blockchain Estate Registry presumes that it runs in parallel to the conventional registry based on centralised database. Proprietors can choose in which registry to manage their property rights. Competitive systems showed they co-exists, such as in Australia which had two systems (old land system inherited from England and Torrens title registry) which formally existed for about 150 year (till 1999).

The proposed use cases based on model smart contracts reduce the number registration procedures that involve trusted third parties, e.g., a registrar, a conveyancer, etc. Economic scenarios involving fractional ownership allow to scale up the number investors in one property and reduce their costs on managing their investments. Circulation of property tokens free from bureaucracy and transactions costs will supposedly impact the markets as property investments will become more liquid, though this should be further studied and evaluated.

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