

Using Blockchain in **Land Registry**



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Introduction

Land registration serves a fundamental purpose in establishing ownership of real estate. The critical role it plays in the real estate markets cannot be understated. Global real estate transaction volumes reached \$1.75 trillion in 2018. In a perfect world, each of those transactions would have a corresponding accurate land registration record attached to it.

However, bearing in mind the world isn't perfect, the land registration process comes with various challenges, many of which are also linked to broader economic, political, or societal issues.

Implementing a blockchain-based solution for land registration offers the potential to overcome many of the current challenges with the process. It also provides the opportunity to realize significant efficiencies, saving time, and reducing public spending on land registration.

In this e-book, we will explore:

- Current Approaches to Land Registration and the Challenges
- How Blockchain-based Solutions Can Help
- Examples of Blockchain-based Land Registries in Practice
- Benefits of a Blockchain-based Land Registry
- How CoreLedger can help your organization with implementation



Current Approaches to Land Registration

There can be variations in the approach to land registrations, as many systems have evolved alongside the country's legal system. Many major economies, such as Switzerland or the US, operate a cadastre, which records survey of all land in the nation.

For example, in Switzerland, every piece of land in the entire country is recorded as a distinct parcel, with each parcel having a designated owner. Roads, railways, and public areas are recorded under the ownership of federal or cantonal authorities, whereas other land may be owned by co-operatives, companies, or individuals. All of this information is stored in the Swiss national land registry.

However, the job of the Swiss land registry is far more complex than

merely tracking ownership. Each parcel of land has a specific purpose and attributes assigned to it. This could cover construction restrictions, protection orders for sites of historical interest, or groundwater protection.

Maintaining the cadastral system is an ongoing task undertaken by teams of surveyors working at the national or local level. This mammoth undertaking has one goal – to establish a single point of truth about the current state of land and its ownership across the entire country.

In contrast to the Swiss cadastral system, the UK has evolved a different approach of land registration and ownership. In England and Wales, people don't "own" land in the same way as the Swiss, but instead have rights over it. Land rights can overlay

one another, with different parties holding different rights for the same physical space. For example, a piece of woodland may be owned by one party who has the right to cut timber, but another party might have a specific right to hunt in that land, even limited to a defined time period.

Furthermore, because the UK has never undertaken an exercise to record the rights and status of all land in the country, only around 85% of land ownership and rights are registered with the UK Land Registry. Under current law, when unregistered land is sold, it must be registered and the government has set a target to achieve 100% registration by 2030.

While UK land registration is now a legal requirement, registration doesn't cover the precise details

of boundaries in the same way as Switzerland's cadastral system. Boundaries are recorded by the Land Registry in a general sense, but in case of a successful legal challenge, the boundary could be moved. Therefore, the UK Land Registry has an ongoing challenge to keep track of land ownership, rights, and changes of boundaries in the absence of a cadastral register.

Elsewhere, most countries operate a compulsory land registration requirement, with the land registry itself usually a division of the government. When real estate changes hands, the parties to the transaction are required to register the change with the land registry.

Therefore, each piece of land and/or building has a record attached to

it, showing the history of rights or ownership. Examples of other types of information that may be recorded include the purpose of the land or building, price information, mortgage status, boundary information, or structural changes that have taken place over time.





Challenges and Issues

Regardless of the system used,
land registration comes with
various challenges.



Risk of Lost Documentation

Historically, land registries were based on paper documents, which can be lost, destroyed, falsified, or otherwise manipulated.

In the UK, if someone wants to sell an older property that hasn't previously been registered, and the paper title deeds are missing, there is an extremely arduous [process](#) to make an entry to the UK Land Register.

The seller will need to somehow prove the basis of their claim to ownership without the relevant paperwork, as well as explain how the documents came to be lost or destroyed. They'll also have to engage professional surveyors and conveyancing professionals to handle the requirements of registration.

However, there are greater risks involved with paper-based land registries. In 2010, an earthquake devastated large parts of the country of Haiti, leaving [1.5 million people](#) homeless. The disaster also destroyed 60 years of government archives, including land registrations.

Since then, many Haitian people have put significant effort and investment into rebuilding their towns and cities. However, they [remain without](#) any legal means of claiming land as their own, since the government has no record of prior ownership. This also means that property owners have no way to prove they're entitled to any compensation payouts due.

Fraud and Corruption

Even in the absence of such a disaster, land registries in the developing world are fraught with challenges. As recently as 2004, only [one percent of land](#) in sub-Saharan Africa was under formal government registration.

A [2018 study](#) into the challenges of land registration in a state within Nigeria found that only 11 percent of real estate consultant respondents stated that they always registered residential land purchases. The study uncovered that a critical reason for this was corruption. Land registration often takes place in a black box, with little transparency for the parties to

the transaction, and involving a high degree of trust in the central party registering the land sale.

The result of this low rate of land registration means that landowners have no ability to prove their ownership, potentially restricting what they can do with the land. Furthermore, the government has no visibility over how individuals are using land, meaning they cannot enforce any legislation governing land use. In the worst case, a corrupt government could seize the land and the owner would have no recourse.

Lengthy Processes

The Nigerian study also uncovered other issues than corruption. Land registration was found to be highly inefficient. Cumbersome procedures resulted in lengthy delays, taking up to 82 days to complete a registration. Theoretically, the property could be sold again before the land registry even reflects the first sale.

Long delays result in frustration with the process, feeding into the problem of landowners or their agents simply failing to register a sale transaction at all.

Although developed nations like the UK and Switzerland have moved to digital land registries, making an entry still takes time. The UK government states that it takes between two and five days to process each application for a change. Even in Estonia, a country renowned for its sophistication in digitizing governmental processes, registering a change takes up to seven days.

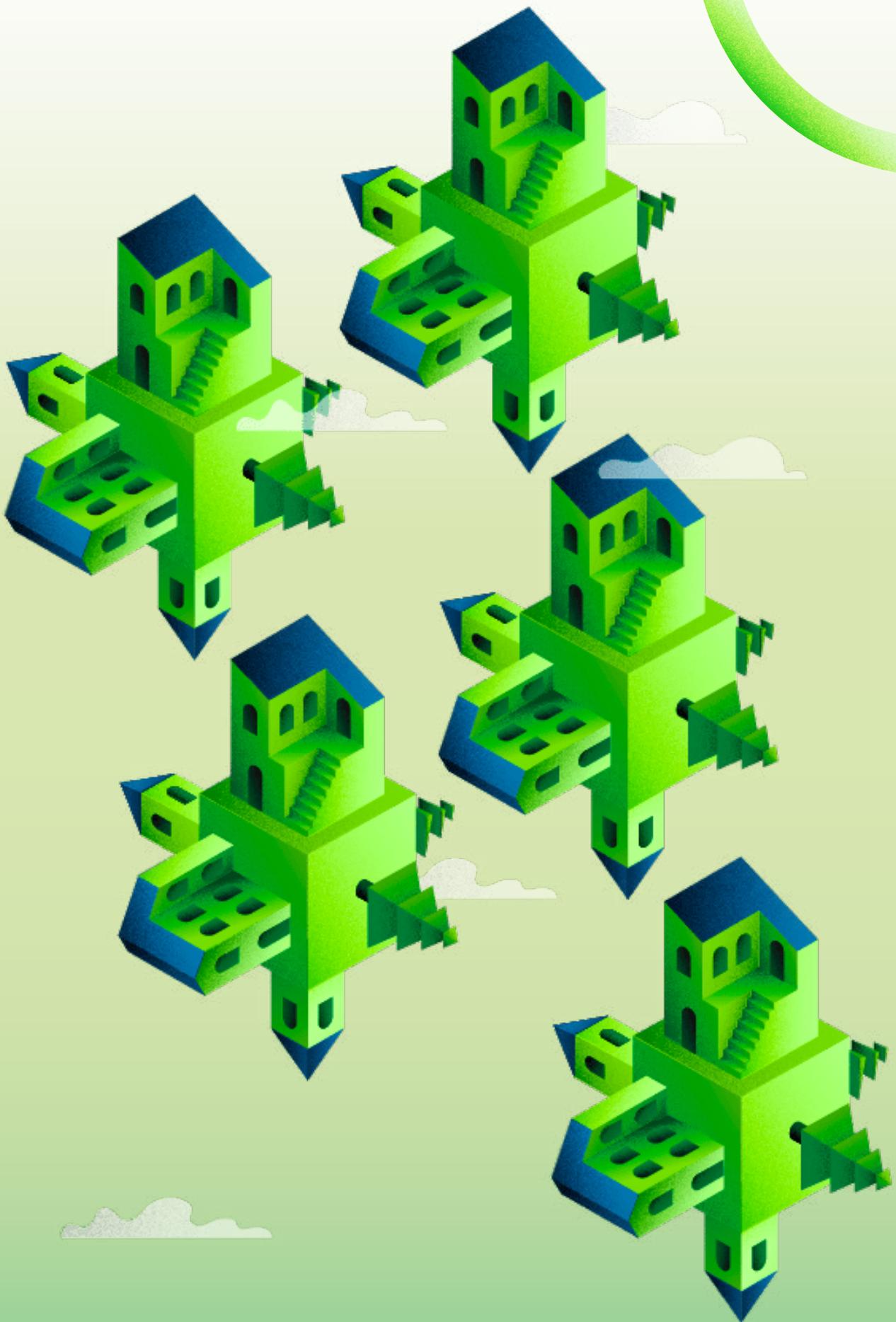
Blockchain-based Solutions for Land Registration

Blockchain provides a potential solution for many of the challenges of land registration. This use case for blockchain extends beyond a pure database, leveraging the opportunity to create a permanent, unbreakable record of ownership for land or real estate.

The simplest implementation of a blockchain-based land registry could enable the ownership documents to be recorded and assigned to an owner's user account. If there are structural changes to the building, these can be added to the blockchain, and if the property is sold, all the

relevant documentation can be transferred to the new owner. Every transaction is traceable, time stamped, and indisputable. Such a system could easily replace a land registry of the kind operated in the UK.

For a cadastral system like Switzerland, then it would be possible to take the blockchain implementation a step further and create a digital token for each parcel of land on the cadastral register. The token could have all the necessary attributes of the land coded into it. When a property is sold, the token is transferred to the new owner.



How Blockchain Overcomes the Current Challenges of Land Registration

Blockchain offers governments the opportunity of creating a highly secure record of land ownership that cannot be manipulated. Because documentation on the blockchain isn't stored on any central server, it cannot be lost or destroyed as each node in the network keeps a copy. Therefore, blockchain offers clear benefits not just over a paper-based system, but even over a digital system stored on centralized servers, which could be easily hacked or corrupted.

When a real estate transaction takes place, the seller is obliged to transfer ownership to the buyer upon receiving the payment. The property documentation should now reflect the new owner.

When this transaction takes place on the blockchain, it is time stamped and can take place immediately, in real-time. If the land registry department or future potential buyers want to see how many times the property has changed hands, this information is accurate and immediately available. Buyers and sellers no longer need to go through a lengthy process and visit multiple government agencies to complete the process. Real estate agents can save more time and close more deals.

Blockchain transactions are transparent and trustless. Participants could easily view entries made to the land register, according to their individual access rights. It offers the potential to overcome the challenge of corruption and fraud in land registration in developing countries. Because each entry is permanently recorded, there's no opportunity for anyone to manipulate the records.

End-to-end encryption means that only parties who are granted the right to read the documents can access them. For example, if the owner wants to switch to a new mortgage provider for a better interest rate, they can grant access rights to the mortgage company. This can be done whenever needed, unconstrained by office working hours.

Transactions on a blockchain are instant and low-cost. Whereas currently, it can take a matter of days to update the land register, with blockchain, it can be done instantly.

For example, a government could provide write access to its own surveyors. If there's a change in land use, the surveyor can make the entry in real-time, on-site. If there's a change in ownership, the counterparties to the transaction, and perhaps their attorneys, can each provide their own private keys to update the register at the moment the ownership changes hands. Therefore, blockchain offers the potential to significantly reduce the time taken to record an entry to the land register.

Beyond the Basics

Far from merely overcoming the challenges of existing systems, tokenization and smart contracts on the blockchain unlock vast potential for the ownership of real estate. If the property is represented as a digital token on the blockchain, it can be divided between parties, enabling fractional ownership of a building or piece of land.

In the future, real estate owners could opt to sell a part-ownership of their properties to fund future building works, creating new revenue streams and avoiding the need to go through a mortgage lender to raise funds.

If the building is leased out to tenants, a smart contract could distribute rental income between the shared owners.

Furthermore, blockchain-based voting could enable owners to make decisions about the property. For example, owners could elect to have part of the rental income allocated to a fund and cast votes on when to spend that fund on maintenance or renovation works.

Not all of these scenarios are yet a reality. Some, such as selling fractional ownership, may have legal considerations for implementation. However, if a government has made a decision to adopt blockchain in land registration, it may also subsequently decide to pass legislation that takes full advantage of blockchain's capabilities in managing the ownership of real estate.



Examples of Blockchain-based Land Registries in Practice

Around the world, governments are already exploring the use of blockchain in land registration and starting to reap the benefits. [Sweden](#) is one example, which started operating a blockchain-based land registry in 2018. Under the previous process, it took between three and six months to register a sale on the Swedish land register, even though it was already digitized. Now using a blockchain-based system, it takes a little as hours and estimated to save the government up to \$106 million each year in costs.

In 2017, the International Monetary Fund held back part of Ukraine's bailout fund due to its lack of a transparent land registration system. To address the problem, the Ukrainian government [engaged a blockchain firm](#) to implement a land registration platform modeled on the same one

used by [Georgia](#). Both countries suffered from the challenge of corruption and a lack of trust in the land registration process.

The Georgian government engaged blockchain firm Bitfury in 2016 to implement a blockchain-based land registration system. In the first phase of implementation, each real estate transaction generated a land title which is sent to the blockchain as a unique hash, and is time stamped and permanently recorded. A second phase is aiming to use blockchain and smart contracts to facilitate the sale process itself.

In 2018, over 1.5 million land titles were registered on the Georgian land registration platform. The real estate sale process now takes minutes, with operational cost reductions of up to 90

percent for the government. The move unlocked over \$20 trillion in dead capital because before the blockchain platform was implemented, more than a third of people had no way of proving they owned their land.

According to an [independent study](#) conducted into the project, it “significantly improved the government’s efficiency and helped restore public trust in national agencies,” by eliminating the risk of manipulation and corruption.

How CoreLedger Can Help Your Organization **Implement a Blockchain-based Land Registry**

In each of the examples outlined above, governments have worked with private technology companies to implement their blockchain-based land registry. CoreLedger is an established blockchain infrastructure provider based in Switzerland. We have a proven track record of implementing blockchain solutions that deliver tangible benefits to our clients.

Our experienced team of project managers and software engineers can work together with land registry specialists to develop a customized solution tailored to government needs on top of its TEOS (Token Economy Operating System), which can save significant time and resources, helping to speed up the development. Whether you're looking for a straightforward document management registration system, or a full, tokenized land registry solution, or simply to find out more about blockchain-based land registry solutions, we can help. Drop us an [email](#) to have a discussion about your requirements.



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