Blockchain and Land

The World Bank's Global Land and Geospatial Unit and the World Bank Group Technology & Innovation Lab are collaborating on exploring use cases for land administration. This work focuses not only on the technological solutions but also looks at "off chain" issues such as governance, legal and regulatory framework, and enabling conditions (e.g. data accuracy, digitized records, digital signatures).

Proof of Value[1] (PoV)

As part of this work, the Global Land and Geospatial Unit and Technology & Innovation Lab partnered to carry out a PoV for three use cases which are the most common services in land administration:

1. First Registration of a Parcel

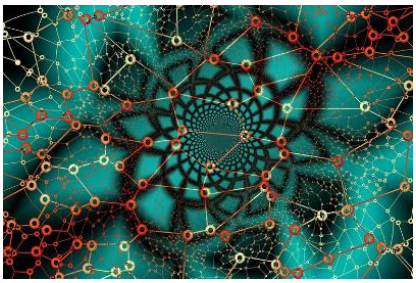
While parcel registration is a common service, the use case focused on first registration. This was done for simplicity as first registration (the first record of a parcel registration) does not require there to be a parcel history on the blockchain. As the technology develops, more complex registration scenarios can be tested.

2. Transfer of Ownership

An important land administration service is the transfer of ownership where a buyer and seller come together and complete a transaction on the blockchain platform. This use case aims to show the opportunity to use smart contracts to reduce the time associated with the transaction while simultaneously improving security and transparency in the process and increasing trust between the interacting parties.

3. Virtual Notarization

Blockchain, inherently, acts as a virtual notary. The third use case explored the notarization of a transaction by a certified notary and the creation of a time-stamped record on a blockchain platform. As of now, this PoV did not look at the cost of the service to the citizen though this could be studied in future PoVs.



The PoV was implemented using Microsoft Azure Blockchain-as-a-Service. A private Ethereum blockchain was chosen, which allowed the teams to configure the blockchain, specifically the proof-of-work consensus and transaction costs. The PoV simulated transactions between owner/possessor, buyer, private surveyor, and the land registry. Each transaction was submitted to the transaction node, which is broadcasted to the mining nodes in a peer-to-peer fashion. When a mining node validated and confirmed a transaction, it was added to the blockchain and broadcasted to the peer-to-peer network for confirmation. Smart contracts were coded using Solidity language, which allowed the teams to implement the transactions securely. Each transaction captured the parameters of properties such as parcel details, status, documents, on/off-chain storage, and the signatures of the involved actors.

Off-Chain Issues

If designed and deployed correctly, blockchain could help increase trust and transparency. At the same time, the technology aspect is only a part of the solution. For a blockchain-based solution to work effectively, "off chain" issues need to be kept in mind. For instance, any interested country would need to have accurate, digitized records.

Other constraints to be considered include the security of a private blockchain, privacy of data, capacity related to understanding blockchain advantages and disadvantages, data storage (particularly ownership history), the recognition of customary ownership, and the legal recognition of transactions done on the blockchain. These questions are being explored through legal and policy discussions. *For questions contact us at* *blockchainlab@worldbankgroup.org*

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[1] A Proof of Value is assessing or demonstrating the usefulness of trending emerging/disruptive technologies in the context of our business environment.