Property Registry on Secure Decentralized Ledger

By Nikhil Ram, MITS Gwalior, 2019
nikhilram851997@gmail.com

Abstract - Property registry information is very crucial to identify current and previous ownership. In absence of a secure way to validate the chain of ownership, the same property can be fraudulently sold to multiple people. In a huge country like India, where registering and maintaining the property is a tedious task especially where the system is storing the information in a centralized manner. I proposed the solution to the problems, caused due to centralized data storage systems, such as fraudulence, corruption, lack of transparency in the system.

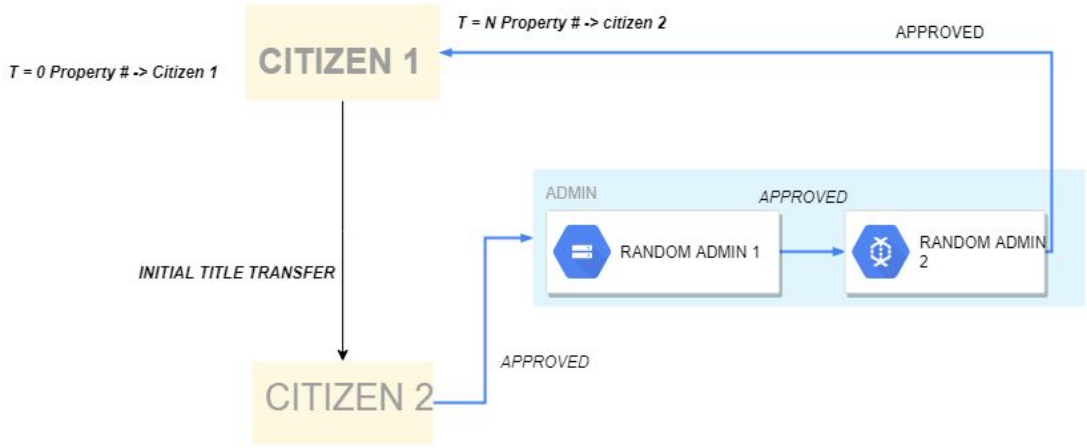
Introduction

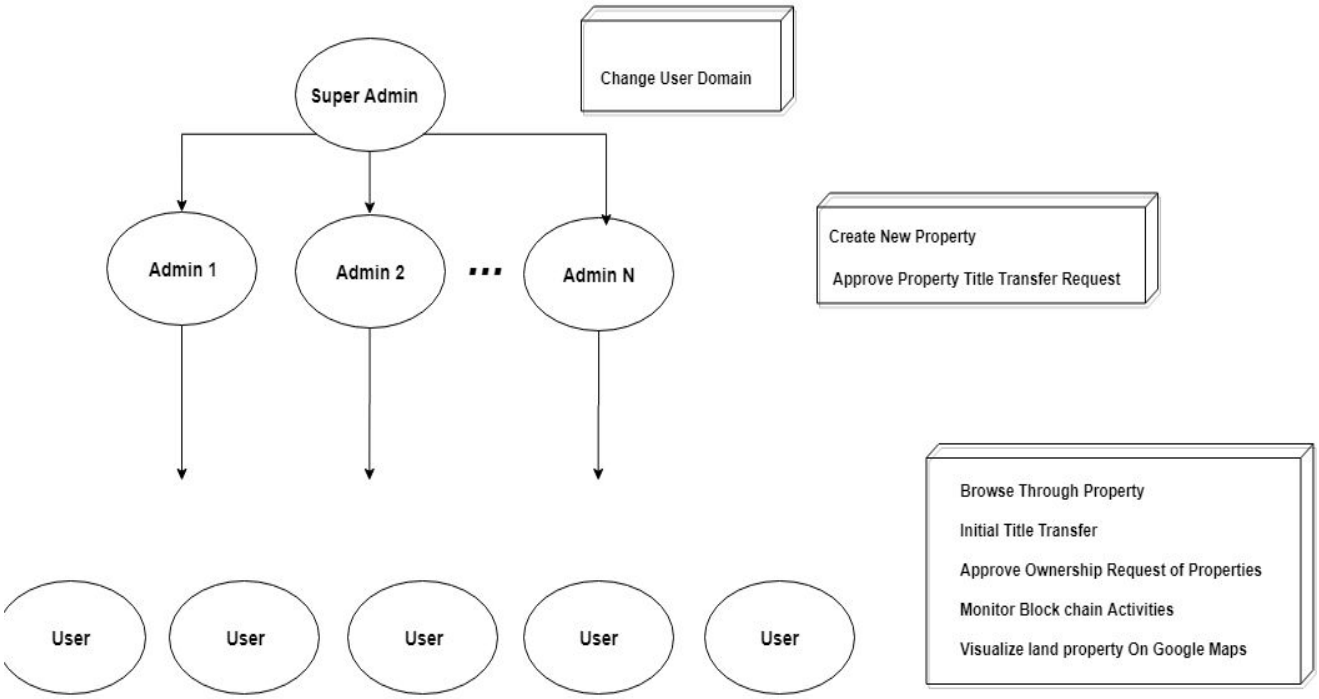
Property registry has always been a complex problem to deal with for a huge country like India. The major problem is to come up with an architecture that supports ever-growing property registration. Use of Secure Decentralized ledger of Ethereum Blockchain provides a model to incorporate government level authentication with decentralized network security in solving the problem of selling a property to multiple citizens and get full auditability of transactions.

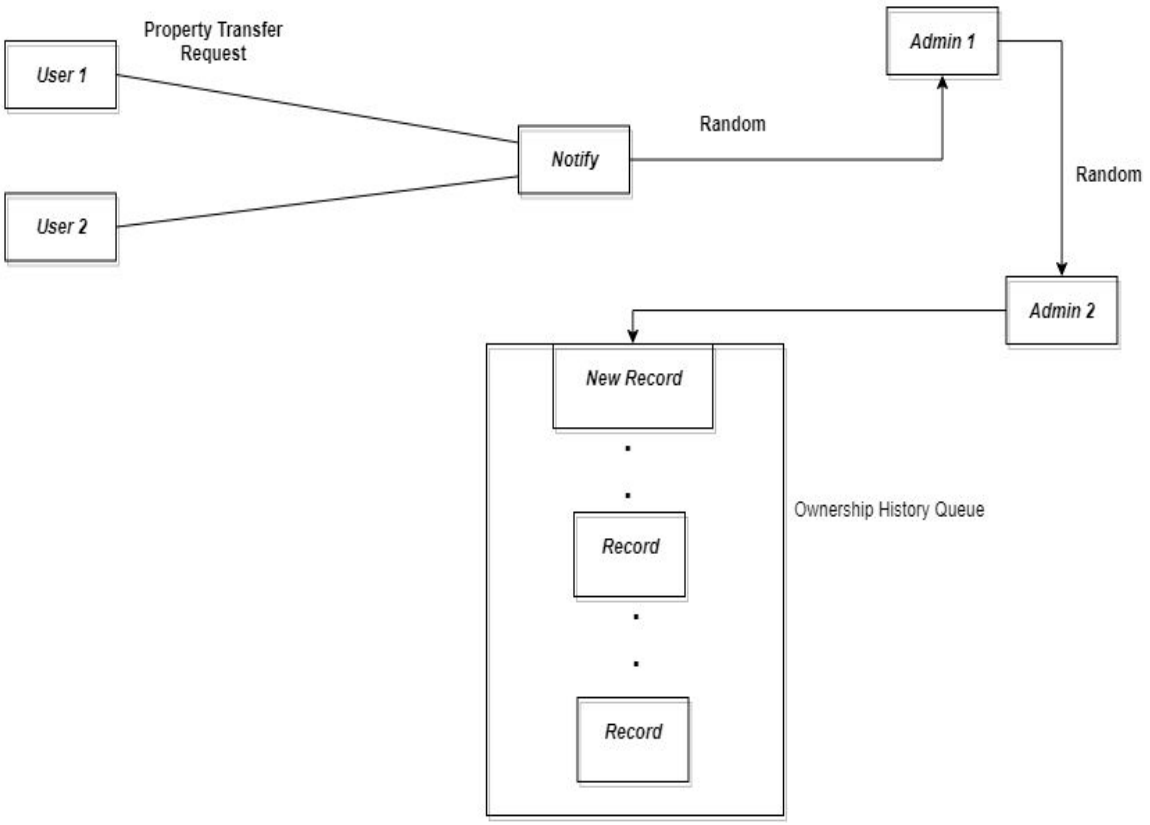
Conceptual Note

User involvement with the system takes place in three levels:
1. *Super admin* - One Authority in the whole system is designated with the single task of creating multiple admins and can change the user domain to admin status.
2. *Admin* - These are authorized by super admin and holds the right of creating a new property or importing from the pre-existing state-level property registry database. Admins can approve the property title transfer request with our advanced double random admin(Govt. officials) authentication model.
3. *Citizens*- They can initiate initial title transfer on their own property and can sell or buy a property through the portal. Citizens can approve ownership request of properties for which they are notified. Citizens can also monitor blockchain activities ensuring full transparency and full audit ability for this system. Citizens can also visualize land property on Google maps.

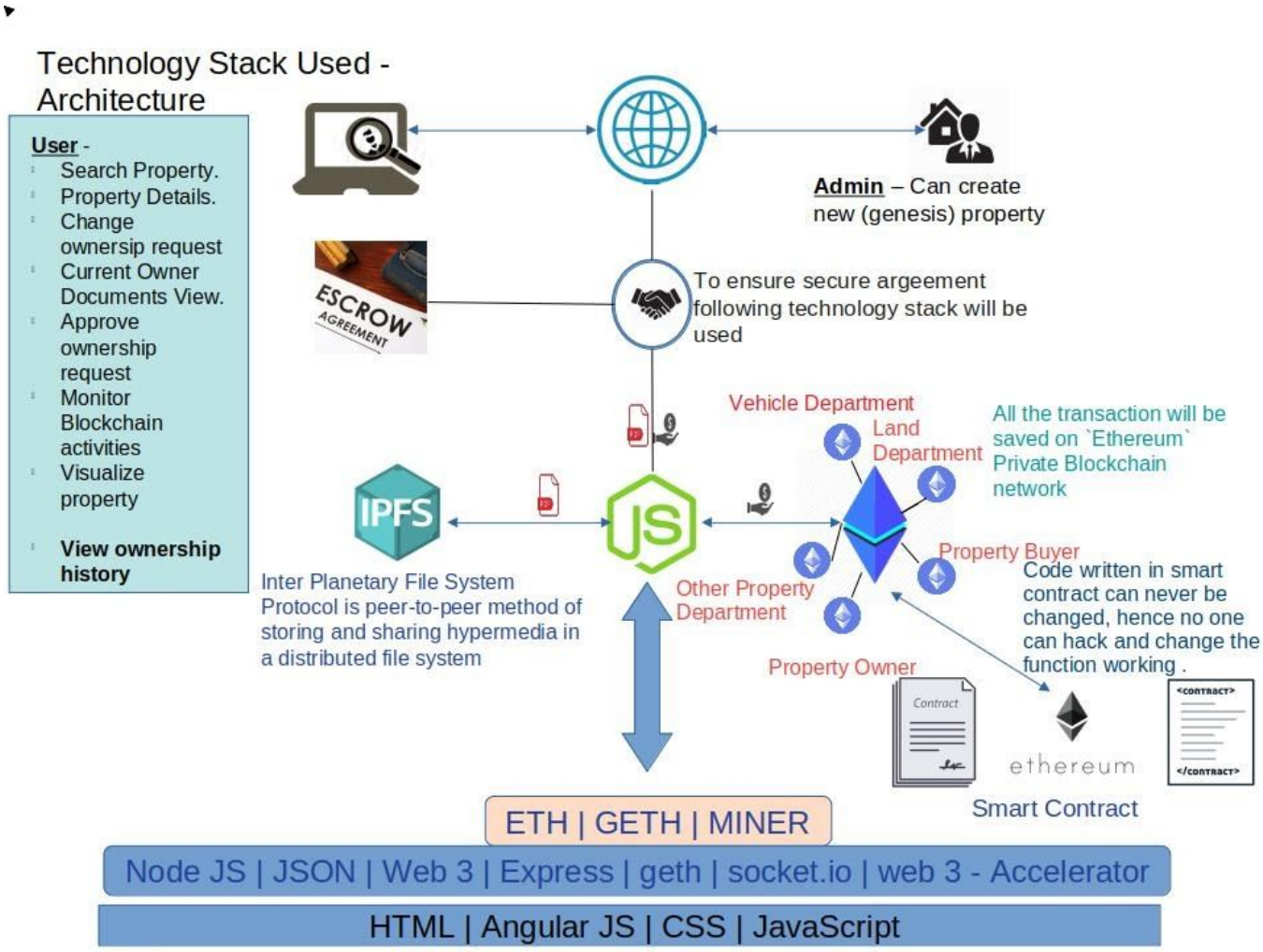
Architecture







Every Transactional record is saved on ethereum distributed ledger.



My model verifies and validates user data and provides secure mutual agreement in property Registry, with the use of multi-node ethereum blockchain which has provided impeccable security through its decentralized architecture and the multi-node architecture which I have designed. Every ownership transactions such as a change in ownership, create a new property are being verified by proof of stack algorithm. Super admin verify admin who can validate new property by stating property value, property ID, Issue Date, property owner Aadhar number (Indian Government Social Security Number) and approve initial title transfer. The current owner can request change his/her ownership to the new owner, which will be approved by both party's mutual agreement approval and dual random admin authentication. Property's unique hash ID will be the basis of transactions in the blockchain. Property ownership records and the financial transactions will be saved on the distributed ledger of ethereum blockchain which could be referenced if requested, which will provide strong audit-ability for the transaction with a time-stamp. Users can browse through ownership history of any property which ensures full transparency, blockchain will ensure the validity in the chain of ownership which will prohibit selling a particular property to multiple users.

User Interaction

The user interface will be capable to enable a user to browse through registered property either land or vehicle, admin can validate new property (genesis) by stating - property value, property ID, Issue Date, property owner, property owner Aadhar number. A property owner can request a change in ownership and can attach relevant documents that will be uploaded on a secure distributed ledger, respective land/vehicle department will validate the request and the current owner will approve the ownership change request and this way property ownership will be changed.

Web App functions

1. Search Property.
2. Property Details.
3. Ownership History.
4. Current owner Documents.
5. Change ownership request.
6. Approve ownership request.
7. Monitor Blockchain activities.
8. Visualize land property on google map.

Conclusion

For a developing nation like India where trust is a liability, my model not only solves property registry problem but also provide a feasible architecture which could be scaled to the whole nation and eradicate corruption from its root and give digital democracy to its citizens.

References.

1. Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto 2008.
2. Ethereum white paper by Vitalik Buterin 2013.
3. “Blockchain-Based Consensus” and “SoK: A Consensus Taxonomy in the Blockchain Era” by Dr. Juan Garay.

Full Working Project on github.com/nikhsr/Property-Registry-Blockchain