NSW Office of Registrar General

Response to Discussion Paper
Removing Barriers to Electronic Land Contracts

Comments submitted by ChromaWay Australia

February 16, 2018

ChromaWay Australia
Head office: Centralplan 15, 111 64, Stockholm, Sweden
www.chromaway.com info@chromaway.com

Discussion Paper
Removing Barriers to Electronic Land Contracts

We commend the Minister of Innovation and Regulation and the Office of the Registrar General for outlining the challenges and opportunities for New South Wales in proceeding down the path towards a fully digital land registration system., ChromaWay is a global-leader in blockchain solutions. We developed the world's first consortium database, Postchain, which utilizes blockchain protocols to facilitate decentralized data sharing among partners (e.g., in the conveyance process). We recently opened an office in Australia and we are excited to share our lessons learned having developed solutions with land registries and the mortgage market in Asia, Europe, and the United States.

As is noted in the Minister's forward, the paper focuses exclusively on the use of digital technology in the conveyance process. Though beyond the scope, the paper also notes the importance of "The beginning of a transaction, including the negotiations between the parties, vendor disclosure and exchange of contracts." Since these tasks are so closely related to conveyance, we hope future papers will address the opportunities to leverage digital technologies.

In order to contribute to the discussion, we have focused on how New South Wales can leverage blockchain technologies to strengthen conveyance processes. A blockchain is an open, distributed ledger that can record transactions between parties efficiently and in a verifiable and permanent way. A blockchain is managed by a (public or permissioned) peer-to-peer network collectively adhering to a protocol for validating new data. The advantages of blockchain include the following:

1. **Disintermediation & trustless exchange.** Parties are able to make an exchange without the oversight of a third party.
2. **Durability, reliability, and longevity**. There is no central point of failure and a blockchain network can better withstand malicious attacks.
3. **Process integrity.** Transactions will be executed exactly as the protocol commands.
4. **Transparency and immutability.** Transactions are immutable, they cannot be altered or deleted.
5. **Ecosystem simplification**. A synchronized distributed ledger enables a jurisdiction to better grow the property market, provide data to multiple partners, and ensure security.

6. **Lower reconciliation costs.** Accounting and data reconciliation costs are driven down with blockchain solutions.

We believe these features of blockchain technology can both strengthen conveyance processes and, more importantly, further position the New South Wales property market as a model of transparency and efficiency.

Q.1 Should the formal requirements for registry instruments, such as mortgages and leases, be reviewed so that they can be created wholly by electronic means?

Execution of eMortages and eLeases have already been approved in many property markets throughout the world. In reality, many local jurisdictions (due to legal restrictions) utilize a hybrid approach where, for example, the security instrument is wet-signed and notarized, and subsequently imaged and submitted for eRecording. In the United States, over 329,000 eNotes have been registered.

Blockchain technologies don't obviate the need for changes to laws pertaining to security instruments and signatures, but they address many underlying concerns of digital uses. For example, blockchain addresses the "double spend" problem ensuring an electronic mortgage or lease couldn't be copied and be assigned to different owners. Conflicting information would be identified during the consensus process on a distributed ledger. The false owner would be rejected by a majority of the validating entities.

Q.2 Does the Verification of Identity regime replace the need for witnessing for all land registry documents

In many ways the system of witnesses and notaries used today to validate identity has its own significant limitations. For example, someone can pose as the property owner and sign a deed or transfer in front of an innocent (or colluding) notary. Other scammers may use a completely made-up name or identify themselves as the owner's personal representative. Regardless of the method, the result is a transfer of property made possible by false documentation or identity theft.

The use of witnesses and notarization of documents is one of the oldest features of mortgage and property systems around the world. Blockchain technologies replace the need for witnesses through the use of hashes, or digital fingerprints, which mathematically match signatures on documents with a previously captured digital signature of an individual. The blockchain utilizes a consensus protocol spread among

independent nodes to further validate those signatures. In addition, it's possible to replicate the process on the blockchain where a witness and, for example, a property owner sign the same transaction without physically being in the same room.

Q.3 Are there any other gaps or uncertainties that need to be resolved to allow land transactions to be fully electronic?

We prefer to use the term "digital" vs. "electronic." A land transfer request on a PDF form emailed to the land registry could be considered an electronic transaction. On the other hand, digital signatures embedded in digital documents require the use of a digital certificate, essentially a type of key or code that utilizes cryptographic algorithms to assure the integrity and authenticity of electronic media, and the information within. The result of all this processing is a secure document that is tamper evident. If any value in the source document is corrupted or maliciously altered, it can be easily detected by verifying the original signature.

A robust identity framework is a foundational piece for facilitating fully digital land transactions. Blockchain technologies rely on individuals generating their own unique private keys to secure identify and protect them against fraud. Trusted entities can be established to initially validate identify (in Sweden, we worked with the Telecom company, Telia) and allow users to create their own keys. They can also provide support for lost or stolen keys. Multi-signature solutions which require, for example, the property owner and the land registry to sign-off on property transfers can also be part of the solution.

Q4 Should legislation intervene to regulate the use of electronic contracts in conveyancing, or is this a matter best left for conveyancing practice to develop within the current framework?

Our experience in Sweden indicated that some laws would have to be changed to allow for uniform acceptance of digital signatures for property transactions. We believe many of the same restrictions would have to be addressed through legislation in New South Wales.

Courts need to accept digital signatures, since this is at the very foundation of electronic contracts. In Sweden some work is still needed in this field, while in e.g. Norway digital signatures are in practice already approved for property transfers. For New South Wales, if there today still are legal obstacles present for approving digital signatures for property transfer, these obstacles should ideally be removed. At the

same time, many steps can be made without changes to the law on the path towards towards digital land registration processes.

Q.5 Have you used electronic contracts? What, if any, obstacles did you encounter in the electronic process?

Most blockchain solutions, including ours, utilize smart contracts to facilitate signed agreements between parties. Smart contracts are programmable, or codified contracts, capable of enforcing itself upon occurrence of pre-defined conditions. The benefit of a properly executed smart contract is that it will only perform/initiate tasks according to the codified agreement in the contract. So, payment from settlement will only be made to specified parties for specified amounts and instructions of property conveyance will only include the name of specified parties. The other advantage is that smart contracts are fully auditable in real time, not days, weeks, or even months after execution.

Q.6 If you have been reluctant to use electronic contracts, what are your concerns?

Perhaps the primary challenge for smart contracts is not the technology, but the ability to reduce complex contract language to code (e.g., if/then statements). Though contract simplification would go a long way towards making the mortgage/property transfer process simpler for participants, we recognize that national and local regulations frequently make this task challenging. In addition, inexperienced developers partnered with mortgage/property professionals may inadvertently draft a defective smart contract not consistent with the agreed upon objectives of the party. If gone undetected, execution of the contract could result in a long list of unintended consequences. It's critical that the necessary reviews controls are put in the smart contract development process to prevent these problems.

Q7. Should the Sale of Land Regulation provide an alternative, electronic means of providing the prescribed documents? If so, should this be in a particular format?

Advances in web and mobile interfaces permit many user-friendly ways of reviewing documents in a simpler and more user-friendly (e.g., tabs) method. These documents can be individually signed using a public/private keys and stored on the blockchain or off the blockchain (using hashes of the signed documents) as part of an immutable

electronic record. Optimally the documents should be in a digital format in order that the signature can be embedded in the document.

Q.8 Electronic contracts may be cheaper and easier for a vendor's solicitor to prepare, but do they provide any form of consumer protection for buyers?
Q**.9 Are contracts 'available' at the time a property is marketed, if only in electronic format?**
Q.10 Should vendors be permitted to pass on printing and associated costs to a purchaser who cannot receive documents electronically?

Digital contracts offer the advantages of simpler distribution and stronger versioning. Since the blockchain can store multiple versions of a contract with exact signature, time, and date stamps, there can be no confusion over when a contract was signed and who signed it. This provides powerful protection to consumers and vendors around the exact circumstances of contracts/document execution. If the system is well integrated, the buyer can check if the property exists and if the seller actually is the real owner, if there are other encumbrances on the property. Thus, in case of changes they can get notified in case some of the parameters change.

Q.11 Should there be any further protections for a purchaser if disclosure is made electronically (such as a longer cooling off period to enable the electronic file to be considered by a solicitor or conveyancer)?

A well designed user-interface and proper support from vendors should facilitate a more consumer-friendly experience for purchasers. Since the purchaser should be able to access the full record of signed-documents at any time, there should be no need to extend the cooling off period for rescission of a mortgage or conveyance.

Q.12 What methods of electronic signature are appropriate for sale of land contracts?

We prefer digital signatures to electronic signatures. Electronic signatures are simply signatures in electronic form, but provide the same security and identify protection as digital signatures. A digital signature can be understood as a hash code generated by combining a user's private key with the data they wish to sign. The generated hash code or "signature" can then be used to verify the data, and vice versa. If the data is altered in even the slightest way, it will no longer match the signature and will show as invalid when checked.

Public key encryption has actually been around since the 1970's. Think of a person who has two connected keys to a safe. The public key (known to all) is used to place a document in the safe, but only the matched private key (known only by the user) can unlock the safe and read the document. So, a public key is used to lock transmitted data (encryption) and a private key is used to unlock the data (decryption).

This key-pairing framework can also be used to create a digital signature which provides an extra layer of authentication, data integrity, and nonrepudiation - all features which are critical for registering assets like land contracts.

Q.13 Is there a need to clarify the appropriate methods to identify a signatory to an electronic contract, or whether that person had authority to sign?

In our work with other land registries we have recommended multi-signature frameworks where, for example, land transfers can only be performed with the digital signatures of the buyer, sellers, and a trusted third party such as the land registry or another public agency. Before approving the transfer, the land registry could confirm the public key of the buyers/sellers to make sure they match the registry records. This provides a superior method of fraud protection.

Q.14 Should there be a witnessing requirement for requirement for electronically signed contracts? How might this be achieved in an electronic environment?

Please refer to our response in Q.2.

Q.15 Is a formal exchange of contracts relevant where contracts are formed electronically? If so, how can exchange be affected?
Q.16 How can the parties' intention be clearly determined without a formal exchange process?

An exchange of contracts can still be performed within an electronic/digital framework. In Sweden, we utilized our smart contracts and secured workflow tools to allow for participants in a real estate transaction (e.g., buyers, sellers, real estate agents, attorneys, banks, the land registry, etc.) to receive, review, and sign-off on contracts. The smart contracts were codified to only allow intended participants the ability to review and/or sign and the secure workflow was driven by the completion of pre-coded tasks (i.e., the buyer couldn't sign the sales contract until the seller reviewed/sign-off, etc.).

All of the process steps, signatures, documents, and data are time and date stamped in the blockchain and is available for real-time auditing. Because the smart contracts codify the specific areas of agreements, there is little room for miss-understanding the intentions of the participants. In the case of Sweden, digital documents were exchanged using smart phones and personal computers instead of across a table.

Q.17 What protections can be implemented to ensure preliminary negotiations do not constitute a legally binding agreement?

Without the signatures of the participants, it's unlikely that the preliminary negotiations would constitute a legally binding agreement. User interfaces could be designed to require multiple digital signatures and a rescission period, as it exists today, would offer additional protection.

Q.18 Should the law be clarified to enable a deed to be formed by electronic means? If so, should this relate to all deeds or limited only to those specifically relating to land transactions (such as option deeds)?
Q19.If a Deed is to be executed electronically, what form of electronic signature is appropriate?

Generally, a deed or instrument must have the following features:

- it must be written on parchment, vellum or paper;
- a personal seal was placed on the document; and
- it must be delivered to the counterparty.

These requirements clearly date back well before the advent of digital technology. As we have previously noted, a signed digital document using cryptography is far superior to a "wet signature" from the perspective of mitigating fraud. The requirement is that a jurisdiction has a process for issuing digital keys based on an initial off-line identity verification process. We believe this framework applies to all types of agreements, including deeds.

Q.20 Should electronic signatures on deeds be witnessed? If so:
- **How can a witness attest to a signature in an electronic environment?**
- **Should the witness by physically present when the signer signs, or can this be performed through video link (such as Skype or Facetime) or other means?**

Q.21 Should the signatory be present when the witness signs?

Please see our response to Q.2.

_____

For additional questions regarding the responses or ChromaWay, please contact:

Nick Delaveris
ChromaWay Australia
nick.delaveris@gmail.com

Todd Miller
ChromaWay USA
todd.miller@chromaway.com