

SMARTER THAN SMART CONTRACTS

by Gunnar COLLIN*

For logistics specialists and companies involved in global trade, the opportunity to create digital documents that can replicate the legal status and functionality of their physical equivalent is a game-changer.

Achieving such an objective can introduce considerable efficiencies into industries that are dependent on negotiable instruments and documents of title such as promissory notes, bills of exchange, and warehouse receipts.

A digital equivalent can eliminate inefficiencies associated with the handling of paper, thus reducing levels of bureaucracy (especially in trade finance), cost, complexity, and fraud.



Ricardian Contracts

Ricardian contracts are nothing new. The idea of Ricardian contracts was first articulated by renowned financial cryptographic expert Ian Grigg in the late 1990s.¹ Essentially, Ricardian contracts are legally binding records of agreement between parties. Their most outstanding feature is that (unlike smart contracts) they are both machine and human-readable. This means that a Ricardian contract is a digital transaction protocol that can be read by anyone, while being automatically executable by a computer based on certain pre-conditions.

How Ricardian Contracts Differ from Smart Contracts

Smart contracts take on a simplistic approach. Simply put, smart contracts are transactional protocols that will execute events automatically when a specified set of conditions are met. While a smart contract is useful in automated decision-making processes, they are not legally binding unless all parties are in a closed user group and all have agreed to the same rulebook. In a world where organizations are increasingly moving towards automation and data-driven collaborative work, self-executing, freely transferable and legally binding contracts are needed properties that go hand-in-hand.

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1. Grigg's contract design is named after British economist David Ricardo (1772-1823) in honor of his significant work in the area of international trade theory.

This is where Ricardian contracts come into play. These types of contracts go a notch higher than smart contracts in that they incorporate different aspects of an agreement. This means that in sectors where original documents are used to maintain legal enforceability of a contract, Ricardian contracts, in combination with blockchain technology, can provide a perfect blend to enable the digital

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properties of a smart contract while replicating the properties of the original paper equivalent. Hence, in case of a dispute between parties, electronically signed Ricardian contracts can be used in a court

of law where the best evidence (the original document) always rules. Smart contracts cannot be used in court since they only contain digital instructions that define an agreement between parties.

Ricardian Contracts as a Problem-Solver

Despite the increased use of electronic records in digital trade, paper documents continue to play a huge role in logistics, forfeiting, and documentary trade finance. Paper documents and electronic records each have their respective advantages and disadvantages. While electronic records provide efficiency, they cannot be used as negotiable documents. They are also complex, expensive, and come with legal uncertainties.

Paper documents, on the other hand, have their own limitations. While their purpose is to provide certainty for sellers, buyers, and finance providers, paper documents can be forged easily, their transportation is slow and insecure, and secure storage is never guaranteed. They also come with errors and omissions that may not be spotted during the preparation period.

Ricardian contracts evidenced through blockchain technology can provide a balance in that all the properties of an original paper document are replicated in the digital format of the contract. This includes all the elements that make a paper document valid as a negotiable payment instrument. These elements include originality, possession, transferability, and legal rights described in the document relative to the holder of the document.

How Ricardian Contracts Work

To illustrate the working mechanism of a Ricardian contract, let us look at how digital documentation solutions provider Enigio is using Ricardian contracts to solve the challenge of creation and management of authoritative digital original contracts. The company has developed ‘trace:original’ which is a patented solution that allows for the creation of digital original documents that replicate the nature of their paper equivalent. As briefly discussed above, maintaining the legal enforceability and authority of a digital document requires that document to replicate:

- The possibility to separate the original document from a copy;
- The transferability of the original; and
- The functionality of the document relative to the holder of the original document.

Through trace:original, a user can create an unequivocally original digital document. Just like the original paper document, a trace:original document maintains the right of the holder to transfer ownership or transfer certain rights by endorsement to another party. What is more, trace:original offers an unconventional solution in that it can achieve all these qualities without the published release of any contents of the contract into a blockchain or operated in a closed ecosystem with a set rulebook or consensus protocol, as is the case with most smart contracts. This makes trace:original one of the most cost-effective and practical solutions for companies and organizations looking to create digital documents that replace paper originals.

trace:original takes an entirely new approach with Ricardian contracts in that it uses blockchain, cryptography, and cryptographic key pairs² to introduce immutability and traceability to digital documents as well. At its core, trace:original is a tool that can capture the original market acceptance of a physical document and translate it to its digital equivalent without losing any of the characteristics of a traditional paper document. This is done through a cryptographic algorithm that produces an equivalent of the original paper. The wet ink signatures on the paper are substituted by digital signatures that are registered on a distributed ledger to enable immutability. Also, cryptographic key pairs are used to secure possession of the document while giving the holder of the document the right to transfer ownership at their discretion to anyone.

Sectors Where Ricardian Contracts are Especially Useful

Ricardian contracts used in creating digital originals, like those built using trace:original, can be utilized in various areas.

Traditional trade finance

In traditional trade finance where forfaiting requires the use of bills of exchange or promissory notes to originate and distribute assets from primary markets to secondary markets, use of digital originals can eliminate inefficiencies inherent with the handling of paper documents. Since digital originals reduce complexity cost and bureaucracy, trade finance, in the long run, can become cheaper, more accessible, and easier to operate.

Receivables finance

In the world of receivable financing, banks purchase receivables by way of a pledge from the seller. Therefore, with each receivable financing, a unique process is required for establishing the pledges that come with invoice discounting. These processes vary from one jurisdiction to the other. For that reason, while a finance provider may perfect a pledge in one jurisdiction, it can be difficult (even impossible) to create a legally binding pledge in the jurisdiction where it is payable. However, digital bills of exchange can offer a more practical solution as they can be amended with requirements that fit any jurisdiction. Furthermore, copies of the original can be distributed at minimal cost, making the process much more transparent, easier, and affordable.

Logistics

Bills of lading (B/L) are issued by carriers (or their agents) to acknowledge receipt of cargo for shipment. A bill of lading is a document of title. The B/L can, in many situations, be

2. A system that dually utilizes public keys, which may be disseminated widely, and private keys, which are known only to the owner.

traded multiple times but needs to be presented at the destination as the B/L is the instrument used to identify the rightful receiver of the cargo. Use of Ricardian originals when issuing a B/L would significantly reduce risks of delay due to slow courier services and fraud.

Real estate mortgage

All over the world, promissory notes are used in real estate and mortgage markets as a promise to repay a specified sum of money plus interest over a specified period. In most cases, these promissory notes are physical originals. However, physical originals cost more to transport from one party to the other, they are difficult to store and retrieve, plus they are prone to errors during preparation. Digital originals, on the other hand, can easily be stored where the holder prefers while still being easy to distribute from one party to the other. trace:original is a solution that provides authoritative digital originals for the mortgage market in Sweden and other European countries.

Wills and testaments

As much as wills and testament laws determine the validity of a person's will, the actual documents are easily manipulated, misinterpreted, or simply destroyed. Plus, during the process of writing a will, human errors can easily tamper with the validity of a will. Also, the entire process of creating a will and seeing it through to the probate phase is costly in terms of legal fees. However, with digital original documents, not only is security guaranteed on the blockchain, but confidentiality of the will can be maintained. With digital originals, it is also easy for a court to verify if a copy of the will corresponds to the current original.

Conclusion

For a long time, smart contracts have been seen as the ideal application for blockchain technology. However, it is becoming increasingly evident that Ricardian contracts are the preeminent application. As the world steadily evolves into a global village with organizations and companies embracing data-driven collaboration, the need for digital original documents is bound to increase. Digital original documents provide a unique solution that addresses the documentation needs of multiple industries while requiring little to no disruption of the status quo. ■