“Smart contracts,” in their purest form, seek to leverage the trustless, immutable nature of the blockchain to empower peer-to-peer, disintermediated agreements enforced automatically by code. Smart contracts, as such, are not legal contracts, but rather, code to allow systems to execute a legal contract.

This paper explores whether, by integrating language, by way of a semantic legal layer, into blockchain-based smart contracts, smart contracts could become full legal contracts.

The current blockchain landscape, in and of itself, is insufficient to capture the nuance of contract language, to preserve the evidence of the contracting process for those cases where parol evidence might be admissible, or to provide for the many non-financial terms that parties typically negotiate as part of a contract. However, the integration of a semantic legal layer – utilizing jurisdiction specific legal ontologies – could add the precision, flexibility, and enforceability to blockchain-based smart contracts to allow them to serve the same purposes at their traditional progenitors.

The great specificity and power of legal language necessitates that, if smart contracts are to have the flexibility and import of their traditional progenitors, smart contracts must be able to draw on formal language of contract.

Integrating legal language into smart contracting processes, then, is no small feat. Particularly for contracts between major enterprises, smart contracts are highly unlikely to eliminate the need for legal counsel with expertise in both the industry(ies) and jurisdiction(s) pertinent to the contract. A number of clauses, such as choice of law, indemnification, disclaimer of warranty, limit of liability, assignability, termination, modification, and so forth, will still need to be negotiated between parties. For contracting parties without counsel at their disposal, however, fully legal smart contracts could potentially “level the playing field,” giving them at least some access, through an ontology, to the same language used so effectively by attorneys, in addition to access to automated enforcement.

Semantic Blockchain is a distributed database that maintains a continuously-growing list of standardized data records, using Resource Description Framework (RDF), hardened against tampering and revision. Replace RDF with classification codes.

Should one of the parties to a smart contract have issues with it after its formation or execution (for example, individuals who lost money in the DAO hack), that party would first have to prove the existence of a contract at all – a formidable feat for current smart contracts, which can easily be made without a legal contract coming into existence.

While using linked data to help preserve the archival bond in smart contracts offers a first step towards more enforceable smart contracts, full blockchain-based legal contracts are unlikely to happen without the integration of a legal ontology.

The development of appropriate ontologies to support full legal contracts on a semantic blockchain remains an open challenge. While there exist a number of legal ontologies, such LKIF-Core (an OWL ontology of “basic” legal concepts), a great deal more granularity would be required to properly support the use of smart contracts for full contracting purposes. Furthermore, legal knowledge, despite the vast array of code, cases, and statutes brought to bear, remains a largely tacit affair.

As Lemieux and Sporny assert, it is only by preserving the archival bond that the unique identity of each record can be preserved. “The archival bond contains within itself the direction of the cause-effect relationship of the procedure which gives rise to records, and it is therefore the primary expression of the development of the activity in which the document participates, rather than just facts about the act that the document embodies.” Without the archival bond, it is impossible to know if a contract has formed, because it is impossible to reconstruct the relations of the records in such a way as to prove that an ‘acceptance’ was actually an acceptance, as opposed to an attempt to accept a lapsed or revoked offer”.

The archival bond is also critical in cases where the final reduction to writing of the contract between the parties is only a partial integration of their understanding. In such a case, “parol evidence,” or evidence beyond the four corners of the contract, is admissible to prove the parties’ intentions regarding terms beyond those captured in the contract. For example, if the final contract doesn’t specify a time for performance, parties can introduce evidence of their negotiations regarding that term prior to the contract formation. Without the archival bond, however, it becomes impossible for the parties to clear the hurdles to admissibility for documentary evidence, namely, the best evidence and authenticity rules. Smart contract systems that don’t provide for the archival bond leave any open terms largely to the discretion of the courts.