

From Bills Of Lading To Blockchain Structures: Part 1

By **Christopher McDermott, Jeffrey Nagle, Martin Horowitz and Stephen Johnson**

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A bill of lading is an old form of legal document. Early progenitors of the bill of lading emerged in the seventeenth and eighteenth centuries as medieval trading practices yielded to more modern mercantilism.

As merchants ceased embarking personally on ships to accompany their shipped goods, but instead entrusted the goods to the shipper to transport and deliver at their destination, those merchants needed a way to make tangible and transferable the right to receive the entrusted goods and the contract of carriage of those goods.

When the merchant discovered he could send the receipt obtained from the ship's master and convey it ahead to the recipient of the goods, who could in turn present it to the shipper to prove his title and obtain delivery of the goods, the bill of lading as the document of title we know today was born.

The rules relating to bills of lading and other documents of title evolved over the centuries. Today, a patchwork of laws governs bills of lading in domestic and international commerce.[1] Under U.S. state law, the rules governing bills of lading and other documents of title are housed mainly in Article 7 of the Uniform Commercial Code[2], so this article will limit its inquiry to the rules under the UCC.

Technological change — and of particular interest, the emergence of blockchain technology — is raising new questions about the future of this old instrument. Recent media accounts report collaborative ventures between traders and financial institutions using blockchain solutions to serve the functions of bills of lading.[3]

But as these blockchain strategies become more accepted in commodities trade, it falls to lawyers to tackle the challenge of fitting the new blockchain structures into the existing legal concepts that evolved for traditional bills of lading. Modern bills of lading still perform the same basic functions as their ancient ancestors: they evidence the title to the goods being shipped, the contract of carriage and the right to receive and direct the disposition of those goods. The blockchain solutions emerging in commodities trading seem to have the same functions.



Christopher
McDermott



Jeffrey Nagle



Martin
Horowitz



Stephen
Johnson

It is fair to ask, then, whether the same legal rules apply? Or put another way, if a blockchain structure acts like a bill of lading, is it a bill of lading under the UCC? And if it is not — or if the answer is unclear — what is it?

Description of Model Blockchain

Before we can usefully discuss the application of UCC rules to a blockchain structure, however, we need to describe a structure to put to the test. There are many variants of the basic blockchain concept,[4] and it is not obvious from media reports how the blockchain applications currently being tested are structured.

So for the purposes of this article, let's describe as a thought experiment a blockchain structure that we think is probably representative of current endeavors to use blockchain in the movement of goods through a supply chain.[5] At a high level, our model blockchain would be a decentralized, automated system for storing information about transactions between its members.

It would be "permissioned" — that is, participants in the model blockchain must be admitted by the existing members, and the general public would not have access. (Those members would presumably need to include the relevant community of merchants selling and buying the goods, the carriers who ship them and financial institutions that finance such transactions.)

Our model blockchain would not be anonymous. Each member would be able to identify any other by their digital signature, which a computer could match to a member's name.

The system would also be "trustless," in that no single party validates a transaction. Instead, transactions would be validated by the model blockchain's members. Each member's computer would verify basic facts to protect against fraud or double spending.

After validation, a transaction would be written into a block in the model blockchain. Data in a block would be encrypted such that it is nearly impossible to modify. This non-centralized verification system — the distributed ledger — is the basic innovation common to blockchain systems that gives them their wide usefulness.

In the model blockchain, the data for a shipment of goods would identify the transferor, the transferee, the carrier, the time of the transaction, what is transferred and any miscellaneous data the transferor decides to include as "metadata." Transaction data would be available only to members of the model blockchain.

We would further imagine that the real-world assets or rights dealt with on our model blockchain would be represented as digital coins (blockcoins). A blockcoin would essentially be a bitcoin, but would have no monetary value. It instead would represent the goods.[6] A blockcoin and the model blockchain would work together. The blockcoin would stand in for the goods covered, while the model blockchain would identify who controls the coin and thus has title to the goods.

Could Model Blockchain Constitute a UCC "Bill of Lading"?

The UCC sets forth a complex statutory system covering bills of lading, but much of the UCC's framework was drafted with paper bills of lading in mind. New concepts such as "electronic documents of title" have been grafted on to the pre-digital framework, but the basic structure still largely employs concepts

foreign to the electronic frontier, such as “bearer,” “issuer,” or “copy.”

How does that framework look when we map the model blockchain against the UCC’s mixture of old and new rules? Could our model blockchain system constitute a bill of lading under the UCC?

Under the UCC, a bill of lading is defined as (1) a document of title, (2) evidencing the receipt of goods for shipment, (3) issued by a person engaged in the business of directly or indirectly transporting or forwarding goods.[7] To answer this first question, we need to unpack this UCC definition.

Could a Blockchain System Constitute a Document of Title?

A document of title is defined in the UCC as (1) a record, (2) “that in the regular course of business or financing is treated as adequately evidencing ... [title to] the record and the goods the record covers,” and (3) that “purports to be issued by ... a bailee and to cover goods in the bailee’s possession.”[8]

1. “A record”

In the model blockchain, the transaction data — which includes the blockcoin — stored in a block would seem to clearly constitute a record. A record is “information ... that is stored in an electronic or other medium and is retrievable in perceivable form.”[9]

The transaction data in the model blockchain is stored in a computer (an electronic medium) and is retrievable in perceivable form when the data is displayed on a member’s computer monitor.

2. “In the regular course of business”

A carefully constructed blockchain system should satisfy the “regular course of business” requirement as well, at least over time. Courts have tested the idea of “regular course of business” by looking to established industry practice.[10]

While a disruptive new technology like blockchain may not initially be an established industry practice, as blockchain architectures gain acceptance for applications relating to the trading of goods, such objections should naturally evolve away.

Further, recent additions to the UCC providing for electronic documents of title suggest that the statutory scheme does not intend for this requirement to impede the development of new technologies.[11] To mitigate this risk, a transaction on our model blockchain might include — at least initially — a PDF of an executed industry standard bill of lading, linking the model blockchain back to more traditional, established industry standards.

3. “Purports to be issued by ... a bailee”

For the model blockchain to satisfy the requirement that the document of title purport to be issued by a bailee, it must address two problems.

First, how does the bailee “issue” this document? Second, can the bailee really be a “bailee” if the parties use the model blockchain? Both problems stem from the decentralized nature of blockchain systems, where there is no single document that is issued in the traditional sense.

While Article 7 of the UCC does not specifically define the term “issue” in the context of a document of title, Article 3 does define the term in the context of the issuance of instruments, such as promissory notes, as “... the first delivery of an instrument to a holder or a remitter”.^[12]

“Delivery” is defined in connection with an electronic document of title as “voluntary transfer of control”. Control of an electronic document of title is also specifically defined, and is deemed to exist in favor of a person if “... a system employed for evidencing the transfer of interests in the electronic document reliably establishes that person as the person to which the electronic document was issued or transferred.”^[13]

Under the model blockchain, the document of title could be deemed issued when all members of the model blockchain vote to create a blockchain and assign it to one of the members, which would seem to fit the idea of “delivery” under the UCC.

4. Ensuring the bailee is a bailee

Even if we are comfortable that a blockchain bill of lading might be “issued” within the meaning of the UCC, can we also be comfortable that it was issued by a bailee holding the goods? The UCC defines bailee as “a person that by ... [a] document of title acknowledges possession of goods and contracts to deliver them.”^[14]

Presumably, in our model blockchain transactions, the shipper who receives goods from a consignee will be a member of the model blockchain. The shipper/member’s entry of data into the model blockchain to confirm receipt of the goods should suffice as such acknowledgement.

But the UCC definition of “bailee” also requires that the bill of lading be the delivery contract as well as the receipt for the goods. Shipment of the goods under the model blockchain would likely be governed by a smart contract between the shipper/bailee and the holder of the blockchain.

In a smart contract, the terms of the agreement are incorporated into a computer program that automatically executes the contract’s terms when the correct conditions precedent are met. The code of a smart contract for the carriage of the goods could be stored in the model blockchain and run on the computers of its members, but it would not technically constitute part of the blockchain per se.^[15]

Rather, it would run using information that is stored in the blockchain to trigger the conditions for the performance coded into it. In any event, such a contract should permit us to conclude that the shipper would be a “bailee” for UCC purposes.

Since we can posit that the shipper/member of the model blockchain is a person engaged in the business of directly or indirectly transporting or forwarding goods, the above discussion demonstrates that the model blockchain structure — including the bundle comprised of the model blockchain itself, the blockchain representing the goods and the smart contract encoding the contract of carriage — should constitute a bill of lading under the UCC.

In the second part of this article, we will consider possible ramifications of our model blockchain being covered by the UCC, including whether a blockchain bill of lading could be an electronic document of title, and whether it could be negotiable.

From Bills Of Lading To Blockchain Structures: Part 2

By Christopher McDermott, Jeffrey Nagle, Martin Horowitz and Stephen Johnson

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A bill of lading is an old form of legal document. The rules relating to bills of lading and other documents of title evolved over the centuries. Now, technological change — and of particular interest, the emergence of blockchain technology — is raising new questions about the future of this old instrument.

As these blockchain strategies become more accepted in commodities trade, it falls to lawyers to tackle the challenge of fitting the new blockchain structures into the existing legal concepts that evolved for traditional bills of lading. Modern bills of lading still perform the same basic functions as their ancient ancestors: they evidence the title to the goods being shipped, the contract of carriage and the right to receive and direct the disposition of those goods. The blockchain solutions emerging in commodities trading seem to have the same functions.

But do the same legal rules apply? Or put another way, if a blockchain structure acts like a bill of lading, is it a bill of lading under the Uniform Commercial Code? In the first part of this article, we described a model blockchain structure that might fulfill this function, and considered how to ensure its compliance with the requirements of the UCC.

In this installment, we will further explore the ramifications of our model blockchain being covered by the UCC, including whether a blockchain bill of lading could be an electronic document of title, and whether it could be negotiable.

Ramifications of the Model Blockchain Being Covered by the UCC

Could a Blockchain Bill of Lading be an Electronic Document of Title?

Another point to consider — which, as we discuss below, is relevant to the application of other UCC concepts — is whether our model blockchain bill of lading constitutes an “electronic document of title” under the UCC. To be an electronic document of title, a document of title must be (1) evidenced by a record (2) consisting of information stored in an electronic medium.

We already have established that data stored in the model blockchain would constitute a record under the UCC. That record residing on the model blockchain clearly also is stored in an electronic medium. The model blockchain consists of bits of data stored in the distributed ledgers on each of the members’ computers, i.e., in an electronic medium. It seems clear, then, that our model blockchain bill of lading would be an electronic document of title.

Could a Blockchain Bill of Lading be “Negotiable”?

As further discussed below, the status of a document of title as negotiable or nonnegotiable has a broad range of effects under the UCC, including effects on rights against issuers and effects on the perfection and priority of security interests. Current legal requirements for making documents of title negotiable have frustrated prior efforts at digitizing bills of lading.[1]

It is therefore relevant to consider whether the model blockchain bill of lading would be negotiable or nonnegotiable under the UCC. We think that the model blockchain bill of lading could be tailored to fit the UCC requirements of a negotiable bill of lading.

Under the UCC, an electronic document of title may be either negotiable or non-negotiable. To be negotiable a document of title must provide “by its terms the goods are to be delivered to bearer or to the order of a named person.”[2]

The model blockchain bill of lading would need to satisfy either the “bearer” or “to order” options of this definition. In the permissioned blockchain system we have imagined, the participants must all be members of the system, and information coded into the model blockchain and the related smart contract would need to designate the recipient of the goods by name.

Would it be sufficient for the bill of lading to be “to order” for the model blockchain bill of lading to provide that the member/transferee of the goods may redirect its right to obtain the goods to another member of the model blockchain — or does the exclusion of non-member third parties from the universe of who might obtain the goods under the model blockchain system make it not “to order”?

We think that a model blockchain bill of lading may still be negotiable as being “to order” if it provides for the conversion of the bill of lading from an electronic one resident on the model blockchain (negotiable to members only) to one that may be negotiated to non-members, such as a traditional tangible bill of lading.

The UCC contemplates such conversion. To convert from an electronic to a tangible document of title, the person entitled under the electronic document of title must surrender control of the document of title to the issuer and the issuer must issue a tangible document of title stating “it is issued in substitution for the electronic document.”[3] This conversion kills the electronic incarnation of the bill of lading.

While such an escape hatch may be necessary to clearly satisfy the legal definition of a “to order” negotiable document of title, if the model blockchain gained wide enough currency that all or most of the participants in the relevant market were members, then the likelihood of a bill of lading dropping out of the electronic model blockchain system would be diminished.

What about the other leg of negotiability for a bill of lading, providing by its terms for the delivery of the goods “to bearer”? The idea of a bill of lading payable to bearer is clearly a concept deriving from the realm of tangible bills of lading, in which the owners are able to “bear” the tangible document in the sense of physical possession in the real world.

However, electronically stored information, such as the model blockchain bill of lading, cannot be physically “borne” in that traditional sense. And the model blockchain is decentralized, with each member having a copy of the whole blockchain. Facially, the “delivered to bearer” leg of the definition seems not to work for the model blockchain.

The UCC attempts to provide a solution. The term “bearer” is defined to include a person “in control of a negotiable electronic document of title.”[4] As discussed above, control of an electronic document of title is satisfied when the electronic system reliably establishes the person to which the document is transferred or issued.

There is, obviously, some circularity in the UCC definitions on this point — in order to determine if the document of title is negotiable, we have to look to a definition of control which is, in turn, defined for electronic documents of title that are negotiable. Nonetheless, it seems that the statutory scheme is

attempting to designate the person reliably established by the electronic system as the holder of the document to be the “bearer” of the document.

So, perhaps, the best way to view the state of the law is that, if control can be established with respect to an electronic document of title, then that electronic document of title should be regarded as negotiable. Our model blockchain bill of lading would seem to be negotiable under this way of thinking as well, even without a tangible bill of lading failsafe.

Negotiation and Due Negotiation

Per our discussion above, the model blockchain bill of lading could be negotiable if properly designed. It could also be non-negotiable. Whether the model blockchain bill of lading is the one variety or the other could have significant effects. The UCC gives different treatment to negotiable and non-negotiable bills of lading, and to holders of negotiable bills of lading to whom the document is transferred by negotiation and “due negotiation”.

For example, the ability of a consignee of a non-negotiable bill of lading or the holder of a negotiable bill of lading to recover damages from the issuer of the bill of lading caused by misdating, or by misdescription or nonreceipt of the goods, depends on different factors — giving value in good faith, in the case of the non-negotiable document, and having taken by “due negotiation” in the case of the negotiable one.[5]

Similarly, the lien of a carrier on the goods covered by a bill of lading is subject to limitations, in the case of a purchaser for value of a negotiable bill of lading, that are not otherwise applicable.[6]

One of the most salient impacts is the effect on priority of rights among competing claimants to the document or the goods — whether the competing claimants are direct owners of the bill of lading, or secured parties claiming a security interest in it.[7] Various rules outline the rights of transferees of negotiable and non-negotiable documents of title, and the parties who can defeat the claims of such transferees,[8] in the absence of “due negotiation” of a negotiable bill of lading.

A holder who takes a document of title by due negotiation enjoys a favored position. Such a holder acquires title to the document, title to the goods, all rights under the law of agency or estoppel, including rights to goods delivered to the bailee after the document was issued, and the direct obligation of the issuer to deliver the goods according to the terms of the document free of most defenses or claims by the issuer.

The holder also acquires a title to the goods that is superior to the rights of stoppage of the goods, the rights of a prior holder of the document against which the negotiation was a breach, a person who was done out of the document by fraud and a third party to whom the document or goods were sold.[9] The holder by due negotiation, like a holder in due course of a negotiable instrument, can acquire better title than its transferor.

So what is “due negotiation,” and can the holder of a negotiable model blockchain bill of lading obtain that status?

There are two steps. First, a negotiable electronic document of title is “negotiated” when it is “delivered” to another person.[10] Such a document is “delivered” upon a voluntary transfer of control of the document.[11] Control, as previously discussed, can be transferred via entries made in the model

blockchain.

The second step, to establish the “due negotiation” of the negotiable electronic document of title, in general requires the holder to purchase the document in good faith, without notice of any defense against or claim to it on the part of any person, and for value.[12]

It is notable that the second step, to promote the status of a holder to one taking by due negotiation, depends on state of mind factors of the transferee — lack of notice of defenses, and good faith. Further, all negotiations or deliveries of a document of title, even without rising to the level of a due negotiation, trigger certain warranties by the transferor to its immediate transferee that include similar state of mind points: that the transferor does not know of any fact that would impair the document’s validity or worth, and that the negotiation or delivery of the document is rightful and fully effective with respect to the title to the document and the goods it represents.[13]

It is intuitive to understand those state of mind factors in a traditional environment of tangible documents of title, or even a centralized, “trusted” electronic system. But do state of mind factors work in a “trustless,” decentralized blockchain arrangement like our model blockchain, where much of the advantage of the new system is its speed and automation, taking steps in commodity trading transactions out of the hands of human beings?

In one sense, the model blockchain should work with the state of mind factors in “due negotiation” and warranties of transfer in the same way traditional documents of title do, to resolve competing claims in front of a judge.[14] But other complexities might arise. The members of the model blockchain would not be indifferent to their status vis-à-vis competing claimants to the bill of lading and the underlying goods in determining a price they are willing to pay for the bill of lading or ascribing a collateral value or borrowing base eligibility to it for financing purposes.

The model blockchain may, therefore, need to be designed to include protocols permitting members to add additional information to the blockchain as to facts that a member might have or discover regarding specific claims and defenses involving other members or their goods, and that might relate to transactions represented by existing or future model blockchain bills of lading, which would trigger a flag in the smart contract that could prevent the “due negotiation” of a model blockchain bill of lading.

Perhaps the model blockchain would need to impose requirements on the members to input such information promptly, and to embed automatic representations deemed made by members that such information is up-to-date. The model blockchain membership would need to consider the appropriate sanctions for members who fail to add such disclosures to keep the system honest.

Conclusion

The blockchain innovation in commodities trade is already upon us. It appears that, properly designed, a blockchain system can be accommodated in existing UCC provisions governing bills of lading.

Legislators have indicated their willingness to adjust the UCC incrementally to provide for technological developments in electronic commerce that intersect with the existing law. It remains to be seen whether the UCC will change further as more experience accrues with real-life blockchain applications.

Christopher McDermott and Jeffrey Nagle are partners, and Martin Horowitz and Stephen Johnson are associates, in the Charlotte office of Cadwalader Wickersham & Taft LLP. They represent commercial banks and other financial institutions in commercial lending and other financing transactions.

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[1] See, e.g., Carriage of Goods by Sea Act of the United States; the Australian Sea-Carriage Documents Bill 1996; and the Carriage of Goods by Sea Act of 1924 (UK); the International Convention for the Unification of Certain Rules relating to Bills of Lading at Brussels of Aug. 25, 1924.

[2] Unless otherwise noted, references to the UCC used in this article will be to the Uniform Commercial Code as in effect in New York.

[3] See, e.g., “What’s cooking in the blockchain kitchen?” (2017), <https://www.ing.com/Newsroom/All-news/Whats-cooking-in-the-blockchain-kitchen.htm>; and Denis Balibouse, Mercuria Introduces Blockchain to Oil Trade with ING, SocGen, Reuters, Jan. 19, 2017, <http://www.reuters.com/article/us-davos-meeting-mercuria-idUSKBN1531DJ>.

[4] See generally Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, <https://bitcoin.org/bitcoin.pdf> (outlining the framework of Bitcoin); and White Paper: A Next-Generation Smart Contract and Decentralized Application Platform, <https://github.com/ethereum/wiki/wiki/White-Paper> (outlining the framework of Ethereum).

[5] For examples of recent endeavors, see Blockchain: A Better Way to Track Pork Chops, Bonds, Bad Peanut Butter?, N.Y. Times, <https://www.nytimes.com/2017/03/04/business/dealbook/blockchain-ibm-bitcoin.html>.

[6] Bitcoins used for such purposes are called “colored coins.” Nicolas Dorier, Programming The Blockchain in C# 95, <https://www.gitbook.com/download/pdf/book/programmingblockchain/programmingblockchain>.

[7] UCC 1-201(6).

[8] UCC 1-201(16).

[9] UCC 1-201(31).

[10] See, e.g., *Bank of New York v. Amoco Oil Co.*, 35 F.3d 643, 651 (C.A.2 (N.Y.), 1994).

[11] See Report on Revised Article 7 of the Uniform Commercial Code, New York City Bar, <http://www2.nycbar.org/pdf/report/uploads/20072201-ReportonRevisedArticle7oftheUniformCommercialCode.pdf>. “The concept of an electronic document of title itself allows for commercial practice to determine what records issued by bailees are 'in the regular course of business or financing' and are 'treated as adequately evidencing that the person in possession or control of the record is entitled to receive, control, hold, and dispose of the record and the goods the record covers'.” *Id.* at 3.

[12] UCC 3-102(1)(a).

[13] UCC 7-106(a).

[14] UCC 7-102(a)(1).

[15] In Ethereum, for instance, the smart contract code is written into the transaction data so that it cannot be changed and is run on the appropriate member's computer system. So a copy of the code is a part of that blockchain, but the software is not run "on" the blockchain network.

[1] For instance SEADOCs — where a centralized third-party custodian held all paper bills of lading and acted as the registry — failed after less than a year of operations, and Project BOLERO — an electronic document exchange with a centralized third party acting as the registry — has failed to gain much traction even after more than a decade of operations. See Susan Beecher, *Can the Electronic Bill of Lading Go Paperless?*, 40 Int'l Law. 627 636-637 (2006).

[2] UCC 7-104.

[3] UCC 7-105(a).

[4] UCC 1-201(5).

[5] UCC 7-301(a).

[6] UCC 7-307(a).

[7] The priority rules set out in Article 9 preserve in an Article 9 security interest scheme the priorities established in Article 7 with respect to the rights of a holder of a negotiable document of title to which the document has been duly negotiated. See UCC 9-331(a).

[8] See UCC 7-504.

[9] UCC 7-502.

[10] UCC 7-501(b)(1).

[11] UCC 1-201(15).

[12] UCC 7-501(b)(3). Note that "purchase" as used in this provision has a broad meaning, encompassing the grant of liens and security interests as well as absolute transfers. UCC 1-201(29).

[13] UCC 7-507.

[14] Indeed, the concept of documents of title as "magic" pieces of paper that might be transferred from hand to hand in the stream of commerce far away from the original issuer is already "chained," and rather more analogous to blockchain systems, than other "hub and spoke" structures which are exploring utility of blockchain, such securities intermediary arrangements in brokerage accounts.