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BLOCKCHAIN BILLS OF LADING

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Blockchain bills of lading

*Elson Ong**

The advent of blockchain technology will, in future, usher in a long-awaited shift away from paper bills of lading. Several maritime hubs, including Singapore, are exploring the possibility of digitalising trade and maritime documentation, such as bills of lading, using blockchain technology. However, there is still considerable uncertainty concerning the legal value of blockchain bills of lading, as with other electronic bills of lading. This paper analyses why electronic bills of lading on the registry model are not suitable for use as bills of lading in Common Law jurisdictions and discusses the suitability of blockchain bills of lading. The adoption of the MLETR may provide a legal regime for blockchain bills of lading. Key articles of the MLETR are considered, leading to a proposal for an amended version. This will entrench a sustainable, resilient and robust framework that will prepare Common Law jurisdictions for the new technological age in the shipping industry.

Keywords: Blockchain, bills of lading, possession, control, unique, transferable, registry, token, key.

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1 Introduction

Since late medieval times, paper documents have been issued by carriers for goods shipped on board merchant vessels. This practice has developed in complexity, evolving from the issuing of paper receipts and recording cargo onboard ship in a parchment book register,¹ to the issuing of rudimentary versions of paper bills of lading acknowledging receipt and, subsequently, containing contractual provisions. These receipts eventually adopted more sophisticated features, such as quasi-negotiability.² Today, paper bills of lading are ubiquitous in international trade.³

Although modern paper bills of lading have matured in legal character, there are practical limitations. First, paper bills of lading can be exploited as shams⁴ or can be fraudulently issued.⁵ However, this is a risk that traders have accepted, in exchange for speed and convenience.⁶ Second, paper bills of lading take time to arrive at the port of destination. It is no longer a certainty that original paper bills of lading will reach the consignee or indorsee before the goods arrive at the port of destination. The evolution of ocean carriage from ships powered by sail to steam and, later, motor vessels, has resulted in faster maritime voyages. A trade can involve a documentary credit, requiring the bill of lading to make an additional detour to the bank, delaying transmission.⁷ In some trades, there may be multiple resales on short voyages, resulting in

¹ Article 16 of the *Ordinamenta et Consuetudo Maris de Trani* of 1063 required every shipmaster to take with him a clerk who was obliged to swear an oath of fidelity and to enter the record of the goods received from the shipper into his register, covered with parchment: Sir Travers Twiss (ed), *The Black Book of the Admiralty*, vol 4 (Longman & Co 1876) 533-535.

² For more information, see Michael Bools, *The Bill of Lading* (LLP 1997) ch 1.

³ See eg UNCTAD Secretariat, 'The Use of Transport Documents in International Trade' (26 November 2003) UNCTAD/SDTE/TLB/2003/3.

⁴ A sham bill of lading gives the appearance of creating between the parties legal rights and obligations different from the actual legal rights and obligations that the parties had intended to create. See Elson Ong, 'Call a bill a bill: *The Star Quest*' (2017) 23 JIML 328, 334.

⁵ See eg *Trafigura Beheer BV v Mediterranean Shipping Co SA (The MSC Amsterdam)* [2007] EWCA Civ 794, [2007] 2 Lloyd's Rep 622. A counterfeit bill of lading can be created by the forgery of authorised signatures on a blank bill of lading. A defrauder can exploit the counterfeit bill of lading by trading in non-existent goods or obtaining bank credit based on non-existent collateral: see UNCITRAL Secretariat, 'Electronic data interchange' (31 January 1996) A/CN.9/WG.IV/WP.69 [44].

⁶ Paul Todd, *Maritime Fraud & Piracy* (2nd edn, Informa 2010) [2-050].

⁷ 'Electronic data interchange' (n 5) [42].

additional documentation and also delaying transmission.⁸ The late arrival of bills of lading may also be a cause of congestion at ports owing to the receiver(s) of cargo(es) not possessing an original bill of lading for presentation to take delivery of the goods.⁹ In situations where delivery of the goods is made without production of bills of lading, there is a well-developed industry practice of delivering cargo against letters of indemnity in lieu of original bills of lading.¹⁰ However, this puts the seller in a precarious position of not being paid for the released cargo and may lead to protracted litigation.¹¹

The practical limitations associated with paper bills of lading can be resolved by a technological solution, such as employing electronic techniques to give bills of lading an electronic form. This will not only prevent the occurrence of sham and fraudulent bills of lading, but also effect instantaneous transmission of a bill of lading. Electronic bills of lading have existed for a number of years with readily available platforms for their use, but these have not been so well received owing to uncertainty concerning the legal value of electronic bills of lading.¹² This uncertainty can be attributed to the lack of a legal infrastructure to support the use of the electronic bill of lading, the controversial registry model approach of identifying the holder of an electronic bill of lading,¹³ and the lack of a suitable technology to facilitate the token model approach.

⁸ For example, the oil trade.

⁹ 'Electronic data interchange' (n 5) [42]. See also n 125 below.

¹⁰ See *Great Eastern Shipping Co Ltd v Far East Chartering Ltd (The Jag Ravi)* [2012] EWCA Civ 180, [2012] 1 Lloyd's Rep 637 [1]-[2]; Felipe Arizon and David Semark, *Maritime Letters of Indemnity* (Informa 2014) [1.1], [1.2], [1.6] and [1.7]. This is a practice which is common in the oil trade: see eg *A/S Hansen-Tangens Rederi III v Total Transport Corp (The Sagona)* [1984] 1 Lloyd's Rep 194, 201, where a master, when asked how often an original bill of lading had been presented to him prior to discharge, answered 'I have never seen it'.

¹¹ 'Electronic data interchange' (n 5) [42].

¹² See eg Miriam Goldby, 'The CMI Rules for Electronic Bills of Lading reassessed in the light of current practices' [2008] LMCLQ 56, 66-67; Nicholas Gaskell, 'Bills of lading in an electronic age' [2010] LMCLQ 233, 283; Koji Takahashi, 'Blockchain technology and electronic bills of lading' (2016) 22 JIML 202, 205.

¹³ See part 3.1.3 below.

2 Lack of a legal infrastructure

There is a need to develop an overarching legislative framework to govern business relationships in commercial shipping. Although there has been some use of electronic bills of lading using electronic registry systems, users of such systems accept contractual terms set out by commercial providers¹⁴ before being granted access to the registry.¹⁵ Third parties are not privy to the web of contracts executed by commercial providers and users of their systems.¹⁶ As a result, there has been uncertainty as to what governs the relationship between users and third parties.

3 Models for identifying the holder of an electronic bill of lading

3.1 Registry Model

3.1.1 Definition of registry model

A registry model identifies the person in control in a separate independent third-party registry.¹⁷ This requires careful control over the registry and a system to verify the integrity of the electronic transferable record (ETR) in order to reliably establish its owner.¹⁸ The creation, issuance and transfer of ETRs is based on information transmitted to and recorded in the central registry,¹⁹

¹⁴ Examples of such commercial providers include Bolero and Korea Trade Net (KTNET). Bolero is subject to English law and is governed by its own private law framework, the Bolero Rulebook. For a description of Bolero, see UNCITRAL Secretariat, 'Possible future work on electronic commerce: Transfer of rights in tangible goods and other rights' (20 December 2000) A/CN.9/WG.IV/WP.90 [75]-[86]. The KTNET system was designated as the registry operator for the purposes of the South Korean Presidential Decree on the Implementation of the Electronic Bill of Lading Provisions of the Commercial Act of 2008. For a discussion of the content and workings of this legislation, see UNCITRAL Secretariat, 'Present and possible future work on electronic commerce' (15 April 2010) A/CN.9/692 [26]-[47].

¹⁵ UNCITRAL Secretariat, 'Legal issues relating to the use of electronic transferable records' (8 September 2011) A/CN.9/WG.IV/WP.115 [15].

¹⁶ IMDA and AGC, 'Joint IMDA-AGC Review of the Electronic Transactions Act (Cap 88) – Review of draft UNCITRAL Model Law on Electronic Transferable Records (Public Consultation Paper)' (10 March 2017) 8.

¹⁷ Takahashi (n 12) 209. See also 'Legal issues' (n 15) [48(b)].

¹⁸ 'Legal issues' (n 15) [48(b)].

¹⁹ Ibid [52].

with the concept of control and the associated security concerns centering on the registry rather than the ETR itself.²⁰

3.1.2 Registry model and the control approach

An ETR under a registry model does not exist digitally as a token to be traded. Instead, the ETR merely contains a reference to the registry where the identity of the person with control can be found.²¹ However, a reference does not behave like a symbolic key to the warehouse and is, therefore, not capable of being possessed. As such, the registry model invariably uses the control approach to identify the holder. This involves identifying the person entitled to enforce the rights embodied in the ETR by identifying the person that controls the ETR.²²

In order to give statutory effect to electronic bills of lading under the registry model, the prevailing solution deems control of an ETR to have the same effect as possession of a paper bill of lading. This solution has been adopted by a number of legal regimes such as the Comité Maritime International Rules for Electronic Bills of Lading,²³ the Rotterdam Rules,²⁴ and more recently, the UNCITRAL Model Law on Electronic Transferable Records (MLETR).²⁵

3.1.3 Registry model incompatible with transferable documents

The registry model is incompatible with transferable documents like bills of lading because this model does not enable the act of delivery, nor the acts of indorsement and delivery.²⁶ The

²⁰ Ibid [14].

²¹ Ibid.

²² Ibid [46].

²³ Rule 7(d): 'The transfer of the Right of Control and Transfer in the manner described above shall have the same effects as the transfer of such rights under a paper bill of lading.'

²⁴ Article 8(b): 'Subject to the requirements set out in this Convention: The issuance, exclusive control, or transfer of an electronic transport record has the same effect as the issuance, possession, or transfer of a transport document.'

²⁵ Article 11. See also part 4.3 below.

²⁶ See Michael Bridge et al, *Law of Personal Property* (2nd edn, Sweet & Maxwell 2017) [5-008]. See also nn 127, 171, 173 and 174 below.

transfer of control of an electronic record between two parties in a registry appears merely to have the effect of changing the identity of the person who has control over the electronic record, rather than delivering an electronic record from one party to another party, which would transfer possessory and contractual rights. It follows that a person who receives control of an electronic bill of lading under the registry model may neither access the possessory rights²⁷ of the bill of lading to claim delivery of the goods at the discharge port,²⁸ nor seek contractual remedies arising from breach of the contract of carriage.²⁹

3.1.4 Registry model and electronic books of lading

It may be observed that registry systems mirror more closely the practice of registering cargo aboard ships in the record-keeping parchment books of the eleventh century than modern bills of lading.³⁰ As pointed out by UNCITRAL, rights in goods represented by documents of title are typically conditioned by the physical possession of an original paper document, such as a bill of lading, warehouse receipt, or other similar document.³¹ The electronic bill of lading under the registry model represents the rights in goods by the control of a registry record, and it is for this reason that electronic bill of lading registries appear to behave like electronic books of lading.³²

There is a real danger that the adoption of the registry model will reverse several centuries of progress, regressing to medieval books of lading. In seeking to give the electronic bill of lading the same level of legal recognition as the paper bill of lading, the technique of holding the ETR was supposed to be founded upon the basic purposes and functions of the primary paper bill of lading.³³ However, the very reason for the control approach was that possession of an electronic

²⁷ Bills of Lading Act (Cap 384, Rev edn 1994) (Singapore), s 5(2)(a), s 5(2)(b) and s 5(2)(c) (BOLA).

²⁸ *Sanders v Maclean* (1883) 11 QBD 327, 341.

²⁹ See n 129 below.

³⁰ See n 1 above.

³¹ 'Transfer of rights' (n 14) [35].

³² The term 'book of lading' is taken from Heiko Giermann, *The Evidentiary Value of Bills of Lading and Estoppel* (LIT Verlag Münster 2004) 21.

³³ 'Legal issues' (n 15) [31]. See also UNCITRAL Secretariat, *United Nations Convention on the Use of Electronic Communications in International Contracts* (United Nations 2007) [51].

record prior to the advent of the blockchain technology was not capable of being replicated. The UNCITRAL Working Group IV has, moreover, reiterated that the MLETR will not deal with matters governed by substantive law.³⁴ However, the control approach may inadvertently disturb existing legal concepts and approaches underlying the primary paper bill of lading requirements which UNCITRAL sought to avoid.³⁵

3.2 Token Model

3.2.1 Definition of the token model

The token model identifies the holder of the ETR in the ETR itself.³⁶ It relies on careful control over the ETR itself and the transfer of control process to determine the owner of the ETR.³⁷ This can be achieved by installing technological and security safeguards, to ensure the existence of a unique authoritative copy that cannot be altered.³⁸

3.2.2 Token model and the possession approach

Unlike the registry model, an electronic token is capable of being possessed. Possession follows title or the right to possess.³⁹ There is a general tendency of the law to favour appropriation, reflecting an abhorrence of the absence of proprietary and possessory rights as a kind of vacuum.⁴⁰ Accordingly, legal possession of the electronic token attaches to the identity of the person with title or the right to possess.⁴¹

³⁴ 'Report of Working Group IV (Electronic Commerce) on the work of its forty-seventh session (New York, 13-17 May 2013)' (22 May 2013) A/CN.9/768 [14].

³⁵ See 'Legal issues' (n 15) [31].

³⁶ Ibid [13].

³⁷ Ibid.

³⁸ Ibid.

³⁹ Bridge (n 26) [10-012].

⁴⁰ OW Holmes, *The Common Law* (1881) 237-238.

⁴¹ Legal possession refers to the state of being a possessor in the eyes of the law: see Bridge (n 26) [10-008]. See also n 115 below.

3.2.3 Token model and compatibility with bills of lading

It is suitable to base an electronic bill of lading on the token model as an electronic token is susceptible to immediate visual verification on the spot, like a tangible paper document.⁴² The identification of the holder of an electronic token is found in the token itself.⁴³ As a result, the holder can demonstrate an entitlement or right to the possessory interest. Accordingly, the holder can assert this right, enforce its interest, and vindicate itself by claiming remedies for wrongful interference with goods.⁴⁴

3.2.4 Lack of a suitable technology

Prior to the advent of the blockchain technology, there was a lack of a suitable technology which could identify the holder of the ETR in the ETR itself. Conventional technologies like digital object identifiers and digital rights management could ensure that electronic records were unique,⁴⁵ but these records could not be transferred as unique tokens.⁴⁶ Conventional technological methods could enable the secure transfer of electronic records as tokens, but could not ensure that these records were unique. An electronic bill of lading token could, therefore, exist in the form of a chain of digital signatures⁴⁷ with the transfer of an electronic bill of lading taking place by hashing the transferor's electronic bill of lading and the transferee's public key, and digitally signing the transferee's electronic bill of lading using the transferor's private key (Figure 1).

⁴² 'Transfer of rights' (n 14) [35].

⁴³ See n 36 above.

⁴⁴ See Bridge (n 26) [10-005].

⁴⁵ 'Legal issues' (n 15) [37].

⁴⁶ Ibid [37].

⁴⁷ Satoshi Nakamoto, 'Bitcoin: A Peer-to-Peer Electronic Cash System' (2008) 2 <<https://bitcoin.org/bitcoin.pdf>> accessed 16 November 2017: 'We define an electronic coin as a chain of digital signatures'.

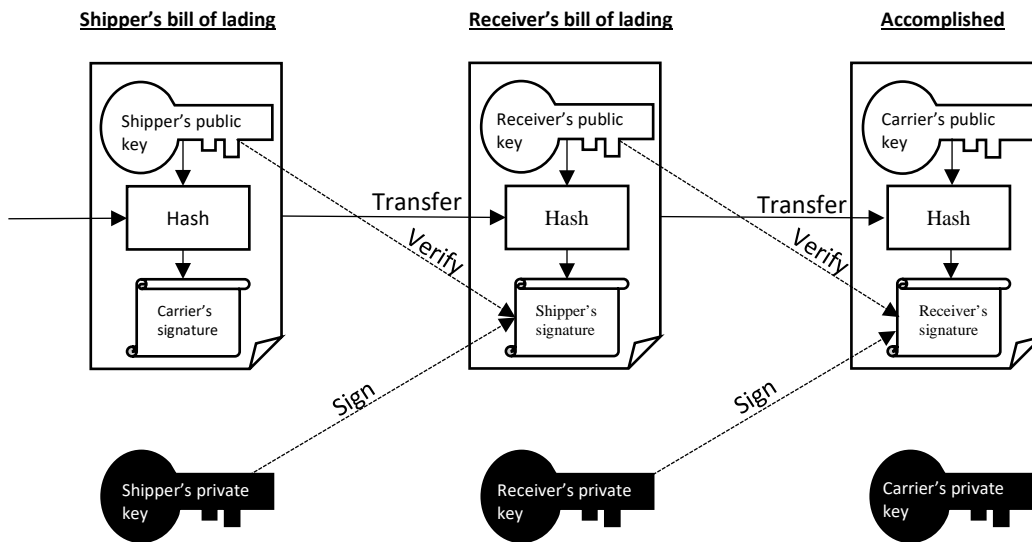


Figure 1: Electronic bill of lading token

In this scenario, a shipper can transfer an electronic bill of lading to a receiver by using the shipper's private key to digitally sign the hash of the shipper's bill of lading⁴⁸ and the public key⁴⁹ of the receiver.⁵⁰ While the receiver can use the shipper's public key to verify whether the shipper has used its private key to digitally sign the transfer,⁵¹ the shipper could already have signed the hash of the shipper's bill of lading and the public key of a third party with its private key without the receiver being able to verify this. This results in the creation of another bill of lading⁵² and, for this reason, this technology cannot *per se* ensure the existence of a unique authoritative copy that cannot be altered. For this reason, it was not possible to base an electronic bill of lading on the token model.

⁴⁸ The shipper received the bill of lading from a previous transfer by the issuer, the carrier.

⁴⁹ This is available in the public directory of the certification authority.

⁵⁰ Nakamoto (n 47) 2: 'Each owner transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner and adding these to the end of the coin. A payee can verify the signatures to verify the chain of ownership.'

⁵¹ Ibid: 'A payee can verify the signatures to verify the chain of ownership.'

⁵² This is also called the 'double spending problem'.

3.2.5 Blockchain technology

Introduction

Blockchain technology is essentially a special database⁵³ technology which was developed by an individual (or a group of individuals) known as ‘Satoshi Nakamoto’ in 2008.⁵⁴ Blockchain technology uses an ingenious method of employing classical cryptographic techniques⁵⁵ to achieve data integrity and identity authentication while providing corresponding timestamps to form an append-only,⁵⁶ purportedly-immutable,⁵⁷ tamper-evident, ledger.⁵⁸

Blockchain technology has been heralded to have potentially the greatest impact on the future of the world economy⁵⁹ and was recently endorsed by Chinese President Xi Jinping as a ‘breakthrough’ technology.⁶⁰ The use of blockchain technology is predicted to generate an additional \$1 trillion in global trade⁶¹ and, for this is reason, is said to be the ‘biggest innovation in the [shipping] industry since the containerisation’.⁶² Blockchain is touted as one of the new

⁵³ Jean Bacon, ‘Blockchain Demystified: An introduction to blockchain technology and its legal implications’ (2017) Queen Mary University of London, School of Law, Legal Studies Research Paper 4.

⁵⁴ Bacon (n 53) 10.

⁵⁵ The two cryptographic techniques that are involved in the blockchain technology are hash functions and Public Key Infrastructure (PKI), first discovered in the 1950s-70s and 1970s respectively: see *ibid.*

⁵⁶ This means that new data can only be built on previous data.

⁵⁷ Bacon (n 53) 24.

⁵⁸ *Ibid.*

⁵⁹ Don Tapscott and Alex Tapscott, *Blockchain Revolution: How the technology behind bitcoin is changing money, business and the world* (Portfolio Penguin 2016): ‘The technology likely to have the greatest impact on the future of the world economy has arrived, and it’s not self-driving cars, solar energy, or artificial intelligence. It’s called the blockchain’.

⁶⁰ 习近平, ‘在中国科学院第十九次院士大会、中国工程院第十四次院士大会上的讲话’ (新华社, 28 May 2018) <http://www.xinhuanet.com/politics/2018-05/28/c_1122901308.htm> accessed 3 June 2018: 以人工智能、量子信息、移动通信、物联网、区块链为代表的新一代信息技术加速突破应用. For translation, see Evelyn Cheng, ‘Chinese President Xi Jinping calls blockchain a “breakthrough” technology’ (*CNBC*, 30 May 2018): ‘A new generation of technology represented by artificial intelligence, quantum information, mobile communications, internet of things and blockchain is accelerating breakthrough applications’ <<https://www.cnbc.com/2018/05/30/chinese-president-xi-jinping-calls-blockchain-a-breakthrough-technology.html>> accessed 3 June 2018.

⁶¹ Kyunghye Park, ‘Blockchain Is About to Revolutionize the Shipping Industry’ (*Bloomberg*, 18 April 2018) <<https://www.bloomberg.com/news/articles/2018-04-18/drowning-in-a-sea-of-paper-world-s-biggest-ships-look-for-a-way-out>> accessed 3 June 2018.

⁶² *Ibid.*

technologies that will cause a change in the maritime industry's rules of engagement,⁶³ and many commentators anticipate that the advent of blockchain technology will usher in a long-awaited shift from paper bills of lading to an electronic alternative.

The development of blockchain technology is particularly timely for the shipping industry. It is expected to improve efficiencies which will contribute to the reversal of the current shipping industry downturn⁶⁴ and it has been suggested that digitalisation will result in a more stable market, with fewer peaks and shorter cycles.⁶⁵

Blockchain bill of lading token

Blockchain bills of lading will share the same token model as electronic bills of lading.⁶⁶ A blockchain bill of lading system collects all announced transfers of a number of bills of lading into a block at regular intervals through its ledger,⁶⁷ which displays the addresses⁶⁸ at which the tokens are kept.⁶⁹ The ledger operates as a timestamp server:

⁶³ Dr Lam Pin Min, 'Speech by Senior Minister of State for Transport Dr Lam Pin Min at the Singapore Maritime Technology Conference' (Ministry of Transport, 25 April 2018) <<https://www.mot.gov.sg/news-centre/news/Detail/speech-by-senior-minister-of-state-for-transport-dr-lam-pin-min-at-the-singapore-maritime-technology-conference/>> accessed 6 June 2018.

⁶⁴ See Wei Zhe Tan, 'The time is right for digitalisation to change the shipping industry' *Lloyd's List* (London, 27 June 2017).

⁶⁵ Nicola Capuzzo, 'BIMCO debate suggests digitalisation will make shipping both transparent and more stable' *Splash247* (Singapore, 7 June 2018) <<https://splash247.com/bimco-debate-suggests-digitalisation-will-make-shipping-transparent-stable/>> accessed 9 June 2018.

⁶⁶ See Figure 1 above, part 3.2.4.

⁶⁷ The ledger is a timestamp server that is integrated into a blockchain system: Nakamoto (n 47) 2.

⁶⁸ Takahashi (n 12) 209: 'The addresses are cryptographic identities of the holders of the tokens. The holders are therefore pseudonymous: they are not displayed by their real-life identities (names). The private keys corresponding to the addresses are secret'.

⁶⁹ Ibid.

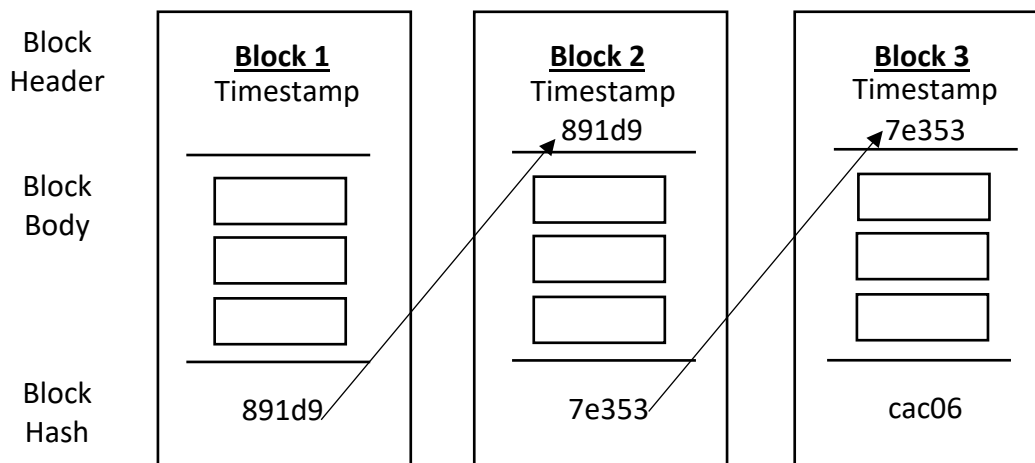


Figure 2: Ledger (Timestamp Server)

Blockchain bills of lading can, using timestamping and cryptographic techniques, single out the earliest transfer of a blockchain bill of lading as the authorised transfer and void later unauthorised transfers in the process,⁷⁰ enabling blockchain bills of lading to be unique. Moreover, the person in possession of a blockchain bill of lading would be able to access the possessory remedies that arise from legal possession and also access the contractual remedies that arise from the right to control the blockchain bill of lading. Blockchain bills of lading will, therefore, replicate the practical and legal objectives achieved by paper bills of lading.

4 UNCITRAL Model Law on Electronic Transferable Records

4.1 History of the Model Law

The United Nations Commission on International Trade Law (UNCITRAL), established by the United Nations General Assembly on 17 December 1966, is the principal legal body of the United Nations concerned with international trade law.⁷¹ It is responsible for modernising and

⁷⁰ See Nakamoto (n 47) 2.

⁷¹ UNCITRAL Secretariat, *A Guide to UNCITRAL: Basic facts about the United Nations Commission on International Trade Law* (United Nations Office at Vienna 2013) 1.

harmonising rules of international trade to facilitate trade and investment⁷² and counts preparation and promotion of use and adoption of model laws⁷³ amongst its legislative techniques to achieve this objective. The substantive preparatory work is usually done by working groups.⁷⁴

The UNCITRAL Model Law on Electronic Transferable Records (MLETR) is intended to act as a uniform and neutral text for the cross-border⁷⁵ use of electronic transport records (ETRs) in international trade.⁷⁶ It has been drafted to enable the use of ETRs as functionally equivalent to transferable documents or instruments,⁷⁷ and is meant to include bills of lading.⁷⁸ UNCITRAL first deliberated issues of negotiability and transferability of rights in goods in an electronic environment at its 27th session, in 1994.⁷⁹ Subsequently, at its 44th session, UNCITRAL tasked Working Group IV to undertake work on ETRs.⁸⁰ Working Group IV proceeded with the work from Working Group IV's 45th session to its 54th session, culminating in a draft MLETR for UNCITRAL's consideration at UNCITRAL's 50th session in 2017.⁸¹ On 13 July 2017 UNCITRAL adopted the MLETR and recommended that Member States give favourable consideration to the MLETR when revising or adopting legislation relevant to ETRs.⁸² UN Member States, including Singapore,⁸³ are at present deliberating whether to adopt the MLETR.

Even though the registry model is not compatible with bills of lading,⁸⁴ the legal framework

⁷² Ibid.

⁷³ A model law is a set of model legislative provisions that States can adopt by enacting it into national law: *ibid* 14.

⁷⁴ *Ibid* 7.

⁷⁵ National legislation predating the adoption of the MLETR and dealing with specific types of electronic transferable records did not address cross-border aspects.

⁷⁶ UNCITRAL Secretariat, *UNCITRAL Model Law on Electronic Transferable Records* (United Nations Office at Vienna 2013) 13-14.

⁷⁷ *Ibid* 13.

⁷⁸ *Ibid* 21. However, the question whether bills of lading were transferable was left to the applicable substantive law of the enacting jurisdictions.

⁷⁹ *Ibid* 14.

⁸⁰ *Ibid* 3.

⁸¹ *Ibid* 16.

⁸² *Ibid* 4.

⁸³ 'Joint IMDA-AGC Review' (n 16) [3.2].

⁸⁴ See n 26 above.

provided by the MLETR enables the use of both the registry and token models for electronic bills of lading. This may be attributed to the principles of functional equivalence and technological neutrality. Moreover, the harmonising of international trade law between Member States from both Common Law and Civil Law jurisdictions will necessarily involve a compromise. It is proposed that the MLETR be adapted for use in Common Law jurisdictions.

4.2 Article 10 — Functional equivalence

The principle of functional equivalence essentially involves replicating the objectives achieved by paper form in electronic form.⁸⁵ This approach was designed to allow Member States to enforce electronic transactions in accordance with existing laws without necessitating wholesale removal of the paper-based requirements themselves or disturbing the legal concepts and approaches underlying those requirements.⁸⁶ This principle finds expression in art 10 of the MLETR, which deems an electronic transferable record as a transferable document or instrument, if certain requirements are met.

4.2.1 The law

There are some difficulties with the wording used in art 10: ‘where the law requires a transferable document or instrument, that requirement is met by an electronic record’. It is submitted that this wording is linguistically awkward because, as formulated, the law will play two roles.

The first role is to prescribe requirements for ‘a transferable document or instrument’. A document is transferable when the obligation it embodies can be transferred by the act of delivery, or by acts of indorsement and delivery.⁸⁷ A document achieves transferability when it is classified as a document which, by mercantile custom, enables its holder to transfer the property

⁸⁵ ‘Legal issues’ (n 15) [30]. For the three core functions of the bill of lading, see eg *Jl MacWilliam Co Inc v Mediterranean Shipping Co SA (The Rafaela S)* [2005] UKHL 11, [2005] 2 AC 423 [38] (*The Rafaela S* HL).

⁸⁶ *Ibid* [31]. See also *United Nations Convention on the Use of Electronic Communications in International Contracts* (n 33) [52].

⁸⁷ *Bridge* (n 26) [5-008].

in the goods to the transferee.⁸⁸ A bill of lading in which goods are ‘shipped by any person or persons to be delivered to order or assigns’, or similar wording, falls within this class of documents.⁸⁹ Therefore, order bills of lading fall within the class of transferable documents and meet the requirement for transferability.⁹⁰

The second role pertains to legal recognition and enforceability when the requirements are met. Since order bills of lading meet the requirement of transferability, they are recognised by law as transferable and enforceable.

For these reasons, it is submitted that the wording in art 10 of the MLETR is unacceptable. Additionally, the wording ‘that requirement is met by an electronic record’ does not fully articulate the understanding that the transferable document or instrument receives legal recognition and enforceability.

Accordingly, it is proposed that the wording ‘where the law requires a transferable document or instrument, that requirement is met by an electronic record’ under art 10 of the MLETR be changed to ‘where the law recognises and enforces a transferable document or instrument, that recognition and enforceability is given to an electronic record’.

4.2.2 The electronic transferable record

It is not controversial that the bill of lading is a unique document, being universally recognised as a symbol of its cargo at sea and the key to the door of the warehouse to the goods, both terms being synonymous with uniqueness.⁹¹ This requirement of uniqueness is found in art 10(1)(b)(i)

⁸⁸ Guenter Treitel and Francis Reynolds, *Carver on Bills of Lading* (4th edn, Sweet & Maxwell 2017) [6-002].

⁸⁹ *Lickbarrow v Mason* (1794) 5 TR 683, 685.

⁹⁰ Cf straight bills of lading: see n 159 below.

⁹¹ *Sanders* (n 28) 341: ‘A cargo at sea while in the hands of the carrier is necessarily incapable of physical delivery. During this period of transit and voyage, the bill of lading by the law merchant is universally recognised as its symbol, and the indorsement and delivery of the bill of lading operates as a symbolical delivery of the cargo ... [a bill of lading] is a key which in the hands of a rightful owner is intended to unlock the door of the warehouse, floating or fixed, in which the goods may chance to be.’ (Bowen LJ).

of the MLETR.

This article requires the identification of the electronic record that contains the information that would be required to be contained in a transferable document or instrument using a reliable method as the electronic transferable record. A blockchain bill of lading can meet this requirement because the blockchain bill of lading token exists in the form of a chain of digital signatures,⁹² with the additional ledger technology to single out the earliest transfer of a blockchain bill of lading as the authorised transfer. It is also submitted that this meets the standard of general reliability under art 12(a)(i) of the MLETR because it employs operational rules relevant to the assessment of reliability. Ledger technology depends on the operational rules of a timestamping server. The blockchain bill of lading system decides on a single history, in the order of receipt, to determine which blockchain bill of lading to reference from amongst competing transfers of blockchain bills of lading.⁹³ The blocks⁹⁴ in the ledger behave as ‘clearing houses’ for the collected announced transfers. Each block ascertains that there are no conflicting transfers within its block and, if so, authorises the transfers. If there are two or more similar transfers of a particular blockchain bill of lading, the block will reference the earliest transfer out of the announced transfers, identify this as the authorised transfer, and void the later unauthorised transfers in the block.⁹⁵ In this way, the identification of a unique electronic record can be accomplished.

⁹² See n 47 above.

⁹³ Ibid.

⁹⁴ Blocks are individual transaction records that are grouped together: see Bacon (n 53) 8.

⁹⁵ Nakamoto (n 47) 2: ‘We need a way for the payee to know that the previous owners did not sign any earlier transactions. For our purposes, the earliest transaction is the one that counts, so we don't care about later attempts to double-spend. The only way to confirm the absence of a transaction is to be aware of all transactions’. Cf n 98 below.

4.2.3 The electronic record contains the information that would be required in a transferable document or instrument

The word ‘information’ in art 10(1)(a) of the MLETR appears to refer only to the information contained in a ‘transferable document or instrument’, without extending to the other features in the bill of lading. If this were the case, however, this would give legal recognition and enforceability only to the conveyancing function and no other bill of lading functions. However, the MLETR further provides in art 6 that ‘nothing in this law precludes the inclusion of information in an electronic transferable record in addition to that contained in a transferable document or instrument’. Accordingly, any uncertainty that the information in the electronic record would not include the other necessary information for a transferable document or instrument to operate as a bill of lading is addressed by this article.

In order for a bill of lading to be captured by an electronic record, the electronic record should contain all the salient information that is present in paper bills of lading. The electronic record should include the names of the shipper, the port of loading and the vessels, name or statement as to the port of destination, the specification of the quantity of goods loaded and the statement that the goods are shipped in ‘apparent good order and condition’, and the suitable completion of the incorporation clause of any relevant charterparty.⁹⁶ The wording importing transferability, such as ‘shipped by any person or persons to be delivered to order or assigns’, should be retained in the electronic record, where possible.⁹⁷ However, the notation ‘one of which being accomplished, the others to stand void’,⁹⁸ may not require retention.⁹⁹ Traditionally, bills of

⁹⁶ See Ong (n 4) 328-335.

⁹⁷ Ibid 334.

⁹⁸ This wording is said to be the ‘time honoured form’: see *The Marlborough Hill v Alex Cowan & Sons Ltd* [1921] 1 AC 444, 453 (Lord Phillimore); *Jl MacWilliam Co Inc v Mediterranean Shipping Company SA (The Rafaela S)* [2003] EWCA Civ 556, [2004] QB 702 [43] (*The Rafaela S* CA); *Hilditch Pty Ltd v Dorval Kaiun KK (No 2)* [2007] FCA 2014, 245 ALR 125 [30] (Rares J); *The Star Quest* [2016] SGHC 100, [2016] 3 SLR 1280 [60].

⁹⁹ This notation, expressly or impliedly, requires delivery only against the bill of lading. Even if it were an implied term, it would be no less a term of the contract of carriage. This notation also enables the operation of the bill of lading as a document of title: *The Star Quest* (n 98) [5], [20], [60]. See also *The Rafaela S* HL (n 85) [45]: ‘In any event, the issue of a set of three bills of lading, with the provision “one of which being accomplished, the others to stand void” necessarily implies that delivery will only be made against presentation of the bill of lading’. See also a similar notation in Conlinebill 2016: ‘One original Bill of Lading must be surrendered duly

lading have been issued in triplicate,¹⁰⁰ with a copy each for the consignor, carrier¹⁰¹ and consignee respectively.¹⁰² This practice of issuing bills of lading in sets could be attributed to the slow speed of mail services¹⁰³ and was intended to protect honest dealing while also running the risk of fraud.¹⁰⁴ However, this has long been criticised.¹⁰⁵ In any case, this practice may not be relevant for blockchain bills of lading because transmission is instantaneous.

Notwithstanding the redundancy, the removal of the notation 'one of which being accomplished, the others to stand void' may affect the status of the bill of lading as a document of title.¹⁰⁶ It is submitted that other suitable wording be used in its place.¹⁰⁷

4.2.4 To render that electronic record capable of being subject to control from its creation until it ceases to have any effect or validity

History of the control approach

The development of a legal framework for electronic bills of lading was challenged by a lack of a suitable technology capable of capturing the possession of a unique transferable document which could establish the identity of the exclusive holder and the uniqueness of the message to be relied upon by the carrier when delivering the goods.¹⁰⁸ Technology was also incapable of

endorsed in exchange for the cargo or delivery order, whereupon all other Bills of lading to be void.'

¹⁰⁰ At times, more bills of lading are issued, which could be deposited at the seller's agent at a number of port states, for merchants to secure the best price from a number of buyers: see Kurt Grönfors, *Towards Sea Waybills and Electronic Documents* (Göteborg, Maritime Law Association 1991) 20-21.

¹⁰¹ For following the goods.

¹⁰² *Lickbarrow v Mason* (1787) 100 ER 35, 40 (Buller J): '... according to the common course of merchants there are only three; one of which is delivered to the captain of the vessel, another is transmitted to the consignee, and the third is retained by the consignor himself as a testimony against the captain in case of any loose dealing'. See also Grönfors (n 100) 12.

¹⁰³ Grönfors (n 100) 20.

¹⁰⁴ *Sanders* (n 28) 341-342.

¹⁰⁵ See eg *Glyn, Mills & Co v East & West India Dock Co* (1882) 7 App Cas 591, 605. Carriers also risk being faced with competing lawful holders: Anders Møllmann, *Delivery of Goods under Bills of Lading* (Routledge 2017) 155.

¹⁰⁶ See n 99 above.

¹⁰⁷ The wording should require delivery against an original bill of lading without issuing multiple copies.

¹⁰⁸ *UNCITRAL Model Law on Electronic Transferable Records* (n 76) 15. See also 'Electronic data interchange' (n 5) para 92.

replicating the possession¹⁰⁹ of a unique¹¹⁰ transferable document. These difficulties eventually found their way into the MLETR¹¹¹ and UNCITRAL deliberated the use of a different approach, the control approach,¹¹² to accommodate the available technologies, such as electronic registry systems, which could identify the person to whom the ETR was issued or transferred.¹¹³ The principal difficulty with such an approach is that the concepts of possession and control are not one and the same.

The nature of the right of control

Generally, the right to control arises from the contractual nature¹¹⁴ of the bill of lading¹¹⁵ and covers the right to tell the possessor what is to be done with the property.¹¹⁶

The right to control a bill of lading covers the contractual right requiring the possessor to produce the bill of lading to the shipowner.¹¹⁷ However, the person with the right to possess¹¹⁸ and the

¹⁰⁹ For more information, see 'Legal issues' (n 15) [19]-[21].

¹¹⁰ That is, singular.

¹¹¹ 'Legal issues' (n 15) [38].

¹¹² By using the control approach, the uniqueness of a record could be achieved using a suitable system under the registry model. Transactions will be recorded and managed through a central authority, or through a technical device based on cryptography that ensures the singularity of the relevant data message. Furthermore, exclusive rights can be transferred so long as there has been reasonable guarantee of the singularity and authenticity of the transmitted data. See 'Transfer of rights' (n 14) [35]-[37].

¹¹³ See 'Legal issues' (n 15) [38]-[39]. See also part 3.1.1 above.

¹¹⁴ For example, see *Chimbusco Pan Nation Petro-Chemical Co Ltd v The Owners and/or Demise Charterers of the Ship or Vessel 'Decurion'* [2013] HKCA 180, [2013] 2 Lloyd's Rep 407 [1], [61]-[62] (*Decurion CA*).

¹¹⁵ The contractual right to control the goods arises from the bill of lading as the contract of carriage. For the right to control a bill of lading, see BOLA, s 2(1)(a); Carriage of Goods by Sea Act 1992 (UK), s 2(1)(a) (COGSA). For the right to control the goods under order bills of lading, see Carver (n 88) [1-040]. Cf the proprietary nature of legal possession: see Bridge (n 26) [10-011]. However, the right to possession may originate from contract: see Bridge (n 26) [10-004], [30-007]; statute, eg for goods: see BOLA, s 2(2); COGSA, s 2(2); or common law eg by the transferor's disposal of the right and the transferee's acquisition of the right (ie delivery) with the corresponding intention to transfer possession: see Bridge (n 26) [29-001], [29-006].

¹¹⁶ *Dollfus Mieg et Compagnie SA v Bank of England* [1950] Ch 333, 359: 'Control would therefore, as it seems to me, cover the right to tell the possessor what is to be done with the property' (Somervell LJ), applied in *Chimbusco Pan Nation Petro-Chemical Co Ltd v The Owners and/or Demise Charterers of the Ship or Vessel "Decurion"* [2012] HKCFI 630, [2012] 2 Lloyd's Rep 309, affirmed in *Decurion CA* (n 114).

¹¹⁷ See n 99 above.

¹¹⁸ That is, the holder. See BOLA, s 5(2) (in *pari materia* with COGSA, s 5(2)).

person with the right to control a bill of lading¹¹⁹ actually refer to the same person. This underlines the multi-functional aspects of the bill of lading, *qua* document of title and *qua* contract of carriage.

At common law, the right to control the goods under order bills of lading is properly referred to as the shipper's right to redirect the goods.¹²⁰ The person with the right to control the goods under order bills of lading¹²¹ and the person with the right to possess the goods¹²² refer to different parties.¹²³ However, the question concerning the right to tell the possessor what is to be done with the property does not arise because the shipper loses its right to redirect the goods once its rights under the contract of carriage have been transferred to the consignee.¹²⁴

Right of control and right of possession

The right to control a bill of lading enables the person identified on the face of the bill of lading to take delivery of the goods in accordance with the presentation rule,¹²⁵ but the right to possess the bill of lading enables the person in possession to use a symbolic key to unlock the door of the warehouse to receive the goods.¹²⁶

¹¹⁹ The person identified in the consignee or order box on the face of the bill of lading.

¹²⁰ Carver (n 88) [1-022] and [1-032]. Cf the Rotterdam Rules, which identify the common law right to redirect goods under order bills as a 'right of control': art 1(12) defines the 'right of control' of the goods as 'the right under the contract of carriage to give the carrier instructions in respect of the goods in accordance with chapter 10'; and art 50(1)(c) limits the right of control to the 'right to replace the consignee by any other person including the controlling party'. Unlike the common law, the Rotterdam Rules vest the right of control in the 'controlling party' ie the holder: Carver (n 88) [1-037].

¹²¹ That is, the shipper.

¹²² That is, the lawful holder. See BOLA, ss 2(2) and 5(2); COGSA, ss 2(2) and 5(2). See also n 134 below.

¹²³ This is unlike the right to control a bill of lading and the right to possess a bill of lading, where they point to the same person.

¹²⁴ Carver (n 88) [1-024], [1-025] and [1-037]. See also BOLA, s 2(1)(a); COGSA, s 2(1)(a).

¹²⁵ *Kuwait Petroleum Corporation v I&D Oil Carriers Ltd (The Houda)* [1994] 2 Lloyd's Rep 541, 553 (Leggatt LJ): 'Under a bill of lading contract a shipowner is obliged to deliver goods upon production of the original bill of lading. Delivery without production of the bill of lading constitutes a breach of contract even when made to the person entitled to possession'; Stephen Girvin, *Carriage of Goods by Sea* (2nd edn, Oxford University Press 2011) [10-02].

¹²⁶ See n 91 above.

Transfer of possession and contractual rights

The transfer of possession of the bill of lading can transfer both the right to possess and the right to control the goods. Contractual rights of suit are typically transferred by contractual provisions, such as assignment or subrogation clauses. However, the act of delivery,¹²⁷ or acts of indorsement and delivery,¹²⁸ can also transfer contractual rights of suit, if the statutory requirements for lawful possession of the bill of lading are met.¹²⁹ Originally linked with the passing of property in the goods,¹³⁰ the Bills of Lading Act¹³¹ provides that the lawful holder of a bill of lading who possesses a bill of lading in good faith¹³² 'shall have transferred to and vested in him all rights of suit under the contract of carriage as if he had been a party to that contract'.¹³³ This will perfect the transfer of possession and enable the indorsee, who is not an original party to the contract of carriage, to become party to the contract of carriage.

Legal implications

At common law, a person without legal possession of the bill of lading is unable to transfer possessory title to the goods¹³⁴ because of the *nemo dat quod non habet* principle.¹³⁵ However, the approach of deeming the person in control of the ETR to have the same effect as possession

¹²⁷ That is, in the case of a bill of lading made out to bearer or where an order bill of lading is endorsed in blank: see eg *Bandung Shipping Pte Ltd v Keppel Tatlee Bank Ltd* [2002] SGCA 46, [2003] 1 SLR(R) 295 [22].

¹²⁸ See n 87 above.

¹²⁹ Such contractual rights cannot be transferred at common law: *Thompson v Dominy* (1845) 14 M & W 403, 405.

¹³⁰ Bills of Lading Act 1855 (18 & 19 Vict, c 111), s 1; *Enichem Anic SpA v Ampelos Shipping Co Ltd (The Delfini)* [1990] 1 Lloyd's Rep 252, 274.

¹³¹ Cap 384, Rev edn 2004 (Singapore).

¹³² BOLA, s 5(2) (in *pari materia* with COGSA, s 5(2)).

¹³³ BOLA, s 2(1)(a), read with s 5(2)(a)-(c) (in *pari materia* with COGSA).

¹³⁴ The transfer of a bill of lading transfers constructive possession of the goods to the transferee without any physical dealing in the goods and the transfer of ownership of the goods follows the intention to transfer property: *Carver* (n 88) [6-002]. The transfer of the bill of lading to the transferee operates as a symbolic delivery of the goods, giving title to sue in the tort of conversion, which does not require ownership of the goods, but either possession or the right to immediate possession of the goods: *Bridge* (n 26) [5-031].

¹³⁵ That is, no person can give a better title than he has. The *nemo dat quod non habet* principle applies not just to ownership, but to possessory title as well: *Bridge* (n 26) [1-041] and [30-002]. Cf Sale of Goods Act, Cap 393, Rev edn 1999 (Singapore), s 21(1); Sale of Goods Act 1979 (UK), s 21(1). The transfer of possessory title and the transfer of ownership can be distinguished: see *Bridge* (n 26) [2-011]; *Borealis AB v Stargas Ltd (The Berge Sisar)* [2001] UKHL 17, [2002] 2 AC 205, [2001] 1 Lloyd's Rep 663.

of the bill of lading will bypass this rule to enable the transfer of possession of the goods without common law legal possession of the bill of lading. This will divide legal possession between common law and statute. Accordingly, the approach will create a new branch of statutory legal possession.¹³⁶

Subject to possession

For all the above reasons, it is submitted that the wording in art 10(1)(b)(ii) of the MLETR should be amended to reflect possession, and not control, of the electronic record as the functional equivalent of possession of the bill of lading. However, this amendment does not mean that the person in possession of a blockchain bill of lading loses the right of control. The right to control the blockchain bill of lading would still be protected by art 6 of the MLETR.

4.3 Article 11 — Control

Article 11(1)(b), read with art 11(1)(a), of the MLETR identifies the person to whom exclusive control of the ETR has been established as the person in control to meet the requirement of possession of a transferable document or instrument. Since control is not a suitable functional equivalent to possession, it is proposed that the words ‘exclusive control’ in art 11(1)(a) and the word ‘control’ in art 11(1)(b) be changed to ‘possession’. Similarly, the reference to ‘transfer of control’ in art 11(2) should be changed to ‘transfer of possession’.

4.3.1 To identify that person as the person in possession

It is possible to possess a blockchain bill of lading through one’s digital identity. Blockchain technology enables a digital identity through use of the cryptographically secure Public Key Infrastructure (PKI) technology that can identify a holder pseudonymously.¹³⁷

¹³⁶ This is not to be confused with the existing statutory lawful possession: see BOLA, s 5(2) (in *pari materia* with COGSA, s 5(2)).

¹³⁷ See Bacon (n 53) 9.

4.3.2 Where the law requires or permits transfer of possession of a transferable document or instrument, that requirement is met with respect to an electronic transferable record through the transfer of control over the electronic transferable record

Transfer of possession

It is possible to transfer possession of a blockchain bill of lading because of a cryptographic technique known as ‘hashing’.¹³⁸ There are several hashing algorithms available and a blockchain bill of lading system can use any of the popular hashing algorithms, such as Secure Hash Algorithm 256 (SHA-256)¹³⁹, to generate hash values.

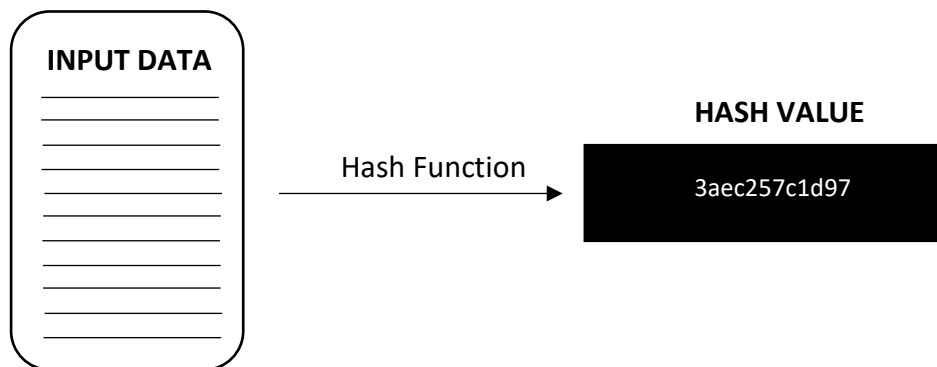


Figure 3: Simple Hash Function

In order to prevent tampering, the hash value has to be visible to external observers, even though the data item can remain invisible.¹⁴⁰ Hashing is secure because it only goes one way¹⁴¹ and while it is possible to hash data into a hash value, it is not possible to use the digested hash value to obtain the original data. It is therefore not possible to reverse the transfer of the possession of

¹³⁸ This is a secure cryptographic technique running input data through a cryptographic digest function to map data to an output hash value and presented in a fixed string of alpha-numericals. Figure 3 shows a simple hash function to illustrate this.

¹³⁹ SHA-256 generates a 32-byte hash.

¹⁴⁰ See Bacon (n 53) 7.

¹⁴¹ Ibid.

the blockchain bill of lading by ‘unsigned’ the transfer. This provides assurance of data integrity¹⁴² and security of hardware and software.¹⁴³

4.4 Article 7 — Technological Neutrality

The MLETR neither encourages nor discourages the use of a particular technology and the principle of technological neutrality is found in art 7 of the MLETR. Technological neutrality is clearly desirable because it prevents technological discrimination and promotes innovation. The replacement of the word ‘control’ with ‘possession’ in the MLETR appears, however, to discriminate between technologies because it recognises electronic bills of lading under the token model, but not those under the registry model. The use of control as a functional equivalent to possession certainly accommodates more approaches for identifying the holder of the bill of lading, but it is submitted that the principle of technological neutrality has to stem from the token model. When the MLETR discussions were ongoing,¹⁴⁴ there was no suitable technology which could replicate paper bills of lading in the electronic form.¹⁴⁵ This does not apply today, however, because of blockchain technology.

Additionally, it can hardly be said that technological neutrality under the token model leads to the stifling of innovation. There is plenty of room for innovation for blockchain technology which can be adapted for trustless and permissionless environments,¹⁴⁶ or trusted and permissioned environments.¹⁴⁷ There are already a good number of consortia developing bespoke blockchain bills of lading solutions.¹⁴⁸ This has led to concerns that there may be a plethora of blockchain

¹⁴² MLETR, art 12(a)(ii).

¹⁴³ Ibid, art 12(a)(iv).

¹⁴⁴ See part 4.1 above.

¹⁴⁵ Blockchain technology only emerged sometime between 2008 and 2009. See Bacon (n 53) 10; Tapscott (n 59) 5; Nakamoto (n 47).

¹⁴⁶ This can be achieved using distributed storage and consensus protocols.

¹⁴⁷ See Bacon (n 53) 11-21.

¹⁴⁸ HSBC-ING: Michael Selby-green, ‘HSBC is shaking up a centuries-old industry using blockchain’ *Business Insider* (Singapore, 14 May 2018). IBM-PSA-PIL: see Sam Chambers, ‘IBM, PSA and PIL to work on blockchain technology shipping solutions’, *Splash247* (Singapore, 16 August 2018) <<https://splash247.com/ibm-psa-pil-work-blockchain-technology-shipping-solutions/>>. HMM-Oracle: Sam Chambers, ‘Oracle looks at shipping’s blockchain quest with HMM collaboration’, *Splash247* (Singapore, 17 May 2018)

platforms in the future,¹⁴⁹ leading to operational inefficiency,¹⁵⁰ and contrary to the aspiration to standardise the logistics chain.¹⁵¹

Accordingly, UNCITRAL can continue to uphold the principle of technological neutrality without using the control of an ETR as a functional equivalent to possession of a bill of lading.

4.5 Article 2 — Transferable document or instrument

Article 2 of the MLETR recognises that ‘a transferable document or instrument’ means ‘a document or instrument issued on paper that entitles the holder to claim the performance of the obligation indicated in the document or instrument and to transfer the right to performance of the obligation indicated in the document or instrument through the transfer of that document or instrument’.

4.5.1 Requirements

Document issued on paper

The four most common documents used in international trade are sea waybills, straight bills of lading, bearer bills of lading and order bills of lading.¹⁵²

<<https://splash247.com/oracle-joins-shippings-blockchain-quest-hmm-collaboration/>>. Maersk-IBM-Agility: Sam Chambers, ‘Agility in blockchain collaboration with Maersk and IBM’, *Splash247* (Singapore, 7 February 2018) <<https://splash247.com/agility-blockchain-collaboration-maersk-ibm/>>. The blockchain solution is based on IBM’s blockchain solution, Hyperledger Fabric: Jason Jiang, ‘Maersk and IBM team up on “transformative” blockchain technology’, *Splash247* (Singapore, 6 March 2017) <<https://splash247.com/maersk-ibm-teams-supply-chain-solution/>>.

¹⁴⁹ Cichen Shen, ‘SMW: ONE sets out its digitalisation priorities’, *Lloyd’s List* (London, 25 April 2018).

¹⁵⁰ Tan (n 64).

¹⁵¹ Richard Meade, ‘SMW: It’s time to demand a little more depth from the digital revolution’ *Lloyd’s List* (London, 24 April 2018) <<https://lloydslist.maritimeintelligence.informa.com/LL1122341/SMW-Its-time-to-demand-a-little-more-depth-from-the-digital-revolution/>>.

¹⁵² ‘The Use of Transport Documents in International Trade’ (n 3).

Obligation indicated in the document

This obligation can refer to the notation requiring delivery against the bill of lading, reflected in the standard bill of lading wording, ‘one of which is accomplished, the others to stand void’.¹⁵³

Entitles the holder to claim the performance of the obligation

This entitlement can refer to the right to claim the performance of the ‘obligation indicated’ in the bill of lading.

Transfer the right to performance through the transfer of that document

The right to performance of this obligation can be transferred by transferring the bill of lading which transfers constructive possession of the goods to the transferee.¹⁵⁴

4.5.2 Applicability to bills of lading

The reference to a ‘transferable document or instruments’ under the MLETR is intended to include transferable bills of lading.¹⁵⁵ Bills of lading entitle the holder to claim delivery of the goods against presentation of an original and this entitlement can be transferred by transferring the bill. For this reason, a bill of lading which is recognised and enforceable in Common Law jurisdictions meets the requirement of being ‘a transferable document or instrument’ as defined under art 2 of the MLETR. The question, however, as to whether a bill of lading is transferable is left to the applicable substantive law of the enacting jurisdiction in conjunction with the multilateral conventions to which that state is a signatory.¹⁵⁶

¹⁵³ See n 98 above.

¹⁵⁴ See Carver (n 88) [6-002].

¹⁵⁵ See n 78 above.

¹⁵⁶ See *UNCITRAL Model Law on Electronic Transferable Records* (n 76) [21].

4.5.3 Documents in international trade

Sea waybills

Sea waybills are not regarded as bills of lading because they are not documents of title¹⁵⁷ and are not transferable. The remaining question is whether a sea waybill would still fall within the definition of ‘a transferable document or instrument’ under art 2 of the MLETR. Instead of requiring delivery, a sea waybill permits delivery on proof of the identity of the named consignee. Since the holder of the sea waybill is not entitled to claim ‘performance’ of this obligation, sea waybills do not fall within the requirements of ‘a transferable document or instrument’ as defined under art 2 of the MLETR.

Straight bills of lading

Straight bills of lading are considered to be bills of lading but whether they are documents of title is a matter of some uncertainty. This is because straight bills of lading are technically not transferable, other than to the named consignee, owing to the absence of wording importing transferability¹⁵⁸ and/or the inclusion of wording which expressly negates transferability.¹⁵⁹ This is the case in both Singapore¹⁶⁰ and the United Kingdom.¹⁶¹

¹⁵⁷ See *Voss v APL Co Pte Ltd* [2002] SGCA 41, [2002] 2 Lloyd’s Law Rep 707 [27], [53]. See also *The Rafaela S* HL (n 85) [46].

¹⁵⁸ Such as ‘shipped by any person or persons to be delivered to order or assigns’.

¹⁵⁹ Such wording includes ‘non-transferable’ or ‘non-negotiable’.

¹⁶⁰ See *Voss* (n 157).

¹⁶¹ See *The Rafaela S* HL (n 85). The uncertainty of the common law ‘document of title’ status of straight bills in English law stems, at least in part, from *Kum v Wah Tat Bank* [1971] 1 Lloyd’s Rep 439 (PC) 446, where Lord Devlin suggested that it had never been settled. However, cf the obiter remarks of Rix LJ in *The Rafaela S CA* (n 98) [145]. See also, for Australia, *Beluga Shipping GmbH & Co v Headway Shipping Ltd* [2008] FCA 1791 [16]-[18].

Hague and Hague-Visby Rules

In *The Rafaela S*¹⁶² the House of Lords unanimously held that a straight bill of lading was a bill of lading or at least a 'similar document of title'¹⁶³ under the Hague and Hague-Visby Rules. Additionally, it was held that, in the hands of the named consignee, the straight bill of lading was its document of title.¹⁶⁴ However, the court did not have to decide whether the straight bill of lading was classified as a bill of lading or a similar document of title at common law.¹⁶⁵

Bills of Lading Act

Under the Bills of Lading Act¹⁶⁶ straight bills of lading are not 'bills of lading', as the Act states that references to a 'bill of lading' do not include references to a document which is 'incapable of transfer either by indorsement or, as a bearer bill, by delivery without indorsement'.¹⁶⁷ It follows that straight bills are instead treated like sea waybills under this statute.¹⁶⁸

MLETR

It is submitted that a straight bill of lading would not be excluded from the definition of 'a transferable document or instrument' under art 2 of the MLETR. This is because the holder of the straight bill of lading is entitled to claim the performance of an indicated obligation in the bill of lading. It has been confirmed that straight bills of lading require the production of the bill in order to take delivery of the goods¹⁶⁹ and that the right to performance of the obligation is

¹⁶² *The Rafaela S* HL (n 85).

¹⁶³ See art 1(b) of the Rules and *The Rafaela S* HL (n 85) [20], [77].

¹⁶⁴ *The Rafaela S* HL (n 85) [46].

¹⁶⁵ Although cf *ibid* [63]-[64], [78].

¹⁶⁶ See also COGSA, which provided the template for BOLA in Singapore.

¹⁶⁷ BOLA, s 1(2)(a). This is in *pari materia* with the Carriage of Goods by Sea Act 1992, s 1(2)(a).

¹⁶⁸ See also Law Commission and Scottish Law Commission, *Rights of suit in respect of Carriage of Goods by Sea* (Law Com No 196; Scot Law Com No 130, 1991) [2.50].

¹⁶⁹ *Voss* (n 157) 722. This has been endorsed in *The Rafaela S* HL (n 85) [45] and followed in Australia (*Beluga Shipping GmbH v Headway Shipping Ltd* [2008] FCA 1791 [13], [18]); Canada (*Cami Automotive Inc v Westwood Shipping Lines Inc* 2009 FC 664, (2009) 351 FTR 236 [16]); Hong Kong (*Carewins Development (China) Ltd v Bright Fortune Shipping Ltd* [2009] 3 HKLRD 409 [2]).

transferable, albeit only once.¹⁷⁰ Accordingly, straight bills of lading fall within the requirements of 'a transferable document or instrument' as defined under art 2 of the MLETR.

Bearer bills of lading

A bearer bill of lading is made out to 'bearer'. This means that whoever presents the bill of lading at the discharge port is able to take delivery of the cargo.¹⁷¹ It follows that bearer bills are not endorsed, but transferred by delivery. Accordingly, bearer bills of lading fall within the requirements of 'a transferable document or instrument' as defined in art 2 of the MLETR.

Order bills of lading

An order bill of lading is one which is consigned to 'order'. This could mean that the cargo is to be delivered according to the order of the shipper¹⁷² or to the order of a named consignee.¹⁷³ Order bills of lading may also be indorsed in blank.

When an order bill of lading is indorsed in blank, this gives the bill of lading the same character as a bearer bill of lading.¹⁷⁴ It follows that order bills of lading indorsed in blank are transferable by delivery.¹⁷⁵

When an order bill of lading is indorsed in the name of an indorsee, the character of the bill changes from that of a bearer bill to that of a bill which had been transferred specifically to the

¹⁷⁰ It was accepted by the English Court of Appeal in *The Rafaela S* that a straight bill was transferable, but could only be transferred once, to the named consignee: see *The Rafaela S CA* (n 98) [87], [137]. Note that no Singapore decision has clarified whether a straight bill of lading is considered to be a bill of lading or at least a similar document of title under the Hague-Visby Rules (although cf *The Star Quest* (n 99), which relied on the exposition of the hallmarks of a bill of lading in *The Rafaela S HL* (n 85)).

¹⁷¹ Carver (n 88) [1-010].

¹⁷² Ibid, see 'order bill of lading'.

¹⁷³ For the distinction and methods of transfer, see Carver (n 88) [1-011].

¹⁷⁴ See eg *Bandung* (n 127) [22].

¹⁷⁵ See Carver (n 88) [1-012].

named indorsee.¹⁷⁶ This does not mean that the bill ceases to be transferable by delivery; on the contrary, the bill of lading is still transferable by delivery, but only to the indorsee. Once the indorsee accepts the bill of lading, the indorsee becomes the new lawful holder of the bill of lading and is entitled to further indorse the bill of lading, either in blank, or to another indorsee. Accordingly, order bills of lading indorsed in the name of an indorsee also fall within the requirements of ‘a transferable document or instrument’ as defined under art 2 of the MLETR.

5 Conclusion

It is without doubt that the blockchain revolution will drive digital transformation of the global shipping industry, reforming the entire spectrum of shipping processes, from trade documentation to vessel operations to port operations. The relentless march of technology will urge the adoption of blockchain capabilities to remain competitive. This will require the shipping industry to be responsive to change. Although the shipping industry is conservative, it also has its fair share of adventurous self-starters and risk takers who are unfazed by technological challenges. There is also a growing interest in shipping by younger professionals from other industries.¹⁷⁷

Technological change will require a systematic, structured, and organised ledger technology. Emerging technologies, such as the burgeoning 5G network, will empower various Internet of Things (IoT) technologies, including autonomous ships,¹⁷⁸ smart port technologies,¹⁷⁹ and smart containers to communicate information with each other in real-time. It is foreseeable that, in future, blockchain bills of lading will unlock smart containers from artificially intelligent ships, and smart contracts of carriage will enforce obligations using IoT and cryptocurrency. As a result,

¹⁷⁶ *Bandung* (n 127) [23].

¹⁷⁷ Jason Jiang, ‘Entrenched attitudes versus technology adoption’ (*Splash247*, 29 January 2018) <<https://splash247.com/entrenched-attitudes-versus-technology-adoption/>>.

¹⁷⁸ See Luci Carey, ‘All hands off deck? The legal barriers to autonomous ships’ (2017) 23(3) *JIML* 202.

¹⁷⁹ See Jacqueline Woo, ‘PSA Singapore unveils advanced port technologies in new exhibition’ *The Business Times* (Singapore, 9 January 2018) for examples of the next generation port technologies that will be introduced in the Tuas mega-port, earmarked as the centerpiece of Singapore’s next generation port vision.

blockchain technology will become increasingly pervasive in all aspects of the shipping industry. Maritime hubs have identified this trend and have publicised ambitious plans for the new digital era in shipping.¹⁸⁰

The future introduction of blockchain bills of lading, together with other forms of trade documentation, will result in greater efficiency, productivity, security, transparency and speed and will take global shipping and port operations out of analogue systems into new frontiers.¹⁸¹ The MLETR was designed to provide a dedicated legal framework to give legal effect to ETRs and is, therefore, an excellent starting point for building a comprehensive legal framework.

However, a chain is only ever as strong as its weakest link. It would, therefore, be irresponsible to adopt any available legal framework in order to let bills of lading ride the blockchain wave, only to find that there is not even a vestige of the bill of lading in the ETR. The proper way to identify the holder of an electronic bill of lading should be to identify the person with possession of the bill of lading and not to identify the person in control the bill of lading, notwithstanding that both approaches may point to the same person. Accordingly, it is submitted that the use of the control approach and the registry model for electronic bills of lading should not be supported. It is recommended that UN Member States, especially those from Common Law jurisdictions,

¹⁸⁰ Denmark plans to grow its shipping sector into a global maritime hub by 2025 and has adopted initiatives to become a leading laboratory for testing new maritime technologies, digital systems, types of production and operation as well as the generation of energy: Marcus Hand, 'Denmark targets digitalisation as it sets out global maritime hub plans for 2025' *Seatrade Maritime News* (Singapore, 23 January 2018) <<http://www.seatrade-maritime.com/news/europe/denmark-targets-digitalisation-as-it-sets-out-global-maritime-hub-plans-by-2025.html>> accessed 5 June 2018. Singapore aspires to be the Silicon Valley of shipping: Richard Meade, 'The Interview: Kenneth Lim' *Lloyd's List* (London, 27 April 2018). Singapore aims to grow the sector's value-add by S\$4.5 billion and create more than 5,000 good jobs by 2025 and has launched the Sea Transport Industry Transformation Map to drive Singapore's vision to be a Global Maritime Hub for Connectivity, Innovation and Talent: MPA, 'Sea Transport Industry Transformation Map to Drive Singapore's Vision to be a Global Maritime Hub for Connectivity, Innovation and Talent' (12 January 2018) <<https://www.mpa.gov.sg/web/portal/home/media-centre/news-releases/detail/83647952-0b16-4a15-ba04-32f14ba29bb2>> accessed 5 June 2018. Singapore has signed several MOUs with Singapore Customs, the Singapore Shipping Association (SSA), and the Maritime Port and Authority of Singapore (MPA), covering the digitalisation of trade and maritime documents, such as bills of lading: Marex, 'Singapore Boosts Maritime Digitalization' *The Maritime Executive* (Fort Lauderdale, 14 January 2018) <<https://www.maritime-executive.com/article/singapore-boosts-maritime-digitalization>> accessed 5 June 2018.

¹⁸¹ Takahashi (n 12) 205.

adopt an amended MLETR to give legal effect to electronic transferable records,¹⁸² which will ensure a conducive legal environment for blockchain bills of lading to thrive.

¹⁸² The proposed amended MLETR can be found in the Appendix 2 of this paper.

Appendix 1: UNCITRAL Model Law on Electronic Transferable Records (Original)

UNCITRAL Model Law on Electronic Transferable Records

CHAPTER I. GENERAL PROVISIONS

Article 1. Scope of application

1. This Law applies to electronic transferable records.
2. Other than as provided for in this Law, nothing in this Law affects the application to an electronic transferable record of any rule of law governing a transferable document or instrument including any rule of law applicable to consumer protection.
3. This Law does not apply to securities, such as shares and bonds, and other investment instruments, and to [...].¹⁸³

Article 2. Definitions

For the purposes of this Law:

“Electronic record” means information generated, communicated, received or stored by electronic means, including, where appropriate, all information logically associated with or otherwise linked together so as to become part of the record, whether generated contemporaneously or not;

“Electronic transferable record” is an electronic record that complies with the requirements of article 10;

“Transferable document or instrument” means a document or instrument issued on paper that entitles the holder to claim the performance of the obligation indicated in the document or instrument and to transfer the right to performance of the obligation indicated in the document or instrument through the transfer of that document or instrument.

Article 3. Interpretation

1. This Law is derived from a model law of international origin. In the interpretation of this Law, regard is to be had to the international origin and to the need to promote uniformity in its

¹⁸³ The enacting jurisdiction may consider including a reference to: (a) documents and instruments that may be considered transferable, but that should not fall under the scope of the Model Law; (b) documents and instruments falling under the scope of the Convention Providing a Uniform Law for Bills of Exchange and Promissory Notes (Geneva, 1930) and the Convention Providing a Uniform Law for Cheques (Geneva, 1931); and (c) electronic transferable records existing only in electronic form.

application.

2. Questions concerning matters governed by this Law which are not expressly settled in it are to be settled in conformity with the general principles on which this Law is based.

Article 4. Party autonomy and privity of contract

1. The parties may derogate from or vary by agreement the following provisions of this Law: [...].¹⁸⁴
2. Such an agreement does not affect the rights of any person that is not a party to that agreement.

Article 5. Information requirements

Nothing in this Law affects the application of any rule of law that may require a person to disclose its identity, place of business or other information, or relieves a person from the legal consequences of making inaccurate, incomplete or false statements in that regard.

Article 6. Additional information in electronic transferable records

Nothing in this Law precludes the inclusion of information in an electronic transferable record in addition to that contained in a transferable document or instrument.

Article 7. Legal recognition of an electronic transferable record

1. An electronic transferable record shall not be denied legal effect, validity or enforceability on the sole ground that it is in electronic form.
2. Nothing in this Law requires a person to use an electronic transferable record without that person's consent.
3. The consent of a person to use an electronic transferable record may be inferred from the person's conduct.

CHAPTER II. PROVISIONS ON FUNCTIONAL EQUIVALENCE

Article 8. Writing

Where the law requires that information should be in writing, that requirement is met with respect to an electronic transferable record if the information contained therein is accessible so

¹⁸⁴ The enacting jurisdiction may consider which provisions of the Model Law, if any, the parties may derogate from or vary by agreement.

as to be usable for subsequent reference.

Article 9. Signature

Where the law requires or permits a signature of a person, that requirement is met by an electronic transferable record if a reliable method is used to identify that person and to indicate that person's intention in respect of the information contained in the electronic transferable record.

Article 10. Transferable documents or instruments

1. Where the law requires a transferable document or instrument, that requirement is met by an electronic record if:
 - (a) The electronic record contains the information that would be required to be contained in a transferable document or instrument; and
 - (b) A reliable method is used:
 - (i) To identify that electronic record as the electronic transferable record;
 - (ii) To render that electronic record capable of being subject to control from its creation until it ceases to have any effect or validity; and
 - (iii) To retain the integrity of that electronic record.
2. The criterion for assessing integrity shall be whether information contained in the electronic transferable record, including any authorized change that arises from its creation until it ceases to have any effect or validity, has remained complete and unaltered apart from any change which arises in the normal course of communication, storage and display.

Article 11. Control

1. Where the law requires or permits the possession of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if a reliable method is used:
 - (a) To establish exclusive control of that electronic transferable record by a person; and
 - (b) To identify that person as the person in control.
2. Where the law requires or permits transfer of possession of a transferable document or instrument, that requirement is met with respect to an electronic transferable record through the transfer of control over the electronic transferable record.

CHAPTER III. USE OF ELECTRONIC TRANSFERABLE RECORDS

Article 12. General reliability standard

For the purposes of articles 9, 10, 11, 13, 16, 17 and 18, the method referred to shall be:

- (a) As reliable as appropriate for the fulfilment of the function for which the method is being used, in the light of all relevant circumstances, which may include:
 - (i) Any operational rules relevant to the assessment of reliability;
 - (ii) The assurance of data integrity;
 - (iii) The ability to prevent unauthorized access to and use of the system;
 - (iv) The security of hardware and software;
 - (v) The regularity and extent of audit by an independent body;
 - (vi) The existence of a declaration by a supervisory body, an accreditation body or a voluntary scheme regarding the reliability of the method;
 - (vii) Any applicable industry standard; or
- (b) Proven in fact to have fulfilled the function by itself or together with further evidence.

Article 13. Indication of time and place in electronic transferable records

Where the law requires or permits the indication of time or place with respect to a transferable document or instrument, that requirement is met if a reliable method is used to indicate that time or place with respect to an electronic transferable record.

Article 14. Place of business

1. A location is not a place of business merely because that is:
 - (a) Where equipment and technology supporting an information system used by a party in connection with electronic transferable records are located; or
 - (b) Where the information system may be accessed by other parties.
2. The sole fact that a party makes use of an electronic address or other element of an information system connected to a specific country does not create a presumption that its place of business is located in that country.

Article 15. Endorsement

Where the law requires or permits the endorsement in any form of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if the information required for the endorsement is included in the electronic transferable record and

that information is compliant with the requirements set forth in articles 8 and 9.

Article 16. Amendment

Where the law requires or permits the amendment of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if a reliable method is used for amendment of information in the electronic transferable record so that the amended information is identified as such.

Article 17. Replacement of a transferable document or instrument with an electronic transferable record

1. An electronic transferable record may replace a transferable document or instrument if a reliable method for the change of medium is used.
2. For the change of medium to take effect, a statement indicating a change of medium shall be inserted in the electronic transferable record.
3. Upon issuance of the electronic transferable record in accordance with paragraphs 1 and 2, the transferable document or instrument shall be made inoperative and ceases to have any effect or validity.
4. A change of medium in accordance with paragraphs 1 and 2 shall not affect the rights and obligations of the parties.

Article 18. Replacement of an electronic transferable record with a transferable document or instrument

1. A transferable document or instrument may replace an electronic transferable record if a reliable method for the change of medium is used.
2. For the change of medium to take effect, a statement indicating a change of medium shall be inserted in the transferable document or instrument.
3. Upon issuance of the transferable document or instrument in accordance with paragraphs 1 and 2, the electronic transferable record shall be made inoperative and ceases to have any effect or validity.
4. A change of medium in accordance with paragraphs 1 and 2 shall not affect the rights and obligations of the parties.

CHAPTER IV. CROSS-BORDER RECOGNITION OF ELECTRONIC TRANSFERABLE RECORDS

Article 19. Non-discrimination of foreign electronic transferable records

1. An electronic transferable record shall not be denied legal effect, validity or enforceability on the sole ground that it was issued or used abroad.
2. Nothing in this Law affects the application to electronic transferable records of rules of private international law governing a transferable document or instrument.

Appendix 2: UNCITRAL Model Law on Electronic Transferable Records (incorporating proposed amendments for Common Law jurisdictions)

UNCITRAL Model Law on Electronic Transferable Records

CHAPTER I. GENERAL PROVISIONS

Article 1. Scope of application

1. This Law applies to electronic transferable records.
2. Other than as provided for in this Law, nothing in this Law affects the application to an electronic transferable record of any rule of law governing a transferable document or instrument including any rule of law applicable to consumer protection.
3. This Law does not apply to securities, such as shares and bonds, and other investment instruments, and to [...].¹⁸⁵

Article 2. Definitions

For the purposes of this Law:

“Electronic record” means information generated, communicated, received or stored by electronic means, including, where appropriate, all information logically associated with or otherwise linked together so as to become part of the record, whether generated contemporaneously or not;

“Electronic transferable record” is an electronic record that complies with the requirements of article 10;

“Transferable document or instrument” means a document or instrument issued on paper that entitles the holder to claim the performance of the obligation indicated in the document or instrument and to transfer the right to performance of the obligation indicated in the document or instrument through the transfer of that document or instrument.

Article 3. Interpretation

1. This Law is derived from a model law of international origin. In the interpretation of this Law,

¹⁸⁵ The enacting jurisdiction may consider including a reference to: (a) documents and instruments that may be considered transferable, but that should not fall under the scope of the Model Law; (b) documents and instruments falling under the scope of the Convention Providing a Uniform Law for Bills of Exchange and Promissory Notes (Geneva, 1930) and the Convention Providing a Uniform Law for Cheques (Geneva, 1931); and (c) electronic transferable records existing only in electronic form.

regard is to be had to the international origin and to the need to promote uniformity in its application.

2. Questions concerning matters governed by this Law which are not expressly settled in it are to be settled in conformity with the general principles on which this Law is based.

Article 4. Party autonomy and privity of contract

1. The parties may derogate from or vary by agreement the following provisions of this Law: [...].¹⁸⁶
2. Such an agreement does not affect the rights of any person that is not a party to that agreement.

Article 5. Information requirements

Nothing in this Law affects the application of any rule of law that may require a person to disclose its identity, place of business or other information, or relieves a person from the legal consequences of making inaccurate, incomplete or false statements in that regard.

Article 6. Additional information in electronic transferable records

Nothing in this Law precludes the inclusion of information in an electronic transferable record in addition to that contained in a transferable document or instrument.

Article 7. Legal recognition of an electronic transferable record

1. An electronic transferable record shall not be denied legal effect, validity or enforceability on the sole ground that it is in electronic form.
2. Nothing in this Law requires a person to use an electronic transferable record without that person's consent.
3. The consent of a person to use an electronic transferable record may be inferred from the person's conduct.

CHAPTER II. PROVISIONS ON FUNCTIONAL EQUIVALENCE

Article 8. Writing

Where the law requires that information should be in writing, that requirement is met with

¹⁸⁶ The enacting jurisdiction may consider which provisions of the Model Law, if any, the parties may derogate from or vary by agreement.

respect to an electronic transferable record if the information contained therein is accessible so as to be usable for subsequent reference.

Article 9. Signature

Where the law requires or permits a signature of a person, that requirement is met by an electronic transferable record if a reliable method is used to identify that person and to indicate that person's intention in respect of the information contained in the electronic transferable record.

Article 10. Transferable documents or instruments

1. Where the law ~~requires~~recognises and enforces a transferable document or instrument, that ~~requirement~~recognition and enforceability is ~~met by~~given to an electronic record if:
 - (a) The electronic record contains the information that would be required to be contained in a transferable document or instrument; and
 - (b) A reliable method is used:
 - (i) To identify that electronic record as the electronic transferable record;
 - (ii) To render that electronic record capable of being subject to ~~control~~ possession from its creation until it ceases to have any effect or validity; and
 - (iii) To retain the integrity of that electronic record.
2. The criterion for assessing integrity shall be whether information contained in the electronic transferable record, including any authorized change that arises from its creation until it ceases to have any effect or validity, has remained complete and unaltered apart from any change which arises in the normal course of communication, storage and display.

Article 11. ~~Control~~Possession

1. Where the law requires or permits the possession of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if a reliable method is used:
 - (a) To establish ~~exclusive control~~ possession of that electronic transferable record by a person; and
 - (b) To identify that person as the person in ~~control~~ possession.
2. Where the law requires or permits transfer of possession of a transferable document or instrument, that requirement is met with respect to an electronic transferable record through the transfer of ~~control over~~ possession of the electronic transferable record.

CHAPTER III. USE OF ELECTRONIC TRANSFERABLE RECORDS

Article 12. General reliability standard

For the purposes of articles 9, 10, 11, 13, 16, 17 and 18, the method referred to shall be:

- (a) As reliable as appropriate for the fulfilment of the function for which the method is being used, in the light of all relevant circumstances, which may include:
 - (i) Any operational rules relevant to the assessment of reliability;
 - (ii) The assurance of data integrity;
 - (iii) The ability to prevent unauthorized access to and use of the system;
 - (iv) The security of hardware and software;
 - (v) The regularity and extent of audit by an independent body;
 - (vi) The existence of a declaration by a supervisory body, an accreditation body or a voluntary scheme regarding the reliability of the method;
 - (vii) Any applicable industry standard; or
- (b) Proven in fact to have fulfilled the function by itself or together with further evidence.

Article 13. Indication of time and place in electronic transferable records

Where the law requires or permits the indication of time or place with respect to a transferable document or instrument, that requirement is met if a reliable method is used to indicate that time or place with respect to an electronic transferable record.

Article 14. Place of business

1. A location is not a place of business merely because that is:
 - (a) Where equipment and technology supporting an information system used by a party in connection with electronic transferable records are located; or
 - (b) Where the information system may be accessed by other parties.
2. The sole fact that a party makes use of an electronic address or other element of an information system connected to a specific country does not create a presumption that its place of business is located in that country.

Article 15. Endorsement

Where the law requires or permits the endorsement in any form of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if the

information required for the endorsement is included in the electronic transferable record and that information is compliant with the requirements set forth in articles 8 and 9.

Article 16. Amendment

Where the law requires or permits the amendment of a transferable document or instrument, that requirement is met with respect to an electronic transferable record if a reliable method is used for amendment of information in the electronic transferable record so that the amended information is identified as such.

Article 17. Replacement of a transferable document or instrument with an electronic transferable record

1. An electronic transferable record may replace a transferable document or instrument if a reliable method for the change of medium is used.
2. For the change of medium to take effect, a statement indicating a change of medium shall be inserted in the electronic transferable record.
3. Upon issuance of the electronic transferable record in accordance with paragraphs 1 and 2, the transferable document or instrument shall be made inoperative and ceases to have any effect or validity.
4. A change of medium in accordance with paragraphs 1 and 2 shall not affect the rights and obligations of the parties.

Article 18. Replacement of an electronic transferable record with a transferable document or instrument

1. A transferable document or instrument may replace an electronic transferable record if a reliable method for the change of medium is used.
2. For the change of medium to take effect, a statement indicating a change of medium shall be inserted in the transferable document or instrument.
3. Upon issuance of the transferable document or instrument in accordance with paragraphs 1 and 2, the electronic transferable record shall be made inoperative and ceases to have any effect or validity.
4. A change of medium in accordance with paragraphs 1 and 2 shall not affect the rights and obligations of the parties.

CHAPTER IV. CROSS-BORDER RECOGNITION OF ELECTRONIC TRANSFERABLE RECORDS

Article 19. Non-discrimination of foreign electronic transferable records

1. An electronic transferable record shall not be denied legal effect, validity or enforceability on the sole ground that it was issued or used abroad.
2. Nothing in this Law affects the application to electronic transferable records of rules of private international law governing a transferable document or instrument.