Digital Business

# Blockchain for Trade Finance

## DIGITAL BUSINESS

Process inefficiencies also compromise the ability to minimize risk in payment mechanisms such as letters of credit. But by modeling payments as self-executing contracts on a blockchain, parties across the spectrum of trade finance may automate contract compliance and ensure faster-protected payments by avoiding disagreements resulting from ambiguities in terms and conditions of payment contracts.

## EXECUTIVE SUMMARY

Payment settlement methods such as letters of credit (LC) and documentary collection have historically provided successful risk mitigation for trading parties by bank facilitation in the trade finance phase. However, because of their associated high costs, contractual delays and process complexity, these activities only account for less than one-fifth of international trade. LC is the most commonly used of the two accounting for approximately 12%2 of all trade transactions. LCs have also been described as the lifeblood of global trade, but their importance can be severely restricted by the risks and inefficiencies of the current process.

Inefficiencies have increased the time and cost of the LC issuance and verification process, made it less attractive for trading parties, particularly for low-value transactions, and led to an increase in open-account trading, which disconnects banks from the process. The findings of the 2017 Trade Finance Study released by the International Chamber of Commerce's (ICC) Banking Commission3 reaffirm the decline in LC and the continued shift toward open account, with 80% of survey respondents indicating limited growth or a decline in LCs going forward (see Figure 1).

### Letters of Credit Plummet

For the past three years, there has been a steady decline in the volume of MT700s, which accounts for approximately 90% of all LC transactions.



Figure 1
Source: SWIFT Trade Traffic (from "Rethinking Trade & Finance," ICC, 2017).

## CURRENT PROCESS CHALLENGES

As LCs are measured on the basis of trade records and not the basis of actual delivery or quality of products, errors in terminology and interpretation of the compliance criteria frequently lead to conflicts between trading parties. As a result, the goods can remain unclaimed at the place of distribution as the parties negotiate a way forward. To understand why these variations exist, we need to look more closely at how an LC contract is organized.

As a payment duty made by the issuing bank (buyer's bank) to the seller, the LC is followed by two other trade contracts:

- The sales contract between the buyer and the seller, outlining the terms of trade.
- The promise by the buyer to reimburse the issuing bank for duly honoring a "compliant" LC submitted by the seller.

The latter also obligates the bank to ensure that the documents presented by the seller completely adhere to the LC terms and conditions, so the bank cannot unilaterally overlook or waive even the smallest discrepancy. At the same time, the LC independence principle5 renders the bank's obligation to the seller independent of the seller's obligation to the buyer. Therefore, even if the sales contract terms have been breached, the bank is required to pay the seller as long as the LC terms and conditions have been met. Thus, the issuing bank must therefore carefully determine whether the documents submitted by the seller comply with the requirements of the LC. For a variety of reasons, this can lead to process inefficiencies for all participants, as well as delayed or refused payments for the seller (see Figure 2, next page).

### Payment Disputes Due to Contractual Ambiguities

Interpreting the semantic ambiguities of the legal clauses in the LC contract typically requires a discretionary decision by the bank. If the bank checks only for significant or fair compliance with the terms of LC, it risks waiving a material deviation and, in doing so, fails to comply with its contractual obligation to the buyer. To prevent this, banks more often frequently follow the strict compliance standard, which mandates compliance with the LC both in spirit and in letter. However, this can lead to payment disputes or refusals, sometimes on the basis of trivial uncertainty, despite the seller's fulfilment of the performance specifications of the sales contract.

## Letters of Credit Pain Points

**Payment disputes due to contractual ambiguities**

- Ambiguities necessitate discretionary determination by banks, which can refuse payment even for trivial discrepancies based on strict compliance standards.
- LC independence principal can lead to payment denial to seller despite fulfillment of the sales contract.

**4 out of 5** LC documents contain discrepancies when presented to banks.

*Source: Industry estimates*

**Payment delays from contract errors**

- Data mismatches in documents, semantic and syntactic errors can hold up payment to the exporter.
- Need waiver or acceptance from buyer or resubmission of documents before LC expiry date.

**70%** of documents presented for LC evaluation are rejected on first presentation.

*Source: ICC*

**Cost and overhead from amendments**

- Amendments add to costs (e.g., as discrepancy fees and telex charges for follow-ups, etc.)
- Process overheads make LC unprofitable for small transactions or those involving time-sensitive or perishable goods.

**7–10 days** Average time for LC issuance.

*Source: LetterofCredit.biz*

**$250** Average cost of LC issuance

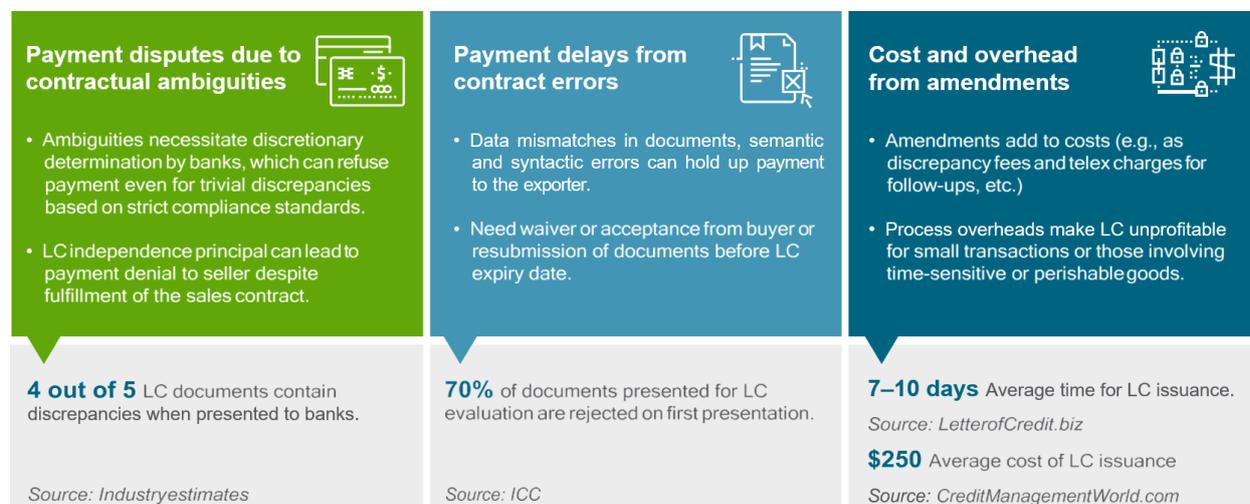*Source: CreditManagementWorld.com*

Figure 2

Consider a hypothetical international trade transaction involving the shipment of goods by sea. If the LC states that the shipment is to be carried out "at the beginning of September," various parties could translate this timeframe in a variety of different ways (see Figure 3). Similarly, the conditions requiring "competent" or "well-known" issuers of the document, or acts that need to be taken "as soon as possible" or "promptly," both require discretion, as well.

## Letter of Credit Ambiguities: A Case in Point

| International Trade Transaction (hypothetical example) | | Difference in Interpretation | |
|---|---|---|---|
| **Term** | **Condition** | **Seller** | **Bank** |
| Shipment date | Beginning of September | September 1–10 | First week of September |
| Earliest delivery date | After September 18 | September 18 | September 19 |
| Maturity date | 30 days from or after the actual shipment date (September 1) | September 30 | October 1 |
| Document issue | From "competent or well-known party" | Party X acceptable | Party X is not acceptable |

Figure 3

While the UCP 6006 has sought to improve the flexibility of strict compliance rules and provide some guidelines for interpreting the compliance conditions, there are still instances of misunderstandings and varying interpretations. Some figures indicate that more than four out of five[7] letters of credit documents contain possible ambiguities when presented to banks.

**Payment Delays from Data Errors in the Contract**

In addition to ambiguities, LC contracts can also involve data mismatches or related variations. In the case of tulips transported from the Netherlands to New Jersey, for example, a difference might be considered if the LC referred to the shipped consignment as "tulips" and the inspection document called them "Dutch tulips" or even "tulipia," their scientific name. If the importer is referred to as "Jonathan & Co Limited" instead of "Jonathan Co. Limited," it could also be considered a material discrepancy. All these discrepancies require the buyer's approval to be waived.

GIVEN THE POSSIBILITIES OF TERMINOLOGY RELATED AND TYPOGRAPHICAL ERRORS AND OVERSIGHTS BY MULTIPLE PARTIES, MISMATCHES CAN EASILY OCCUR IN LC AND TRADE DOCUMENTS. THE ICC STUDY SHOWS THAT BETWEEN 60% AND 70% OF DOCUMENTS SUBMITTED FOR THE LC EVALUATION ARE REJECTED ON THE FIRST PRESENTATION DUE TO SUCH DISCREPANCIES.

Given the possibilities for terminology-related and typographical errors and oversights by multiple parties, mismatches can easily occur in LC and trade documents. An ICC study shows that between 60 per cent and 70 per cent[8] of the documents submitted for the LC evaluation are rejected on the first presentation due to such discrepancies. These statistics are not surprising given that even errors or ambiguities in presentation and grammar, including spelling and punctuation, can be considered discrepancies.

**How LC Amendments Increase Costs and Overhead**

Ambiguities and discrepancies that cannot be waived — e.g., those involving change in the address of exporter (sellers) — require amendments in the LC contract, the sales contact or both. All such waivers and amendments must also be achieved within a limited timeframe before the LC expiry date. A majority of LCs today are provided via SWIFT as MT700 messages rather than as paper contracts.

But even then, the average LC easily costs several hundred dollars and takes seven to 10 days[9] after documents are submitted for processing and payout. Any changes, waivers or amendments add to these costs (e.g., as discrepancy fees or telex charges for follow-ups) and delays, rendering this process unprofitable for small transactions or those involving time-sensitive or perishable goods.

While many attempts have been made to digitize LCs, most have not been successful at mitigating these pain points due to data matching and authentication issues, lack of integration with the overall trade process, or failure to bring all stakeholders to a common centralized platform.

## A BLOCKCHAIN SOLUTION

Using blockchain, LC can be modeled as a smart contract between the financier and the supplier to guarantee payment to the latter — if the trade merchandise is shipped to the buyer in compliance with all defined terms and conditions (see Figure 4). The blockchain smart contract codifies the terms and conditions of trade. This is achieved by abstracting and expressing conditional clauses — concerning the time, place and manner of shipping and delivery, the definition and quantity of the goods shipped, and the documentary proof needed for verification — as separate, independent, or interdependent functions that provide a pass/fail outputs based on the input details.

Based on the documentation submitted by the exporter, determining and verifying that the LC conditions meet specified shipment deadlines can be automated by program logic to indicate compliance or non-compliance for each case.

### Letter of Credit Process Flow

Payment methods like LC and the underlying trade contracts can be modeled as smart contracts on a blockchain to provide payment certainty to the seller.
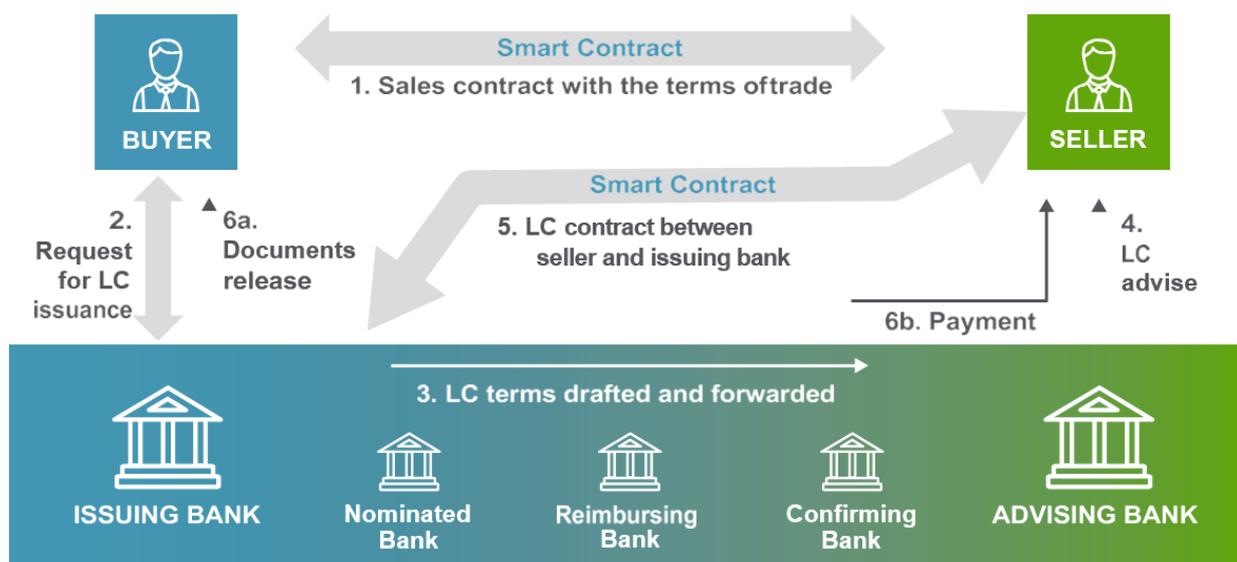


Figure 4

THE NETWORK CONSENSUS MECHANISM ENSURES THERE IS ONLY ONE SINGLE FINAL VERSION OF THE LC DRAFT AT ANY GIVEN TIME AND THAT ALL PARTIES ARE ABLE TO VIEW AND WORK ON THIS VERSION BASED ON THEIR ACCESS RIGHTS.

The LC is issued on a distributed ledger technology (DLT)10 network consisting of the buyer, seller, facilitating banks (including the issuing, advising, confirming, nominating, reimbursing and correspondent banks) and other trade finance institutions acting as participating nodes. The terms and conditions of the LC can be drawn up by the importer

and stored immutably on the blockchain network as a draft. This draft is first made available to the issuing bank, which, after reviewing and underwriting the LC application, can digitally sign it to confirm its approval.

Similarly, the LC can be sequentially reviewed and approved by other participating banks, including the advising bank, before being forwarded to the exporter. The network consensus mechanism ensures there is only one single final version of the LC draft at any given time and that all parties are able to view and operate on this basis of their access rights. After being reviewed and accepted by the exporter, the LC is finalized as a contract between the issuing bank and the exporter. Amendments or updates to the LC can be handled through a similar multi-signatory mechanism, offering approval and viewing permissions to buyer, seller and participant banks depending on the type of the change required.

## BLOCKCHAIN BENEFITS: PAYMENT ASSURANCE TO SELLER

Payment method automation on blockchain allows faster-guaranteed payments by eliminating conflicts arising from contract ambiguities, which eliminates payment delays by early detection of discrepancies and decreases the cost and complexity of making amendments due to discrepancies (see Figure 5).

**Blockchain Benefits**

**Reduces contractual ambiguities**
Modeling LC as a smartt contract codifies compliance Conditions and prevents ambiguities in interpretation.

**Reduces time and cost of LC amendments**
LCs can be issued and modified instantly and Digitally through a multi-signatory mechanism.

**Enables early discovery of information discrepancies**
Stakeholders have visibility into the LC process and can highlight and resolve discrepancies faster.

Figure 5

PHRASES SUCH AS "BEGINNING OF THE MONTH" AND "AS SOON AS" ARE REPLACED BY DISCRETE DATE AND TIME FRAMES TO SPECIFICALLY DEFINE THE DATES ALLOWED FOR SHIPPING, DISTRIBUTION, PAYMENT, ETC. BY MEANS OF SMART CONTRACTS, EACH CONDITION CAN BE ASSESSED ON THE BASIS OF THE DOCUMENTS SUBMITTED BY THE EXPORTER, EFFECTIVELY REMOVING AMBIGUITIES AND, CONSEQUENTLY, THE NEED FOR DISCRETION BY THE ISSUING BANK.

**How Smart Contracts Reduce Contractual Ambiguities and Errors?**

Specifying LC requirements as logical and verifiable conditions in the smart contract template compels consistency and accuracy in terms of time, location, value and manner of shipment when drafting the LC. For example, phrases such as "beginning of the month" and "as soon as" are replaced by discrete date and time frames to explicitly specify the dates allowed for shipping, distribution, payment, etc. Through smart contracts, each condition can be assessed on the basis of the documents submitted by the exporter, effectively eliminating ambiguities and, consequently, the need for discretion by the issuing bank.

In addition, by modeling the previous sales contract between the purchaser and the seller as smart contracts, as well as the agreement between the purchaser and the issuing bank, data anomalies can be further avoided in the LC contract, as key data elements such as a description of the products, names of the parties, etc. can be obtained directly from the underlying contract. This would ensure continuity in the description-so that products such as 'tulips' would be referred to as 'tulips' or 'Dutch tulips' in all transaction-related records, and similarly, the importer would be referred to in a consistent manner across the commercial life-cycle—reducing data errors.

SINCE ALL TRADING AND FACILITATING PARTIES ALSO HAVE VISIBILITY INTO THE LC ISSUANCE PROCESS ON BLOCKCHAIN — AND CLEAR OVERSIGHT INTO THE CURRENT STATUS OF THE PENDING ACTIONS — POTENTIAL DISCREPANCIES CAN BE MORE QUICKLY IDENTIFIED.

**Early Discovery of Discrepancies through Data Sharing**

Since all trading and facilitating parties also have visibility in the process of issuing the LC on blockchain and clear oversight into the current status of the pending actions — possible discrepancies can be detected more easily. In addition, any amendments or corrections demanded can also be made earlier in the process rather than after being sent to the issuing bank. For example, if the shipment is postponed for a few weeks, the effects must be dealt with in real-time; the purchaser may either allow the bank to waive the difference on the date of shipment (and its consequent effect on the dates of delivery and payment) or the purchaser and the seller may agree to change other terms of exchange and to make an adjustment to the LC.

The argument here is that these discussions should be undertaken and decisions taken in advance of the request rather than after the difference of documents are rejected by the issuing bank. This would help reduce the time taken to review the bank and also speed up distribution, freeing up funds to meet the needs of the seller's working capital needs. Overall, if the LC sets out a number of requirements that need to be met at any given time, all parties will see which conditions have been successfully achieved, refused or are pending; this saves time and eliminates additional costs for trading parties for long-drawn disputes.

In certain situations, this method could also be the only way to avoid non-payment. For example, although internal documents can be changed at a later point for compliance with the LCs, this may not always be feasible in the case of third-party documents, such as the bill of lading, as a post-shipment adjustment would result tantamount to the perpetration of fraud in some countries.

BLOCKCHAIN TECHNOLOGY REMOVES THE NEED FOR PHYSICAL DISPLAY OF DOCUMENTS, MAKING THE PROCESS QUICKER AND MORE ACCESSIBLE TO TRADING PARTIES. IT ALSO ENSURES THAT ALL PARTICIPANTS ARE MADE AWARE OF THE PROCEDURE AND CAN REVIEW THE DOCUMENTATION SUBMITTED BY THE SELLER.

**Digitizing Workflow to Reduce LC Amendment Time and Costs**

Another advantage of blockchain is that it greatly decreases the time and costs for the issuance of the LC, as well as for any purchaser's waivers or amendments made due to discrepancies. Through the multi-signatory mechanism, any necessary changes required can be immediately accepted or countered by the relevant parties, and the updates can be made available to all stakeholders in real-time.

Unlike paper-based or SWIFT LCs which are mainly intended to be bilateral interbank contact tools, this approach greatly reduces the time taken to issue and update an LC. Proofs of concept (PoC) for LC automation via smart contracts has reduced execution times from weeks and days to a few hours.[11] For example, if the address of the importer has changed, an amendment can be proposed by the importer, reviewed and approved by the exporter and issuing bank, incorporated in the LC and shared with all other stakeholders. All other documents, including the sales contract, that use this data input field will also be automatically flagged for update and modified in a similar manner to avoid discrepancies.

Although LC is the most common method of payment and requires greater bank involvement compared to other methods, blockchain benefits accrue similarly to payment methods such as documents against payment (D/P) and documents against acceptance (D/A). Blockchain technology eliminates the need for the physical display of documents, making the process quicker and more transparent and accessible to trading parties. It also ensures that all participants have visibility into the process and can peruse the documents presented by the seller.

**LOOKING FORWARD**

By effectively solving their pain points, blockchain has the potential to make trade finance payment methods more powerful, secure and profitable for all trading parties and increase their indispensability for risk mitigation in international trade.

In the short term, blockchain technology eliminates process inefficiencies by digitizing the LC documentary assessment. In the long term, the sophistication and ubiquity of blockchain processes and ecosystems offer a more comprehensive view of knowledge flows, fully eliminating the need for document-based assessment and financing, and instead allowing LC assessment and financing to be based on asset movements and other contractual milestones. For example, rather than an inspection report, the LC condition for a perishable shipment may be based on the shipping temperature not exceeding the recommended range for the whole transport and disbursement of funds to a small or medium-sized enterprise.

Given the potential benefits of blockchain technology in this field banks and other stakeholders in the broader trade finance ecosystem must begin to explore and evaluate its implementation through targeted use cases. Doing so will create awareness and acceptance for the introduction of comprehensive business solutions that bridge blockchain process efficiency promises the tough reality of incorporating core banking systems into blockchain-based trade finance networks.

**FOOTNOTES**

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8. "At Sight Letter of Credit," LetterofCredit, http://www.letterofcredit.biz/at_sight_letter_of_credit.html.

9. In this paper, we have used blockchain and distributed ledger technology (DLT) interchangeably. Blockchain is a specific type of DLT in which blocks of transactions are cryptographically linked together. Enterprise platforms like Corda are examples of non-blockchain DLT systems that provide localized (deal-level) consensus and limited (on a need-to-know basis) data sharing.

10. Melodie Michel, "First Live Blockchain Transaction Conducted," Global Trade Review, July 9, 2016, http://www.gtreview.com/news/global/first-live-blockchain-trade-transaction-conducted/.

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## ABOUT DIAMANTE BLOCKCHAIN

Diamante Blockchain is a global, decentralized finance platform successfully implementing and developing a competitive blockchain-enabled ecosystem for trade, payments, and financing. We proudly provide our consortium with payment and line of credit solutions built on our proprietary blockchain infrastructure.

The Diamante ecosystem will encompass individuals and enterprises throughout the entire global finance supply chain and will give members immediate access to i) PayCircle - PayCircle allows businesses and individual to Custody, Send & Receive multi-currency (USD/AUD/CAD/EUR/JPY) Fiat and Digital assets (BTC, ETH, ERC20 based tokens and stable coins like USDT) anytime & anywhere, 24/7 and 365 days, ii) CreditCircle - a decentralized finance application where individuals and businesses can opt for receiving loans and credit at a relatively low-interest rate compared to traditional financing, and iii) Diamante Net -  a safe and secure blockchain network where participants can connect, interact and transact with each other.