

DISTRIBUTED LEDGER TECHNOLOGY – THE NEXT FRONTIER FOR BUSINESS STANDARDS

In principle, distributed ledger technologies and smart contracts could lift levels of automation in post-trade processing by reducing the amount of information that has to be exchanged to settle a transaction, and potentially the number of parties involved as well. The realisation of these benefits depends on standardisation, and ISO 20022 provides the ideal foundation on which to build a viable transition from current to future technologies, argues Stephen Lindsay, Head of Standards, SWIFT.

Distributed ledger technology (DLT) and smart contracts (SC) are rich in potential. They promise a complete transformation of automation in the financial services industry. This is why both DLT and SCs are generating lavish interest at financial institutions and technology providers.

DLT offers a single, consistent and shared view of the state of a business process. In principle, this means the technology can eliminate the need to pass information between market participants or counterparties. Individual firms would simply have access to independent copies of exactly the same data in their own systems.

Reduced number of interactions

DLT can therefore reduce much of the point-to-point messaging and other processing required to keep data synchronised and reconciled. SCs can add further efficiency by replacing complex interactions amongst many actors with self-executing processes deployed on a distributed ledger.

A recent paper published by the European Central Bank (ECB)¹ sets out several possible adoption paths for DLT and SCs in post-trade securities processing.

They range from an evolutionary trajectory, in which financial market infrastructures (FMIs) and financial institutions employ the technology to improve the efficiency of current business processes, to a more disruptive vision, in which the prevailing post-trade infrastructure is replaced by a fully automated, peer-to-peer mechanism that intermediates all exchanges of information between issuers, buyers and sellers without intermediation by fund managers, brokers, custodians, clearing houses and depositories.

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**- Stephen Lindsay,
Head of Standards, SWIFT**

¹ European Central Bank, Andrea Pinna and Wiebe Ruttenberg, Occasional Paper Series, *Distributed ledger technologies in securities post-trading: Revolution or evolution?* No. 172, April 2016. The paper can be found at: <https://www.ecb.europa.eu/pub/pdf/scpops/ecbop172.en.pdf>

Obstacles to be cleared

However compelling, these remain long-term possibilities. DLT and SCs have many obstacles to overcome before they are ready to supplant the infrastructural status quo. This is certainly the view expressed in a recent position paper on distributed ledger technologies published by SWIFT.²

The paper sets out a number of critical areas in which further evolution of the technology is required. These include governance, data controls, regulatory compliance, identity management, security, reliability, scalability and standardisation.

Standards are being developed

Standardisation in particular has become a discussion point within the DLT community. The Hyperledger Project, a cross-industry collaborative programme, aims to create an open source coding standard.³ New tools for writing strict smart contracts, such as Distributed Asset Modeling Language (DAML), are also emerging.

Similarly, the prototype of the standardised architecture for private distributed ledgers being developed by the R3 consortium of more than 50 financial institutions⁴ is supported by a standardised language its inventors have dubbed CLACK.

All of these developments are welcome, but they ignore an important lesson of previous waves of technology-driven automation.

This is that success in an environment populated by multiple parties requires all of its participants to define and agree the meaning and content of the information they share, and the business processes, roles and responsibilities by which that information is shared. This is the domain of business standards.

The twin functions of business standards

Today, business standards fall into two broad categories. The first is reference data and the second is messaging.

Reference data standards lay down universally applicable codes for key data elements in a transaction, such as the currencies being exchanged, the underlying securities being bought and sold, and the legal entities exchanging the currencies and securities.

The reference data standards define both the format of the data (for example, the length and format of each currency code) and the data itself (for example, the list of agreed currency codes such as CHF, EUR, GBP and USD). These reference data standards ensure consistency in the exchange of important business data.

Messaging standards, on the other hand, define the formal content of business messages exchanged by participants in a transaction. They enable the parties to complete a business process, such as the settlement of a cash payment or a securities transaction.

They also describe the roles played by different actors in a business process, and the message flows required to achieve a particular objective. Importantly, messaging standards specify data elements using reference data standards wherever possible. This minimises ambiguity.

Both reference data and messaging standards have worked well in conventional electronic messaging, and made a major contribution to higher levels of automation. DLT, on the other hand, offers a different paradigm from electronic messaging. It is forcing

2 The paper can be found at: <https://www.swift.com/insights/press-releases/swift-and-accenture-outline-path-to-distributed-ledger-technology-adoption-within-financial-services>

3 Hyperledger is a Linux Foundation collaborative project between 79 organisations to create an open source distributed ledger framework and code base which firms in all industries can use to build and run specific applications. See <https://www.hyperledger.org>

4 See <https://r3cev.com>

payments and securities industry participants to re-think some of their ideas about standards.

DLT requires a new approach to standards

For example, a conventional electronic message using current standards enables the parties to a transaction to exchange the information needed to settle it by combining two distinct functions. The first function is a notification (“choose how to receive a payment”) or instruction (“make a payment”), while the second function conveys the information needed by the recipient to complete the action (“USD 1,000 to A.N. Other’s account number 12345”).

In conventional messaging, this combination of distinct functions is so familiar that the distinction between them is usually overlooked. But when the same transaction is replicated using DLT and SCs, it becomes possible not only to separate the functions, but in some cases to eliminate one or both of them.

This is possible because some or all of the information required to complete a transaction may already be present on the ledger and not need to be sent. For example, the instruction (“make a payment”) only may be required.

Equally, the event that gives rise to the payment (interest falling due on a deposit, for example) could be described autonomously on the distributed ledger by writing a SC. This still requires an external trigger, but it does not require any external party to act.

These characteristics of DLT are what make the technology so potentially disruptive. It removes the need for many of the exchanges of information between the parties to a transaction required to complete it. It may ultimately remove the need for some of the parties as well.

Transitioning to DLT

The self-contained nature of DLT and SCs means traditional methods of standardising exchanges of information cannot readily be applied. So what would it take to standardise a DLT-cum-SC use-case such as

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a payment or securities transaction settlement? What would such a standard look like?

In answering this question, it is clear that the standard will have to define clearly the data present on the ledger; how it is represented; and, importantly, what it means.

For the accompanying SCs, it will also be necessary for the standard to define what software engineers call the logic: the principles by which the elements of the contract are arranged to perform the specified task. This includes defining what each participant is entitled to see within the distributed ledger, based on their roles and responsibilities in the processing of the transaction.

Some of these challenges are met by an existing standard. ISO 2022 provides a comprehensive set of definitions for key business concepts that is independent of any messaging or other automation style. ISO 2022 also defines business roles, although these are linked to message exchanges and high-level business processes rather than contractual obligations.

As one of the principal organisations behind ISO 2022, SWIFT has embarked on a programme of work to investigate how the standard could be applied in environments that make use of DLT and SCs.

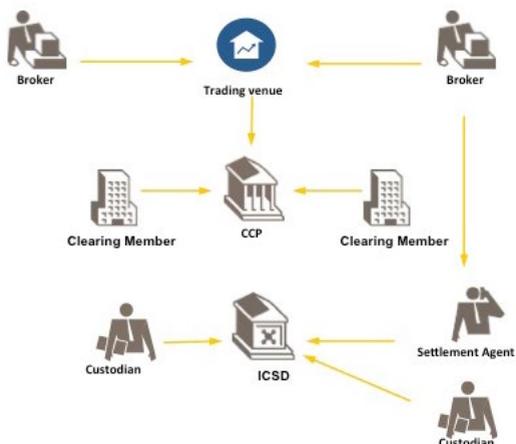
The first fruits of this effort will be visible at Sibos 2016 in Geneva, where SWIFT will demonstrate an ISO 2022-based proof-of-concept DLT and SC implementation that automates the lifecycle of a fixed rate bond. The insights gained in this project will be shared in a new information paper that will be published simultaneously.

The paper will argue that ISO 2022 provides an ideal foundation from which to evolve standards specific to DLT and SCs. There is clear value, for example, in re-using reference data standards and business content from ISO 2022, since it avoids the need to reinvent definitions.

Above all, using ISO 20022 as a base will also facilitate inter-operability among DLT implementations and FMI that use current electronic messaging standards and technologies. This is essential, since the transition from current post-trade arrangements to new technologies, no matter how desirable they are in principle and in practice, will inevitably take time.

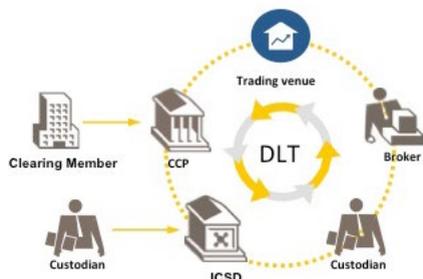
Indeed, by making use of ISO 20022, advocates of DLT and SC technologies will not slow down the implementation and acceptance of the new technologies. They will accelerate it.

Messaging



Distributed ledger technology

in this example, some actors share information directly using DLT



The SWIFT DLT proof-of-concept will be demonstrated at Sibos on the SWIFTLab stand at the following times:

Monday 26th September at 10:10
Wednesday 28th September at 10:10

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