

# BLOCKCHAIN

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From the  
hype to  
the concept  
with PoCs



## Introduction

Blockchain and Distributed Ledger Technologies (DLT) are bringing disintermediation to nearly all industries. A survey from Greenwich Associates<sup>1</sup> highlights that financial and technology firms are expected to invest more than US\$1 billion to bring blockchain technology to capital markets in 2016. According to the World Economic Forum<sup>2</sup>, financial services will be transformed by this technology, with the expectation that at least 10 percent of the global GDP will be stored on blockchain platforms by 2025.

DLT can be defined as a database that can be shared across the network. Underlying this technology is blockchain that consists in a decentralized ledger that operates in a transparent environment.

With the increase of investments around blockchain and DLT, the hype continues to grow as several initiatives, startups, and technological platforms continue to blossom. However, it is still a nascent technology with limited feedback and lessons learned, making it difficult to know how to develop and take full advantage of this technology.

In this context, in order to explore the capabilities of DLT and demonstrate the economic viability of concrete use cases, Deloitte has launched various initiatives worldwide ranging from forming alliances with startups to the setup of development labs.

The aim is also to acquire internal competencies so that Deloitte can support clients in building and integrating custom solutions based on different technological platforms and partners. Several platforms, technologies, protocols, and methods are available for blockchain development and the choice of a particular solution is highly dependent on the business objective.

Ethereum, Hyperledger, and Rubix, among others, are examples of platforms on which to develop Smart Contracts, which are digital representations of a contract, including terms implemented in a computer language that are executed automatically when specific conditions are met.

From a protocol point of view, several algorithms can be used to obtain a consensus. Proof of Work (protocol relying on the amount of work to spend for mining) is the most known and used so far, but other consensus such as Proof of Stake, Practical Byzantine Fault Tolerance, and Node to Node are also considered by various platforms.

In 2016, Deloitte Luxembourg developed several proofs-of-concept (PoCs) in order to have hands on experience, understand the pros and cons of different platforms, and demonstrate use cases.

Three of them are presented in the following sections:

- Cross-currencies payment rail using Temenos and Ripple.
- **ArtTracktive** to track art pieces on Ethereum.
- **AirMes** to enable transaction regulatory reporting on Ethereum in the context of EMIR, MiFIR, and SFTC regulations.

## Temenos-Ripple integration

In the context of cross-currency settlements, there is a need to reduce the time of international transfers usually performed through SWIFT protocols. The Temenos-Ripple PoC, co-developed by Deloitte and Bluzelle, consists of the integration of Ripple into Temenos's Core Banking Systems with the objective to enable financial institutions to send payments, either in local or foreign currency, in real time without relying on intermediary banking relationships.

To conduct this PoC, a Hybrid Agile methodology structured around quick runs has been followed. The developed solution enables cross-currency payments to be routed to Ripple and allow the execution of an international payment in six seconds. This immediacy ensures that the best possible exchange rate is used for the transaction. The benefits for banks are to obtain higher exchange rate margins and considerably reduce the costs for using the SWIFT network. The solution also improves the user experience, since international payments are executed almost instantaneously.

By developing this PoC in only 8 weeks, it has been proven that blockchain integration can be quickly implemented from design to production. ➤

<sup>1</sup> Blockchain Adoption in Capital Markets, Greenwich Associates, June 2016

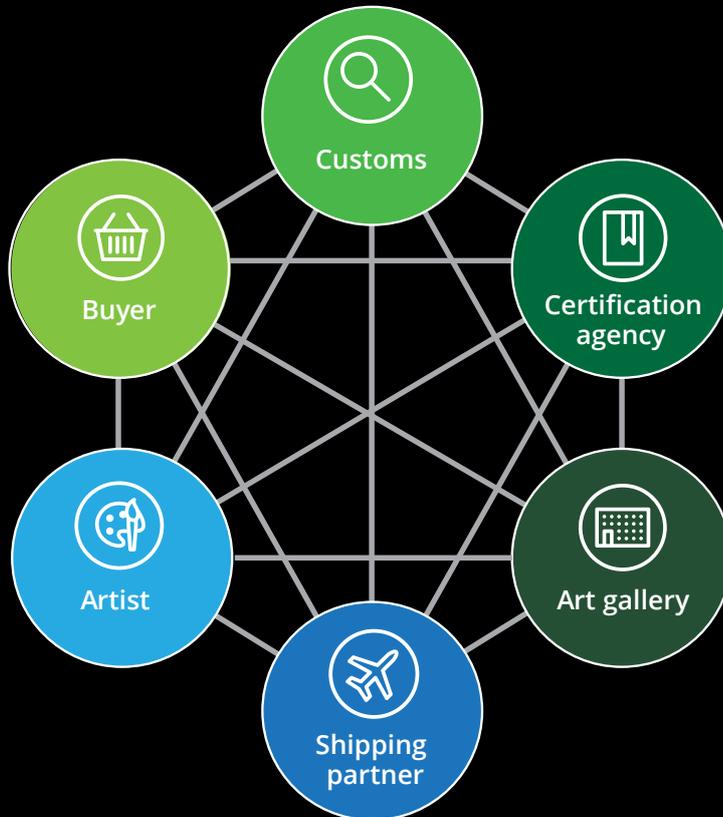
<sup>2</sup> World Economic Forum. September 2015

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**ArtTracktive: solving the traceability issues in art**

The ArtTracktive PoC shows how the key challenges faced by the art industry—namely the traceability of information, the trust of counterparties, and the transparency of transactions—can be addressed by using a distributed ledger for tracking the origin and the journey of works of art. Today the traceability of work of art is inefficient, inconsistent, time-costly and mostly paper-based.

ArtTracktive proposes a platform to solve traceability issues in art by recording interactions between all parties involved on a blockchain in processes such as lending and selling.



Current interactions for the traceability of works of art are various, heterogeneous, and unnormalized

Parties interact with the blockchain through a web application in order to record their actions from the introduction of the piece of art, its certification, and the notification of sell/lend, all the way to the shipping and customs clearing.

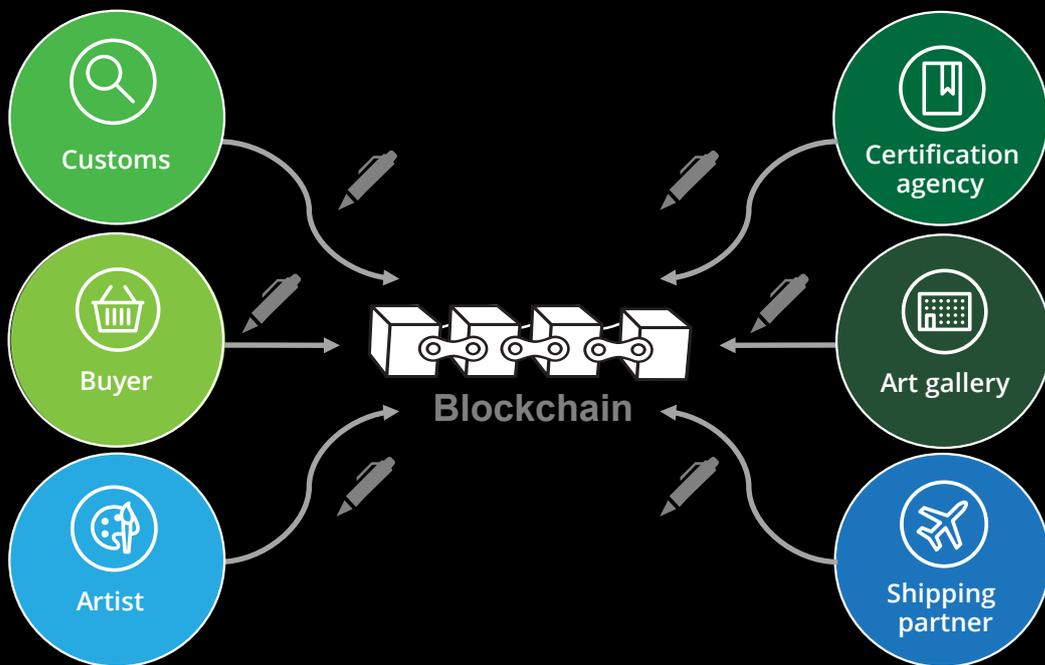
The main lessons learned from this PoC are around the development of Smart Contracts. For example, the specialization of Smart Contracts with minimum data (fit-for-purpose) is important, due to the cost associated with the storing of fields—which can become very expensive on Ethereum. It has also been required to implement a specific trace-back chaining mechanism to ensure an effective technical tracking of transactions that is not native in Ethereum, as opposed to Bitcoin.

### Transaction Regulatory Reporting with AirMes

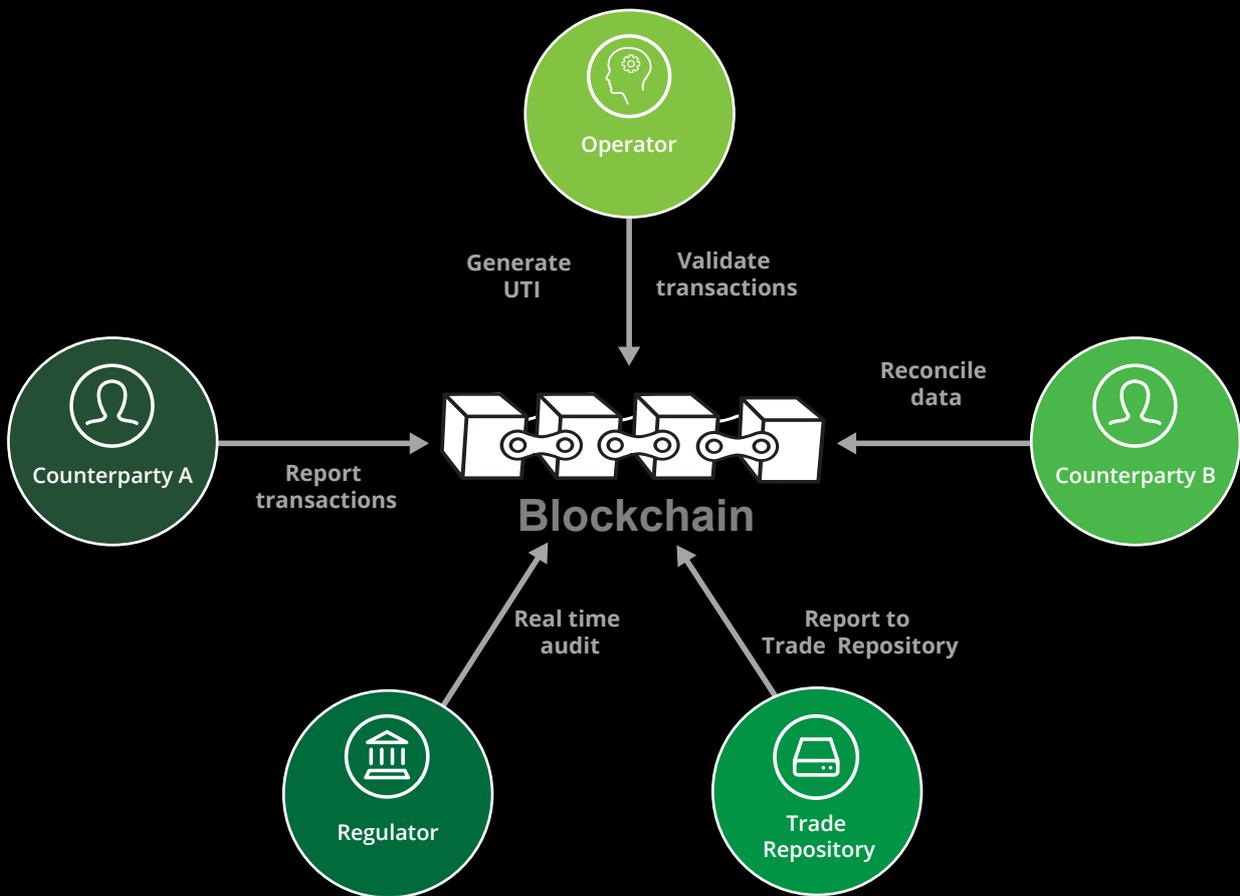
The AirMes PoC provides an answer to recent regulations that enforce the need for a timely reporting on post-trade transactions. EMIR, MIFIR, FSTC, and others involve challenges in terms of data quality, data reconciliation, timing, and cost that a blockchain can address thanks to its immutable shared ledger of pre-reconciled transaction reports.

In this concept, the first counterparty loads reporting information to the application, where the smart contract performs data quality checks and automatically validates transactions. Occasionally, a data quality operator may propose adjustments to correct irregular input data before the validation.

Once transaction reports are validated and signed by the first counterparty, the second counterparty receives the reporting information for confirmation and sign-off. At this point, the Unique Trade Identifier (UTI) required by the regulator is generated and stored onto the blockchain. Reporting information is finally sent to the trade repository, which can approve or reject it based on a predefined set of criteria such as the appropriate format. One of the main strengths of the process is that it can be supervised in real time by the regulator, enabling real-time analytics to detect fraudulent activities, exceptions, and more.



Blockchain will bring uniformization, automation, and better trust



Transaction Regulatory Reporting process based on blockchain will be faster and more efficient

This PoC has been developed following an agile methodology with three sprints of two weeks. In order to enable the modification of reporting data, two smart contracts are activated within this PoC: the proof-of-process, which contains the hash of the reporting data and can be modified; and the actual reporting smart contract, which contains the hash of the reporting data only when A and B agree on common data (final hash) as well as the UTI.

One of the main challenges faced during the development is related to the implementation of asynchronous business validation of the data. The design of the state machine is a critical activity that must be performed by a cross-functional team with subject matter experts, software developers, and end-user interface (UX) designers.

Another lesson learned is that, even if it has not been demonstrated in this PoC, the trade repository could also be disintermediated, if the law allows it, as the solution itself provides data quality control and immutable transaction reports storage.

It has also been learned that data interface and API specification standards is key to enable industrialized deployment of this solution, especially if the insertion of the data on the DLT is made online by different participants. This is not only a question of type of data (dates, integer, decimal, etc.), but also a question of format and cross-field business rule controls.

Without it, it will be very difficult to enable streamlined system-to-system integration and asynchronous business validation of data or transactions.

### Development of a new PoC for KYC/ Smart Identity

As a new challenge, Deloitte is currently developing a new PoC to deal with Know your Customer and Identity Management issues. More to come...

## Conclusion

Deloitte has learned a lot about various aspects of blockchain technology by developing these proofs-of-concept in a startup spirit:

- Technological: deep understanding and technical expertise on the use of blockchain platforms, their pitfalls and strengths
- Methodological: setup of agile organization and processes that can deliver Minimum Viable Products (MVPs) within a few sprints of two to three weeks

- Organizational: the added value of cross-functional teams involving business experts, software developers, and UX designers, who explore together how to leverage the technology to enable disruptive business and operating models in a digital world
- Marketing and communication: the importance of timely and targeted marketing and communication in a context and an environment where lot of players are struggling to gain a strong position on a promising technology; more than pieces of eminence like white papers, various practical PoCs prove one's hands-on expertise on the topic, and generates a lot of attention and interest from existing market players and new entrants such as Fintechs, RegTechs and other startups

Deloitte Luxembourg has the ambition to continue developing those proofs-of-concept—not only on its own and by contributing to the recently launched Deloitte EMEA Grid Blockchain Lab, but also, and preferably, by working with market players and ad-hoc communities. Objectives are manifold: demonstrate use cases and their potential for disruption and disintermediation; test DLT platforms; assess startups and how they can work with incumbents; grow functional, technological, and technical expertise; and generate new exciting opportunities and projects. ●