White Paper

Distributed Ledger Technology

What does blockchain have in store for the funds industry?

Calastone™

Distributed Ledger Technology

Introduction

Few people can be unaware of the advent of Distributed Ledger Technology (DLT), more commonly referred to as blockchain. Over recent years, it has moved from being a topic of discussion amongst pure technologists and is now championed by business and technology leaders as the means to solve a broadening array of problems.

In this white paper we explore the potential of blockchain, how it works, and specifically what value this new technology offers for the funds industry, the opportunities it presents and the challenges it poses.

This paper argues for a carefully measured and managed adoption of this technology in appropriate sectors of the funds industry at the correct time and pace.

Hype or opportunity?

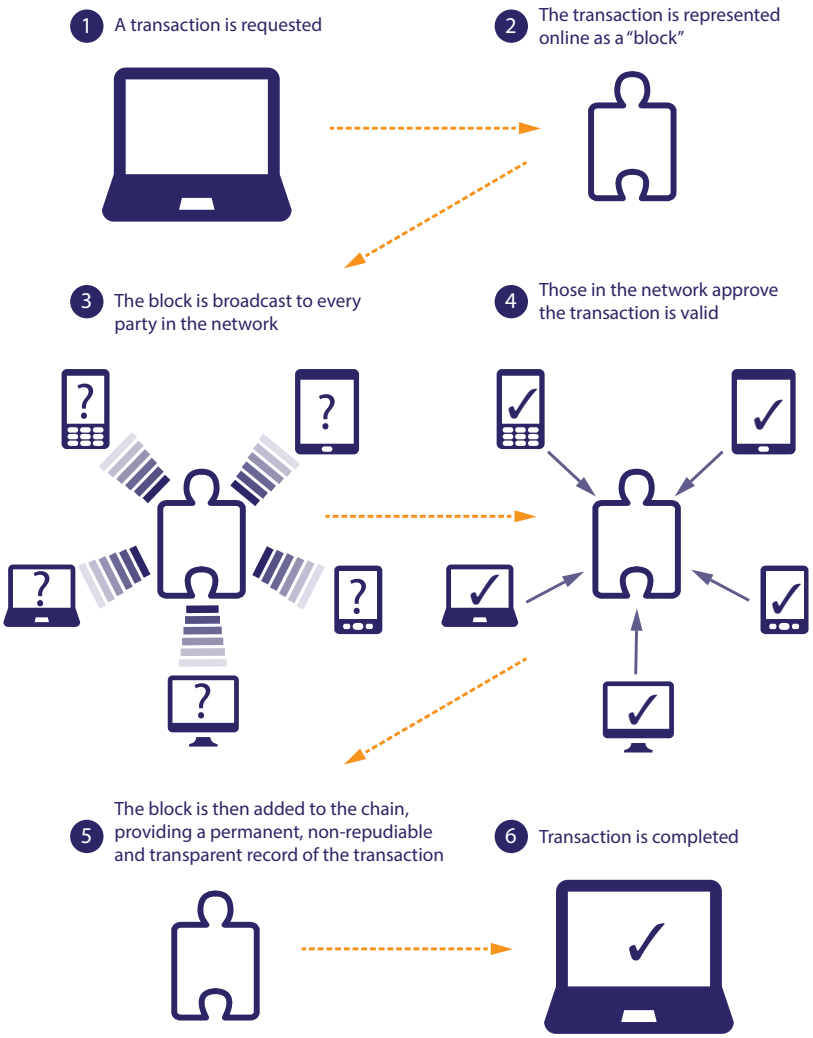
In 2015 a survey conducted by the World Economic Forum predicted that by 2025 at least 10% of the global GDP would be stored on DLT platforms. The hype that brought this prophecy, which coincided with exaggerated expectations of bitcoin and other cryptocurrencies, has died down. In 2016, Consultancy firm Oliver Wyman describe the interest and investment in DLT as having already "reached critical mass".[1] However as we go on to explore in this paper, the hopes for DLT in the funds industry are continuing to grow with new DLT initiatives taking shape, setting out to address a host of challenges the market faces.

What is DLT and what gives it such an enormous potential?

In simple terms, a distributed ledger is a digital database that allows information to be shared, recorded and synchronised in multiple places at the same time. This data is validated and maintained by multiple participants within the system rather than by a single authority, so it is unlike a traditional ledger where data is centralised.

1 Oliver Wyman and J.P. Morgan, *Unlocking Economic Advantage with Blockchain. A guide for asset managers* (2016).

Figure 1



This diagram shows how DLT can be used to record transactions. Transactions are represented as blocks, which are secure. Once a block or transaction is validated and approved, it is added to a ledger, which is called a chain – hence blockchain.

A ledger can be public, meaning that it is open and anyone can join or participate in the network, or private, meaning that it is distributed to specific parties that adopt a protocol for communication and validation.

The data stored in the distributed ledger cannot be changed retroactively. It thus provides a permanent and non-repudiable record, which allows multiple parties to interact securely with the same data source, without the need for a trusted authority to validate transactions.

The potential of DLT increases when you consider how the technology can be combined with smart contracts and other applications. A smart contract is essentially a computer programme, which is agreed by all users of the chain, as a tool for digitally verifying and executing a contract. With this tool the action of any of the parties to invoke the contract results automatically – along predefined rules – in agreed outcomes for all the parties. The powerful combination of DLT and smart contracts can be used to build an intelligent infrastructure for transactional applications that is more reliable, accountable and transparent than a traditional centralised network.

What stage is the evolution of DLT?

Worldwide, DLT is still considered an emerging technology. Credited as having surfaced about a decade ago, it supported the creation and transfer of bitcoin, and then this was followed by the creation of other cryptocurrencies. In recent years a number of organisations have developed a second generation of applications for situations requiring the storage and manipulation of large volumes of data with digitised records, decentralised input and access, immutable transactions and immediate processing.

There is a huge breadth of projects, from all over the world and across a growing list of sectors, that are working with DLT to achieve greater efficiency. Figure 2 provides examples of a handful of instances at more advanced stages of development.

Figure 2

Presently, the most often occurring or intended application of DLT is in digital record keeping and authentication. Many organisations are, however, looking to employ the technology to address many other business challenges. These include logistics operations, combatting fraud, enabling anti-counterfeit measures and to market and track goods, assets and other property.

There have already been several significant developments in the use of DLT. Everledger, a global business that assists in the reduction of risk and fraud for banks, insurers and open marketplaces, currently maintains a blockchain-based diamond registry, adding around 100,000 diamonds a month (as at 2018). In 2018 De Beers announced their intention to start a similar project. Technology companies have started partnering with large logistics companies to employ blockchain, a good example being Danish shipping giant, Maersk, who have partnered with IBM in using DLT to track shipping containers. This joint venture already has 92 companies on board.[2]

The financial services sector is well engaged in exploring the potential of DLT, perhaps not surprising given the nature of its inception. Banks and new market entrants are actively exploring and developing uses such as payment systems, creating and handling digital wallets and portfolios, trading of shares and currencies, tracking of transactions, and providing insurance and bank guarantees. In 2018 the Australian Securities Exchange (ASX), for example, announced their plan to go live on blockchain in 2021 for the clearing and settlement of equities. This is a notable development with a critical market exchange moving from the investigation and proof-of-concept phase, to announcing production.

2 As at 2019

What are the opportunities for DLT in the funds industry?

It's accepted that the funds industry has to date not been at the forefront of driving technical innovation, but things are changing. Funds firms are facing growing market pressures caused by the inefficiency of outdated technology, rising costs, declining fees, new regulatory demands and evolving consumer behaviour patterns. DLT has the potential to enable solutions for these issues by increasing the efficiency of existing work processes, changing entire value chains and enabling new business models more aligned to the needs and expectations of the customer.

The expected cost savings are substantial. The amount of reconciliation, errors and parallel processing, for example, will be significantly smaller. Cost reduction will be key to achieving operational alpha, and these labour-intensive operations can often make up a significant portion of a typical asset manager's cost base. There could also be additional savings as the risk of data mismanagement and the need for resolution or remediation decline. The benefit is not just to the business, however, as the reduction of these costs should result in cost efficiencies being passed on to end investors in the form of lower fees.[3]

The application of DLT could also simplify the growing regulatory challenge. For example, as a distributed ledger provides complete and reliable transparency of transactions, it could assist in providing regulators with important insights of transactional data. It would even be possible to give regulators direct access to a distributed ledger, which could potentially reduce participant firms' own compliance overheads.

3 Oliver Wyman and J.P. Morgan, *Unlocking Economic Advantage with Blockchain. A guide for asset managers* (2016).

The Calastone view on the benefits of DLT is supported by consultant PwC, who stress DLT's potential to *'lead to a large cost reduction, improved efficiency and lowered risk'*.[4] As the operations of the business are more efficient and effective, the door is opened to improve the customer experience. This is because effective and scalable back office systems will be key in ensuring a seamless end-to-end experience as businesses look to scale up their 'front-end' technology.

Application of DLT will have different effects on different parts of the funds industry. Deloitte predicts that the new technology will disrupt links in the value chain, with the greatest impact expected in trade & cash management, transfer agency, global custody and fund distribution – *'Blockchain technology is likely to disrupt almost all activities where there are intermediaries'*.[5]

Calastone's view is that all firms, including fund managers, distributors, transfer agents and platforms, can benefit from DLT. While there is potential to deliver savings and benefits within organisations, the real value of DLT is achieved by partnering with firms within the value chain. The greatest benefits can almost certainly be derived from wholesome and comprehensive innovation across the global market.

4 PwC, *Distributed Ledger Technology. The genesis of a new business model for the asset management industry* (2017).
5 Deloitte, *Impact of the Blockchain on fund distribution* (2018), Figure 2.

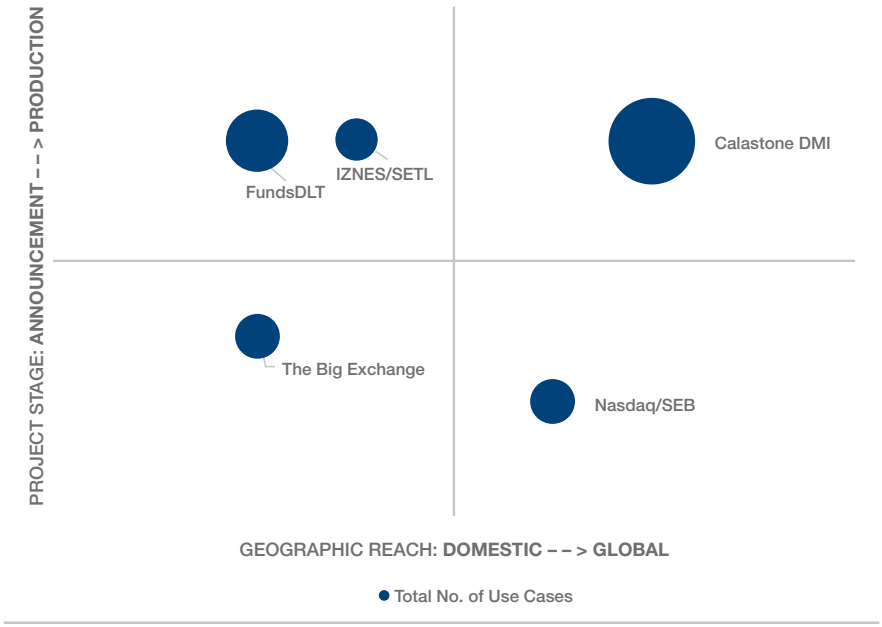
“ It’s not about technology, but about business models. When you reduce the frictional cost of trading you enable new business models and opportunities. ”

Ken Tregidgo, Deputy CEO, Calastone

What is the state of DLT in the funds industry?

Participants in the funds industry have been actively engaging with DLT, with some firms having already started the move from research and experimentation into live use.

Figure 3



This quadrant shows five examples of DLT applications in the funds industry and measures them according to their geographic reach, development stage and number of use cases. A use case is a distinct application of distributed ledger technology.

The below table outlines each of these initiatives:

Calastone Distributed Market Infrastructure	A global market infrastructure that leverages DLT to create a funds marketplace in which buyers and sellers can connect and transact.
The Big Exchange	A DLT based impact (ethical) investment platform for the UK market. It is being led by four asset managers and technology firm FNZ.
FundsDLT	A platform that leverages DLT to connect Transfer Agent activities, payment systems and investors.
IZNES/SETL	A pan-European platform that leverages DLT for fund subscription, distribution and settlements. This is being developed by SETL in collaboration with a community of asset management firms.
Nordic Fund Ledger	A DLT based trading platform that is being planned by exchange group Nasdaq and participants from the Nordic financial services industry.

These examples show that DLT will soon be put to work in the funds industry. As Deloitte say, the clock is running fast for the industry as a whole, and this means that the new technology should be taken seriously, which also means facing its challenges.

What are the barriers to consider for adopting DLT?

Despite the maturing nature of DLT, a common set of challenges are often the topic of discussion across industry events.

- Acceptance

  The lack of acceptance for the technology is partly due to a lack of awareness, causing misunderstanding and distrust. This may result in a perception that it is not user-friendly and not yet standardised. Many people in the funds industry still need to be convinced about the benefits of DLT. Showing them the technology at work will gain their trust and open their eyes to the new opportunities.

- Adoption

  It is one thing to build a beautifully architected blockchain system, but for it to work, and deliver any of the much discussed potential benefits, a community of users need to agree to use it.

- Interoperability

  Initially the new technology is expected to work alongside legacy systems and going forward, between chains. The development of inter-ledger protocols should provide interoperability between chains thus ensuring that the focus remains on the business model benefits rather than technology integration.

- Scalability, performance and resilience

  The technology must be scalable and resilient to ensure that it can support significant volume and complexity.

- Confidentiality

  A DLT based solution must prove that it can provide the correct levels of data access and privacy controls. The technology must also support additional requirements, such as the right to be forgotten under GDPR.

- Regulation

  Businesses must demonstrate that all processes and investor outcomes are compliant. This includes KYC and KYD, AML and regulatory reporting standards.

What will the future bring?

Deloitte predict that DLT will *'make trading and post-trading processes much more efficient, improve regulatory control and remove multiple intermediaries'*. PwC forecast the creation of a revolutionary new business model that will be the result of a process of evolution, in which larger parts of the value chain will change significantly. Wyman foresee that the technology will *'reshape market structure, product capabilities and the client experience, ultimately having a lasting influence on the global economic system.'*

Calastone agrees with these analyst predictions and has forecast the potential financial benefit to drive over £3.4bn ($4.3bn) per year in cost efficiency for the global funds market.[6] Ken Tregidgo, Calastone Deputy CEO notes that 'For DLT to succeed, the transition phase must be carefully managed. Migrating onto new technology can be a highly complex process for fund businesses, many of which still rely on significantly outdated technology. To ease the transition, the industry must adopt DLT in a straightforward manner without disrupting existing systems and processes.'

Tregidgo continues 'The transition phase has already begun – we are due to migrate our entire client base of over 1,700 financial organisations to blockchain in May 2019, and the ASX has also committed to going live on blockchain in 2021.' It is likely that during the next five years even more applications will move from PoC stage to practical implementation in significant but well-contained areas of the value chain.

Further in the future, it is impossible to predict with accuracy how DLT will be used. However, the technology will bring about a sea change in the funds industry. At the moment the industry is trailing other financial services sectors in terms of digitalisation and automation, but with DLT the transformation point has been reached, and by embracing change through adoption of this new technology the industry will be able to manage its own disruption more effectively.

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6 https://www.calastone.com/news/calastone-launches-world-first-blockchain-powered-global-funds-marketplace-in-may-2019/

The Calastone Distributed Market Infrastructure (DMI)

Calastone will migrate its entire global network of more than 1,700 financial organisations, across 40 global markets, to its blockchain-enabled DMI in May 2019. The DMI connects one of the largest communities of global financial organisations using distributed ledger technology, marking a significant step for the digitalising of the funds sector.

The DMI creates an ecosystem within which the trading and settlement of funds is friction free, eliminating the ever-growing risk and cost that is embedded within the current system. By normalising all orders across the mutual fund purchasing chain, market participants are able to share a single, consistent and accurate view of each transaction and all balances. The shared ledger enables a fully digital distribution chain where all participants benefit through the real-time view of each trade, and agree on the data and the outcome. By placing each element of the transaction from the order, transfer and settlement onto a blockchain, there is less opportunity for errors or reconciliation issues at individual register levels.

This hugely simplifies what is otherwise a complex market and importantly reduces the volume of costly manual processes thus driving down the cost of trading and settlement across the whole market. We have predicted that through the use of a mutualised infrastructure, made possible by Calastone's DMI, the global funds industry will see a reduction in cost of over £3.4 billion per year.

The DMI will be run on a private, permissioned infrastructure in which consensus will be authorised amongst a closed group of agreed participants, voted in by the group. Access to transactions between trading counterparts will only be granted to those with the suitable permission.

Organisations can leverage the open technology on which the DMI is built, allowing them to innovate, stay competitive and offer new services and investment opportunities better suited to the changing, more sophisticated needs of modern investors.

The migration is non-disruptive, with minimal impact on client's current systems while enabling them to operate with their existing trading partners. If you would like to discuss the DMI migration with Calastone please contact: **marketing@calastone.com**

About Calastone

Calastone is the largest global funds transaction network, connecting many of the world's leading financial organisations. Our mission is to make funds accessible to everyone by reducing the frictional cost of trading. We use smart technology solutions and industry collaboration to lower operational risk and enhance client profitability through digitisation and automation.

Over 1,700 customers in 40 countries and territories benefit from Calastone's services, processing over 9 million messages and £170 billion of transactions each month.

Calastone is headquartered in London and has offices in Luxembourg, Hong Kong, Taiwan, Singapore and Sydney.

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