

# **SEI: Blockchain & building ecosystems in financial services**

**Real-time reconciliation and integration**

**Putting together an ecosystem with agreed rules**

**Offering improved transparency and security**



# Blockchain & building ecosystems in financial services

By James Williams

## What could blockchain mean for the financial services industry?

Attend almost any financial industry event today and the chances are a panel discussion will refer to blockchain and the transformation opportunities it could afford the industry. It has become a buzzword, a term that one has to pretend to understand and nod sagely whenever it comes up in conversation. If you don't understand blockchain, you're not in the club, cast aside as a technological Luddite.

In short, blockchain is a shared digital, immutable ledger that records events or transactions within a fully distributed or peer-to-peer network, whether public or private, and verifies them across the number of participants operating within that network.

From a trading perspective, it enables

people to clearly quantify and understand what it is they are purchasing.

Indeed, the immutability feature of blockchain is what makes the ability to look at information and perform reconciliations in real-time, for example, really exciting. It has the potential to revolutionise the financial industry by removing reliance on intermediaries to clear and settle accounts and introduce significant cost savings. One survey<sup>1</sup>, by Bain & Co, estimates that total savings to global financial markets could reach anywhere from USD15 billion to USD35 billion.

To underscore just how much excitement there has been since bitcoin - the cryptocurrency developed by Satoshi Nakamoto (a pseudonym) that uses blockchain technology - first emerged in

2009, firms that have engaged in research and development of this technology have raised more than USD1.55 billion in venture capital since 2012, according to CB Insights.

### So many flavours

Cristina Dolan is an expert on blockchain technology and is the founder of InsightChains, a New York-based consultancy practice focused on digital transformation. Dolan has been presenting at conferences and working with organisations to build ecosystems around shared data with economic layers facilitated by the use of tokens to create a network effect for adoption.

"The blockchain ecosystem is part of what I call the whole digital transformation and it opens up a lot of opportunities," says Dolan. "There are more than 30 different flavours of blockchain and three different categories. These include: publicly distributed ledgers (Bitcoin, Ethereum), which require economic transactions, private and consortium versions of blockchain, and thirdly hybrid versions of blockchain.

"Blockchain is just a generic term for the technology. The magic is how one brings different parties together, and how they set the rules to contribute the data relative to a security, or a policy, to build an ecosystem."

In some respects, the concept of blockchain is not new. The UK real estate market works off of a similar principal. There is one land registry that records all sales and purchases of housing stock. It is a single ledger that has been in use since the Royal Commission on Registration of Title (1857).

### Speed it up please!

Jim Warren, Head of Solutions Strategy & Development at SEI, says the technology makes perfect sense in principal and could indeed alter the entire modus operandi of financial services.

"However, in today's reality there are limitations with distributed ledger technology, specifically the speed at which it can process things: Due to bitcoin protocol, bitcoin blockchains, for example, can only achieve seven transactions per second compared to VisaNet, which has a peak processing capacity of over 50,000 transactions per second."



A recent report by EY<sup>2</sup> based on research it conducted in 2016 found that scalability is likely to be a hurdle to industry-wide adoption for many organisations. When asked, "Which milestones must blockchain pass before broad adoption would be possible at your organisation?" 80 per cent of respondents cited: "Demonstrated ability to handle volume resiliency".

Processing speed is one of the reasons why people have come up with other versions of blockchain. Goldman Sachs, for example, has filed patents for various blockchain technologies. One of these is a different flavour of bitcoin called SETLcoin, illustrating where the bank's current thinking is for how best to apply blockchain to its business model.

Blockchain attempts to automate the trust and verify framework within which modern finance operates. It is this that is causing processing speed issues. However, some believe that when used in a private, closed environment the 'trust' element becomes less important and are removing it in newer versions of blockchain. An example of this is Corda, another bitcoin variant developed by R3, a consortium of banks that are pooling resources and who have just secured USD107 million from 43 financial institutions to build a blockchain platform<sup>3</sup>.

"The financial industry requires different flavours of visibility and privacy than what bitcoin offers. A number of blockchain solutions have been created to adapt to

different industry requirements. For example, R3 worked with financial institutions to create Corda which is a distributed ledger built for financial services to record and manage financial agreements. Some of the key features include data access protected by agreements and consensus executed between firms and their specific deals,” explains Dolan.



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**Cristina Dolan, InsightChains**

### **The ‘How’ of blockchain**

Conceptually, blockchain is great but the financial industry remains a long way from making it work. Hence why a lot of firms, and consortia such as R3, are doing R&D and running proofs of concept.

Comments SEI’s Warren: “Our perspective on blockchain has been that we like to remain at the forefront of technology and we felt it was important to plug into the ‘how’ of blockchain not just the ‘what’. So we started looking at how it could work, and for what purposes we could use it. So far, our feeling is that its near-term usage is probably more for internal-based capabilities than external.

“One of the things we found out early on was that, when interacting with large institutions, getting them all to march to the same beat was a bit of a challenge because everyone has different internal policies and procedures, as well as desired end-games. So our focus became: How can we use blockchain technology internally to manage data and to manage integration?”

Real-time reconciliation and integration is the beauty of what blockchain brings to financial organisations but in Warren’s view, until multiple parties are able to agree on a common set of rules, the ability to utilise blockchain technology in wider ecosystems, outside of the four walls of an individual organisation, will remain limited.

“We have no doubt that issues such as processing speed will be resolved over time. Of more importance will be getting different parties to agree on format and capability,” he says.

One example of where blockchain technology could enhance the operation of financial markets is the securitisation space. There remain a lot of data opacity issues when investors buy portfolios of CLOs on secondary markets and need to interrogate the underlying loan details.

To address this, fund managers are looking to develop a blockchain solution that could provide a 360-degree view of the loan asset, including everybody who had touched that asset, so that when the time comes for it to be sold in the secondary market, all of the relevant loan data is visible.

### **Regulatory benefits**

Blockchain could also revolutionise the way that asset managers deal with regulatory reporting obligations. Currently, there is a great deal of work involved sharing data with counterparties, cleansing it, putting it into report templates, and filing it with different regulatory authorities.

As SEI itself points out in a recent report – *The Investment Management Operating Model 2.0*<sup>4</sup> – it is easy to visualise a future in which regulatory reporting is as simple as granting secure permissions to oversight authorities to view the ledger.

“Because DLT looks to vastly improve financial security, accuracy and latency, regulators and standards associations have been quick to voice their support in getting blockchain to the point of standardisation,” writes SEI.

“In this day and age, with all the regulatory issues around investors, if we had a shared ledger of investor information that multiple parties could simultaneously reference – for KYC information for example – that could be a game changer. And on the investment side, we could use blockchain for smart contracts for derivatives and other financial instruments, creating a process that could be easily shared, reducing settlement timelines dramatically,” posits Warren.

### Internal blockchain for KYC

One of the things that SEI has looked at internally is a shared ledger around investor information; processing investor records as they relate to investors in funds and trying to ascertain how it could be best used from a KYC perspective.

"We've done some proofs of concept in SEI Trade, a new product we launched earlier this year<sup>5</sup> to help fund managers with the investor onboarding process to make it as seamless as possible. It makes sense to use blockchain technology in SEI Trade. There are multiple investor transactions and KYC documents to track and monitor and this technology has the potential to offer a solution to that," suggests Warren.

SEI Trade streamlines the end-to-end processing of investor activities, allowing investor relations teams, in particular, to review, approve, track and take delivery of subscription documentation, KYC / AML requirements and supporting documentation.

"At this stage we're trying to work out how blockchain could plug in to other technologies on the SEI platform. We're doing this in discussions with clients to see if there could be some mutual benefit, or whether it makes more sense for us to use it internally to deliver information to our clients. Whether or not it has applicability today, it's important for us to keep ahead of these developments from an innovation perspective."

### Drone technology

Undoubtedly, the continued adoption of digital platforms and the growing phenomenon that is the Internet of Things – where everything from TVs to toasters and fridge freezers will all be connected to the internet – will facilitate the rapid development of blockchain technologies. Although the technology is still in its nascent phase, the opportunities are limitless.

Walmart<sup>6</sup>, for example, has filed a US patent for a system designed to manage drone deliveries using blockchain-like distributed ledger technology. Like the loan securitisation example, the distributed ledger would store information unique to each package such as its location, its contents, etc. Impediments such as regulation and consumer acceptance, however, mean that



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mainstream adoption is unlikely to occur before 2020.

### Rules-based ecosystems

Nevertheless, it shows what could be possible. The only restriction facing financial institutions is the limit of their imagination.

Those who take the time to consider how to bring blockchain technology into an ecosystem that could transform business have the best chance of becoming pioneers in this arena. And that means involving senior decision makers in the process, not just IT professionals.

Agreeing with Warren, InsightChain's Dolan comments: "Putting together an ecosystem with agreed rules is probably the hardest part of this whole equation, not necessarily the technical implementation. A lot of people have misconceptions and are incapable of seeing the power that a blockchain ecosystem could have on their organisation.

"If you are trying to transform business you need to have senior decision makers involved in how to embrace this technology. If you can create an economic layer within an ecosystem, it could have the same network effect as bitcoin. However, in my view, people don't yet see how value can be extracted for their own organisations."

Once financial organisations have got past the first hurdle of optimising blockchain technology for internal operational processes, the likely second step on the evolutionary path will be how different parties come together to interact within private networks: closed environments where only

trusted members, each of which represents a distribution node, can interact.

Each environment would leverage the immutable nature of data held in blockchain and it is this next stage of development that could really push the financial industry into a new paradigm.

Say there is a network of 10 people. In that network, each member has a node housed in its own data centre such as a cloud platform, and all 10 nodes synchronise.

"If I have a blockchain ecosystem with a number of counterparties, each counterparty will maintain a node on this network with the data, and this prevents any one party on the network from having control of all the data in a centralised location and manipulating the data. The consensus protocol will ensure that a majority of the nodes agree on the information appended on the ledger, which is why changing the information in one of the nodes will cause a failure for that node.

"Therefore, you will need legal agreements within these networks on how members of ecosystems will share and use their data. If you have untrusted parties putting bad data into an ecosystem, it will be recorded in the immutable ledger and will affect the reputation of that specific party. Trust has to extend out to the members of the ecosystem, since their reputation will be affected because the network will maintain the recorded evidence of their transactions," adds Dolan.

### Improved transparency and security

Such are the volumes of data flowing across thousands of counterparty relationships within the financial industry that not only has data management become a core activity, it has become integral to remaining cyber secure.

If the second stage of evolution comes to fruition and private networks spring up, it has the potential to facilitate better transparency, as well as allow for the easier processing and reporting of regulatory responsibilities. Ultimately, blockchain is a methodology of ensuring that data can be shared and processed more accurately, and with more transparency, thanks to the concept of distributed ledger technology. "It has the potential of significantly improving the



situation but it won't solve every problem, it's not a panacea," cautions Warren.

### Blockchain & artificial intelligence

As for how improved security could be achieved, it's worth pointing out that a lot of blockchain technology uses artificial intelligence.

One example is Everledger, which is now being used for the UK's diamonds industry. Everledger collects an asset's defining characteristics, history, and ownership to create a permanent record on the blockchain. As its website states, "this digital incarnation, or thumbprint, is used by various stakeholders across a supply chain pipeline to form provenance and verify authenticity".

Machine learning is employed to create the thumbprint using 41 data points to describe the diamond, which include provenance to monitor conflict diamonds. This system is easier to monitor than paper certificates that can be forged.

This is the power of a closed ecosystem. Everyone can see everyone else, the ledger cannot be altered by adding erroneous data points and it is this that provides enhanced security.

The concept applies equally to interest rate swaps – or any other financial instrument – as it does to diamonds.

"Some instances of blockchain only have a couple of nodes. An example here would be Nasdaq. It has created an immutable blockchain application for privately held companies to subscribe to so they are able to document when shares are issued. From an accounting perspective, the ability to time stamp and construct an electronic audit is very powerful," says Dolan.

Regardless of whether it's a couple of nodes, or 2 million nodes, it's the immutability and time stamp quality that makes blockchain technology so valuable. Going forward, it could help to avoid lawsuits, IRS issues and so on because of the provenance point made above; the distributed ledger records each and every piece of information.

### Blockchain interoperability

If, as predicted in this report, the financial industry begins to develop private networks, what might the implications be if Goldman

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Sachs is using a proprietary cryptocurrency and interacts with JP Morgan for FX trading? Or Fund Administrator X is using a proprietary reconciliation engine and wishes to interact with a fund's counterparties? What will the rules of engagement look like? Can different blockchains operate within a single, closed environment?

Dolan doesn't see this as being too problematic. In the data management space there are lots of different databases and yet the users of all of that data utilise application layers in order to transact and do business.

“I think of blockchain as a close relative to the database systems and I think you will see a number of different ecosystems emerge,” suggests Dolan. “For example, a blockchain for KYC purposes, another blockchain that tracks the assets, with an application, fabric or chain that could link multiple ecosystems – each using different blockchains – in order to extract insights or execute transactions.

“I do therefore see blockchain as being interoperable at some level. Who builds which on what is yet to be determined. The trick to this is how you get people together and involve them in the first place – building the ecosystem. The technology is interesting but it's *how* you use it that is more interesting; that's what will create the value.”

No one can predict the capability of future cyber attacks but the beauty of blockchain is that it's a shared ledger, meaning there are multiple copies of it. It's not that there is one copy of all the information, rather it's that there's a consistent shared copy of all the information. The idea is that if one system goes down, it doesn't matter because everyone else sharing the ledger will already have it on their own systems. The ledger effectively clones itself as more counterparties transact with each other over time.

## Conclusion

In conclusion, Warren says that the financial industry is still very much in the early stages of working out exactly what this technology could do.

“At SEI specifically, we are at the proof of concept stage, conducting experiments and planning for how it could be integrated from an investor and an investment perspective onto our platform.

“What blockchain could become is fascinating. It has the potential to replace the infrastructure for investment management and custodial systems, increase the amount of security and shared information, decrease the technology footprint of financial institutions, and increase overall integration.

“However, it is still more of a concept and the technology behind it still needs to be proven but business owners can easily understand where the potential value may lie.”

As EY states in its blockchain innovation report, “to be successful within an industry such as wealth and asset management, a firm or firms must take the lead and begin the innovation process.” Notwithstanding today's (lack of) applicability, with so much potential and opportunity at stake, it would be in a financial services firm's best interest to develop a strategy development plan and begin proof of concepts.

Incremental progress and step-by-step improvement will lead to the inflection decision point of whether to accelerate the process or take a wait-and-see approach. Those that have the most at stake will be the most aggressive and be the first to reap the rewards of the blockchain technology. Watch this space. ■

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