

# Securities Services on Blockchain: The Disruption of the Custodian Banks?

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*In response to the many questions we received at our webinar discussing a recent white paper, **Securities Services on Blockchain: A Value Analysis for Custodian Banks**, we asked Alex Powell, co-author of the paper, to share his thoughts in response to the themes surrounding this important industry topic. We've grouped the Q&A into the following themes: Use Cases and Opportunities, Obstacles, Incentives, Standards Needed, Regulatory Responses, Cyber-security, Potential Consequences, and The Future.*

You can access a copy of the original white paper by clicking [here](#).

## Use Cases and Opportunities

*What are the use cases that global custodians should collaboratively work on?*

For the most part, global custodians share common interest around elective corporate actions to reduce the risk of losing money due to operational errors. Custodian banks could use a Blockchain network to communicate details of elective corporate actions, such as rights issues and proxy votes, to clients. The present process for doing so is error-prone, with custodians paying out when an investor loses money as a result of inadequate or incorrect information. Custodians could adopt a Blockchain for this purpose. Getting issuers to publish elective corporate actions directly onto a Blockchain, however, might be a difficult step entailing the involvement of both central securities depositories (CSDs) and registrars. Another use case concerning early benefits is to pay agency for issuers. This service, offered by the corporate trust divisions of the custodians, could be more efficient if payments were made to investors on behalf of issuers via smart contracts on a Blockchain.

*Are custodians planning to provide custody services for digital assets, such as BTC, ETH, or ICO tokens?*

This is a product question for custodian banks rather than a Blockchain question. Custodian banks could choose to offer this service, effectively holding private keys on behalf of the investor and putting them in competition with existing third parties that provide “wallet” services. There is understandable concern that, at present, many investors are holding the private keys that guarantee the safety and ownership of cryptocurrencies themselves on their own computers. They are not, for example, in custody with secure third parties. As institutional investors

increase their exposure to the market, this issue will become critical. It is why one of our panellists, John Burnett, and his colleagues at Omniex are building an institutional quality post-trade platform for crypto-currencies.

*Can you expand on institutional investors wanting exposure to this asset class? Does this involve current crypto-currencies or central bank issued currencies, such as USE?*

The institutional appetite for crypto-currencies was not a focus of our paper. However, it is clear that investors want access to this asset class. Both the Chicago Board Options Exchange (CBOE) and the Chicago Mercantile Exchange (CME) are launching futures contracts. In addition, the recent announcement by NASDAQ that it will also list futures based in crypto-currencies, tells us that institutional investors are gaining interest in an asset class that has risen sharply in value. Futures, which may be regulated by the Commodity Futures Trading Commission (CFTC), provide them with a familiar way to invest in the new asset class and enjoy its price volatility, without having to worry about the liquidity of the cash market or purchase and deal with the underlying crypto-currency.

*You provided multiple ways that Blockchain could impact the industry. What is the top priority for achieving the best return for different buyers?*

As stated above, identifying the priority in terms of achieving the highest return on investment, means exploring many details for each type of user. The best return for asset managers, for example, may be to set up their own Blockchain to disintermediate most of the activities of custodian banks.

*How does the custodian create the accounts of the brokers in Blockchain?*

If you have a large position and multiple brokers with a share of it, it is necessary to have sub-accounts, which involves the reproduction of the chain of sub-accounts on a Blockchain. This could potentially lead to several accounts, which would be the case for the current environment if everyone had individually segregated accounts. A couple of options come to mind. The first is to have a ledger with all the accounts of the custodian and all the accounts of the brokers in it. The second is to have separate ledgers linked by smart contracts.

## Obstacles

*Aside from the network effects that you mention in the paper, what do you see as the primary challenges for the use of Blockchain?*

The rate of adoption and the resulting development of network effects is clearly the biggest hurdle. The next challenges include establishing the rules of the network and how those rules are decided and enforced in terms of the participants admitted to the network. In the real world, the critical obstacles will be the performance of the technology and the privacy of the participants. You need a permissioned network to enable the network to

process transactions quickly and even then there will be limits on how many transactions it can process per second. There is also a trade-off to be struck between efficiency and privacy. There are various technical tools for introducing a degree of privacy between a sender and a receiver, which may or may not be needed depending on the use-case. “Zero knowledge proof,” for example, is an effective algorithmic technique to protect the anonymity of both parties in a transaction, but it is very slow due to its high degree of computation. A third obstacle to clear is moving cash to the Blockchain. This is the payment side of the delivery-versus-payment (DVP) equation. Solving it does not require central banks to issue fiat currencies.—The commercial banks can issue commercial bank money onto a Blockchain in the form of tokens, but central bank money would help.

*What bottlenecks do you see in the utilization of Blockchain amongst actors?*

Performance and privacy are the main obstacles. Of course, building a network of participants is also far from easy. It is not unlike building a stock exchange network from scratch. It can be done. BATS Chi-X managed to do this, although it did benefit from great timing in terms of cost pressures on execution and regulatory changes such as MiFID I and Reg NMS. Blockchain networks may or may not benefit from similar factors.

*Who do you see as the biggest losers from the adoption of Blockchain technology at custodian banks?*

The custodian bank’s core settlement and ancillary services revenue are most at risk. In the paper, we projected that 90% of settlement revenues were at risk. Any ancillary revenue associated with settlement, such as corporate actions processing, is likely to be affected.

*One of the primary benefits of DLT is network effect. With asset managers and custodian banks competing for business, is it likely that DLT's core benefit will ever be realised?*

This is a view for which we have some sympathy. Could the asset managers get together and disintermediate the core functions of their custodian banks? Could they do the same for important functions of their custodian banks, such as transfer agency? This is viable. Asset managers want to be serviced as cheaply as possible, yet custodian banks derive their income from servicing them as expensively as possible. Therefore, it is difficult for custodian banks to support asset manager Blockchains that eat their lunch. If the asset managers got together and created their own transfer agency Blockchain, it would save them a lot of money. It would be perfectly feasible to fund subscriptions and redemptions on a Blockchain. Transfer agency also captures many network effects. In our white paper, we stated that Blockchain could have a 90% impact on the revenues of the transfer agents.

*You can't replace the credit intermediation legally with a Blockchain in a CCP. What are your thoughts on this?*

CCPs are not required in a fully Blockchain future. But, until we get there, CCPs will continue to exist and act as net settlement counterparties.

## Incentives

*Bitcoin miners are highly incentivized to be the open source ledger for Bitcoin. Who will verify bank and brokerage transactions and what will their incentive be?*

The user groups that use the permissioned distributed ledgers could all become validator nodes for their network, depending on the consensus mechanism adopted. Alternatively, this could be the role of a trusted third party such as a CSD, or a combination of both a CSD and the nodes. Miners matter only with permission-less networks, and the networks used in the securities industry will be permissioned. It follows that the user group for a permissioned Blockchain network can choose who should validate the transactions recorded by the ledger – and the user group could simply give validation rights to every node. Relying on a trusted third party to validate transactions, as happens today, is a viable alternative, and a logical role for CSDs.

*What gets this moving? How can the first mover make it a competitive advantage rather than a risk? A big pain-point for fund managers is the rising cost and burden of regulatory compliance. Could that be the trigger and do you think the regulators could play a part in driving the initiative?*

What gets this moving is a market introducing this technology, i.e., something that starts to succeed. A good precedent is the FIX message standard. Big firms used it, and so it became more widely adopted. A custodian bank that is prepared to share data with its big buy-side clients via a Blockchain network could have a similar effect. The shared data could include fund accounting information, or corporate actions data, where the custodian invites fund managers to subscribe to or instruct them on elective corporate actions. Regulators can help by providing a seal of quality, as the Monetary Authority of Singapore (MAS) is doing in its domestic market. Regulatory involvement gives Blockchain visibility. In Singapore, both MAS and the Association of Banks in Singapore (ABS) are prototyping a payments Blockchain with the help of Accenture.

## Standards Needed

*How do you think Blockchain platforms will become inter-operable in the future?*

In the near future we do not think they will be inter-operable. Some Blockchains have been developing extensions to other Blockchains. These aim to create inter-operability between, for example, open source Blockchains such as Ethereum and proprietary Blockchains. But financial Blockchains will most likely continue to rely on messaging at the financial transaction level of the kind provided by SWIFT message formats. There is no equivalent of SWIFT as an ISO agency or FIX as the front office messaging standard-setter for Blockchain. Blockchain groups create what they want, though ISITC and SWIFT are looking at the problem. In the long run, adoption of one set of standards might simply drive out the others.

*Do we need some inter-ledger communication such as SWIFT?*

Inevitably we will need to inter-operate ledgers which serve different parts of the value chain, operate in different markets, or compete in the same markets. Today, this inter-operability happens at the financial messaging level, predominately through the use of SWIFT messages. Standardised messaging will most likely remain the principal means of achieving inter-operability when Blockchain networks get off the ground. If you seek inter-operability at the level of the ledgers themselves, rather than by using standardised message types to communicate, you will lose some of the benefits of Blockchain. In practice, inter-ledger communication will work only if there are standards. There is also a risk that banks and financial market infrastructures, for example, will not use the same standard. In the present system, it helps a sub-custodian dealing with multiple CSDs to use a single message standard to communicate with all of them, and the same will be true of Blockchain networks. If one CSD uses the Ethereum Blockchain, another uses Corda, and a third one uses Hyperledger, there is a risk that sub-custodians will not be able to communicate efficiently with all of them. Either you place a communications layer between CSDs and sub-custodians, or you use message standards to enable all Blockchain systems to inter-operate. The ISITC Europe Blockchain DLT Working Group is [looking at this issue](#), and Stephen Lindsay, head of standards at SWIFT, has written a paper that explores the application of message standards to Blockchain networks. You can read the article [here](#).

## Regulatory Responses

*Should regulators take the lead and drive a standard setting initiative?*

Regulators in the United Kingdom have been considering for some time whether to create specific regulations for Blockchains. Our understanding is that they now prefer to regulate the outcome of the use-case rather than introduce a Blockchain-specific regulation, which we believe to be the right answer. Regulating Blockchain technology is no more sensible than regulating, say, Oracle databases. In the United States, the chairman of the Commodity Futures Trading Commission (CFTC) described embracing Blockchain as “in the national interest.” The European Securities and Markets Authority (ESMA) said earlier this year that it thought regulation of Blockchain was premature. Regulators are certainly not hostile.

*Should regulators encourage the adoption of a specific technology or concentrate on the respective services?*

Focus on the respective services. It does not make sense to regulate Blockchain as a technology.

*What do you think about Jamie Dimon's comments on Blockchain?*

His comments appear to be directed at crypto-currencies as an asset class rather than Blockchains.

*The International Monetary Fund (IMF) is interested in crypto-currencies and wants to master their use and all possible consequences. What is your view on this?*

The recent remarks of Christine Lagarde, the managing director of the International Monetary Fund (IMF), regarding the potential impacts of crypto-currencies, especially in markets with unstable fiat currencies, are certainly noteworthy. As she pointed out, “citizens may one day prefer virtual currencies, since they potentially offer the same cost and convenience as cash—no settlement risks, no clearing delays, no central registration, no intermediary to check accounts and identities. If privately issued virtual currencies remain risky and unstable, citizens may even call on central banks to provide digital forms of legal tender.”<sup>1</sup>

## Cyber Security

*I read in the news that quantum computing is expected to break crypto currency passwords within ten years. Would this make Blockchain technology obsolete?*

If we can harness the power of quantum computing it will make every system that uses encryption to protect data obsolete. However, achieving the goal of quantum computing, the creation of algorithms where only the surviving path gives the correct answer, is proving to be extremely difficult. The current prototypes have less power than a pocket calculator, can perform only simple calculations, and have to be kept in giant refrigerators to prevent external interference from collapsing the quantum state. Quantum computing also confronts not only engineering problems, but also challenges in fundamental physics. Success in the field is a long way off but, once it occurs, any of today’s 256-bit encryption techniques are clearly vulnerable.

*Mention was made that cyber-security costs would reduce in a Blockchain world. Why should you assume that Blockchain is immune from invasive cyber-attack in the longer term?*

Blockchains are more secure than traditional databases by virtue of the fact that they distribute the data. Mounting a successful cyber-attack is harder to do on all the nodes in a network. Blockchains also deploy both encryption and cryptography to protect the integrity and sequence of the transactions on the chain. In terms of cyber-resilience, Blockchain is certainly no worse than any other database, and it has some additional advantages in the shape of encryption and cryptography, as well as distribution of the database.

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<sup>1</sup> See <https://www.imf.org/en/News/Articles/2017/09/28/sp092917-central-banking-and-fintech-a-brave-new-world>

## Potential Consequences

*How would T2S fit in a world where Blockchain is generally accepted and used?*

T2S would have to compete for relevance and would likely be higher cost. If the T2S project was starting today, the European Central Bank (ECB) would be seriously looking at developing the system using Blockchain. Central banks are exploring the issue of fiat currency on Blockchains already, in addition to running a variety of other pilot tests. To answer the question directly, T2S could become redundant in a fully Blockchain marketplace, especially if central bank monies are available for settlement.

## The Future

*Where do you realistically see Blockchain in five years?*

Initial Coin Offerings (ICOs) are proving that the technology works: Blockchain deployment for Bitcoin has been used to run a currency market in an open environment for quite some time without falling over. The real constraint on rapid progress in securities services is the unwillingness of custodians to act in concert to reduce the cost for their clients. In the custody industry, I would expect to see one or two markets take a lead first. This month, the ASX announced that it will use Blockchain to replace its ageing CSD system, CHESS, causing settlement processes to likely be an early adopter, as other CSDs follow their example. This will drive change at the custodian banks, which will have to interface with Blockchain-based settlement systems. From the point of view of the buyers of custodial services, it would be helpful if the larger securities markets adopted Blockchain earlier, since that will create the real savings. In reality, emerging markets are likely to adopt Blockchain first, because the risks are lower. While it will take a very long time for the core benefits to be realised, if one country's settlement market gets moving, the others will accelerate.

*Will the Blockchain really kill the banks?*

No, but it *will* narrow their margins, forcing them to look at other ways to make money. We highlight this further in our white paper.

To learn more about the impact of Blockchain on custodian banks, [please download our original white paper](#). You can also view a recording of the webinar [here](#).

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