Optimizing the core business processes of financial asset management companies using blockchain technology

Nick v/d Luijtgaarden
Leiden University
nickluijtgaarden@gmail.com

ABSTRACT

The aim of this paper is to look at how blockchain technology can be used for the core business processes of an asset management company and what the best tools are to set up a blockchain. This study followed a qualitative and quantitive case study research methodology at a small to mediumsized asset management company. This paper argued that Corda was the best blockchain platform because of scalability, auditing for regulators and offering a specific consensus between firms. However, it was evident that blockchain platforms are still in constant development, thus it is important to use the framework provided in this study to evaluate blockchain platforms in a changing industry.

Keywords

Blockchain, distributed ledger technology, financial sset management, blockchain platforms

INTRODUCTION

Our current financial system is built on a model of centralized trust, where most financial activity is required to flow through and be validated by national financial institutions [1]. These intermediaries provide the market with security and stability through services such as fraud detection, recordkeeping and exchange of funds. However, the problem is that these processes are time and cost consuming and a high level of trust is needed in a single central body acting as the "middle man".

Thanks to advances in computing such as networking, processing power and storage facilities, a new technology called blockchain is emerging, that can eliminate these intermediaries in the financial industry [1, 2, 3]. According to D. Biondi, T. Hetterscheidt and B. Obermeier [1], "In simple terms, blockchain is the technology that creates a distributed ledger of transactions on a network that is secure, tamper-proof, and easily accessible. It is a shared record of transactions, distributed over a network of users". One of the most widely known cryptocurrencies called Bitcoin [2] is based on this underlying infrastructure.

Participants in the financial markets know distributed ledger technology is coming; 80% of financial market participants say blockchain technology will be transformative and expect their firms to adopt it by 2020 [4]. According to Goldman Sachs [18], from 2012 till 2015 venture capital firms have invested almost a billion dollars in the technology, with about half of that amount invested in 2015 alone. Still, nearly 40% of executives admit they know little or nothing about blockchain [5].

It is easy to see a use case for blockchain technology in financial asset management. Within the financial asset management industry, all participants keep their own records on a centralized database, while there is a lack of interoperability between these systems, resulting in long waiting times, high transaction fees and slow reporting to clients [6, 7].

Using blockchain technology, data can be shared between consenting parties, thus allowing the parties to work with the same data set and reducing the need for duplicative data and tampering with the data, making documentation processing more efficient.

Currently, there are many different tools available that can be used to set up and deploy a blockchain platform. Because a lot of asset management companies are now just starting to get to learn more about blockchain technology, it is difficult to find the right platform for their common needs, but it is important for these companies to join in on this trend as soon as possible, because it could possibly have have great impact on their current business model [6, 7].

This paper discusses the core business processes of an asset management company and how they can be improved using blockchain technology. In addition, this research will review the currently most widely used and accepted tools to set up a distributed ledger based on blockchain technology and the challenges that can be faced here. Moreover, this study will discuss the requirements that need to be met to improve these business processes. The main research question for this paper is "*What are the best tools to set up a distributed ledger based on blockchain technology for the core business applications of an asset management company?*". Using a case study methodology, the research was performed at a small to medium sized financial asset management organization with international presence.

BACKGROUND

Blockchain technology

A ledger is a database for recording transactions and keeping track of who owns a specific asset. Currently, financial institutions keep their systems and databases internal and do not share them with other parties [8]. As a result of this, these systems have overlapping functionality and are regularly in conflict, and require slow, expensive and difficult reconciliation.

A distributed ledger is a database that can be shared across a network and all participants can have their own identical copy of the ledger [9]. No central administrator or centralised data storage is needed; every copy of the ledger is updated automatically when new transactions occur, and the ledger is maintained by a group of peers, rather than a central agency [6, 10].

Blockchain is the technology that creates a distributed ledger of transactions on a network that is secure, tamper-proof, and easily accessible, see Figure 1 [1]. Blockchain technology makes use of a network architecture called Peer-to-Peer, which means that participants share a part of their own hardware in order to provide the service and content offered by the network [12]. In a public blockchain everyone is allowed to contribute to the ledger, while in private ledgers only certain groups are allowed to.
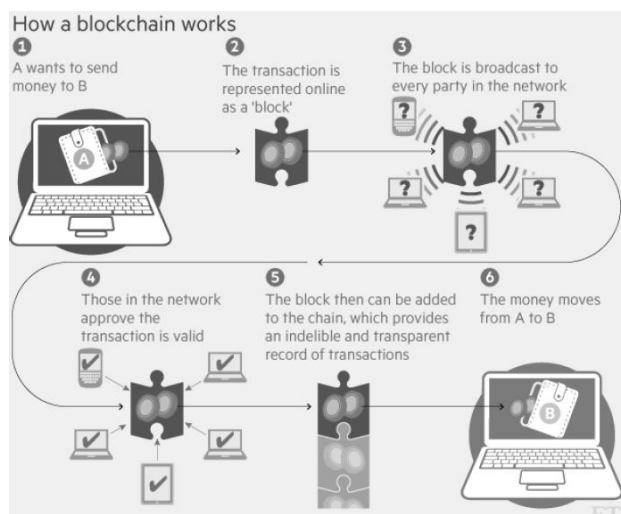

Figure 1: A trade between two parties using blockchain technology [18]

The essential feature of a distributed ledger is that the need for a central authority can be eliminated. Blockchain technology has shifted this responsibility to the group of peers that are using the distributed ledger; any member of this group can add records to the ledger, but they are only accepted when the group agrees that this record meets all the ledger's requirements. The process that these parties use to come to an agreement if a transaction is valid is called the consensus process, which ensures that the next block in a blockchain is the one and only version of the truth [6].

One of the main benefits of blockchain technology is that the ledger itself can be programmed to trigger transactions automatically using "smart contracts" when conditions are met [6]. C. D. Clack et al. [14] define a smart contract as "an automatable and enforceable agreement. Automatable by computer, although some parts may require human input and control. Enforceable either by legal enforcement of rights and obligations or via tamper-proof execution of computer code".

Financial asset management
A financial asset management company manages the assets of individuals, pensions or corporations and uses these assets to generate a greater return than regular savings through investments and trades in stocks, bonds and other investment vehicles. The asset management industry is growing rapidly; the global assets under management have increased at an annualized pace of 5.9% since 2005, reaching $63.9 trillion in 2013 [19]. Through preliminary literature research and talks with people inside the case company it was evident that there are three business processes that can deliver the most value to an asset management company using blockchain technolog [6, 20].

Post-trade settlement process
The post-trading settlement and clearing process starts when two brokers have found a match for their trade. The brokers send information about the trade to their custodian, and they look after the accounting, book-keeping, security and reporting of the company's securities [7]. This process of delivering the securities to the right place at the right time is called the *settlement process.*

Corporate actions
According to J. Femia and C. Wyle [21], "A corporate action occurs when changes are made to the capital structure or financial position of an issuer of a security that affect any of the securities it has issued". Because internal data and research identified that 85% of all corporate actions is cash dividends, this study limits its scope to only this type of corporate action. In the corporate actions process, there are many intermediaries and it is estimated that that missed or mismanaged corporate actions events cost the industry one billion dollars every year.

Know-your-customer
The process of analyzing the wishes of your clients and knowing detailed information about their risk tolerance, investment knowledge and financial position is known as the Know Your Customer (KYC) process. Financial institutions are required to perform this process before engaging in financial transactions with their clients [22]. In addition to getting to know your customers wishes, asset management companies must use their KYC process to make sure that the client's money is legitimate and not acquired from crime or corruption.

APPROACH
This paper followed a qualitative and quantative case study research methodology at a small to medium sized asset management company. Case study research enables the researcher to perform the study in a natural environment, and gain knowledge of the business processes in an organization and create theories from practice. Because not a lot of research had been conducted yet on blockchain and it still was an immature technology, as indicated by the Gartner's hype cycle, a case study research was approriate [15, 16].

For our data collection, this study made use of semi-tructured interviews with people from different departments to get a better understanding of the core business processes inside an asset management company. In addition, this study made use of quantitative experiments and simulations inside this case study to review the tools that can be used to set up a distributed ledger.

This study has limited its scope to three blockchain platforms (Ethereum, Corda and Hyperledger), because this narrow scope allows us to analyze the blockchain platforms in great detail. One of the most important factors we took into consideration when evaluating a blockchain platform was the usage of the platform by other financial institutions and the support for smart contracts.

In this paper, criteria have been determined so the blockchain platforms that we will experiment with could be reviewed (see Figure 2). These criteria have been determined based on talks with people inside the case company and by consulting relevant literature regarding the most important properties of blockchain technology [7, 23].

Figure 2: Determined criteria to review the blockchain platforms

In this study, it was important to define when a blockchain is appropriate and can have the most impact on a business process. Factors that were identified are: redundancy in systems, regulation, high amount of participants, trust and transparency. Based on these factors, interview topics were determined to get more insight in the business processes.

RESULTS
Because of the limited amount of pages in this conference format, this section only discusses the main observations that were found in this study and does not consider the extensive blockchain scenarios that have been defined in the study.

Ethereum
- Extensive API
- Excellent scalability
- Contracts are a vulnerability
- No transparency or auditing options

Hyperledger
- API not mature yet
- Good scalability, except for many validators
- Contracts well developed
- Many transparency and auditing options
- Consensus can be chosen for each network

Corda
- API not mature yet
- Excellent scalability
- Contracts well developed
- Many transparency and auditing options
- Consensus can be chosen between firms for each smart contract

Below, the main observations that were conducted during the analysis of the business processes can be found.

Post-trade settlement process
- Difficult communication with custodans because their processes are manual and internal
- Takes 1-2 days and is not transparent
- Many people needed inside asset management company for exceptions of normal flow

Corporate actions
- Misinformation occurs with custodian, because they all have their own internal systems for processing
- All participants use their own standard/format
- Trust is low

Know-your-customer
- Trust is low, clients do not want to share documents
- Clients have to be identified, while he may have already been identified by another financial institution before
- Much regulation because of privacy laws
- Communication done manually via e-mail

CONCLUSION
First of all, this paper suggests that Ethereum should not be used for the business processes of an asset management company. This is because we have seen in our interviews that regulation is a very important aspect; they will always have to be there to validate transactions. In addition, it was evident that more insight into real-time and up-to-date information for regulators could improve the business processes. Ethereum offers no tools at all that can provide this information for regulators.

We do not expect Ethereum to release any of these tools in the near future, because the focus of the developers is on the public ethereum blockchain and its issues, and not on private and permissioned ledgers. Finally, smart contracts in Ethereum were still not fully developed yet and have led to security vulnerabilities in the past. Corda and Hyperledger are very much alike; both are focussed on the financial industry, offer many tools for regulators, a consensus can be chosen, API is still in its early phases and are supported by many investors. Nonetheless, We can identify some differences; Corda provides the ability to establish a consensus between firms at the level of each individual deal/contract and has better scalability, while Hyperledger provides a more secure ledger. However, one thing to note is that Corda is working on a new feature that brings encryption to transactions.

This paper argues that Corda is the best tool to set up a distributed ledger for the core business processes of an asset management company. The only disadvantage compared to Hyperledger is that transactions are not being encrypted. However, we have seen that in Corda sharing of data only done to the right stakeholders, which means that encryption is not necessary, because there is no chance that a node can access the data if they are not part of the deal. The most important aspect of Corda is that the consensus can be chosen for each individual deal between firms. This is especially important in the know-your-customer process, because laws differ per firm and region, which means that some of them may want to adopt a different consensus.

We have discussed before that one of the main implementation challenges for all the business processes is that there is no standard yet and everyone needs to participate. A consensus between individuals and firms makes sure that there will be no debate in the industry about this, because a firm can adopt a different one if he wants. Finally, Corda offers better scalability regarding validation nodes (regulators); in all of the business processes there are many regulators, and we do not want this to affect the performance.

In our study it was evident that the companies behind the blockchain platform are still immature. Moreover, the blockchain platforms are in constant development and many new features are being worked on. Our answer to the research question was based on an image of the current blockchain industry and can change as other tools in the industry improve their weaknesses. However, in this research we have provided a framework of how a blockchain tool can be evaluated and what criteria are important.

ROLE OF THE STUDENT

Nick van de Luijtgaarden wrote this bachelor thesis under the supervision of T. Cocx at Leiden University. The topic was proposed by the student. The processing of the results was done by the student on the basis of existing data. Besides, the formulation of the conclusions and the writing were done by the student.

REFERENCES

1. D. Biondi, T. Hetterscheidt, B. Obermeier (2016), Blockchain in the financial services industry.

2. S. Nakamoto (2008), Bitcoin: A peer-to-peer electronic cash system.

3. M. Swan (2015), Blockchain: blueprint for a new economy, "*O'Reilly Media*".

4. T. Olsen, F. Ford, J. Ott, J. Zeng (2016), Blockchain in Financial Markets: How to Gain an Edge.

5. Deloitte (2016), Deloitte Blockchain Survey.

6. J. van Oerle, P. Lemmens (2016), Distributed ledger technology for the financial industry

7. A. Pinna, W. Ruttenberg (2016), Distributed ledger technologies in securities post-trading: Revolution or evolution?.

8. Symbiont (2016). Distributed Ledgers vs. Centralized Databases

9. M. Hancock, H. E. Vaizey (2016), Distributed Ledger Technology: beyond block chain, "*UK Government Office For Science*"

10. C. Scardovi (2016), Restructuring and Innovation in Banking, "Springer".

11. P. Evans-Greenwood, R. Hillard, I. Harper, P. Williams (2016), Bitcoin, Blockchain & distributed ledgers: Caught between promise and reality.

12. R. Schollmeier (2001), A definition of peer-to-peer networking for the classification of peer-to-peer architectures and applications, in "*Peer-to-Peer Computing First Conference*", Linkoping, 2001, pp. 101-102.

13. A. Castor (2017). A (Short) Guide to Blockchain Consensus Protocols

14. C. D. Clack, V. A. Bakshi, L. Braine (2016), Smart Contract Templates: foundations, design landscape and research directions.

15. K. M. Eisenhardt (1989), Building Theories from Case Study Research, "*The Academy of Management Review*" Vol. 14 No. 4. (1989), pp. 532-550.

16. Gartner (2016), Gartner 2016 Hype Cycle.

17. Financial Times (2015), Technology: Banks seek the key to blockchain.

18. Goldman Sachs (2015), What if I Told You.

19. P. Baghai, O. Erzan, J. Kwek (2015), The £64 trillion question: Convergence in asset management.

20. P. Froystad, J. Holm (2015), Blockchain: Powering the Internet of Value.

21. J. Femia, C. Wyle (2003), Transforming Corporate Action.

22. N. L. Wawira (2009), Effectiveness of Know Your Customer (KYC) Policies Adopted by Commercial Banks in Kenya in Reducing Money Laundering and Fraud Incidences.

23. S. Shah, A. Dockx, A. Baldet et. al. (2016), Unlocking Economic Advantage with Blockchain: a guide for asset managers.