#1. Blockchain – speeding up and simplifying cross-border payments

5 blockchain use cases in financial services

The transfer of value has always been an expensive and slow process. This is particularly true for cross-border payments. The blockchain is able to speed up and simplify this process - and also reduces the costs significantly.

November 1, 2016

**What is blockchain?**

Most parties in the financial sector already have a grasp of concepts such as bitcoins and other cryptocurrencies. These concepts work on the blockchain technology, which is a digital, distributed transaction ledger with identical copies maintained on each of the network’s members’ computers. All parties can review previous entries and record new ones. Transactions are grouped in blocks, recorded one after the other in a chain of blocks (the ‘blockchain’). The links between blocks and their content are protected by cryptography, so previous transactions cannot be destroyed or forged. This means that the ledger and the transaction network are trusted without a central authority – a ‘middleman’.

**Cross-border payments**

The blockchain can improve many processes within the financial sector, such as cross-border payments. The transfer of value has always been an expensive and slow process. This is particularly true for cross-border payments. For instance, if a person wants to transfer money from Europe to their family in the Philippines, who have an account with a local bank, it takes a number of banks (and currencies) before the money can be collected. Using services like Western Union for the same transaction is faster but very expensive.

**Faster and more affordable**

The blockchain can speed up and simplify this process, cutting out many of the traditional middlemen. At the same time, it makes money remittance more affordable. Until now, the costs of remittance were 5-20%. The blockchain reduces the costs to 2-3% of the total amount and provides guaranteed, real time transactions across borders.

**A few hurdles**

This is why the blockchain is gaining territory in the field of money remittance. Of course, there are a few hurdles to be taken. The most important one is lack of regulation for cryptocurrencies. If money is transferred from one country to another using blockchain wallets, and one of the wallet providers goes bankrupt or the wallet is attacked by hackers, the cryptocurrency stored will be lost and there is no central authority like a bank to reimburse the loss.

**Cryptocurrency exchange**

There is also the problem of exchanging the cryptocurrency back into locally accepted (fiat) money at the destination. This will often require the use of a cryptocurrency exchange where e.g. Bitcoin is traded for US dollars. Using such an exchange can add extra complexity and runs the risk of fluctuating exchange rates (which can be extreme for cryptocurrencies). Still, many people are willing to take these risks, as the benefits outweigh the drawbacks. Their numbers have the potential to go up once more beneficial regulations are developed.

**Regulators**

When regulation has been implemented, the blockchain will also be an interesting option for corporate cross-border payments. As hard as it is for individual clients to lose their money when parties go bankrupt, it is even more disturbing for corporates transferring large amounts of money through cross-border payments. With the proper regulation, banks will be able to offer their corporate clients interesting propositions based on the blockchain. They are already building their understanding of blockchain technology and developing proofs of concept.

**Innovative climate**

On a global scale, more and more countries are improving regulation in the field of cryptocurrency, as they acknowledge its importance for an innovative climate. Until now, Europe has been more conservative. For instance, only a few years ago, Dutch regulator DNB claimed that virtual currency is ‘no currency at all’, comparing bitcoins to the tulip bulb bubble that caused a huge collapse of the Dutch economy in the 17th century, when tulips became the new gold – for a while.

**Experiments**

However, the benefits of cryptocurrencies and other blockchain applications have become clear in the last few years and both Fintech startups and banks are actively experimenting with the technology and pressing regulators for action. With even DNB itself experimenting internally to become more familiar with cryptocurrencies in the form of a ‘DNB-coin’, clearer rules for banks, corporates and individuals are only a matter of time.

#2. Blockchain – the future of share trading

5 blockchain use cases in financial services

Share trading will soon be impacted by the blockchain. Utilizing blockchain technology potentially allows for greater trade accuracy, and a shorter settlement process.

November 8, 2016

**Cutting out the middlemen**

The blockchain is one of the most exciting technology innovations being developed right now. It has the potential to improve many processes within the financial sector, including share trading. Buying and selling stocks and shares has always involved many middlemen, such as brokers and the stock exchange itself. Creating a decentralized and secure ledger – a blockchain – that gives every party a say in the validation of a transaction, speeds up the settlement process, allows for greater trade accuracy, and can cut out some of the ‘middlemen’ (such as brokers) while changing the role of others (such as those determining share price).

**Bitcoin**

So how does it work? Bitcoin is the world's first and most well-known blockchain application. It is a decentralized network for transactions in digital currency, which can be stored and transferred in the form of cryptographic tokens. Bitcoin uses a peer-to-peer network to broadcast information about transactions, which are then added to blocks that are cryptographically secured, forming an immutable blockchain. Because the entire blockchain is shared by all participants, it is easy to prevent double-spending and check who owns which tokens at which time. Furthermore, a powerful scripting system can be used to automate transactions or make them dependent on certain pre-conditions.

**Colored coins**

Originally, bitcoins are a neutral medium of exchange. However, by tracking the origin of a bitcoin, a set of bitcoins can be ‘colored’ to distinguish them from the rest. These bitcoins can then be given special properties and can be associated with the ownership of precious assets, such as gems, art, cars, or stocks and bonds. In this way many different assets can be exchanged using the Bitcoin blockchain, but there are also cryptocurrency networks that are dedicated to exchanging multiple assets, such as Ripple.

**Stock exchange**

Trading has already changed significantly with the introduction of computers. In the near future, share trading will change even more dramatically. The blockchain can not only cut out brokers, but the stock exchange itself could also become decentralized, without a central system being required to bring supply and demand together.

**Countless computers**

Brick and mortar locations all around the world are already being replaced by servers, but by using the blockchain the trading could move from dedicated servers of the stock exchange into a decentralized network running on countless computers around the world. In fact, this could happen much sooner than expected. The main reason that developments are not speeding up more than they might, is that blockchain developers are even scarcer than other software developers.

**Nasdaq blockchain technology initiative**

Blockchain will also impact the process of going public with a company. For instance, only a year ago Nasdaq announced plans to leverage blockchain technology as part of an enterprise-wide initiative. In their own words, ‘blockchain will be used to expand and enhance the equity management capabilities offered by its Nasdaq Private Market platform’. It will offer ‘efficient, fully-electronic services that facilitate the issuance, transfer, and management of private company securities’. The blockchain will be able to take over the role of notary offices in this field, since its content is so well secured.

**Private key**

Is the blockchain completely safe? Well, the chain itself is, but there is still the risk of the ‘private keys’ that prove ownership of a certain asset being lost or stolen. The private key is a variable that is used for digital signatures and can potentially be stolen in the same way as losing your passwords due to phishing or malware. This allows its owner to change the ownership of assets recorded on the blockchain.

**Solutions**

However, developers have already come up with solutions to protect the owners of private keys and blockchain assets. For instance, all parties within a blockchain could agree that a majority of the parties should sign before a transaction is agreed upon. This will prevent hackers from changing ownership by simply stealing a single key. Such multi-signature transactions can be programmed directly into the asset trading applications running on the blockchain.

**Scalability**

Another challenge is scalability. Using the blockchain implies recording and broadcasting an enormous amount of transactions. Because it is shared with so many people, this creates a lot of overhead for data storage. And because every block is linked cryptographically to the block before, it requires a lot of computing power for the entire network to secure and check all transactions.

**Reducing redundancy of information and improving performance**

Bitcoin developers are therefore working on options to reduce redundancy of information and improve performance. An example is the lightning network, which allows smaller transactions between groups of traders to be handled quickly outside of the Bitcoin blockchain, with only the end result of the transactions being written to the blockchain itself, thus recording the end state securely without burdening the network with all intermediate steps. Other, dedicated blockchain trading networks such as the one being built by Nasdaq, are created from the ground up with high volume trading in mind, but are still very much in the testing phase.

**Preparing for change**

What is crucial for the financial sector, is to become an active part of blockchain developments. This means recruiting and training blockchain developers or partnering with them. Even though blockchain is still very new and its possibilities are still being explored, it is important to jump in and join forces with other parties in your ecosystem. Deloitte can help. For instance, together with you we can develop a proof of concept for your financial process on the blockchain or brainstorm with you about the impact and opportunities of blockchain for your organization and other organizations in your value chain. With blockchain, more than ever before, staying in business means looking ahead.

#3. Blockchain – the benefits of smart contracts

5 blockchain use cases in financial services

One of the most promising applications of blockchain technology is the smart contract. It can execute commercial transactions and agreements automatically. It also enforces the obligations of all parties in a contract – without the added expense of a middleman.

November 15, 2016

**Smart contracts**

Smart contracts (which are one of the most highly anticipated applications of the blockchain ) are computer programs that facilitate, verify, or enforce the negotiation or execution of an agreement. Smart contracts often emulate the logic of regular contractual clauses. Therefore, many kinds of contractual clauses can be made partially or fully self-executing, self-enforcing, or both.

**Benefits and conditions**

The benefits are obvious: the blockchain is a secure technology, so smart contracts can be more secure than traditional contract law. Also, they can reduce a number of transaction costs associated with contracting, since the blockchain cuts out any middlemen. However, the fact remains that the quality of the output depends on the quality of the input. Smart contracts are by no means magical constructs that understand user intent and are always flawless. If there is an oversight in the text, the result might be even more dramatic than in a traditional contract, because the rules of the smart contract are recorded in computer code and cannot be freely interpreted according to ‘the intent of the contract’, but only according to literal meaning.

**The Decentralized Autonomous Organization (DAO) case**

The consequences are illustrated by what happened to the DAO, a decentralized autonomous organization for venture capital funding. This organization without employees, existing entirely as computer code on the Ethereum blockchain, was launched with US$ 150 million in crowdfunding in May 2016. Only three weeks later, it was hacked and drained of approximately US$ 50 million in cryptocurrency. The hacker, who was one of the investors, had discovered an unintended loophole in the code of the contract and was able to take the money out. This was technically not an illegal action or a hack in the normal sense – the literal (but flawed) code of the contract actually allowed for this to happen.

**Maturity**

As this example shows, smart contracts have not yet reached the appropriate level of maturity we expect of complex legal contracts. Of course, of all the traditional contracts written on paper over the centuries, many were not flawless, either. In fact, many of them still intentionally or unintentionally offer an escape from the conditions to one or both contract parties.

**Scope**

Careful and unambiguous wording is very hard to achieve, and remains so, whether contracts are written on paper or recorded on the blockchain. But if the scope of the smart contract is small enough, with limited complexity, overseeing the consequences and testing for correctness are much easier. This is why experiments with smart contracts are already underway in various industries.

**Life term insurance**

For instance, Deloitte recently developed a proof of concept for a life term insurance product recorded in a smart contract. Insurance is a logical fit for self-executing smart contracts, since the conditions that lead to a payout can often be clearly defined beforehand in the insurance policy.

**Cargo shipping and real estate**

Other interesting applications are in development for cargo shipping and real estate. Shipping cargo involves a number of intermediaries that handle papers and payments. Being able to cut out these middlemen and reduce administrative burden may save only a few euros per container, but with hundreds of millions of containers a year, the net savings are tremendous. In real estate, smart contracts can be used to keep an overview of all leases and continuously monitor and verify the payments being received. This greatly improves the process of auditing the leases.

So even though maturity of the technology is still an issue, smart contracts are definitely finding their place – and they are here to stay.

#4. Blockchain – how to improve online identity management

5 blockchain use cases in financial services

When identity management is moved to the blockchain, users are able to choose how to identify themselves and who will be informed. They still need to register their identity on the blockchain somehow, but after that, they can re-use that identification for other services.

November 22, 2016

**Online identity management**

Online identity management has always been a time-consuming and costly process. First of all, there is the need for registration. A consumer or client could register online but financial services like loans, mortgages or insurance require a higher level of security for the financial institution to comply with Know Your Customer (KYC) regulations.

**Checking, authentication and authorization**

This usually means that some form of face-to-face checking and/or checking official government identity documents will be required. Second, the client needs a means of authentication: users need to prove that they are who they claim to be each time they log into a service. Third, authorization – there needs to be proof that they are allowed to do what they intend to do. And finally – they need to take all these steps again for every new service provider they are interacting with. Not to mention privacy issues - there are many web services and intermediaries who have large amounts of identity information stored or are aware of what service clients are using.

**Benefits of the blockchain**

One of the benefits of the blockchain is that it has the potential to cut out the middlemen and provide every party in the network access to the same ‘source of truth’. When identity management is moved to the blockchain, users are able to choose how they identify themselves and with whom their identity is shared. They still need to register their identity on the blockchain of course, but once they have, they don’t need a new registration for every service provider, provided those providers are also connected to the blockchain. Once is enough.

**Challenges**

The blockchain is a new technology and identification options are still limited. This means that standards for identity on blockchain are not yet set and best practices are still being developed. Also, research needs to be done as to how much privacy can protected in practice. Once information is recorded on the blockchain, it remains accessible to all parties in the network, so users must be aware to minimize any private information that they don’t want to divulge.

**Private keys**

Of course, this is a difficult balancing act because enough information needs to be shared to be able to prove your identity. Another challenge is the management of private keys. The owner of a private key is assumed to be the owner of a specific identity. Unlike losing a passport or driver’s license, losing your identity on the blockchain means there is no one who can hand out a new one, so the owner would have to register all over again.

**Third party**

A stolen private key is even more of a risk, potentially leading to identity theft. However, there are ways to mitigate this. The owner can make secure back-ups of the private key, or hire a third party to back up and monitor the key. This may sound as a contradiction, as one of the benefits of the blockchain is cutting out the middlemen. But there is a big difference - the user is able to choose their own third party, whether it’s a notary office, a financial services provider, a bank, or any other party that you trust.

**Applications**

A number of startups are developing applications in the field of identity management. Some of those use a closed identity platform. Users only have to identify themselves once to one of the banks or insurance companies connected to this platform. The fact that they have been identified by one of the parties is then recorded on the blockchain, so they do not need to be registered by the other parties as well.

**Open identity platform**

However, at Deloitte we believe in open networks, so we have built a Smart Identities service in the UK that is open to connect to all kinds of organizations and software applications. Besides identifying individuals, these types of services can be used to register the legal representatives of companies or individuals, e.g. family members of elderly people who are unfamiliar with the internet, or doctors who need access to medical records. The characteristics of the blockchain, such as real-time information about who is entitled to do what, are well suited for registering such authorizations.

**KYC light**

When the risks are lower, there is also room for more easily accessible identities. Deloitte has co-created a ‘KYC light’ solution in the micro-insurance domain, which allows insurance companies to identify clients who only need insurance for a limited amount of time (e.g. when they borrow or hire a camera). Insurers can identify them based on their ‘social points’, collected by means of their profiles on e.g. Facebook. Meanwhile the blockchain allows the insurer to ‘track and trace’ the actual camera – with the active user linked to it. In this application the identity of the asset (the camera) is considered more important than the user identity, so an easily accessible means of identification can be used.

**Research, keep up and experiment**

It is obvious that even though the blockchain is still new and its possibilities are still being explored, it is important to research, keep up with new developments and experiment to gain hands-on experience on the best way to manage identity for your client and business needs.

#5. Blockchain – loyalty and rewards

5 blockchain use cases in financial services

Blockchain offers many benefits, including transparency and traceability of transactions. This will help banks and insurers to create a more captivating loyalty and rewards program that fits 24/7 performance management and enhances engagement.

November 29, 2016

**24/7 feedback creates more engagement**

Talent has always been a boardroom issue, but with so many new technologies rapidly evolving, high performance is more crucial than ever. As a result, performance management has gained impact as well, as a tool to improve retention. New performance management systems are all about 24/7 feedback, about being heard and appreciated. They have moved from ‘systems of record’ to ‘systems of engagement’, creating a culture in which people strive to be the best version of themselves.

**Transparency and traceability**

Loyalty and rewards programs can be part of such a performance management system. In order for these programs to be successful, transparency and traceability of transaction are crucial. After all, employee sentiment and use will only improve if rewards are actually delivered and companies and their employees can agree on whether a certain transaction has taken place. This is where the blockchain comes in. This new technology offers many benefits, including transparency and traceability of transactions.

**Deloitte crypto currency**

Since the blockchain is such a new technology, many organizations are still in an experimental stage. But the outlook is promising. Deloitte has been studying blockchain technology for a while and offering advice in this field. But we are also looking into new opportunities, such as loyalty and rewards programs on the blockchain. In order to offer our clients state-of-the-art advice in this field, we are now running an internal pilot program. This pilot includes the Deloitte crypto currency, which is comparable to the Bitcoin, but has been developed by our colleagues in the US, who have joined forces with Loyyal, a company that builds loyalty and rewards apps on the blockchain.

**Real-time award, real-time appreciation**

The Deloitte crypto currency is mainly used as a real-time reward for the behavioral side of performance rather than merely output and results - skills such as sharing knowledge, asking feedback and networking. Skills that are often difficult to develop within organizations. The fact that these rewards are real-time, enhances the sense of 24/7 feedback and makes the employees feel even more appreciated. They can exchange this currency in the Deloitte webshop for e.g. tickets to a football match, a trip to New York, or gifts to their favorite charity – which fits our goal to ‘make an impact that matters’.

**No middleman**

Also, the fact that the Deloitte crypto currency is based on the blockchain, makes it easier for vendors to be part of our loyalty and rewards network. They can rely on the security of the transactions because of the very nature of the blockchain. Other non-blockchain based networks require a payment solution that is facilitated by payment providers and banks. Since the blockchain does not require a middleman, it is possible to build a network in which participants can exchange value, expanding the concept of coalition rewards programs (interoperability).

**Banks and insurance companies**

With the experience Deloitte has gained in this field, we can help banks and insurers to develop similar loyalty and rewards programs on the blockchain. In the financial sector, coins such as the Deloitte crypto currency could be used to enhance e.g. regulatory compliance. They can be a reward for employees who share knowledge, fill out time sheets in time, or visit certain events and take courses (next to mandatory courses). The impact of such a reward could be enhanced by the ‘first come first served’ principle – the earlier employees register for a course, the more coins they receive. It acknowledges that they are on the right track and eventually improves their engagement – and their performance.