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BLOCKCHAIN

A brief introduction and guidlines for action

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Key Facts

- Blockchain is a technology that allows a network of computers to maintain and use a distributed ledger, and has potential to deeply transform the way transactions are handled
- Several organizations have started advancing this technology and exploring potential use-cases to take early advantage of the the benefits Blockchain can offer
- Organisations from all sectors, specially finance institutions, should start investigating this technology in an agile way to stay ahead of the disruption wave

Report

INTRODUCTION

As technology becomes to an even larger extent the driver for innovation in all branches, being on top of emerging opportunities and staying ahead of disruption waves becomes crucial for organizations seeking to lead in their fields.

One of the technologies expected to deeply affect the way we handle transactions over networks is Blockchain. In this article we will briefly introduce the idea behind Blockchain, present some of the initiatives exploring its application, and illustrate some of the potentials.

BLOCKCHAIN IN A NUTSHELL

Blockchain is a technology that allows a network of computers to verify and process individual transactions into a record of non-reversible and tamper-proof entries in a distributed database.

A blockchain based transaction can be described in three steps:

1. Party A initiates a transfer of funds in favor of party B by submitting said transaction to the network of Blockchain participants
2. The transaction is configured into a block and assigned a unique identifier based on its contents and the last known valid transaction block
3. The block is transmitted across the network verified by all participants; once deemed to be valid, it will be considered as the new "last known valid block" and become appended to the blockchain

Because each network participant has a record of all valid transactions that are added to the chain, it can be said that the transaction ledger is distributed among all participants.
Three key technological concepts play a central role in Blockchain:

- **Public-Private Key Cryptography**, which restricts the initiation of transactions to the owner of the private key, but allows anyone in possession of the corresponding public key to verify them
- **Hash functions**, which compute a unique fingerprint for each block, making tampering of information detectable
- A **consensus algorithm**, which allows participants of the network to agree on which the last-known valid block is and discard invalid ones

As of today, the most commonly known application of Blockchain technology is the cryptocurrency Bitcoin. Since its release in 2009, this peer-to-peer

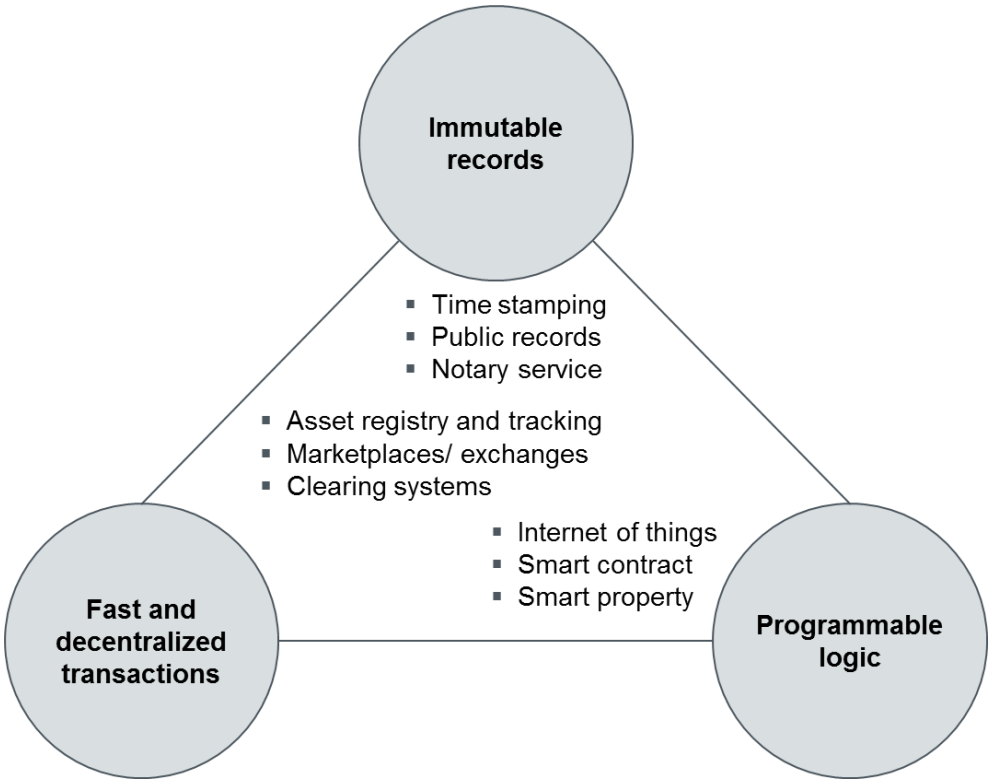

Figure 2: Selection of Blockchain Use-Cases

electronic-cash system has gained notoriety because of its volatility and its involvement in the financing of illegal activities.

However, an increasing interest in Blockchain technology has been developing in several industries and gaining momentum, and the potential of this technology is being explored for further applications outside of cryptocurrencies.

VENTURES AND INTEREST IN BLOCKCHAIN

Due to its most obvious application as a record of transactions, many financial institutions have been looking into Blockchain technology. The largest collaborative effort by banks is currently R3 CEV, with 42 banks participating in the consortium as of January 2016. The U.S. based initiative is working towards the development of a financial grade ledger, the establishment of global collaborative laboratories to test and benchmark technologies, and the production of commercial applications.

However, use-cases of Blockchain technology are not limited to banking and can be applied to a wide variety of areas. Hyperledger is a collaborative project aiming to develop a cross-industry open standard so that a Blockchain tailored for business can be built, and known-issues from bitcoin (e.g. scalability) can be addressed. The project runs under the oversight of the Linux Foundation and as of February 2016, 30 members are participating, including banks, IT-firms and start-ups.

While these large initiatives stem from the private sector, interest in this technology has also been expressed by public organizations. In January 2016, the UK Government Office for Science published a report recommending government efforts towards exploration and testing of Blockchain and distributed ledgers, as well as proposing trials to assess the technology's usability in the private sector.

The list of organisations currently exploring Blockchain technology extends far beyond the above

mentioned examples and keeps increasing, as other industries start developing curiositiy for potential ways Blockchain can improve their business.

Potential Use-Cases

Blockchain is expected to radically change our current way of interacting with systems. Not only is the necessity of a central agent to process transactions eliminated but the corresponding records are also stored in an auditable and tamper proof way. In addition, programmable logic can be added to the blocks, enabling automatized excecution of commands.

Along these features, a variety of use cases can be developed, some of which we have illustrated below.

With increased research in this area and the resolution of Blockchain's current limitations, more opportunities and use-cases will start to unfold.

Riding the disruption Wave

Blockchain technology is still at its early stages and challenges still need to be tackled before it can become a widespread solution. However, the pace at which it will develop should not be underestimated, since more and more organisations are joining in the exploration and advancement of this technology.

While each organization will choose a different approach based on their risk apetite, innovation capabilities and external constraints, three key recommendations should be followed in order to activate Blockchain readiness early on.

Build-up digital literacy

A digitally-informed leadership is crucial to harness the opportunities that arise from this new technology. By building up digital literacy within an organization, it can be ensured that decisions regarding innovation are taken from a position of assertiveness and understanding rather than of fear of the "unknown" new technology.

Start technology trials

Gaining experience with Blockchain technology at an early stage improves the overall understanding of the technology in an organization and triggers the development of new ideas. By initiating small practical trials with Blockchain, an organization can identify the customizations and development that need to take place in order to create a Blockchain application that best suits their needs.

Agilize innovation processes

Once the disruptiveness of Blockchain is activated, the deployment of this technology will rapidly change the market. Being able to react in an agile manner will separate those who are rolled-over by the disruption wave from those who will ride it. An organization that is able to react in a timely fashion and develop or adapt solutions in small but quick steps will have a much better chance to take the most advantage of the new environment.

Sources

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