Agenda
What we will cover today

- An introduction to Blockchain
- Blockchain for CFO
- Proof-of-Concepts
- Round up
An introduction to Blockchain
Introduction
Large companies and government agencies are actively investing in Blockchain
What is happening in Belgium?
Multiple players show interest

KBC develops blockchain-based app for cross-border SME trade
12 July 2018 | 492 views | 8

KBC has developed a blockchain application for managing, tracking and protecting domestic and international trade transactions between SMEs.

The Belgian bank has worked with IT start-up Conga to develop the Digital Trade Chain application, which is based on a 'permissioned' blockchain platform.

Why Is SWIFT Financial Network Interested in African Blockchain Startups?
By Sarina Hong
Published May 13, 2018, 8:08 pm

« Blockchain » : Euronext s'associe à BNP Paribas et Société Générale pour faciliter le financement des PME

Het Belgische Blockchain landschap. Een overzicht:

820 readers

BNP Paribas Lab to Focus on Distributed Ledgers

Published June 24, 2016 at 15:50 BST

AXA investit dans les blockchains interopérables de Blockstream

Published 9 février 2016, 17:40
How does it work?
A Blockchain is a record, or ledger of digital events

What is the Blockchain technology?
Distributed Ledger Technology (DLT) is based on a combination of technologies invented long time ago.
Its main features are:

- A digital ledger that keeps a record of all transactions taking place on a peer-to-peer network
- All information transferred via blockchain is encrypted and every occurrence recorded, meaning it cannot be altered
- It is decentralised, so there’s no need for any central, certifying authority
- It can be used for much more than the transfer of currency; contracts, records and other kinds of data can be shared
- Encrypted information can be shared across multiple providers without risk of a privacy breach

**Definition**: “A distributed database that maintains a continuously growing list of records, called blocks, secured from tampering and revision. Each block contains a timestamps and a link to a previous block.” (Investopedia, 2016)
Blockchain as a System
Going beyond the currency...

As a Currency

Benefits of Blockchain Systems as a Currency

- Low Transaction Cost
  The cost to receive electronic payments is very low for merchants

- Fast Settlement
  Merchants can receive the funds paid by customers in near real-time

- Global Standard
  Blockchain currencies are accepted globally without requiring foreign exchange

Challenges of Blockchain Systems as a Currency

- No Economic Incentive for Customers
  Customers’ economic incentive to pay with Blockchain currencies is entirely relied upon merchants sharing their savings

- Cumbersome Entry Points
  Streamlined options to obtain Blockchain currencies using fiat currencies do not exist for a majority of Blockchain systems

- Nascent POS Experience
  Point-of-sale experience relies on technical processes requiring constant connectivity

- Fluctuation of Value
  Value of most Blockchain currencies fluctuate heavily due to speculative investments, reducing predictability of stored value

As a System

- Systems’ network (e.g., Blockchain, the Ripple Network)
  - Enables efficient transfer of value and information
  - Immutability of the system guarantees high-fidelity
  - Allows for programmability

Systems’ native currencies (e.g., Bitcoin, XRP)
  - Measures the market value of goods and services
  - Intermediates the exchange of goods and services
  - Can be reliably saved and retrieved as store of value
Blockchain as a System

... To establish itself as a networked System

**As a Currency**

Systems’ native currencies (e.g., Bitcoin, XRP)
- Measures the market value of goods and services
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**As a System**

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**Record Keeping**
- Create an immutable record without reliance on a trusted third party
- Improve efficiency of record keeping via automation

**Transfer of Value**
- Enable low-cost, near real-time value transfer without an intermediary
- Expand to transfer of other assets beyond “money”

**Smart Contacts**
- Program protocols to execute transactions when a set of pre-determined conditions are met

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**Examples**

- Digital cheques / IOUs
- Automatic financial instruments
- Parametric insurance contracts
- Automated market making
- Domestic and international remittance
- Internal payments settlement
- Clearing and settlement of securities
- Exchange of low liquidity assets

- Digital certificate of ownership for physical assets
- Transaction validation of digital assets
- Financial accounts

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Blockchain as a system: Record Keeping

Blockchain can offer automated, high-fidelity and low-cost mechanism for record keeping

- The core mechanism behind Blockchain is the maintenance and modification of a distributed ledger
- A ledger can carry any information, including but not limited to monetary value
- Because Blockchain requires user-specific “keys,” records are kept in a distributed ledger but only accessible by authorized users

Advantages over traditional record keeping

- Secured by cryptographic protocols
- Immutability and indelibility of distributed ledger
- Controlled access to the records
- Traceability of modifications and uses of records
- Low cost (executed without an intermediary)

Potential applications

**Financial Services**

- Digital certificate of ownership of physical assets
  - e.g., real estate, stocks, bonds
- Transaction validation of digital assets
  - e.g., price feeds, derivative execution
- Financial accounts
  - e.g., account balance, transaction history, credit history

**Non-Financial Services**

- Accounting records
  - e.g., assets, liabilities, revenues, expenses – enables auditing of financial records without a trusted third party
- Digital identity
  - e.g., personal IDs, birth certificates, corporate identification
- Digital storage of data
  - e.g., medical records, photos, intellectual property
- Digital storage of public records
  - e.g., legislations, voting records
Blockchain as a system: Transfer of Value

Blockchain also enables secure, near real-time, low-cost transfer of value without an intermediary

- Once records are entered on a distributed ledger, they can be transferred to other parties using the same Blockchain protocol
- This allows transfer of value between two parties possible, if all parties participating in the system agree on the assignment of value
- Removes the need for a trusted intermediary, effectively enabling any individuals’ participation in financial markets without brokers

Advantages over traditional transfer mechanisms

- Enables fully virtual transfer of properties
- Irreversibility of transactions preventing fraud
- Greater traceability for dispute resolution
- Fast settlement of transactions
- Low cost (executed without an intermediary)

Potential applications

**Financial Services**
- Domestic and international direct remittance
- Internal payments settlement
- Restructuring of international correspondent banking
- Direct foreign exchange
- Clearing and settlement of securities
- Exchange of low liquidity assets

**Non-Financial Services**
- Digital sales of physical and digital assets
- Treasury management
- Transfer pricing
- Voting
Blockchain as a system: Smart Contracts
The next generation of Blockchain solutions will transform how contracts are executed

- Blockchain protocols are programmable to trigger transfer of value only under certain conditions
- Leveraging programmability, smart contracts can be developed, exchanged and automatically executed on Blockchain
- The effectiveness of smart contracts will be the greatest when they are integrated with assets or products that are condition-based in nature

**Advantages over traditional transfer contracts**

- Fact-base, automatic enforcement
- Greater traceability for dispute resolution
- Flexibility of applications and conditions
- Fast settlement of transactions
- Low cost (executed without an intermediary)

**Potential applications**

**Financial Services**

- Digital cheques / IOUs
e.g., transfer $X to the counterparty on the Yth day
- Automatic financial instruments
e.g., buy / sell specific number of assets at a specified price if a specified price is reached
- Parametric insurance contracts
e.g., pay insurance claims when certain measurable weather conditions are met
- Automated market making
e.g., buy / sell certain assets when certain prices and other conditions are met

**Non-Financial Services**

- Automated escrow service
e.g., receive specified amount of money today and transfer it to the counterparty only when a certain condition is met
- Invoicing / Accounts Receivable
e.g., transfer specified amount of money to the supplier when a shipment arrives
- Decentralized corporations
e.g., automate all transactions conducted by a corporation make it run autonomously on Blockchain
Concrete implications
As blockchain technology evolves, use cases may impact a lot of industries

**Smart Contracts**
Electronic contracts with transfer of ownership provisions coded into the contract itself. Both tamper-proof and self-executing, the need for trusted third-parties to resolve disputes or enforce settlements is eliminated.

**Intellectual Property**
Encrypted and time stamped documents stored on the blockchain can be used to document ownership of IP without revealing the information it contains, and provide proof that the document was authored at a particular time.

**Identity Management**
A cryptographic distributed network could be used to verify people’s identities, such as passports, social security numbers, tax id numbers and driver’s licenses.

**Medical Records**
Patients can hold the private key used to encrypt their medical data, using public keys to share selected information with doctors only when desired.

**Traceability**
Fractional bitcoins marked with certain properties, also known as colored coins, are used to represent digital or physical assets such as a house or a car.

**Foreign Exchange**
The ability to securely clear and settle transactions bilaterally using the blockchain opens the FX market to non-bank market makers, tightening spreads and lowering transaction costs.

**IMPACTS**
- Lower transaction costs
- Increased information sharing
- Elimination of requirement for trusted third-party intermediaries
Blockchain for CFO
The CFO point-of-view

Blockchain will have an impact on the basic functions of a CFO

Impact on CFO’s 4 functions

**Catalyst:** CFO must act as a catalyst for change and trigger interest into Blockchain solutions. CFO must try to anchor a digital culture and a genuine interest for the technology in the DNA of the company.

**Strategist:** CFO must stay informed of the latest development of Blockchain technology in order to provide the strategic business and technological direction from the finance function.

**Operator:** CFO must be aware that innovation and Blockchain technologies in particular can help achieve greater financial efficiencies, therefore having to assess the impact of a potential implementation.

**Steward:** Blockchain is a technology that has great potential to help CFO protect the assets of the company and help report on the financial position and structure to stakeholders.

**Redesigning performance management:** With a private distributed ledger, it is possible to measure, validate and reconcile all transactions within an organization to measure performance almost real time.

**Transforming how Finance provides organizational leadership:** The adaption of Blockchain technology and industry-level systems of record will change the way Finance provides leadership to the organization.

**Evolving risk intelligence gathering and application:** Real time awareness of value transfers in and out of the organization will provide risk intelligence to executive strategic and financial objectives.

**Reforming asset preservation and reporting to stakeholders:** The immutable, verifiable and digitized model to proof-of-existence will transform management of critical assets and reporting to internal and external stakeholders.
## Potential Finance use cases and their impact

We used three key themes to identify and develop potential use cases for the Finance function.

<table>
<thead>
<tr>
<th>Key Themes</th>
<th>Use cases</th>
<th>Impact</th>
</tr>
</thead>
</table>
| Value Transfer | Shareholder voting | • Increased transparency due to reduced manual intervention  
• Better investor relations and shareholder participation |
| Record Keeping | Budgeting and expense management | • Creates an audit trail for every spend  
• Fewer chances of corporate scandals and scams  
• Greater **internal accountability** |
| Smart Contracts | Consolidations and inter-company eliminations | • Facilitates accurate consolidation of financials  
• Enforces documentation of intercompany transactions  
• Promotes **intercompany synergies** |
| | Financial audit | • Eliminates the need for third party validators  
• Reduced audit expense and costs for books maintenance  
• Better **governance and transparency** |
| | Digitalizing ownership records | • Eliminates the need for third party validators  
• Reduced chances of fraud and bad accounts  
• Creates an **ownership trail** for every asset |
| | Requisition and vendor management | • Reduces vendor cash conversion cycle  
• Eliminates need for reconciliation  
• Promotes **efficient Vendor management** |
| | Accounts payable process | • Reduced processing time and enhanced security  
• Eliminates the need for reconciliation of PO and Invoices  
• Better **vendor relations** |
Rounding up
Blockchain reality check
What blockchain is not and the challenges associated with the technology

**MISCONCEPTIONS**

- It’s not a panacea
- It’s not Bitcoin, that is just a use case
- Traditional technology is not redundant or obsolete
- You will still need to integrate data from other systems
- It’s not real-time

**CHALLENGES**

- Standards need to be formalised
- Not all regulators are on board
- Does it scale?
- It is not proven in production environments
- Collaboration is required to make it a success
The Deloitte GRID Blockchain Lab
From Ecosystem to Offering

1 Innovation and Ideation

- We identify relevant use cases to harvest the benefits of Blockchain technologies
- Our thought leadership, developed in conjunction with our ecosystem of innovation and Blockchain companies, enables you to make sense of the broad innovation landscape
- We track over 200 Blockchain companies

2 Strategy Development

- We lead you to define “where to play and how to win”
- We drive business, technology, integration and talent strategy
- We develop strategies to pilot and implement Blockchain based solutions
- We define an iterative and flexible approach to match the rapid changes in the ecosystem

3 Product Development

- We mobilize our global practitioners to your organization to re-engineer business processes or design new ones
- We bring our broad set of services, across compliance, technology, talent, operations and tax, to effectively integrate your Blockchain solution
- We deliver as one team in collaboration with external companies

4 Prototyping

- We accelerate prototyping by using our existing technology capabilities and industry experience
- We have prototypes up and running: Digital Bank, Loyalty & Rewards and Smart Identity
- We have over 20 prototypes in development

Industries where we have deep business process knowledge

Global delivery network with 9 development teams

Practitioners in our Blockchain community from 30 countries

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How does it work?
Blocks containing data are created and signed

Block: containing several transactions, several information items or contracts

Public key cryptography

Public key cryptography is a method for verifying digital identity with a high degree of confidence, enabled by the use of private and public keys

Allows for individual ownership and exchange of Bitcoins among users
How does it work?
You can store various items in a Block

- Record Keeping
- Transfer of Value
- Smart Contracts
How does it work?

Blocks are building a connected chain, therefore the name

The signature of the block:
• Is function of the content of the block, but contains a random part as well
• Needs to comply to certain rules

Every block has a signature, each of them stored in the next block, linking them into a chain

Proof-of-work is a piece of code appended to data that validates that data’s authenticity and controls when it can be written into the system

**Prevents double spend by ensuring data is recorded chronologically**
How does it work?
The chain isn’t maintained in one place, it is duplicated at several places, each of them trying to find a valid signature.

Every time a valid signature is found for a block, the block is sent to all other chains as “the valid next block” and each chain verifies it before joining the chain.

In a peer-to-peer model, every peer in the network is a server and client, both supplying and consuming resources.

Enables the facilitation of a currency without a central, privileged third party.
How does it work?
The Distributed nature of the Blockchain ensures that it is inalterable and irreversible.

If someone tries to tamper with one of the blocks...

All other participants in the blockchain will notice the error and block the erroneous chain.
How does a Blockchain transaction work?
A Blockchain is a record, or ledger of digital events

<table>
<thead>
<tr>
<th><strong>A transaction occurs online</strong></th>
<th><strong>Transaction recorded in a queue as a block</strong></th>
<th><strong>Transaction is broadcasted to every node in network</strong></th>
<th><strong>All nodes in network validate the transaction</strong></th>
<th><strong>Block is added to chain creating valid &amp; immutable record of transaction</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://via.placeholder.com/150" alt="Transaction Initiation" /></td>
<td><img src="https://via.placeholder.com/150" alt="Block" /></td>
<td><img src="https://via.placeholder.com/150" alt="Transaction Notification" /></td>
<td><img src="https://via.placeholder.com/150" alt="Rule Based Validation" /></td>
<td><img src="https://via.placeholder.com/150" alt="Blockchain Formation" /></td>
</tr>
<tr>
<td><strong>Transaction Initiation:</strong> The transaction occurs online on a network</td>
<td><strong>Block:</strong> The transaction is recorded digitally as a block</td>
<td><strong>Transaction Notification:</strong> Each node in the network gets the information regarding the addition of new transaction to the queue</td>
<td><strong>Rule Based Validation:</strong> Each transaction is validated based on certain rules</td>
<td><strong>Blockchain Formation:</strong> The validated block and its hash get added to the end of ledger consecutively to other validated blocks in a way that resembles a chain. This forms the Blockchain</td>
</tr>
<tr>
<td><strong>Transaction Type:</strong> The transaction can be person to person or person to business or business to person or business to business</td>
<td><strong>Block in Queue:</strong> This block is then added to a queue of many pending transactions which are waiting to be validated</td>
<td><strong>Mining Initiation:</strong> The miners at the each node start extracting the transactions from the queue and validating them, a process known as mining</td>
<td><strong>Hash Function Creation:</strong> The miners to validate transactions solve complex mathematical equations and create a hash function for each transaction</td>
<td><strong>Shared Database:</strong> A copy of the Blockchain is shared across all nodes on network</td>
</tr>
<tr>
<td><strong>Asset Type:</strong> Asset transacted can be monetary or non monetary</td>
<td></td>
<td><strong>Network Consensus:</strong> Once all nodes agree on the truth of transaction, the block is validated</td>
<td><strong>Immutable Record:</strong> Any change in transaction will need to be updated across all nodes. This makes changes quite impossible and Blockchain very secure</td>
<td></td>
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</tbody>
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