



Euronet Software Solutions

A Division of Euronet Worldwide

Powerful Payment Solutions that Bring Currency to Life

BLOCKCHAIN

It's not currency. It's a framework.

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Executive Summary

This whitepaper has been created to provide an overview of the key elements of blockchain and the types of applications (sidechains) that can effectively utilize the blockchain framework. The paper touches upon a few of the critical issues facing the global financial economy in an effort to provide context as to why leaders across the world are looking to leverage blockchain as a means to address key concerns.

The goal is to provide the reader with a general understanding of blockchain, how it works and its relevance to the Payments Industry.

Introduction

If there was a technology that allowed the financial industry to use the most advanced algorithms to create an incredibly secure network while promoting transparency, would we adopt it? What if this technology permitted the industry to leverage mathematical computations to strengthen its know-your-customer (KYC) and anti-money laundering (AML) efforts while simultaneously engineering a framework that makes it easier to curb the impact of Zero Lower Bound (ZLB) on the economy, would we embrace that? Blockchain is offering the financial industry the opportunity to make major headway in these areas, which is why financial institutions, governmental organizations and tech giants are throwing resources and brain power behind it.

“This partnership signals a significant commitment by the banks to collaboratively evaluate and apply this emerging technology to the global financial system...” --R3 CEO David Rutter

Throughout 2015, there has been a concentrated effort to better understand the benefits of blockchain technology. This became all the more apparent as 25 of the largest banks announced their intent to not only invest in blockchain but to collaborate in a partnership that leverages their mutual efforts. As can be imagined, an announcement of this magnitude makes it loud and clear to the financial industry that there are untapped opportunities in blockchain that supersede the fears that disruptive technologies oftentimes bring.

Blockchain

Disruptive technologies have a profound impact on conventional services that are offered by banks and financial institutions. In fact, disruption has forced the finance industry to shift from an industry of traditional services, to an industry that offers traditional services in non-traditional ways. A key driver of change has been Fintech, a sector of the technology industry that promotes a systemic re-engineering of core methodologies that are vital when handling financial transactions.

Blockchain technology is a burgeoning Fintech trend that has the potential to influence traditional financial services in unexpected ways. At its most elementary, blockchain is a process that relies heavily upon the concept of consensus. What makes blockchain difficult is the complex set of algorithms that are used to drive applications operating on its framework. In looking past its complexity, there is the potential to leverage the technology in a way that addresses multiple needs across a variety of use cases consequently making interoperability across industries a reality rather than wishful thinking.

Cryptography, distributed ledgers, consensus and logic are the core components of blockchain. When these four elements combine they can effectively scale across platforms and create unique opportunities. Approaching blockchain from this perspective provides a vantage point that allows the industry to see the benefits of intentionally sharing big data in a secure and systematic way. It is important to note that data in the context of blockchain is the equivalent of information that has value. This value can be in the form of currency, assets, authorizations or virtually any piece of information that is measurable.

Cryptography

Blockchain technology is not just data. It is data plus security. Because there are many points at which data can be intercepted by unauthorized parties, cryptography becomes a critical component in any system that is carrying sensitive information. Over time data protection and delivery has evolved from traditional mail protocols to complex mathematical algorithms with digital signatures to send and receive messages. With each iteration, the desired goal is to create a reliable and secure mechanism to share data among groups.

What keeps the blockchain secure is its use of a cryptographic one way hash that provides a level of security that is fast, offers collision resistance, hides information and generates a random output that cannot be linked back to the original input without the appropriate authorization. Because pre-existing algorithms promoting two way encryption are easily compromised they have not been considered as viable candidates for use within the building of a blockchain.

Cryptography in the entire blockchain is a necessity. It promises a level of security before a single data element is created. In fact blockchain is borrowed from cryptography which means that cryptography must be implemented at ground zero. By default it becomes the de facto component of any transaction and is the format that dictates how transactional data makes it into a ledger. Cryptography, with regards to blockchain, is the security that is in place before "security" protocols are breached.

Distributed Ledgers

Distributed ledgers represent the data in the blockchain database. They can be shared publically and/or privately depending upon the application. When data is created, it's electronically written into the ledger. It is similar to the general ledger that is commonly used in accounting principles with the two most discernible differences being accessibility and regulation. With blockchain, not only is the ledger public but every node or contributor to the ledger has a copy of the ledger. In traditional accounting practices, this is often not the case. This is primarily due to the sensitive nature of accounting data and the repercussions associated with having misguided data when reporting earnings and measured numbers.

Private ledgers make sense when dealing with general accounting practices but when used to promote real time transactions they present roadblocks and barriers to ubiquitous payments. The single goal of ubiquitous payments is to promote faster and near real-time transactions. Privacy gets in the way of that goal therefore it seems logical that the transparency available through blockchain and distributed ledgers will continue to be a valuable selling point in its adoption.

Consensus

Consensus amongst nodes is essential in the blockchain. This is because as blockchains are changed or new links are added the majority of the nodes must agree in order for the ledger to be updated. When blocks are updated they provide proof of ownership by applying a proof of work or consensus algorithm. Utilizing this type of mechanism helps to maintain the integrity of the blockchain database. Current measurements require consensus to be at 51% which means that in order for an unauthorized party to erroneously change the data, more than ½ of all of the nodes operating on the framework would have to be compromised. Depending upon the number of nodes this could be costly as it would require an enormous amount of computing power. For example, if there are 100 nodes operating within the framework 51 of those nodes operating on different networks would need to be attacked within a short amount of time in order to take control of the ledger. If we combine this with the complex algorithms associated with cryptography we start to have what appears to be an impenetrable system.

History proves that no system is unbreakable. Network administrators will attest to that. At some point a use case will come along that challenges the fortitude of one or more components of the framework. What the consensus algorithm affords is the opportunity to create a large enough delta between those that would opt to attack the system and those that work to preserve the system. Each node or server within the blockchain recognizes that there is value in maintaining the integrity of the ledger, making blockchain a collective effort rather than an individual one.

Logic

Behind every robust algorithm is a set of rules that determines what enters into the system and what does not. The current iteration of blockchain does not have an exit strategy. This means that data coming into the system stays in the system and is therefore linked back to the genesis record or record of origin.

In essence logic is the “thinking” part of the entire blockchain process. When businesses look to implement blockchain they must evaluate the flexibility of their logic. Rules based engines are the driving force behind business logic and they should allow companies to quickly change course when required without the need to drastically alter underlying algorithms.

Sidechains

The real value proposition of blockchain is in its ability to leverage the framework to build additional value added applications. These applications are called sidechains and allow for multi-block chain ecosystems that can be utilized in non-bitcoin related use cases. Across the industry, banks and financial institutions are challenged to not only drive revenue throughout their organizations but to create operational efficiencies without detracting from the end user experience. Investing in blockchain technology offers companies the opportunity to achieve economy of scale via its usage in multiple applications. This could quite possibly be the reason why a growing number of banks and financial institutions are embracing the framework. Fraud, currency and asset management related use cases are all viable sidechain applications and can in theory overcome some of the challenges that exist with current solutions.

Fraud

According to the Association of Certified Fraud Examiners, the global cost of fraud is 5% of the Global World Product and equates to \$3.9 trillion annually. Fraud, the deliberate deception to secure unfair or unlawful gain, impacts financial institutions, governments, merchants and consumers equally. This is because it reduces purchasing power, leads to inflation and ultimately leads to instability across the global economy. As more devices come online through the Internet of Things (IoT) there will undoubtedly be creative ways to make and receive payments while simultaneously and unintentionally creating avenues that make the financial ecosystem increasingly more vulnerable to fraudulent attacks.

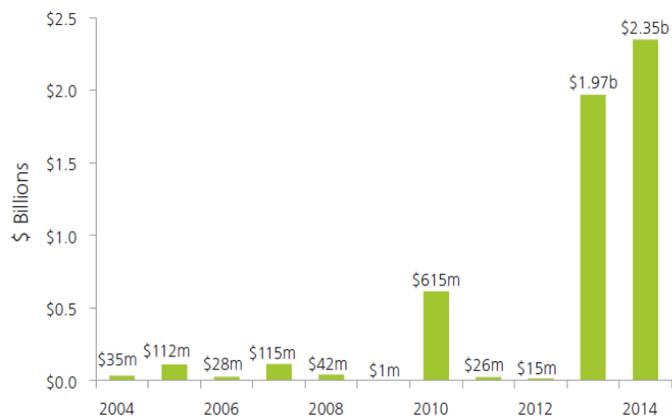
Blockchain has the potential to offer solutions where current initiatives miss the mark. Due to its ability to provide real time information to multiple nodes, it has the power to leverage distributive ledgers in a way that provides safety in numbers. Ultimately, blockchain could quite possibly become the killer app that combats fraud.

AML

Keeping up to date with changing regulations has proven to be a daunting task for any company required to adhere to AML rules. Banks and financial institutions are challenged with creating solutions that must easily adapt to future regulatory requirements. This usually requires firms to rethink and retool their existing processes which can be cumbersome and costly.

The total cost to banks stemming from AML fines has increased significantly over the past decade and many institutions are feeling the resulting financial burdens. Blockchain technology has the potential to offer companies a reliable framework that has inherent processes that reduce the risk of unwittingly falling out of compliance. Leveraging data across vertical and horizontal markets, allows banks, asset managers and regulators to band together in support of a solution that promotes transparency, which is a must have when tackling large threats.

Figure 1 — Fines for AML and sanctions-related regulatory actions have increased



Source: Deloitte analysis as of January 2014

KYC

In order to effectively adhere to AML rules, banks must have a reliable KYC process in place. KYC is only as good as the data that is feeding the system. In many cases the data is incomplete and is not sufficient enough to fully meet evolving requirements therefore leaving banks vulnerable to fines, sanctions and increased fraud. As a result bank executives have been seeking opportunities to collaborate in ways that promote cost savings and improve KYC practices. During a speech in Dubai, Samir Assaf, CEO of HSBC, made it known to the audience that opportunities exist to work

“...we should be looking to create a KYC utility with other players in the market which will save costs and improve practices in the industry.”- Samir Assaf, CEO HSBC

collaboratively in support of KYC initiatives. From his perspective there is a duplication of efforts across the industry since all institutions are measured by the same KYC rules and are therefore building the same tools.¹

Bitcoin, the first blockchain use case, promoted anonymity in transactions but more recent evolutions are lending themselves to sidechains that support customer due diligence (CDD) and enhanced due diligence (EDD) measures that are required for compliance with the Bank Secrecy Act (BSA) and AML.

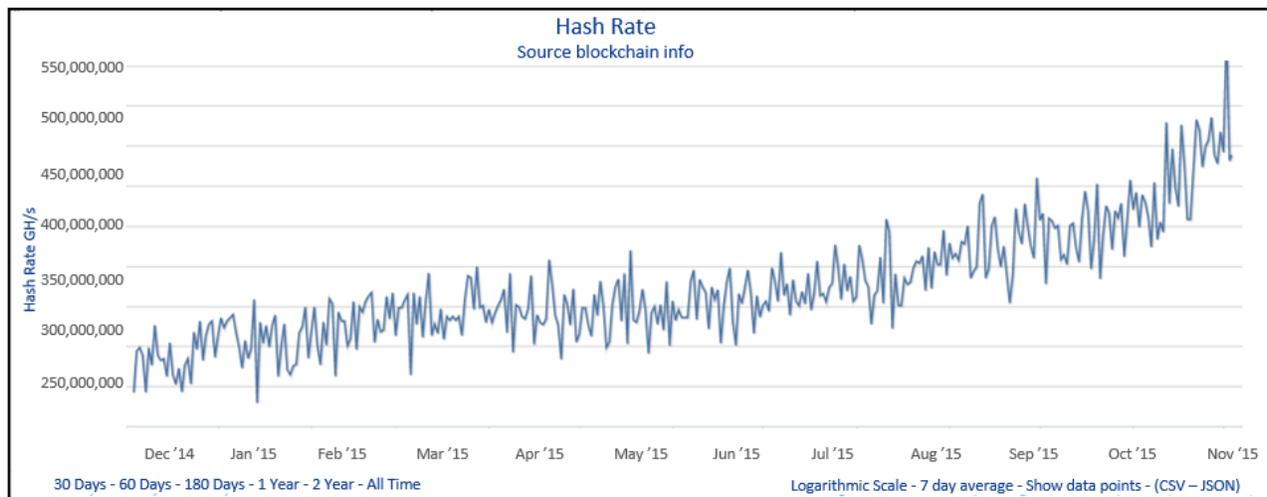
Digital Currency

In recent months several central banking authorities have come out in support of digital currencies. The key theme appears to be centered on the ability of alternative currencies like Bitcoin to play an integral role in reshaping monetary policy and the future of money. The recessions in North America and Europe gave much needed insight into the limiting impacts of certain monetary policies, in particular Zero Lower Bound (ZLB).

In September 2015, Andrew G Haldane, Chief Economist of the Bank of England, discussed the benefits of digital currency as it relates to ZLB. From his perspective offering a government backed currency issued in electronic form rather than paper form would allow negative interest rates to be levied on currency therefore relaxing the ZLB constraint.² ZLB is a macroeconomic problem that happens when short term interest rates are at or near zero. As a consequence, it limits the capacity of the central bank to stimulate economic growth due to a liquidity trap. In other words digital currencies would allow cash to make money through its ability to apply negative interest. This represents an enormous shift for the industry, impacts societal behaviors and has downstream impacts to all systems that utilize and distribute money.

Bitcoins

There is no absence of confusion when discussing Bitcoin and cryptocurrency. Although a great deal of confusion continues to exist it has remained a topic of conversation amongst industry leaders and financial executives. Key questions concerning its definition and impact to traditional banking are not easily answered. However, in spite of these pending questions, many have found substantial value in the underlying framework that supports bitcoin.



¹ Samir Assaf CEO, HSBC Global Banking and Markets, *Transaction Banking: Working together to meet the challenges and seize the opportunities* (Sibos Annual Conference, Dubai, September 16th 2013) pg.4.

² Andrew G Haldane, Chief Economist Bank of England, *How low can you go?* (Portadown Chamber of Commerce, Northern Ireland, September 18th 2015) p.11.

What is cryptocurrency? In its simplest form it is a cryptographically generated token that is attached to a pre-existing data component that has a unit of value. Bitcoin as a currency cannot exist without being linked to another form of currency. Essentially bitcoin has no value on its own and must be coupled to a dollar, euro, pound or some other type of measurement in order to be useable. This is similar in nature to how credit and debit cards are linked to accounts that hold currency. These constraints make it highly unlikely that cryptocurrency will 100% replace paper or any other unit of value. Jamie Dimon, CEO of JP Morgan Chase, all but confirmed this during the November 2015 Fortune Global Forum.

“Virtual currency, where it’s called a bitcoin vs. a U.S. dollar, that’s going to be stopped...No government will ever support a virtual currency that goes around borders and doesn’t have the same controls. It’s not going to happen.” – Jamie Dimon³

The tendency is to agree with this statement because in all honesty, it’s true. No government would support a currency that it did not have control over. With that said it would be premature to discount opportunities to utilize bitcoin in viable use cases. Disruption ensures that there is a number of technologically savvy companies and organizations that are rising to the challenge to help the industry understand the inherent vulnerabilities of its current system.

Banks and Bitcoin

Although bitcoin is technically not a currency it does have a value proposition. That value prop is in its ability to replace certain forms of payment and act as a vehicle for money transfer and exchange. It is reasonable to understand how banks and financial institutions might have trepidation with regards to bitcoin.

The concern stems from the fact that bitcoin miners, individuals that produce bitcoins, are able to act as banks via their wallet. The wallet is nothing more than a network IP address, but from the traditional banking perspective, it functions much like a retail or online banking facility. The ability to mimic banks core competencies opens up a trajectory that allows individual miners to offer varying degrees of service, i.e. loans, credit cards and the ability to generate revenue from transaction fees. From a financial institution’s perspective, all of these possibilities could lead to defragmentation of the current system and impact it in unknown ways.

³ Stephen Gandel, Fortune, *Jamie-Dimon: Virtual Currency Will Be Stopped*, www.fortune.com (2015)

Conclusion

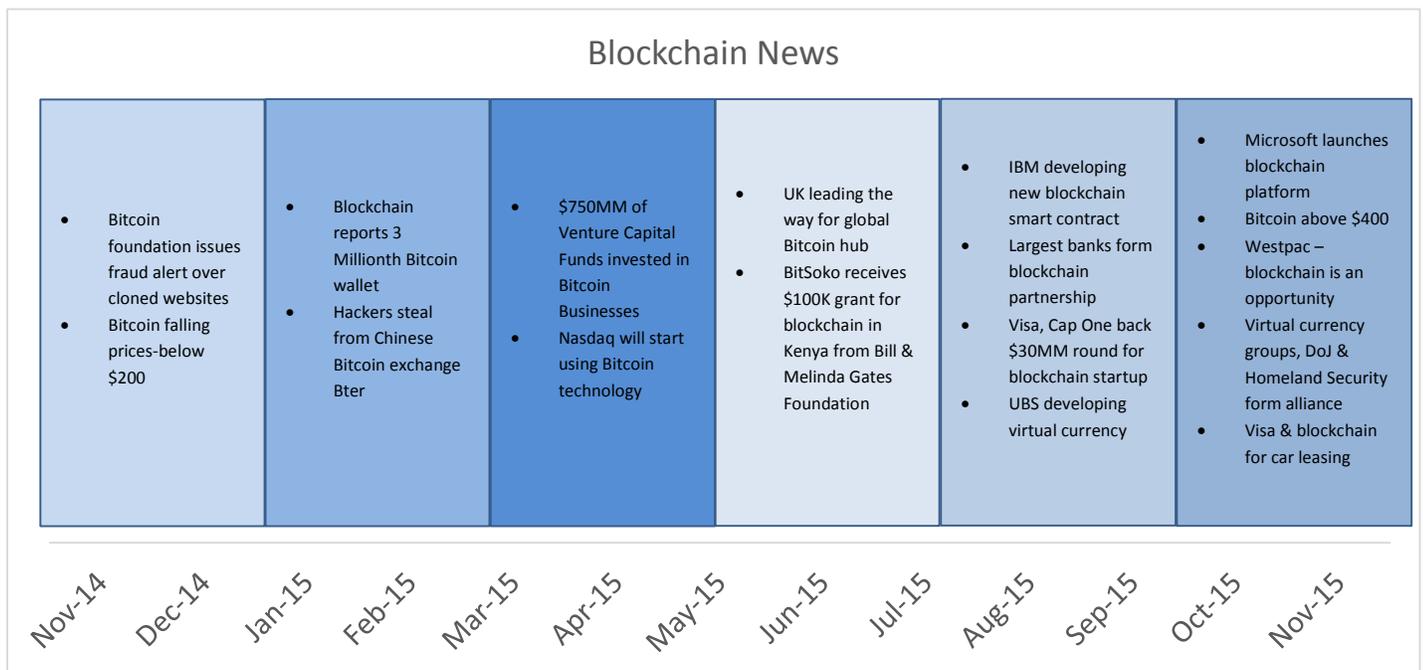
Blockchain is a difficult topic to understand and perhaps even more difficult to implement. The technology framework itself is undergoing extreme changes and there are many players that are reworking it to meet customer demands. Companies like IBM are creating their own blockchains to combat issues associated with secure contracts, Federal Reserve initiatives are taking place to understand how cryptocurrency can improve monetary policy and banks are looking at ways to create operational efficiencies, lower costs and scale their investment.

At the same time new businesses are presenting themselves that seem to jeopardize revenue as it relates to money transfer. As an industry we should ponder a few key points when evaluating blockchain as a viable strategy.

1. If bitcoins were linked to serial numbers how would that impact ZLB?
2. What would my ATM and/or POS system need to do differently?
3. Could banks, merchants or ATM vendors generate revenue from bitcoin transactions?
4. How does sharing data across industries combat fraud and reduce a bank's risk of exposure?
5. What are the network switching and routing requirements?

Blockchain is receiving a great deal of attention. It has the power to change the global economic landscape and when the monetary landscape changes it impacts banks, financial institutions, software providers and any entity that has a vested interest in protecting and growing the economy.

Timeline



About Euronet

Euronet Software Solutions, a division of Euronet Worldwide, is recognized as a leading provider of software that powers electronic payment and transaction delivery systems around the world. Our solutions have reliably served the worldwide cards, payments and financial services markets since 1975.

Ensuring quick time-to-market and delivering a quality experience, we enable our clients to provide secure electronic payment convenience to millions of people around the world. Whether your organization is a bank or a provider of processing services to financial services organizations, our proven solutions will support your critical business needs now and in the future.

We provide a fully integrated suite of solutions for issuing, acquiring, self-service, e-banking and card scheme connections. Utilizing our services-oriented payments hub architecture, our software offerings are designed to increase your revenue, reduce your expenses, improve your security and increase the value of your customer relationships.

For more information:

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