



Transforming business with innovation

Discover the Possible

- a perspective on Blockchain

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/Introducing Invenica

Invenica is an independent technology development and consultancy company. We use technology innovation to solve difficult problems for our clients. We have deep technical and industry knowledge, and a breadth of experience delivering complex enterprise projects. We work for global blue-chip companies, delivering mission critical solutions in the most demanding of environments. We help our clients develop a clear IT strategy – working with them on POCs and Prototypes that deliver a tested and “fast tracked” approach.



Gareth Mee
CEO, Invenica

Gareth is responsible for the growth and strategic direction of Invenica, a specialist software services business. He is currently working extensively within the emerging technologies space covering AI, Blockchain, Chatbots and Conversational Language, with experience in enterprise integration, mobility and UX – delivering mission critical solutions and complex enterprise projects.



Moustafa Bounasser
CTO, Invenica

Moustafa is a Digital Strategist, Innovator & Inventor and an emerging technologies enthusiast with over 12 years' experience in the information technology sector. He has helped multiple organisations across Europe transform their business with innovation, thought leadership and emerging technologies.

During the course of 2019 we will be investigating other emerging technology trends: Artificial Intelligence, Augmented Analytics and Internet of Things.

To keep up to date, visit www.invenica.com or follow us on **Twitter** and **LinkedIn**.

If you would like to get involved and discuss any of the themes of this whitepaper and our “**Discover The Possible**” program, email us at enquiries@invenica.com – we would be delighted to hear from you and start a conversation.

Introduction



/Welcome to our “Discover The Possible” program

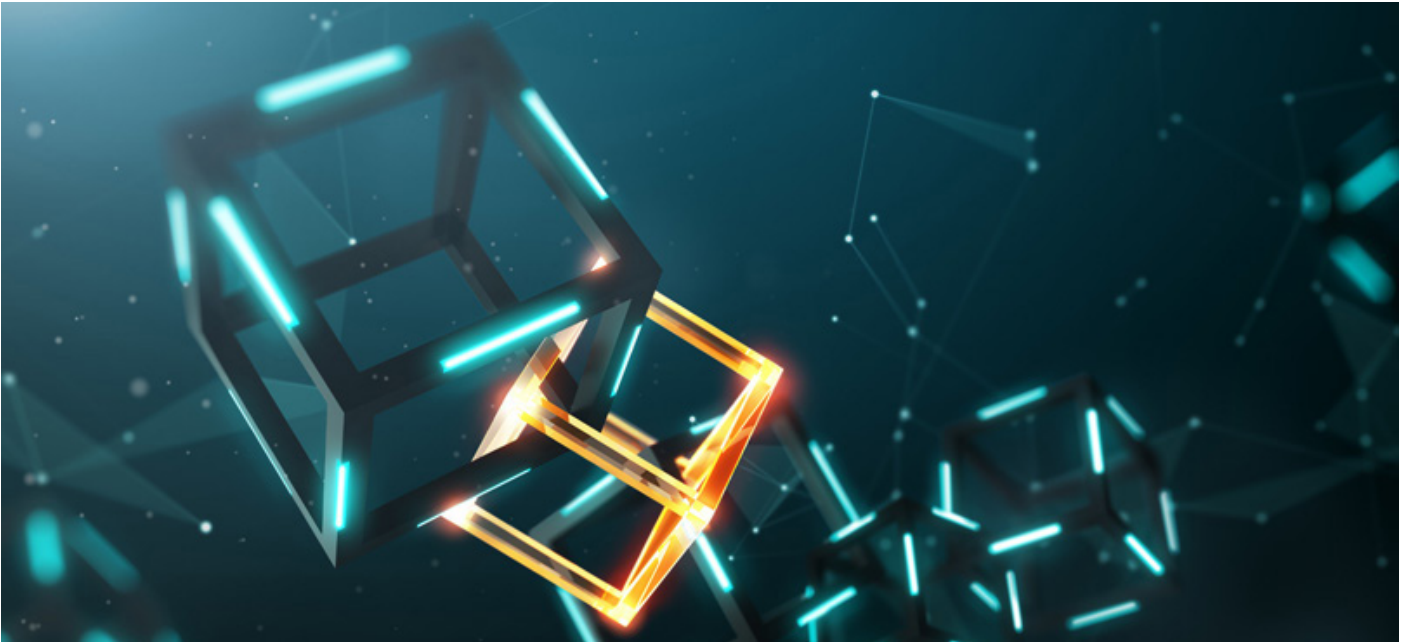
We launched our “Discover the Possible” program in January, and over the coming year, we will be exploring the challenges and opportunities of emerging technology. We will be separating the fact from the fiction, translating the buzz words and jargon into simple plain language, and analysing real business use cases. Our team will be collaborating with our clients, partners and subject matter experts across the markets creating whitepapers, webinars and industry articles to spark discussion and debate.

/About this paper

This is our first paper in the series and focuses on the potential of Blockchain technology, with specific case studies across Retail, Manufacturing and Finance. We review innovation in Identity Management, Asset and Provenance Tracking, and also examine the adoption of Blockchain in Financial Services.

There is no denying that Blockchain comes with a degree of scepticism – firms must move the technology from the ‘theoretical’ to the ‘critical’ – and demonstrate a clear ROI. However, it is clear the technology is exciting, has captured the imagination, and is fuelling thinking and creativity at a break neck pace. There is a strong sense that we are at inflection point.

Blockchain at a glance



Blockchain technology has tremendous potential to be the revolutionary mechanism for business, that the internet was for media.

Conceptualised in 2008 by Satoshi Nakamoto, the technology became the record-keeping technology behind bitcoin. It is a list of records, connected using cryptography, that provide an open, decentralised database of any transaction involving value or personal data. Decentralisation means that copies of the ledger are stored in many different locations and distributed across peer-to-peer networks, significantly reducing the risk of tampering or corruption. Blockchain is transforming the registration and distribution of data, eliminating the need for a trusted third-party.

A simple analogy for Blockchain is an excel spreadsheet. If you imagine each row as a transaction, and a group of rows as a block, containing records that are linked to the previous cell. The cells are protected, and tamper-proof. When a contributor adds a row, it is time-stamped, with a signature against the transaction so others can verify it. Each transaction is assigned a Hash – a cryptographic record of each transaction. When a new transaction is added, it is dependent on the previous one, thus we have a chain of transactions. A public key, like a password, is given to all members who have access to the database and is distributed over nodes to ensure verification. A private key is individual to the user, however, if the individual loses access, it does not affect the rest of the chain.

Blockchain has the potential to disrupt a wide range of industries, revolutionising the management of data, and building immutable trust between businesses and consumers. Preparing for the undoubted change that comes with Blockchain adoption means investing in research and experimentation. The businesses who recognise this will be best placed to thrive in a new, innovative landscape.

Glossary of terms

/Cryptographic hash

A cryptographic hash function is a type of security mechanism that produces a hash value, message digest or checksum value for a specific data object.

/Distributed ledger

A distributed ledger is a database held and updated independently by each participant (or node) in a large network. The distribution is unique: records are not communicated to various nodes by a central authority but are instead independently constructed and held by every node.

/Immutable

An immutable object is an object whose state cannot be modified after it is created.

/Node

A node is a device on a Blockchain network, that is in essence the foundation of the technology, allowing it to function and survive. Nodes are distributed across a widespread network and carry out a variety of tasks.

/Private key

A private key is a sophisticated form of cryptography that allows a user to access his or her cryptocurrency. A private key is an integral aspect of bitcoin and altcoins, and its security make up helps to protect a user from theft and unauthorized access to funds.

/Public key

A public key is a cryptographic code that allows a user to receive cryptocurrencies into his or her account. The public key coupled with the private key are significant tools required to ensure the security of the crypto economy.

/Self-sovereign identity

Self-sovereign identity is the next step beyond user-centric identity and that means it begins at the same place: the user must be central to the administration of identity. That requires not just the interoperability of a user's identity across multiple locations, with the user's consent, but also true user control of that digital identity, creating user autonomy.

Identity Management



/What is the technology and why is it valuable?

Blockchain technology offers transformative improvements for identity management. A central characteristic of Blockchain technology is its distributed, decentralised structure - obviating the need for third-party management. Blockchain is powering a personal data revolution. Relying on physical identity documents in an ever-growing digital age is outdated, cumbersome and expensive, but also increases the risk of fraud, hacking and spoofing. Events relating to the use of customer data for identification purposes can be stored on the Blockchain. Customer identity data is kept in a decentralised, distributed ledger which provides immutable trust between businesses and customers. As a result, this contributes to a reduction in operational costs, improves user experience and eliminates key business risks.

/What does it mean for the user?

With so much of our life and commerce on-line the current methods of handling identity, usernames, passwords, authentication and user verification is error prone. Blockchain technology has established a new paradigm for handling digital identities – self-managed identity. Self-managed identity allows customers to create and manage their own identity, removing the need for a central repository. This new, digital concept using decentralisation and public key cryptography to give individuals control over their data.

When implemented correctly, it can provide flexibility, scalability, security and consensual interactions. For the customer, this means they can transact in a frictionless, trusted, yet private manner. Identity management can also offer increased data privacy, identity is held on the user's devices and is shared directly with products and services when required. Claims and records of authorisation or revoke of access to identity is stored on the Blockchain – giving the user complete control of their data.

Identity Management

/What does it mean for the business?

In 2018, Barclaycard undertook a new programme run by SSI specialists, Evernym. They have developed a distributed ledger technology, Sovrin, that can be used to verify proof of identity anywhere at any time. By adopting Blockchain technology, Banks can significantly improve their onboarding process, streamline operations and develop a secure, trusted KYC solution. On average, Banks spend between 10-100 USD to KYC a new registered user – Blockchain can significantly reduce the operational cost and time of this process. Storing account-opening information on a Blockchain creates a single, tamper-proof KYC record, that mutualises the effort of conducting KYC and adheres to stricter regulation surrounding data and privacy.

Blockchain technology has established a new paradigm for handling digital identities.

If executed poorly, identity management can put businesses at risk of data breaches. With data breaches comes huge cost implications. In 2011, data-driven marketing firm, Epsilon, undertook one of the most expensive breaches to date. It affected up to 75 of their clients, with costs up to \$4 billion. In 2017, Equifax, a consumer credit reporting agency experienced one of the worst cyber security attacks to occur thus far, exposing personal information of over 140 million consumers. These figures are representative of the on-going challenge facing businesses today. Organisations must adopt new methods of data storage, reallocate the responsibility from organisation to user, and harness the potential of Blockchain technology, if they wish to revolutionise identity management and security.

Asset and **Provenance Tracking**



/What is the technology and why is it valuable?

Asset tracking is the process of tracking a business's physical assets and their information. It can provide valuable insight into usage, maintenance and the need for new equipment. This data can enable more informed decision making and prevent losses. Blockchain has the potential to re-invent the way that assets are transferred within and between business networks.

Blockchain's distributed ledger means that the movement of assets between parties is fully transparent. Asset tracking solutions can improve the efficiency of the supply chain by introducing quality assurance. This involves tracking assets through delivery and warehousing, removing fraudulent suppliers and identifying faulty components earlier in the production cycle.

The demand for transparency throughout the supply chain is increasing – consumers want to know where products are coming from. Blockchain technology is the mechanism that will improve provenance management - enabling traceable, transparent tracking of products. It can assist businesses with collating key information on both their products and supply chains using digital tags. Digital tags allow the tracking of products throughout the entire supply chain until they reach the customer's hands – ensuring trust between the user and business.

“Blockchain technology is the mechanism that will improve provenance management.”

Asset and Provenance Tracking

/What does it mean for the user?

In 2018, Maersk and IBM announced the creation of TradeLens – a joint venture that would apply Blockchain to the world's global supply chain. It enables users to interact efficiently, access real-time shipping data and digitalise and exchange trade documentation. The project aimed to create an industry standard for the secure digitisation and transmission of supply chain documents around the world. This platform has succeeded in using Blockchain technology to re-envision asset management – reducing cost, increasing security and establishing a global standard. Businesses are beginning to recognise the potential of Blockchain technology, a study by Deloitte found that '74% of executives from major corporations see a "compelling business case" for the use of Blockchain'. This technology allows firms to capture information about the asset, remove manual, inefficient processing and form an immutable record of truth.

/What does it mean for the business?

For businesses, Asset Tracking and Provenance can offer numerous benefits that can improve day-to-day operations and the overall business infrastructure across the entire supply chain. Detailed tracking, higher mission assurance of assets, reduced cost, improved efficiency and scalability are some of the many benefits it can offer. Relying on a complex network of suppliers from across the globe can present significant challenges – the certification of your product, transparency, security and meeting expectations. Blockchain has the ability to address all these problems.

The application of smart contracts and decentralised transactions will enable businesses to be in the centre of the certification of their supply-chain eco-system. Collectively, these benefits equate to increased trust in suppliers and partners, streamlined production and transformation capabilities and better alignment with industry, security and consumer health standards.

Adoption in **Financial Services**



/What is the technology?

Across Financial Services, from wholesale banking, retail to insurers – they are all striving to reimagine their businesses, radically reduce their physical footprint, cost base and improve their profits. ‘Digital Transformation’ – realising the potential and scope that emerging technologies can bring to deliver this change – is a key driver. Blockchain is one of the digital mechanisms to enable this change, but the industry faces the difficulty of sifting through a plethora of different flavours and interpretations.

Deloitte conducted a study in 2018 that stated ‘84% of executives view Blockchain technology as broadly scalable and will eventually achieve mainstream adoption’¹. But with various, and often competing networks, standards and approaches – the jury is still out on the runners, chasers, winners and losers.

For example, Blockchain finance software house R3 was launched with a great fanfare in 2014 raising hundreds of millions of dollars, with ambitious plans of supplying its Corda blockchain technology to a consortium of major banks. However, founding members Goldman Sach’s and Santander left in 2016 to follow their own strategies, fast forward to today its reported that the firm is running out of money as the company struggles amid questions about R3 and its ability to build a business around its version of Blockchain.

1 - Pawcuk Linda, Massey Rob, Schatsky David, *Breaking Blockchain Open*, Deloitte, 2018, p.19

Adoption in **Financial Services**

/Why are they adopting Blockchain?

There are a range of use cases; Fraud Reduction, Know your Customer (KYC), Smart Contracts, Payments, AML, Trade Finance and Back-Office Reconciliation, that are all perfectly posed to benefit from Blockchain. And there are tremendous success stories. For example, Cobalt who were founded in 2015 are focused on re-engineering the institutional FX market from the ground up. Cobalt deliver a shared back and middle office infrastructure based on a unique combination of low latency and shared ledger technology rather than “a decentralised” one. By creating this shared view of trade data, Cobalt frees up back and middle office resources from multiple layers of reconciliation - generating one immutable record.

A recent example is IHS Markit’s investment into Cobalt. In January 2019, IHS Markit made an announcement on completing the integration of the Cobalt post-trade foreign exchange Blockchain platform, with their MarkitSERV platform. Cobalt’s platform creates a single shared version of an FX transaction, removing the need for reconciliations. Chris Leaver, Managing Director and Head of FX at MarkitSERV said “this collaboration marks the start of a major transformation in FX infrastructure” - evidence that the industry is seizing the opportunity to re-imagine current workflows.

Examples such as Cobalt are confirmation that Blockchain technology can potentially disrupt the financial industry that we know and use today.

/What questions does the industry have?

Despite significant efforts to implement Blockchain technology, there is evidence that there is still a degree of uncertainty regarding its capabilities.

Overall, there appears to be conflicting opinion on the potential of Blockchain technology. Although the industry is beginning to test the capabilities of Blockchain, there is still unanswered complexity and regulatory burden that can be challenging to navigate. However, the fear factor surrounding Bitcoin appears to be fading and as highlighted in the use cases referenced in this paper, permissioned DLTs are helping to transform Banking as we know it.

 **Across Financial Services, they are striving to reimagine their businesses.**

To fully embrace the potential of Blockchain, Banks must create the correct network to support this. But this field is a crowded one, however, and includes notable R3 rivals like Hyperledger, which has received open source contributions from IBM, as well as a collective known as the Enterprise Ethereum Alliance. Banks are notoriously slow to adopt and struggle to find consensus.



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