

Blockchain Briefing:

A technology for a better future?

June 2019

Introduction

Blockchain is a much hyped new technology which is expected to have a significant impact across the financial services industry. This brings a whole raft of questions: What exactly is Blockchain? What benefits does this technology deliver? How is it being used? And what does the future hold?

This paper aims to cut through some of the hype, providing an objective and independent view of the technology. It summarises some of the recent developments, as well as considering what Blockchain might mean for financial services – specifically both insurers and the end consumer.

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Get in touch

Hymans Robertson have a team of technology and insurance industry experts who can support you through this process to better understand Blockchain and identify and test potential use cases in your business

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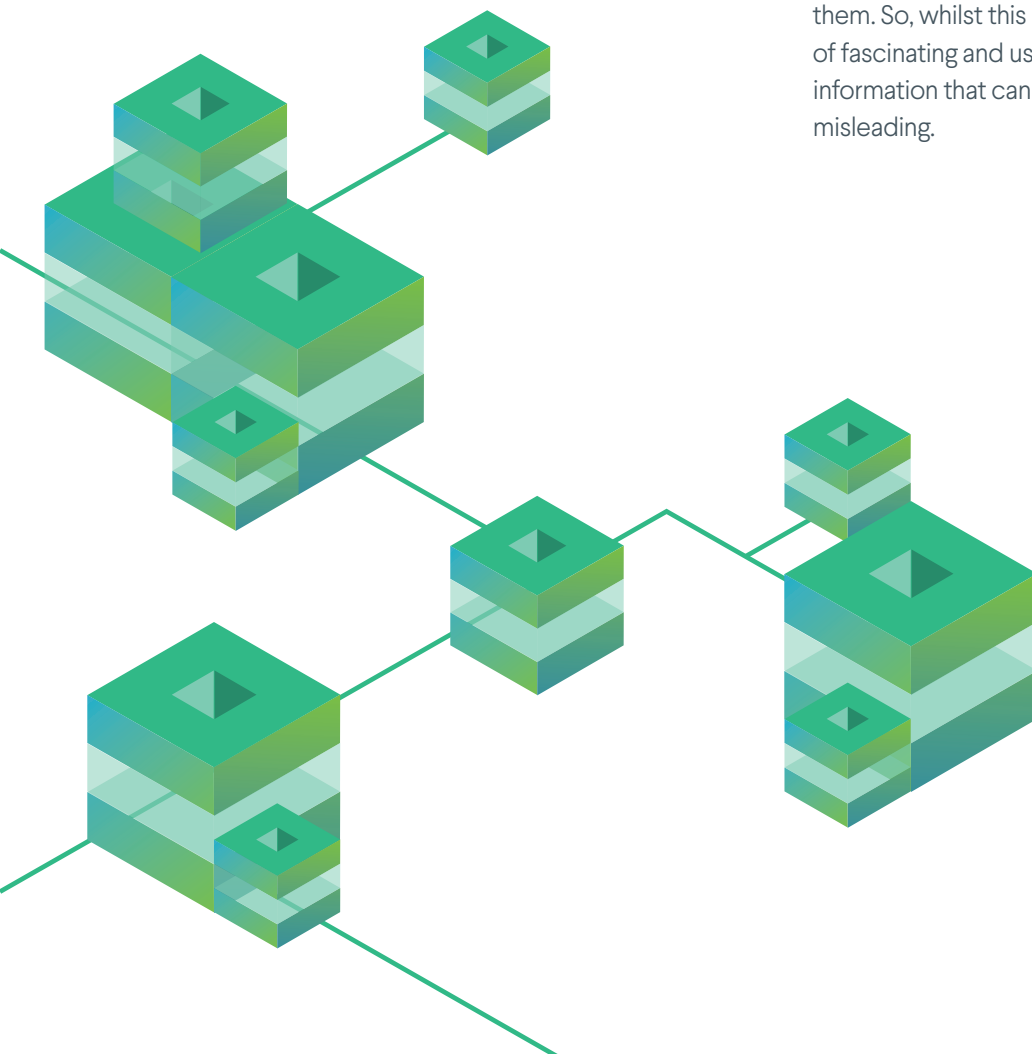
A brief history of Blockchain

Created in the wake of the financial crisis in 2008 by an anonymous individual or group known only by the username “Satoshi Nakamoto” (no-one has ever been identified as the real Satoshi), Blockchain is now a hot topic of discussion in the financial and technology domains.

As the underlying system that supports Bitcoin and many other cryptocurrencies, recent public and media interest in this “digital money” has also thrust Blockchain into the spotlight.

As Blockchain has shifted from being a technical curiosity to something with substantial financial and environmental impact on the world, the public discourse around it has exploded. Much of this has resulted in genuine innovation: making existing processes more efficient; enabling entirely new forms of value exchange; and even challenging us to re-evaluate what financial currency and assets really are in an increasingly interconnected digital world. However, as the commentary running alongside this exciting and fast-paced development scrambles to keep up, many of the views expressed are paradoxically both highly technical and overly-simplified.

Harvard Business Review recently characterised Blockchain as a foundational technology, describing it as having “the potential to create new foundations for our economic and social systems”. It’s easy to see how statements as broad as this can be both inspiring and interpreted very differently by almost everyone who hears them. So, whilst this current high profile affords us a wealth of fascinating and useful information, it also results in information that can be confusing and potentially misleading.





What is Blockchain?

Blockchain is a system which enables the recording of digital transactions and interactions in a way that is designed to be:-

- transparent** – and so auditable;
- tamper resistant** – so participants have a high level of confidence in the validity of Blockchain technology; and,
- reliable** – able to continue running in the face of network outages, which is not an uncommon event on the internet.

The technology as a whole is still very early in its development and adoption and belongs to a family of technologies called “distributed ledger technology”¹

This essentially means two (quite unsurprising) things:-

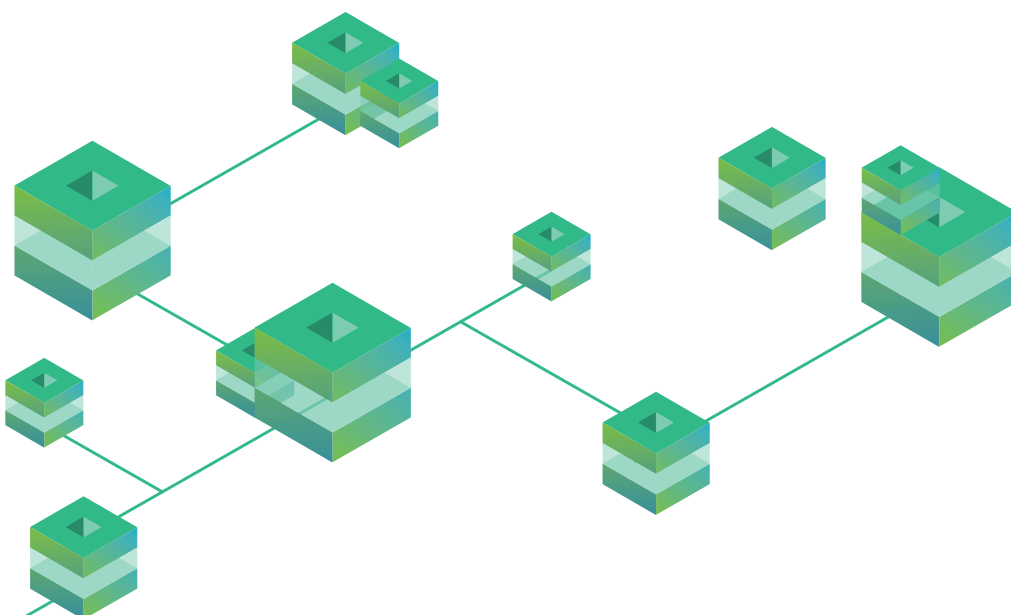
- it's distributed; and
- it's a ledger

Distributed

Blockchain is completely decentralised. There is no central computer or authoritative master system holding the entire chain. Instead, all the participating computers in the network have their own copy of the chain and collaborate to agree any data is added in a consistent way. Information held on a Blockchain exists as multiple shared and continually reconciled lists of records. Stored across millions of computers simultaneously, its data is accessible to anyone with a connection to the internet.

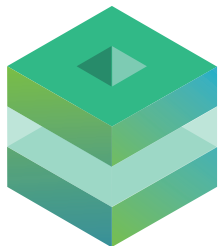
Ledger

Unlike a traditional database, data is only ever added to the end of the chain and is never deleted or updated. Blockchain works as a ledger. It does not just store data about the current state of something (like your bank account balance). Instead, Blockchain stores a continuously growing set of records as a ledger. This is much like a list of all bank withdrawals and deposits from which you can calculate your current balance, rather than storing the current balance directly.



¹You may occasionally come across the acronym DLT used in articles and academic papers.

Key features of Blockchain



Transparency

Being distributed gives Blockchain two advantages, the first being transparency. Everyone participating can see the blocks and the transactions stored in them. It's worth noting that although network participants can see that data exists on the Blockchain, the data itself is encrypted and so is secure from prying eyes.

Ultimately, security is all about the establishment and verification of transactions. Being transparent offers a high degree of security and trust as anyone can see both the transactions and the history of events leading up to a specific transaction. They can then validate these for themselves giving a high-level of confidence in the validity of transactions without any reliance on the word of a third-party.

The source code for various blockchains is often shared publicly (being "open sourced"). The Bitcoin and Ethereum source code is freely available for anyone to verify. This builds trust in the system as everyone can see exactly what the chain is supposed to be doing as well as verify that it's actually doing it.



Tamper resistance

Transparency of both the data and the process used to validate that data also makes Blockchain tamper resistant. As an individual in the network, you can compare your version of the ledger with anyone else who shares their copy. If there is a version of events that doesn't match the consensus view, it can be disregarded. There is no single authority that can approve the transactions or set specific rules to have transactions accepted. All the participants in the network have to reach a consensus to accept transactions.

Consensus rules can, however, differ by Blockchain. In public Blockchains such as those underlying the Bitcoin and Ether cryptocurrencies, the majority wins. Federated Blockchains however, only allow a limited number of trusted participants to carry out the consensus process. For example, in a consortium of 20 insurance companies, one could imagine that 15 of them have to agree for data to be deemed valid.

How Blockchain works

The content of a Blockchain, and so the subject of this consensus process, is described in terms of two types of data:

- **Transactions** – These are the actual records of actions undertaken within the system.
- **Blocks** – These record the transactions and make sure they are in the correct sequence and have not been tampered with.

When someone wants to add a transaction, the participants in the network will validate it. The set of majority agreed transactions is then bundled in a block which is then sent to all the participants in the network. Each validates this new block and adds it to their own copy of the Blockchain.

The next part in the process, and the most complex part, is what gives Blockchain its distinctive tamper resistance.

Each successive block contains a unique fingerprint of the previous block called a hash (to logically prove only the specific block being examined can be linked to the previous block in the chain). The process used to generate this hash has mathematical cryptography at its core. Each hash fingerprint is the result of a complex mathematical puzzle that is designed to be very hard to solve but quick to validate. This is comparable to a Rubik's cube; a lot of effort is required to solve the puzzle, but it's easy to see when one has been completed. Unlike a randomly mixed Rubik's cube however, the starting position of each puzzle is determined by the solution to the previous one, creating a chain. Hence the name Blockchain.

As these hashes are so hard to solve, it is this chained history of digital fingerprints that gives Blockchain its tamper-resistant properties.

The complexity here is that Blockchain is distributed. It is not actually one chain of ordered events, but many views on what the ordered chain of events actually is. You can think of this much like a sedimentation process: material is deposited as sediment layers on top of the material deposited earlier. With Blockchain, each block is layered on top of blocks agreed previously.

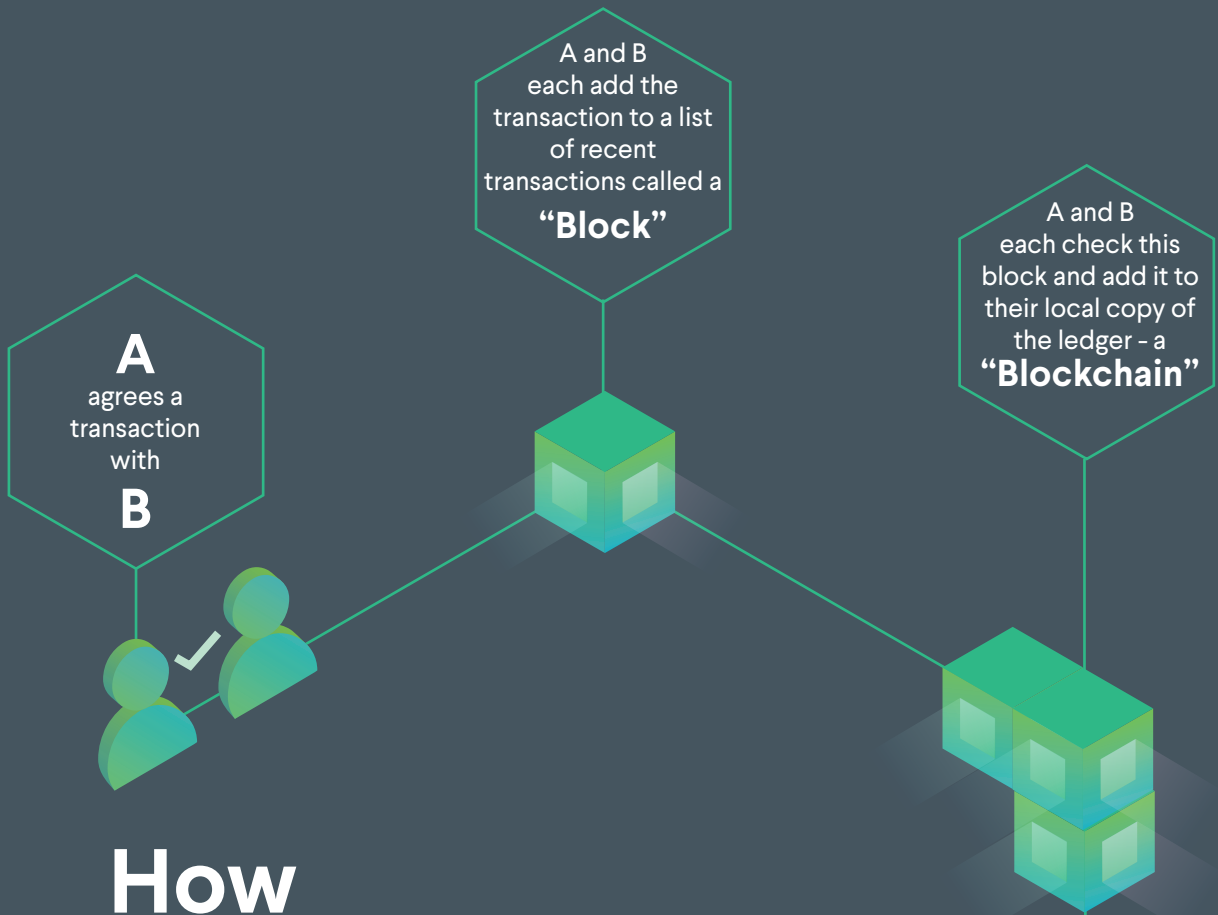
As each network node settles on a particular value for that block (through hashing), more nodes become confident that the block is valid. When a node becomes confident that this is a firm foundation to build on, it will start to work on the next block.

As nodes begin to agree on what the next block should be, they gradually settle this on top of the agreed layer below. As this process continues, older blocks become buried under the weight of the blocks above, until the Blockchain is many layers deep.

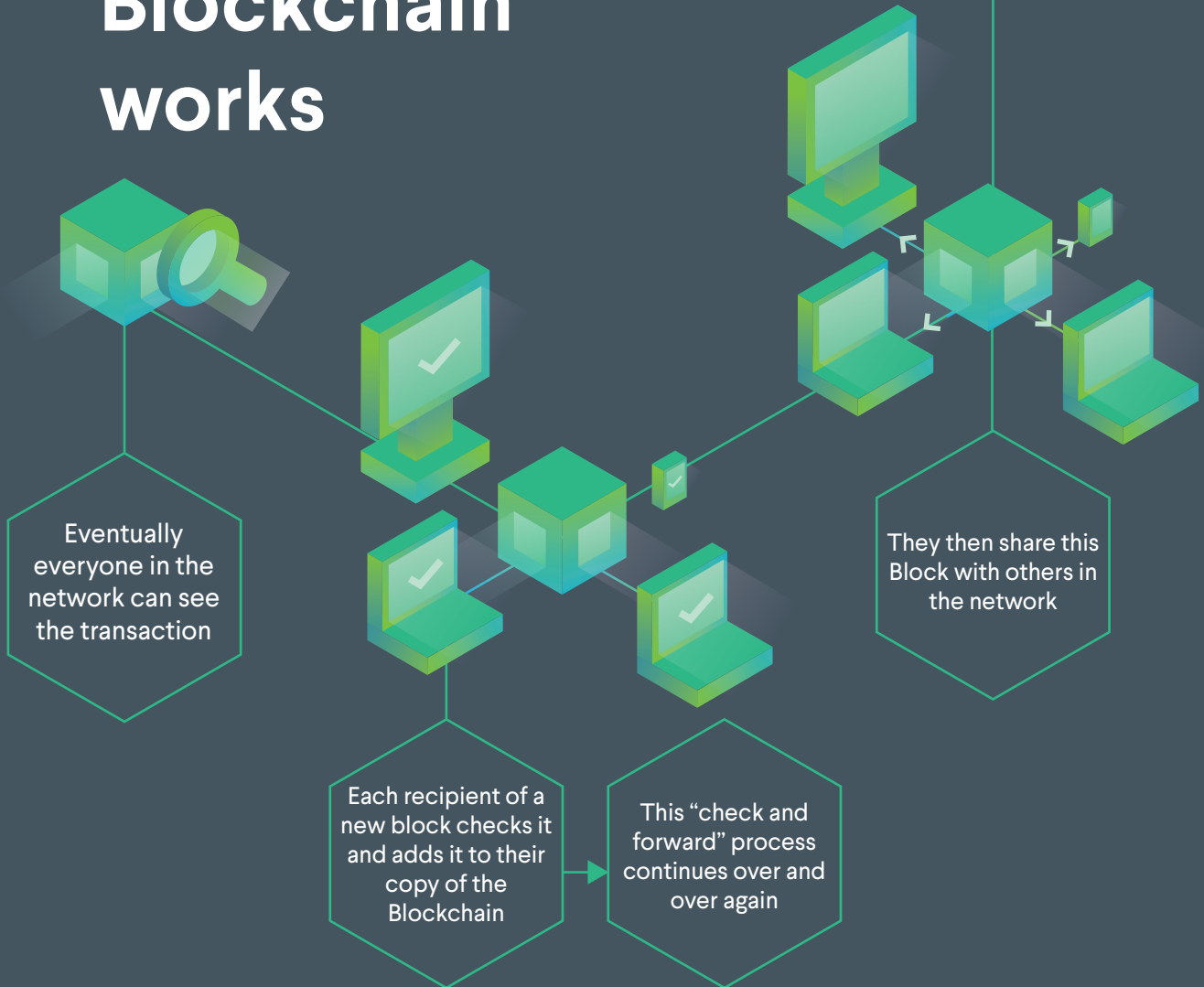
This process prevents records from being easily forged. If you imagine now picking something up from the sea bed. It would be relatively easy to remove a seashell from the top layer of sand without anyone noticing, but harder to remove one buried a meter below the surface. To remove one from compacted sandstone formed half a mile below would be very hard indeed.

To “dig-up” a transaction from the Blockchain would involve re-solving all of the prior blocks' puzzles - re-calculating all of their chained fingerprints if anyone wanted to alter previous records. The further back in the chain transactions are, the more expensive they become to alter.

Bitcoin uses a similar metaphor of “mining-depth”. In reality, each transaction in the Blockchain carries a number called a “confirmation” which describes how many blocks have been committed on top of that transaction. Confirmations offer a visible level of confidence that a transaction has been agreed upon. To illustrate this in practice, many bitcoin exchanges will not accept transactions without a certain number of confirmations. The thinking is that if a transaction has 100 confirmations, someone wishing to “fake” that transaction would have to fake at least the 100 blocks subsequently layered on top of it.



How Blockchain works



What are Smart Contracts?

The successful implementations of Blockchain technology today are almost exclusively either crypto-currencies (now often referred to as crypto-assets) or tamper-resistant audit-trails. However, much of the potential of Blockchain actually comes in the form of a type of software program, written for Blockchain called a “smart-contract” or “self-executing contract”

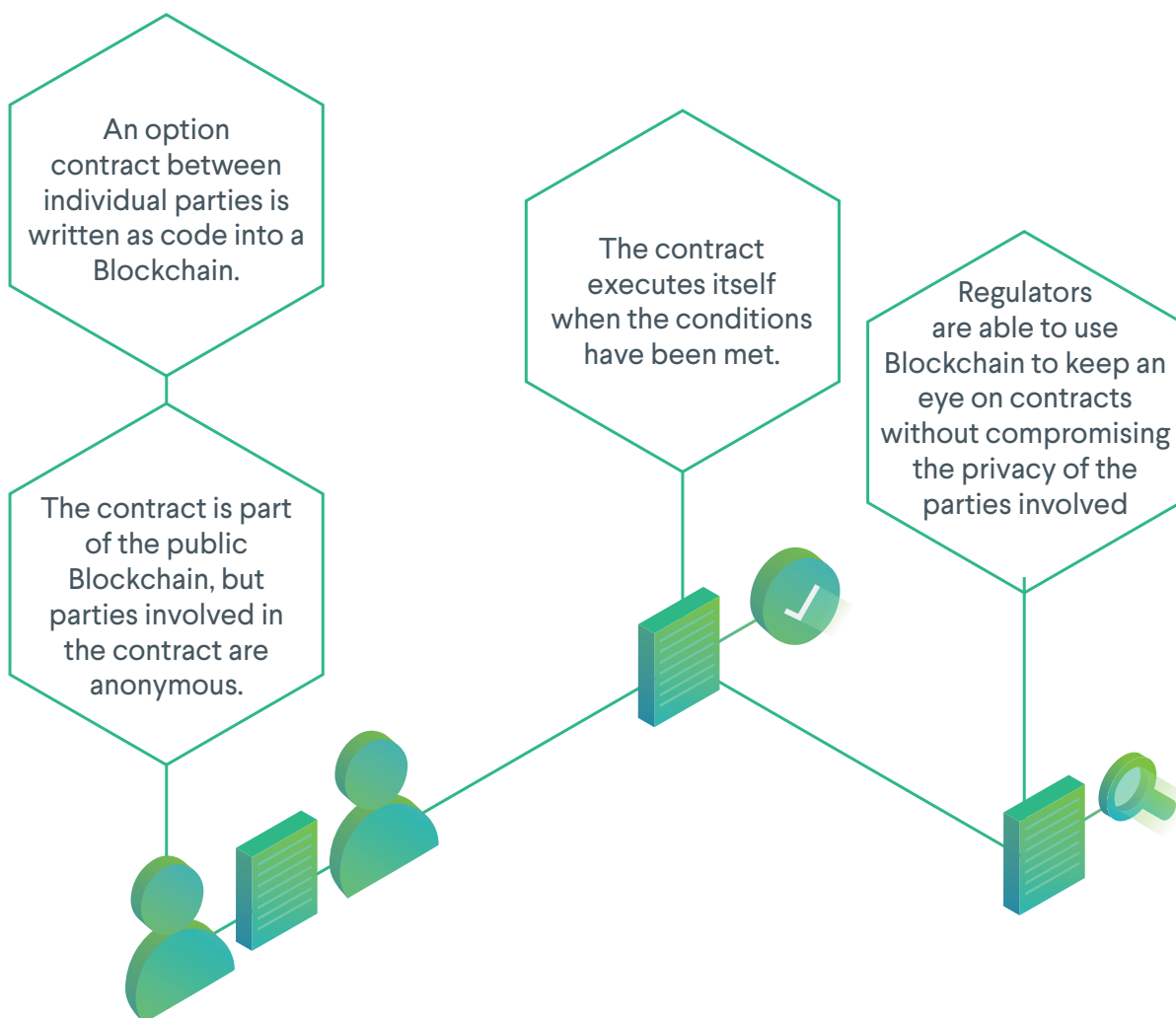
A smart-contract is essentially a small program that runs on Blockchain almost like a digital version of a contract that a solicitor may execute for you in the real world. The idea was first documented by Nick Szabo, a cryptographer and legal expert who came up with the idea in 1994.

It runs, evaluating an “IF.. THEN” statement using the current state of the Blockchain in question as its input and creates further transactions on the Blockchain as its output.

This type of digital contract, which is transparent and tamper resistant due to it being embedded the Blockchain could potentially enable all sorts of complex and automatic contracts to be executed.

Examples may be found in healthcare. For example, a release of prescription information could be made under given conditions, or the idea of informed consent could be made into a smart contract. For instance, someone could agree that their information should only be visible to a particular doctor under certain conditions.

With regard to property ownership, smart contracts make it possible to eliminate escrow middlemen. If an asset is delivered at a particular time then the agreed funds will be released.



Still early days for smart contracts

Smart contracts are currently far from perfect, although they could be very useful if applied in the right situation. Wherever there is very clear, unambiguous logic, smart contracts could be applied.

For example, AXA is using smart contracts to provide flight delay insurance that pays out when a flight is delayed. It does this automatically as airlines must report their delays in a standard way to the regulator.

Of key importance is that flight delays and related payment can be defined in very clear black and white terms. Given other regulatory reporting standards and standard payment systems in place, there can be no further disputes.

However, what happens in more complex circumstances? What if your home rental agreement or mortgage is governed by a smart contract and the previous owners miss their moving out date? If this were subject to a traditional written contract, you could potentially resolve such issues by going to court, but smart contracts on Blockchain work differently.

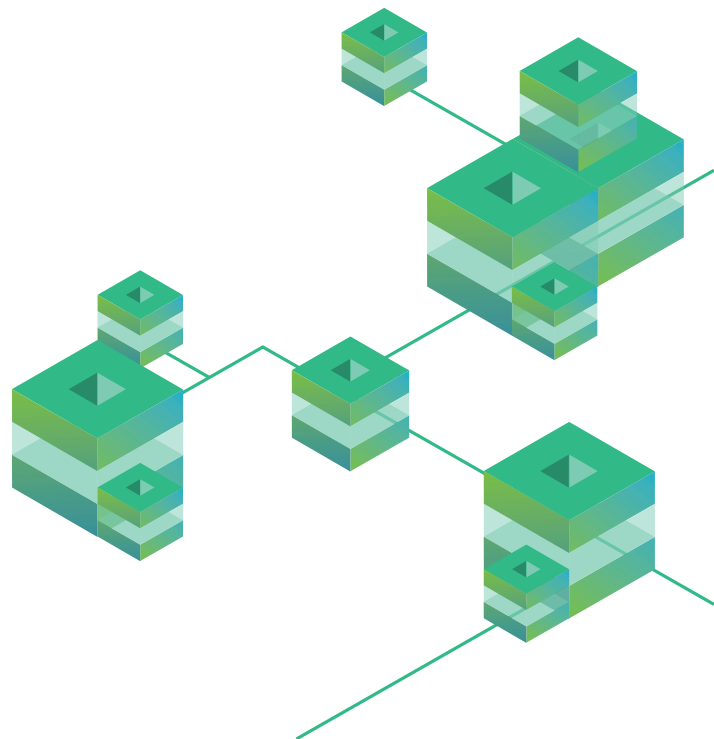
If these are contracts, embedded in globally distributed computer programmes, then under the jurisdiction of which court or government would they reside and how can or should governments regulate them?

Enhancing legal constructs with technology will no-doubt offer many benefits in terms of efficiency, risk-reduction and innovation of new products and services that would not have been possible until recently.

But this is likely to be a space where the technology will take a long time to mature. For example, consider the recent case where PayPal sent a letter to a woman saying her recent death breached their terms and conditions of payment.

This created upset for her widower and an apology from PayPal. If this letter was a newly minted transaction on the Blockchain, with further smart-contracts that executed off the back of this, how would any unintended consequences be addressed?

Unlike a written contract, a smart-contract performs, no matter what.



Blockchain Mythbuster

Here are the top things that people think about Blockchain that just aren't true! Or at least maybe they are not as black and white as people assume.

There is only one Blockchain

If you read much about Blockchain, you may hear the term "the" Blockchain. But in fact there are multiple Blockchain technologies, each designed and developed by different people or groups for specific purposes. Examples include Ethereum, Hyperledger, and Microsoft Distributed Ledger Services.

When "the" Blockchain is written, it is generally with reference to a specific implementation of Blockchain technology.

Blockchain is Bitcoin

Since Bitcoin is much more widely talked about than the underlying system it runs on, and the history of the two are very much intertwined, many people get the two confused. Bitcoin is a cryptocurrency built on top of a Blockchain (the world's first). It makes electronic payment possible directly between two people without going through a third party such as a bank, and is therefore a potential digital equivalent of gold or cash. Since there are no intermediaries acting between the two parties, no one organisation can control the currency.

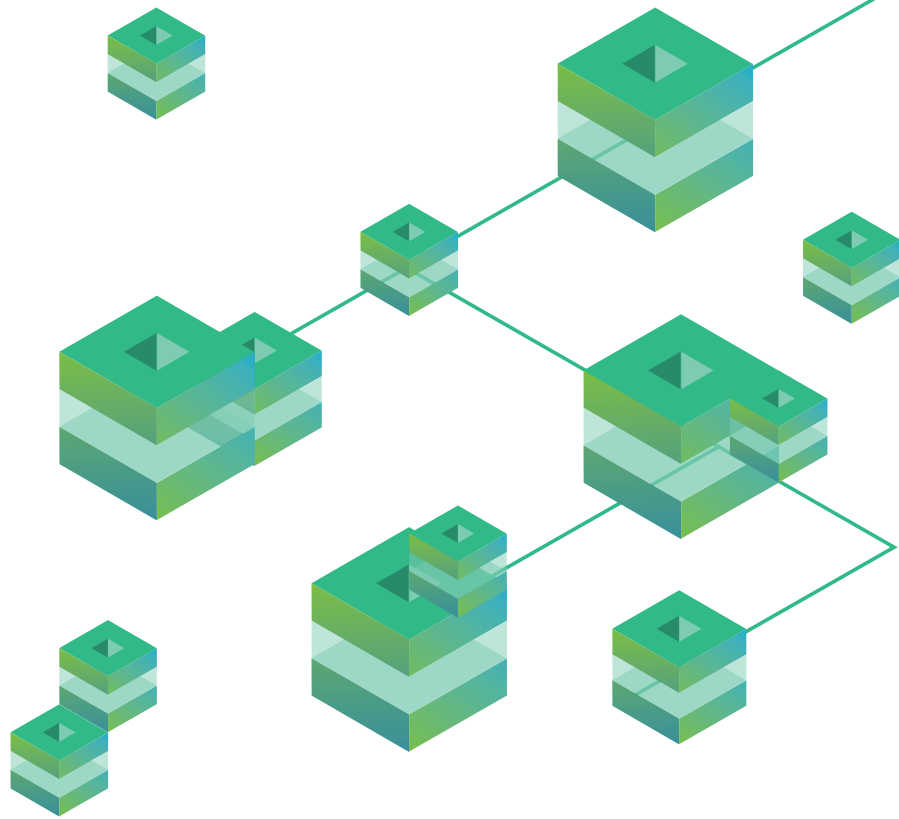
Bitcoin may have been the first Blockchain system designed, but there have been a number of others since then which are very different. The Blockchains being adopted in the mainstream business world today do not tend to be systems for electronic money.

Blockchain consumes a lot of energy

As Blockchain is decentralised, anyone with the right hardware and relevant expertise can participate in a public network. All the electricity required to run these computers needs to come from somewhere, and that's where CO2 emissions come in. Power generated by burning coal is a genuine concern and there are estimates that the cryptocurrency world is putting roughly 16,000 kilotons of carbon dioxide into Earth's atmosphere per year and growing. This is roughly 0.3% of the world's annual electricity supply.

So there is no question Blockchain uses a gigantic amount of power. A fundamental challenge is that most Blockchains rely on solving complex mathematical puzzles to secure the content of the chain. There is certainly a lot of work being done worldwide to invent new ways to make this "mining" process more environmentally friendly. The fundamental question of efficiency is whether the requirement for a large amount of power is justified.

It has been estimated that the VISA network (including the effort banks have to expend to run it) requires 100 terawatts of energy per year, versus Bitcoin using 25-30 terawatts. That might well be a reasonable price to pay for a decentralised, resilient and borderless money transfer network. It's also expected that as miners adopt more modern hardware and bitcoin becomes more widely adopted, it will become more efficient.



Blockchain is only useful for Financial Services

Blockchain receives a lot of press for its applications in the financial services industry, and for good reason, the industry has a particular interest in cryptocurrencies and smart contracts which have many applications in the financial domain. However, there are some surprising use cases for Blockchain technology. The technology has the potential to reshape how supply chains of various sorts are managed and overseen.

For example, Coca-Cola has an enormously complex global supply chain that operates in every country except North Korea. With that globally diverse system, the company has recognised the scope for exploitation of workers in a globally diverse environment where culture and norms vary widely. They are currently investing alongside the US State Department in a Blockchain smart-contract based system to help hold suppliers to account and honour the scope of employees work contracts to minimise the risk of forced and child labour. The technology also has applications in other areas, where contracts have been complex to manage or difficult to enforce.

Baofeng Bokocloud may not be a widely recognised name in the UK, but their media player app has more than 200 million active users in China. Baofeng is beginning to use Blockchain as a means to shore up the copyright protections of artists distributing music on the platform. The transparency of Baofeng's Blockchain system enables a decentralised database that ensures artists maintain their music rights. It also provides transparent and real-time royalty payments to musicians as tracks are downloaded and played.

These uses for Blockchain are only the tip of the iceberg. In the years to come, as the technology becomes more mainstream, we can expect the experimentation in non-currency uses to pick up.

What problems can Blockchain actually solve?

Blockchain technology gives individuals and organisations the ability to confidently authenticate and audit digital information and ultimately create value from it. This enables instant verification of any data that has previously been agreed by consensus. In practical terms, what sort of business applications could this have?

Governance

Making the results of decision-making processes fully transparent and publicly accessible, distributed database technology could bring accountability to elections or any other kind of poll taking.

By enabling organisational decision-making records to be stored using Blockchain, governance becomes fully transparent and verifiable when managing digital assets, equity or information.

Anti-money laundering & know your customer

The ability to verify identity is the cornerstone of financial transactions. Blockchain offers enhanced methods for proving who you are, along with the possibility to digitise, secure and prove the existence of personal documents such as passports and utility bills.

Anti-money laundering and financial services “know your customer” practices have great potential for being adapted to make use of Blockchain technology. Currently, regulated firms must perform a labour intensive and often complex process for each new client they take on. Costs incurred through these customer research processes could be reduced through cross-institution client verification, and also simplified monitoring processes.

Asset trading & transactions

The potential for added efficiency in transaction settlement makes a strong use case for Blockchains in trading. When executed as peer-to-peer transactions, confirmation of a trade can take a matter of seconds, versus current clearing processes that can take up to three working days. This potentially means intermediaries, such as the clearing houses and auditors, could be removed from the process.

This is one of the most active current areas of development and many stock and commodities exchanges are prototyping Blockchain applications, including the Australian Securities Exchange ASX, Frankfurt’s stock exchange and Nasdaq’s platform for private market trading.

Proof of ownership / existence

As they are publicly-accessible, Blockchains can make many kinds of record-keeping that requires tamper resistance more efficient. Anyone can download multiple versions of the Blockchain and compare them to ensure consensus has been met. Property rights such as land title deed registration are an example. They are often the subject of dispute, can be susceptible to fraud, and can be highly expensive and labour intensive to administer.

Blockchain and applications in life & health insurance



The story so far

We have already begun to see Blockchain within insurance, although to date these cases seem to be largely confined to general insurance. Some examples include:

B3i – An insurance industry initiative to facilitate reinsurance transactions between insurers, brokers and reinsurers. This permissioned ledger is currently under trial. We have a case study on B3i, which can be found later in this section.

Nexus Mutual – A discretionary mutual that provides smart contract insurance cover. The product provides a fixed sum assured on “unintended code usage”. We also have a brief case study on Nexus Mutual later in this section.

Fizzy – A travel insurance platform created by Axa, using the Ethereum formatting Blockchain to link in data from air traffic control databases. This product will then compensate passengers automatically if the data shows flights are delayed by two hours or more.

Etherisc – A “decentralised insurance protocol” which provides the means to collectively build parametric insurance products. The first of these was a flight delay insurance product launched in September 2016 that relies upon publicly available information to provide cover against flight delays.

Blocksure – Provides sales, administration and claims processing on a single platform for personal and commercial lines with integrated management information capabilities.

Acre – a broking platform using Blockchain technology to transform the mortgage application process by consolidating consumer and property data.

Legal & General – a leading bulk annuity provider is using a managed Blockchain solution from Amazon Web Services to initially handle bulk annuity transactions outside of its core markets in the UK and US.



Case study 1:

B3i – Using Blockchain to support reinsurance

Why was B3i formed?

B3i was initially formed by five companies in the (re) insurance market who wanted to explore the opportunity of using Blockchain technology and smart contracts in insurance.

These companies had been discussing this opportunity for several months before deciding to initiate the formation of a consortium to formalise the cooperation in October 2016. The five members of the new B3i consortium were Allianz, Aegon, Munich Re, Swiss Re and Zurich Insurance.

The first step was to decide on a use case to test the hypothesis and a property catastrophe excess of loss (XOL) contract was selected for this purpose.

The next milestone came when the consortium decided to widen membership to create a broader network for collaboration. In December 2016, the group expanded to 15 members.

What plans do you have for the next year or two?

The short term focus of the platform is on handling reinsurance contracts on a state-of-the-art distributed ledger:

- From April 2017 to September 2017 a dedicated, combined team drawn from B3i member firms produced a working prototype. The Prototype covers the core functionality required to enable a distributed smart contract management system for property cat XOL contracts
- The technical architecture is close to a production-ready solution and the team is preparing for feature enhancements of the prototype and a first deployment into production shortly.

We also have a well-formed roadmap for the development of further products over the next few years. The first phase will involve the development of additional reinsurance contracts followed by commercial insurance use cases.

What applications are you looking at during the trial phase?

The current product is a property cat XOL contract and the prototype was tested in October 2017 by 38 market participants. The feedback from this trial phase provided the basis for incorporating enhancements into the product we are launching.

What are some of the key assumptions you're looking to test during your trial?

The market testing phase allowed us to gather information on “bugs” and features which the participants felt were necessary for a minimum viable product. The test also provided a basis for understanding scalability, confidentiality and data security aspects.

What are the benefits of using Blockchain over existing technology for these applications?

The core benefit of Blockchain lies in facilitating trust amongst the parties without the need for any intervening clearing house. Insurance relies on multiple layers of counterparties generating “trust” but through the numerous interactions required, this adds a high frictional cost to the process.

So whilst existing systems and processes clearly enable transactions to take place, there are inherent inefficiencies which generate the need for manual reconciliation, resulting in contract uncertainty.

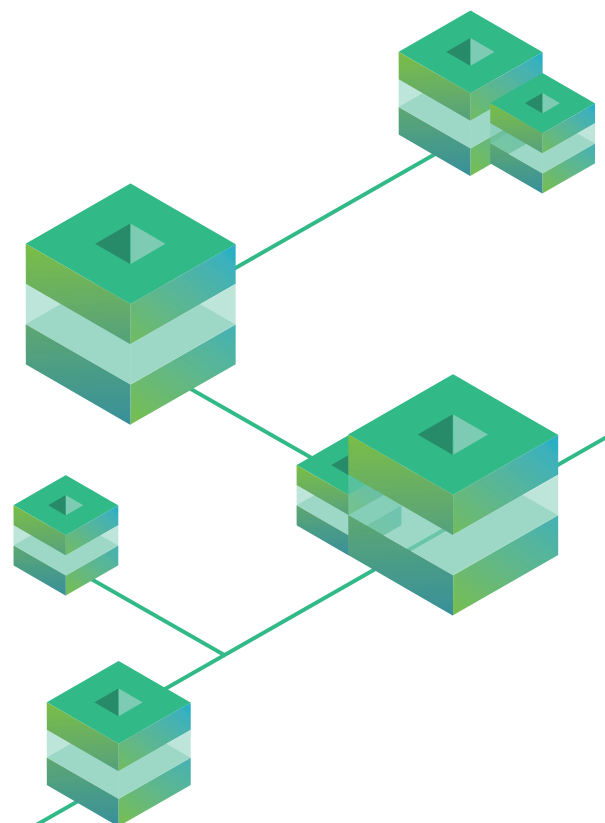
Using Blockchain technology enables information to be shared amongst the counterparties in a more efficient way by providing a single and common version of the truth and removing much of the bureaucracy and friction in the value chain. Ultimately, the outcome is not only an administrative cost saving but also increased speed and quality and improved cash flow.

What other opportunities do you see for insurers?

Insurers generally need to better understand the potential of Blockchain and how it works. Use cases will flow from this. In principle, any form of information sharing across a network or value chain should benefit from the application of Blockchain platforms. When coupled with smart contracts which are able to self-execute, the calculation and payment of premiums and payments can be streamlined.

Many market participants are currently experimenting with Blockchain in order to validate its potential and benefits. It will take some time to bring these prototypes into a production ready state.

The opportunities are not solely grounded in efficiency savings but should lead to the development of new business models and products. Blockchain can enable the transaction flow across multiple layers of counterparties from the insured to brokers to reinsurers and all the way to capital markets. It could feasibly redefine the standard for digital transaction processing and deliver significant efficiency gains.



What are the top barriers to insurers adopting Blockchain?

The main barrier for the adoption of Blockchain probably lies in the lack of understanding by business users of its potential. We see Blockchain enabled insurance as a paradigm shift, a switch that for some may be more challenging from behavioural rather than technology based. The concept has now moved beyond just hype given the emergence of better formed products which are expected to come to market over the next year or so. But the key lies in increasing education within the user community rather than on the technology side.

Once more use cases are created, the demand for developers will increase resources coming into the market. This will also spawn the development of new technology platforms as well as catalyse the need to enhance existing ones and the creation of more consistent standards for data exchange.

What should insurers be doing now if they want to explore Blockchain further?

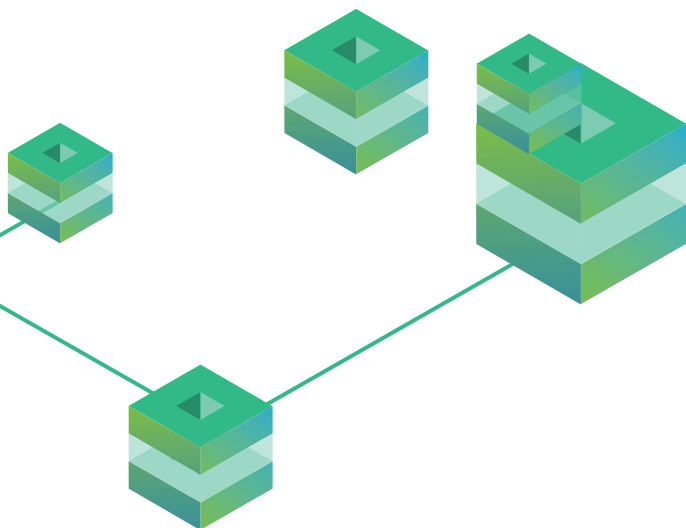
The main priority for insurers today is to increase their understanding of Blockchain and its application within the business. This should lead to the creation of use cases to experiment with and test their hypotheses.

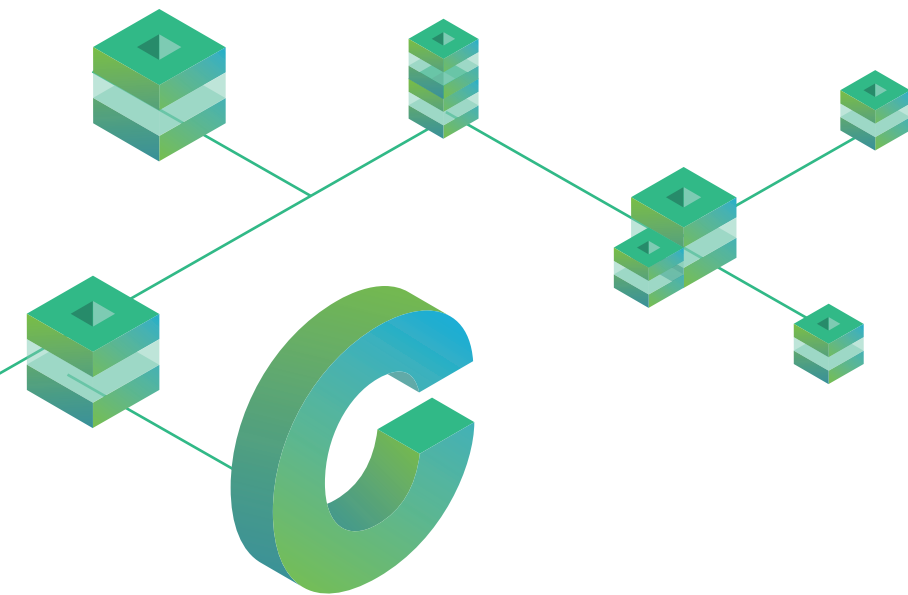
Insurers can also join consortia or common interest groups through which they can share their experiences and knowledge with peers. Some solutions will also be market wide and the experience of B3i shows how a collaborative mentality can lead to valuable outcomes.

Groups like B3i could also offer consultancy services to individual companies or market groups. This could be more efficient deployment of resources and lead to earlier positive outcomes akin to “not reinventing the wheel”.

Insurers that take a more open-minded approach regarding Blockchain will see many opportunities. The goal should really be focused on improving outcomes for end customers through improved speed, transparency, quality and sometimes cost.

B3i strongly believes that Blockchain should be an incentive to make insurance more accessible and attractive for market segments that currently are disenfranchised or underprivileged.





Nexus Mutual

Case study 2:

Nexus Mutual – Insuring Blockchain solutions using Blockchain itself

What is Nexus Mutual?

Nexus Mutual is a peer-to-peer discretionary mutual which is automated using Blockchain technology. Built as a platform on the Ethereum public chain, it allows anyone to become a member of the mutual, buy cover, and earn rewards by participating in risk assessment, claims assessment and governance. The aim is to replicate the workings of an insurance company whilst crowdsourcing some aspects by providing economic incentives for contributing work to the platform.

Initially we have launched with only one product – Smart Contract Cover, the purpose of which is to provide the Blockchain community with a layer of protection against hacks in the value-storing applications (known as smart contracts) built on Ethereum.

How does Nexus Mutual operate?

Once the platform has generated sufficient funds (via crowdfunding) to begin providing cover, it will operate in a self-sufficient manner, tied together by our native token – NXM. The token is used to buy cover and is given out as a reward to claims assessors, risk assessors and for participating in the member governance process. We employ a continuous token model, meaning the value of the token is driven not by speculation, but by the performance of the mutual. If the mutual is well-funded, the price goes up, encouraging members to cash out their NXM holdings. Likewise, if the capitalisation is low, the

price drops, encouraging further purchases of NXM and hence capital inflows to the pool.

The funds backing the capital requirement are stored fully within the Nexus Mutual smart contract, meaning no individual party has access to them.

The code, pricing and capital methodologies are fully publically available, with members able to propose changes at any time, which are then voted on by the membership base. Some proposals can be implemented automatically (e.g. changes in the investment portfolio), while some (e.g. additional products) would involve further development work.

How does the “mutual” aspect of Nexus Mutual function?

Unlike a listed insurance company where there is a clear separation between the policyholder and the institution which provides the policy, Nexus Mutual acts as a risk pool where members can share risk together. In order to participate and buy cover, one must become a member of the mutual. The members legally own the company, including all its assets.

Importantly, the cover provided by the mutual is discretionary, meaning there is no obligation to make a pay-out unless the membership base agrees to do so.

The claims voting process involves casting votes by staking their tokens (which can then be burnt if voting is deemed to be fraudulent). A specific quorum of 70% needs to be reached, and there is a requirement for the total number of staked tokens to reach a specific multiple of the cover amount. If those two requirements are not reached, the outcome is not final and the vote is escalated to the full membership base.

What are the next stages in your development plan?

We've recently launched Nexus Mutual on Ethereum main-net and the mutual is currently operating. It is currently in a crowdfunding phase where individuals and projects in the Ethereum community are contributing funds, once enough funds have been raised cover purchases will automatically be enabled and the system becomes fully operational. Some aspects of the system are working right now and we have security experts staking against specific smart contracts they believe are bug free to earn Risk Assessment rewards. It's fascinating to see and watch people's behaviour as the system is completely open and viewable by anyone.

How big do you think the market is?

As at the time of writing (June 2019), the Ethereum ecosystem (driven by the market capitalisation of its native currency, ETH) is valued at \$25bn. This is a reflection of the market's most recent perception of the underlying value of financial applications built on the Ethereum network. It is difficult at this stage to make sweeping assumptions about how much of that value would be insured, but we estimate a total market of a few hundred million USD in premium income if we were to launch now, with significant growth as the ecosystem develops over time.

Do you plan to step out of Smart Contract Cover and into "conventional" insurance?

Yes, definitely. We actually started development with a product to cover earthquake risks, but shifted direction in late 2017.

There are still challenges regarding public Blockchains, with scalability (in terms of transaction throughput) and user-friendliness being the key ones which make mainstream products quite difficult at this time. However, there are a large number of talented people working on solutions to these problems so we are optimistic that they will be solved within the next few years. In the meantime, we're focusing on a market that has already adopted this technology.

Why does Nexus Mutual require a Blockchain solution?

The need for a Blockchain solution arises from the fact that there is no central entity sitting in the middle coordinating the entire process – the mutual essentially runs itself.

Policyholders trust an insurance company to keep track of their policy, accurately assess whether a claim has occurred upon submission of evidence, and make a pay-out in case of a successful claim.

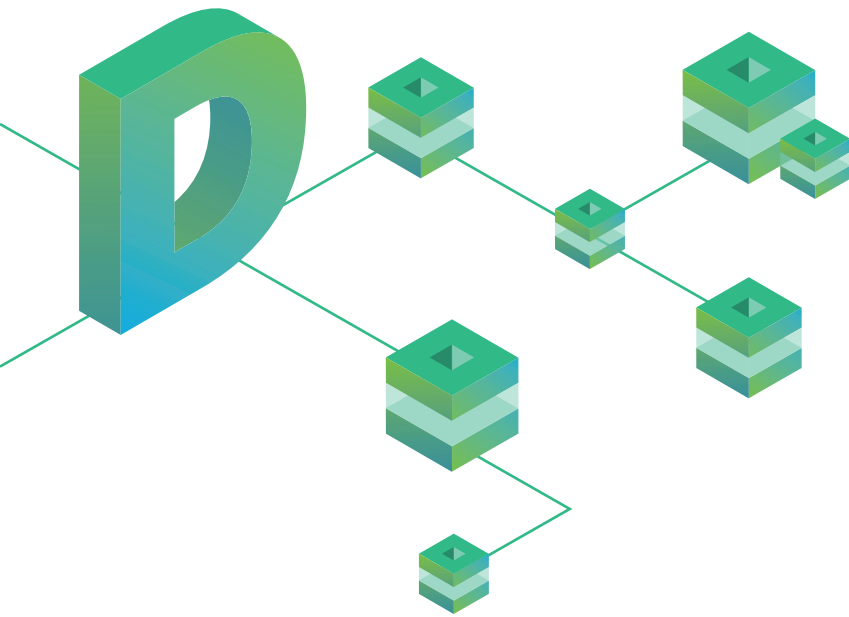
Blockchain technology allows us to replace this trust in the insurance company with trust in the code and economic incentives. There is an immutable record of each active cover stored on-chain and claim pay-outs are automatic once approved via claims assessor voting, with the claims assessors incentivised to vote truthfully. The tech also enables the pool of capital funds to be stored and distributed without any single party having access to the pool.

Do you see Blockchain technology being commonplace in the insurance industry in 5 – 10 years?

There are certainly benefits to embracing the technology, and we'll likely see it come in in some form. Insurers don't need their systems to be permission-less, so a lot of the challenges on public Blockchains related to speed and throughput don't apply.

We see existing insurers using private chains (e.g. Hyperledger Fabric or Quorum) which can only be accessed by employees/customers/counterparties. The most likely initial application would be as a communications layer on top of existing systems, making sure all teams within the company are guaranteed access to the same, easily auditable information.

However, systems teams within most insurers are busy preparing for IFRS 17, and will certainly encounter the usual issues around integrating with legacy systems. Therefore, it's unlikely to be high on the priority list for most insurers in the short term. There is also a lack of education about what the technology can and can't do, as well as an embedded distrust resulting from the speculative market for cryptocurrencies and superficial media coverage.



Future applications in life and health insurance

Life and health insurance provides a valuable financial safety net for families in the event of serious illness or death. The UK protection market is significant too, with approximately 1.5m new policies each year and around £600m of business written (on an Annualised Premium Equivalent basis).

However, there is a remarkable opportunity for growth. In fact, the protection gap in the UK (the difference between the amount of insurance coverage that is economically beneficial to the population and the amount actually in place) is estimated to be £2.4 trillion by Swiss Re. Some of the reasons for this include cumbersome underwriting processes, a fairly commoditised product, and little engagement after purchase (apart from at the point of claim). The question is whether Blockchain technology could also have applications in protection insurance. We have identified a few areas where it could have an application, including: enabling more efficient underwriting, more dynamic products, and a smarter way to process and manage claims.

Underwriting

Currently protection policies are underwritten by requiring customers to complete a long questionnaire about their health and financial status. Sometimes other evidence is required, such as nurse screenings or GP reports to assess the health risks. Then, financial statements or evidence of income may be used for financial underwriting, while other documents may be required to prove identity. Collecting all of this information can be a long, drawn out process, often taking weeks to complete.

Blockchain could play a vital role here in more efficiently collating data about a customer. It could be used to quickly and simply collate data from a range of sources, such as digital medical records and bank statements, giving a clearer single view of a customer. It can also help reduce the risk of inaccurate or fraudulent information provided during underwriting. With the rise of the gig economy, we can expect people to be working for a number of organisations at any one time, creating a more complex picture of an individual. Here Blockchain could help aggregate these multiple data flows, such as; the number of 'jobs' or 'gigs' completed, miles driven or income earned from different gigs, creating a complete picture of a customer's income or risk. This additional information could help more accurately underwrite and assess risks for such customers.

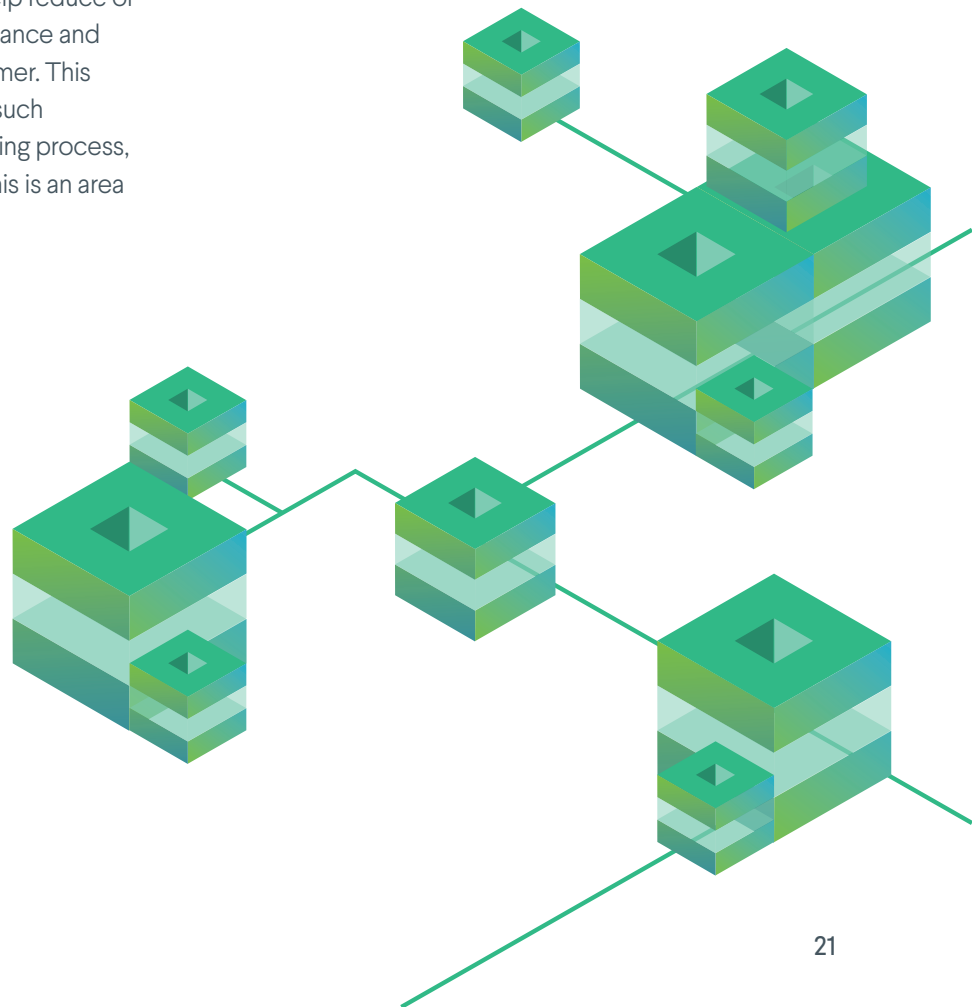
Dynamic products

Currently the amount of protection cover purchased is based in relation to a customer's debt levels and monthly household expenditure at the point of taking out the policy. Products today have some in-built flexibility to vary the cover levels – for example to reflect the expected run-off of debt, or the likely inflation in household expenditure. However, in reality these measures are blunt and could leave a customer over or under insured at any one time.

Instead, Blockchain could be used to provide a real-time view of a customer's expenditure and debt levels by directly capturing information from a customer's bank account, credit card or mortgage provider. This could allow insurers to provide dynamic cover levels that reflect a customer's actual outstanding debt levels or essential expenditure, rather than relying on out-of-date information or estimates currently used to define cover levels. By having more accurate information about the customer's circumstances on an ongoing basis, it can help reduce or even eliminate the risk of under or over insurance and ultimately provide better value to the customer. This technology could also save time collecting such information during the advice and underwriting process, which is good news for financial advisers. This is an area Acre are currently focussing their attention.

Claims

Claims processes for protection can be slow, requiring customers to give evidence of medical diagnoses and test results. They may require financial underwriting at this stage too. Blockchain could offer a way to securely access a customer's medical records for instance. By creating automated alerts once a defined condition is diagnosed, insurers could automatically trigger the start of a claims review process. While insurers may continue to want a human to review evidence, it could at the very least make it easier to collate the information required, speeding up what is currently a long process at a time when customers are keen for a rapid decision. In time, we could also see Blockchain used to automatically pay some smaller, simple claims.



What should insurers be doing now?

There is no doubt Blockchain presents lots of opportunity for the life insurance sector. Certainly, this is a view shared by the industry. According to a survey of insurers and reinsurers conducted by Hymans Robertson in 2018, 77% of insurance professionals believing it could have real implications, while only 18% think it is all hype.

There is also quite a bit of activity within insurers, with 55% saying their organisation is actively looking at potential applications of Blockchain. There is no doubt more will follow, and for those insurers not already exploring the technology, now is as good a time as any to make a start.

The team at Hymans Robertson has extensive experience helping insurers and other financial services firms adopt new and emerging technologies to drive growth and efficiency. We would recommend the following three initial steps when considering adopting Blockchain:

Learn about the technology

A key finding from our own research is that only 50% of colleagues feel comfortable explaining Blockchain technologies to their peers. This clearly highlights the need for the industry as a whole to develop its understanding of Blockchain, including the way it works, potential applications, and the risks.

Blockchain is a complex technology and like all technologies has strengths, weaknesses and characteristics that may be valuable in some cases and not in others. Having a reasonably strong understanding of what Blockchain is, how it works and how it differs from other database technologies is important for decision makers looking for their organisations to adopt Blockchain.

Identify areas of inefficiency or growth

If your business has areas or processes that are based heavily on paper-based contracts, or require lots of validation or review to ensure consistency, Blockchain may be able to help. Looking to make processes more efficient can unlock a lot of value, but you should also consider your growth plans.

- Do you have rapidly expanding areas of your business that rely on digital assets?
- How is ownership or responsibility for them transferred today?

These questions might help you identify areas where Blockchain can have a positive impact on your business.

Explore Applications

Once you understand the technology and you have some candidate areas which you want to explore, an iterative agile approach may be helpful in validating your ideas as you go. If you develop small proofs of concept or minimum viable products before embarking on a large project or programme, you will be well placed to learn and scale up from there.

Contact us

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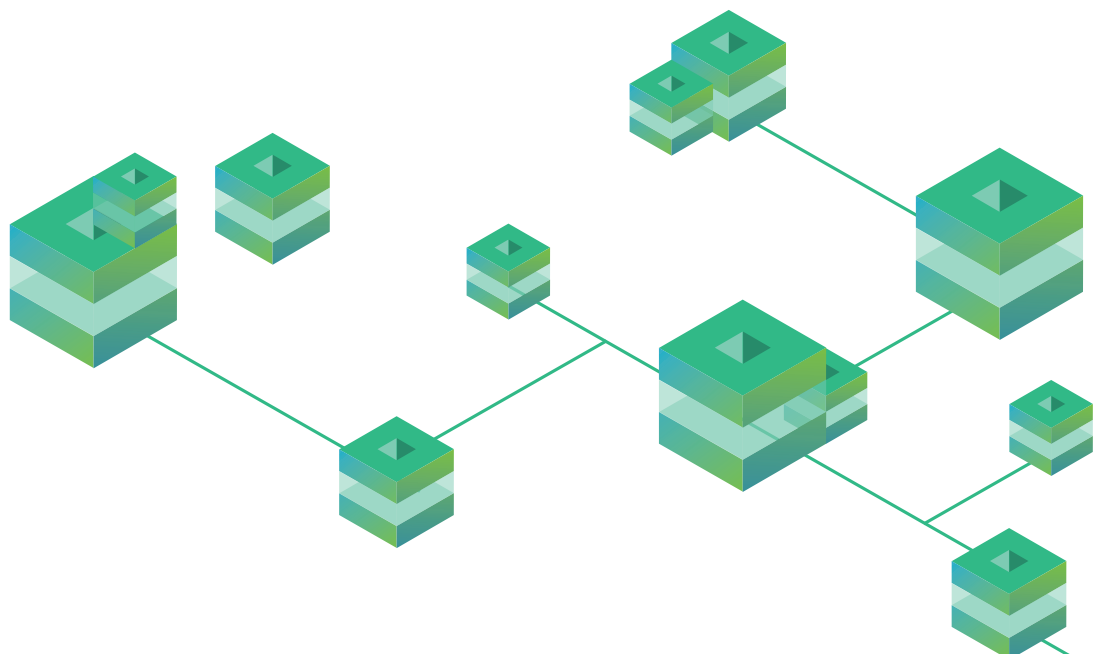
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