

**ConsenSys Insights**

# **Blockchain and Insurance**

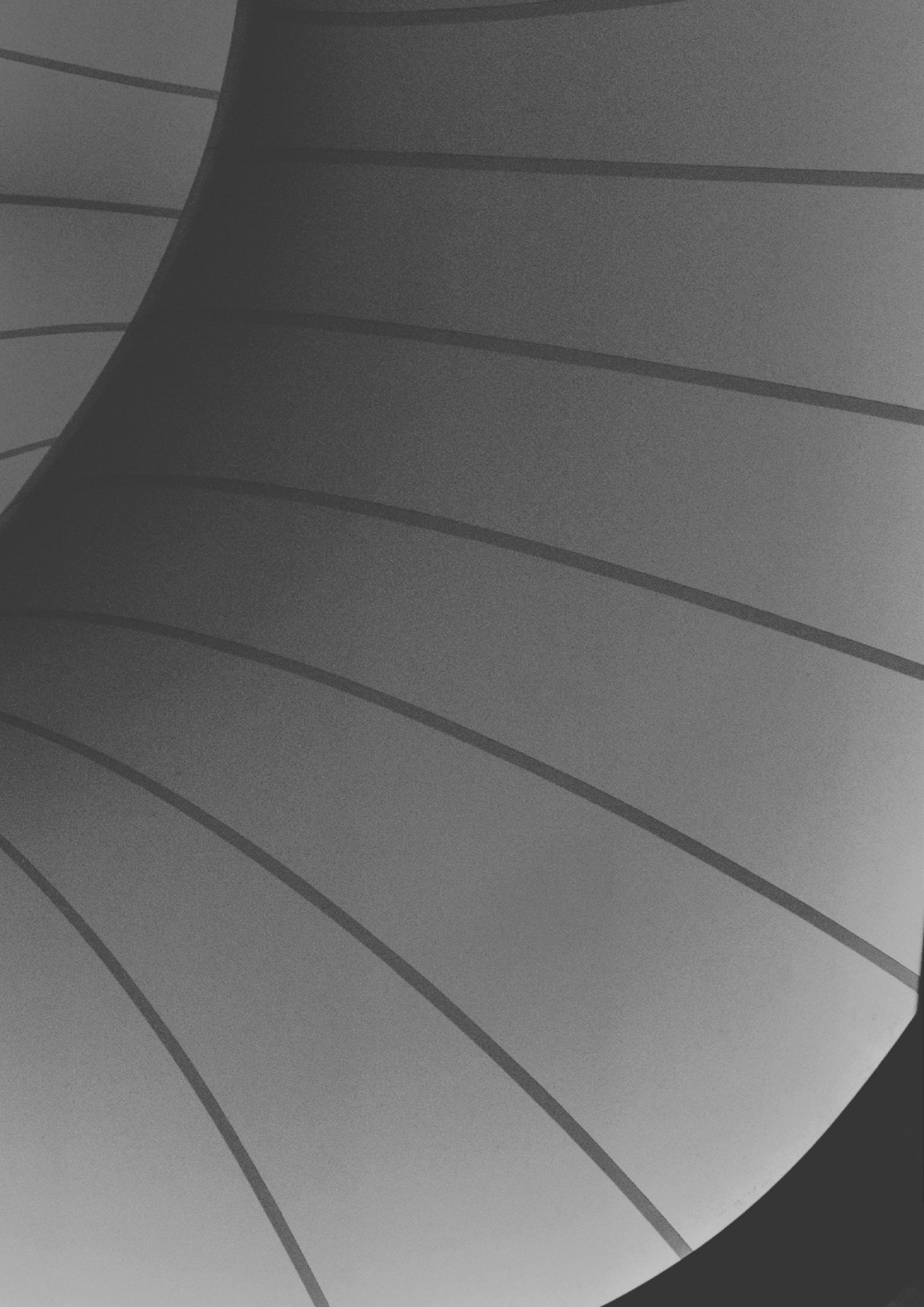
## **New Technology, New Opportunities**



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# Executive summary

This paper is intended as the first in a series on the role that blockchain technology can play in the insurance sector, both now and in the years to come.

Blockchain is a new technology with the potential to transform many industries, including insurance. Efforts are already under way to integrate these distributed ledgers into various business models and processes. Some applications products are already live and many more are in the pipeline of development. This report provides an overview of:

- What is blockchain
- Why is blockchain important for the insurance industry
- The benefits including improved efficiency, cost-savings, data quality, and trust among stakeholders

The report then examines a variety of use cases which show blockchain's transformative potential, including:

- KYC/AML
- Fraud mitigation
- Index-based or parametric insurance
- Peer-to-peer insurance
- Automated claims-handling

Examples of early innovators in the space are highlighted throughout the text. These examples provide valuable insights into how blockchain might come to shape insurance in the future.

If you already know what blockchain is, feel free to jump straight to the section on 'Insurance Industry Overview'.

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# What is blockchain

Blockchain is a distinct type of **Distributed Ledger Technology (DLT)**. DLTs involve ledgers, or databases, where the input and maintenance of data on the ledger is controlled on a peer-to-peer (P2P) basis. This P2P nature means that there is no central trusted party or intermediary required to control the ledger, and so they can be said to be **decentralised**. The Blockchain DLT technology takes its name from the way in which the ledger is structured, where inputs onto the ledger are grouped into **blocks** of transactions, which are then validated and transmitted to the network.

## HOW DOES IT WORK?

The two most important concepts which were combined to create the blockchain technology were **asymmetrical cryptography** and **distributed IT architecture**.

Asymmetrical cryptography is a system of **public and private keys** which allows users to confidently exchange encrypted information with unknown third parties. A public key is a string of numbers and letters which can be made available to everyone [think of your email address], while the private key remains secret, and is used to access any data which is sent to your public key [think of your password used to login and access your emails].

## SOME TECHNICAL TERMS EXPLAINED

In **proof-of-work** consensus mechanisms, miners use their computer power to solve a mathematical puzzle in order to participate in the block validation process. In **proof-of-stake** consensus mechanisms, miners are granted the right to validate blocks by providing some of their currency already they already hold into escrow.

A **hash function** is any function that can be used to map data of arbitrary size onto data of a fixed size. A **hash** is the output which is a predetermined length and format, regardless of the length and format of the source text.

An **oracle** is an agent that finds and verifies real-world occurrences and submits this information to a blockchain to be used by smart contracts.

**Proof-of-authority** uses a set of "authorities" - nodes that are explicitly allowed to create new blocks and secure the blockchain. The chain has to be signed off by the majority of authorities, in which case it becomes a part of the permanent record.

A **consensus algorithm** is a process used to achieve agreement on a single piece of information among distributed processes or systems. Consensus algorithms are designed to achieve reliability in a network involving multiple unreliable parties.

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A distributed IT system is a series of independent computers, known as **nodes**, which can communicate with each other over a network with no central node, much like the Internet. As all the nodes are connected to each other on a P2P basis, when one goes down it does not bring the entire network down with it, also known as automated redundancy.

Blockchains use these two concepts to allow users to store and send information in a decentralised manner, while the users of the network maintain it with the help of **consensus algorithms** which certify and confirm the transactions into 'blocks'. Users which complete this certification are known as **miners**, and a range of consensus algorithms are used depending on the blockchain, the most prevalent of which are **proof-of-work** and **proof-of-stake**. Once the miners have validated blocks through these mechanisms, it is added to the chain and shared with the network. Each block contains a **hash** of the previous block, which means that if any data in the block was altered in any way, the hash of the block would also change, and so the link to the chain would be broken. This means that once a block has been added to the blockchain, it is prohibitively difficult for it to be changed, making blockchains effectively immutable and tamper proof.

## **BEYOND TRANSFER OF CURRENCY AND THE BIRTH OF ETHEREUM**

The original Bitcoin blockchain was created specifically for the transfer of bitcoin, or digital currency, between peers. However, it could not be programmed to transfer anything beyond this. In 2015, Vitalik Buterin launched **Ethereum**, which was the world's first fully programmable blockchain. Ethereum crucially supports the creation of **smart contracts**. These are contracts between two or more parties which are digitally programmed and automatically execute clauses of the contract on the completion of certain events. The events which cause the automatic execution can be external to the blockchain, and the data concerning it is fed into the blockchain by a trusted third party known as an **oracle**. Think for example of sensors on a property which can detect flooding, data from which could be fed into a smart contract through an oracle, leading to an automatic execution of flood insurance claims. These oracles are often linked to Internet of Things (IoT) connected devices, which allows for the automation of the collection of data into the blockchain and gives the confidence that there is accuracy in the data which the contract is being executed against.

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## PUBLIC AND PRIVATE BLOCKCHAINS

The original Bitcoin blockchain, as well as Ethereum's Mainnet, are both examples of what are known as a **public blockchains**. This means that anybody in the world with access to the Internet and appropriate hardware can access the shared ledger, store a copy of it on their machine, and begin to modify it through using their computing power to validate transactions. While public blockchains are extremely powerful in ensuring true distribution of the network and transparency, they are not always suitable for enterprises which may want to control the access and permissions of users on their chain. This is where **private or consortium blockchains** are useful, and many of the enterprise blockchain applications currently in production in the insurance industry are hosted on a private or consortium chain.

A **private blockchain** is one where a central authority controls the right to access or post transactions to the ledger, which are verified through **proof-of-authority**. These chains can be incorporated into enterprises alongside their existing systems and provide an encrypted audit trail of transactions between members of the enterprise or group of enterprises.

### ENTERPRISE PRIVATE BLOCKCHAINS

JP Morgan, along with the Enterprise Ethereum Alliance and ConsenSys, created an enterprise-focused Ethereum version called **Quorum** which tries to improve blockchain technology with its own solution. The objective behind this is to provide a permissioned implementation of Ethereum which supports transactions and contract privacy. Here is how Quorum is different from Ethereum blockchain:

- Network and peer permissions management
- Enhanced transaction and contract privacy
- Voting-based consensus mechanisms

**Pantheon** is an open source Ethereum client built in Java, created by the PegaSys team within ConsenSys. Pantheon is mainnet-compatible, and includes features like consensus algorithms that are applicable to enterprise use. Pantheon provides the following benefits for enterprise clients:

- Built from the ground up with enterprise-friendly licensing
- Vendor supported by PegaSys engineers
- Secure and dependable permissioning and privacy features
- Stable consensus that enables fast, reliable transactions





A **consortium blockchain** is one which is open to the public, but where only certain data is visible to participants. Users are assigned permissions and blocks are validated based on pre-defined rules, often proof-of-authority. Consortium blockchains can therefore be said to be “partly decentralised”. In order to be a consortium and not a private chain, the participating companies must be equally involved in the consensus and the decision-making processes of the chain.

## KOMGO CONSORTIUM

A good example of a private blockchain in production today is komgo<sup>1</sup>, a commodity trade financing platform built on a private instance of the Ethereum Quorum blockchain in partnership with ConsenSys. Komgo is backed by 15 industry leaders, including banks, trading companies, an inspection company and an energy major, created to digitize the trade and commodities finance sector through a blockchain based open platform for KYC and issuance of letters of credit.

<sup>1</sup> <https://komgo.io/>

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# Insurance industry overview

Blockchain is a new technology that “has quickly become a fixation in the financial services industry” due to its potential for:

- Disintermediation
- Improved reconciliation of data
- The efficient transformation of business models<sup>2</sup>

The insurance industry has a well-deserved reputation for conservatism. By comparison with other sectors of finance, especially banking, insurers have been slow to respond to developments in technology and to shifts in popular tastes and preferences.

***The industry is uniquely positioned to benefit from blockchain technology***

The basic, long-standing business model has been insulated by a number of factors, but disruption is only a matter of time<sup>3</sup>. The industry is “uniquely positioned to benefit from blockchain technology”<sup>4</sup>, which can help deliver on key digital opportunities to cut costs, increase efficiency, enhance customer experience, and improve data quality, collection and analytics. Through innovation, insurance companies can grow market share, gain competitive advantages, and create an integrated approach for higher-quality service<sup>5</sup>. Recent research has shown that 46% of insurers expect to integrate blockchain in the next two years, and that 84% of insurers identify that blockchain and smart contracts can revolutionise the way that they engage with new partners<sup>6</sup>.

Blockchain can be used either to enhance existing insurance processes, or used to enable whole new insurance practices. **Blockchain enhancing existing insurance processes** means complementing existing business practices. As a rudimentary use case, a blockchain could be used to pay expenses, salaries, premiums, and claims

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2 Dave Nuernberg and Angus Champion de Crespigny, *Blockchain in Insurance: Applications and Pursuing a Path to Adoption* (New York: EY, 2017) 1.

3 Tanguy Catlin and Johannes-Tobias Lorenz, *Digital Disruption in Insurance: Cutting through the Noise* (Boston: McKinsey and Company, 2017) 8-9.

4 Johannes-Tobias Lorenz, *Blockchain in Insurance – Opportunity or Threat?* (Düsseldorf: McKinsey and Company, July 2016) 3.

5 Bernardo Nicoletti, *Digital Insurance: Business Innovation in the Post-Crisis Era* (London: Palgrave Macmillan, 2016) 2.

6 Jim Bramblet, “Ultimate Guide to Blockchain in Insurance,” *Accenture Insurance Blog*, December 2018.

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# ***46% of insurers expect to integrate blockchain in the next two years, and that 84% of insurers identify that blockchain and smart contracts can revolutionise the way that they engage with new partners***

more cheaply per transaction. As a more sophisticated engagement, a blockchain could function as a shared database between different insurers. **Blockchain enabling new insurance practices** represents a more radical implementation of the new technology by conducting actual insurance over smart contracts and decentralised applications (dApps). Savings, efficiencies, and other benefits may result. Insurance *for* the blockchain is

another evolution in and extension of cyber insurance. It is not in itself an application of blockchain technology, but a drive to extend insurance capacity to the infrastructure that is growing up around distributed ledgers. Insurance *for* blockchain represents a market opportunity for the insurance industry. Some use cases with regard to insurance being enhanced by and having new practices enabled by blockchain are described in the following pages.

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# Blockchain enhancing existing insurance processes

Blockchain enhancing existing insurance processes means using the technology to complement existing business practices. Notably, blockchains can enable parties to share data in real-time in a manner that is trusted and traceable. Whenever a file is added to a blockchain or changed thereafter, this event comprises a new transaction that will be stacked and time-stamped by the network. In this way, the history of any file is fully transparent from beginning to present, and “unauthorized tampering from within or without the system can be detected and prevented”<sup>7</sup>. By using private chains or a combination of public and private chains, access to files can be granted on a need-to-know basis. What is more, as distributed ledgers, blockchains do not present with a single point of failure and are therefore more secure and resilient than other databases. The data-sharing capability of blockchains can greatly enhance insurance operations. Data quality will be improved while costs will be reduced.

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<sup>7</sup> Steve Cheng et al., *Using Blockchain to Improve Data Management in the Public Sector* (New York: McKinsey and Company, February 2017) 3.

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## KYC/AML

Know-your-customer and anti-money-laundering (KYC/AML) regulations are especially onerous for banks and insurance companies. By using a blockchain-enabled shared database, financial institutions, including insurers, can streamline and reduce the cost of their KYC/AML compliance. Onboarding of a customer need only be done once by one institution. When the customer wishes to engage a new institution, that institution can request access to documentation already on-chain in order to confirm due diligence. Encryption ensures that an institution has access only to the documents to which it is entitled, even as any change in the customer's file is transparent, both as to when the change was made and by whom. Transaction audits and surveillance can also be automated more fully.

By "mutualizing" financial transaction information and simplifying KYC onboarding via a distributed ledger, Goldman Sachs estimates that American banks could save \$3-5 billion in AML compliance costs. In 2016, these banks' AML compliance spending totalled more than \$10 billion and more than \$18 billion when inclusive of regulatory penalties. Firms stand to gain by eliminating the duplication in onboarding efforts and

# Goldman Sachs estimates that American banks could save \$3-5 billion in AML compliance costs

improving the quality of data. Both of these measures should reduce headcount, which amounts to 80 percent of the budget for KYC/AML compliance<sup>8</sup>. Better "capture rates" might also reduce penalties. Finally, better security of information should reduce the cost of hacks or other negative cyber events.

In 2018, the IT multinational, **Cognizant**, partnered with 14 insurance companies in India to create a blockchain-enabled shared database. The platform is designed to reduce the risk of data breaches, fraud and money-laundering, while delivering superior experience to customer through improved process efficiency, better record-keeping, and accelerated turnaround time.<sup>9</sup> The decentralized and immutable nature of blockchains are enhancing the ability to combat document tampering and false billing<sup>10</sup>.

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8 James Schneider et al., *Blockchain: Putting Theory into Practice* (New York: Goldman Sachs, 2016) 71-76.

9 Cognizant, "Leading Indian Life Insurers Partner with Cognizant to Develop Industry-Wide Blockchain Solution for Secure Data-Sharing and Improved Customer Experience," news release, *Cognizant*, 16 April 2018.

10 Sujha Sundararajan, "Cognizant Teams with 14 Insurers on Blockchain Data-Sharing Platform," *Coindesk*, 17 April 2018.

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## FRAUD MITIGATION

Fraud is a major bugbear of the insurance industry. Higher costs due to false or exaggerated claims end up being paid by honest policyholders. Insurance fraud costs insurance companies in Ireland an estimated €200 million annually<sup>11</sup>. According to the FBI, insurance fraud costs non-health insurance companies in the United States more than \$40 billion per year, or \$400-700 per family per year in increased premiums<sup>12</sup>. By enabling better coordination between insurers, blockchain can help the industry combat fraud. A blockchain-enabled shared database, with various levels of access and control, would enable insurers to eliminate double-booking or processing multiple claims from the same accident; establish ownership of high-value items through digital certificate and so reduce counterfeiting; and reduce premium diversion (as in the case of unlicensed brokers selling insurance and pocketing premiums)<sup>13</sup>. Fraud mitigation is a compelling use case for blockchain in the insurance industry given the huge sums at stake.

**LVMH**, in partnership with ConsenSys and Microsoft, announced **AURA** in May 2019<sup>14</sup>, a platform which leverages the Ethereum blockchain and Microsoft Azure to serve the entire luxury goods industry with powerful product tracking and tracing services. AURA will make it possible for consumers of luxury goods to access the product history from raw materials all the way to the point of sale, allowing the authenticity of luxury good to be proven at point of sale and beyond to second-hand markets. During production, each product is recorded on the shared ledger, irreproducible and containing unique information. At the time of purchase, a consumer can use the brand's application to receive the AURA all product information. Several of the LVMH group brands, including Louis Vuitton and Christian Dior, are involved with many other LVMH brands in discussions to be onboarded. The platform will not be exclusive to LVMH brands however, as the AURA team chose to implement a consortium model, where any luxury brand can become a full member. This model ensures that the possibilities of the technology can be made accessible to all, while maintaining the flexibility to address the specific needs of each luxury brand.

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11 Insurance Ireland, "Insurance Fraud," *Insurance Ireland*, 2015.

12 FBI, "Insurance Fraud," *Federal Bureau of Investigation*, 2019.

13 C.B. Insights, "How Blockchain Could Disrupt Insurance," *Research Briefs*, 19 January 2019.

14 Scott Thompson, "LVMH, ConsenSys, Microsoft announce AURA, to power luxury industry with blockchain tech", Yahoo Finance, 18 May 2019

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## REINSURANCE

Reinsurance is big business in Ireland, which has the second-highest number of reinsurance companies in Europe<sup>15</sup>. Blockchain can streamline information and payments between insurers and reinsurers. Using a blockchain-enabled shared database, insurers can enter primary data onto smart contracts, with the information being accessible to reinsurers, retrocessionaires and regulators in real-time on a need-to-know basis. The data can be extracted from the blockchain for automated modelling, audits, and compliance checks. Risks can be ceded, and claims can be made with automated notification to all relevant parties and even automated settlement and reconciliation of payments. With a permissioned blockchain, data quality is improved while costs, errors and time are reduced. Although this kind of implementation requires a high level of cooperation among insurers and reinsurers, its eventual adoption would result in enormous cost savings<sup>16</sup>.

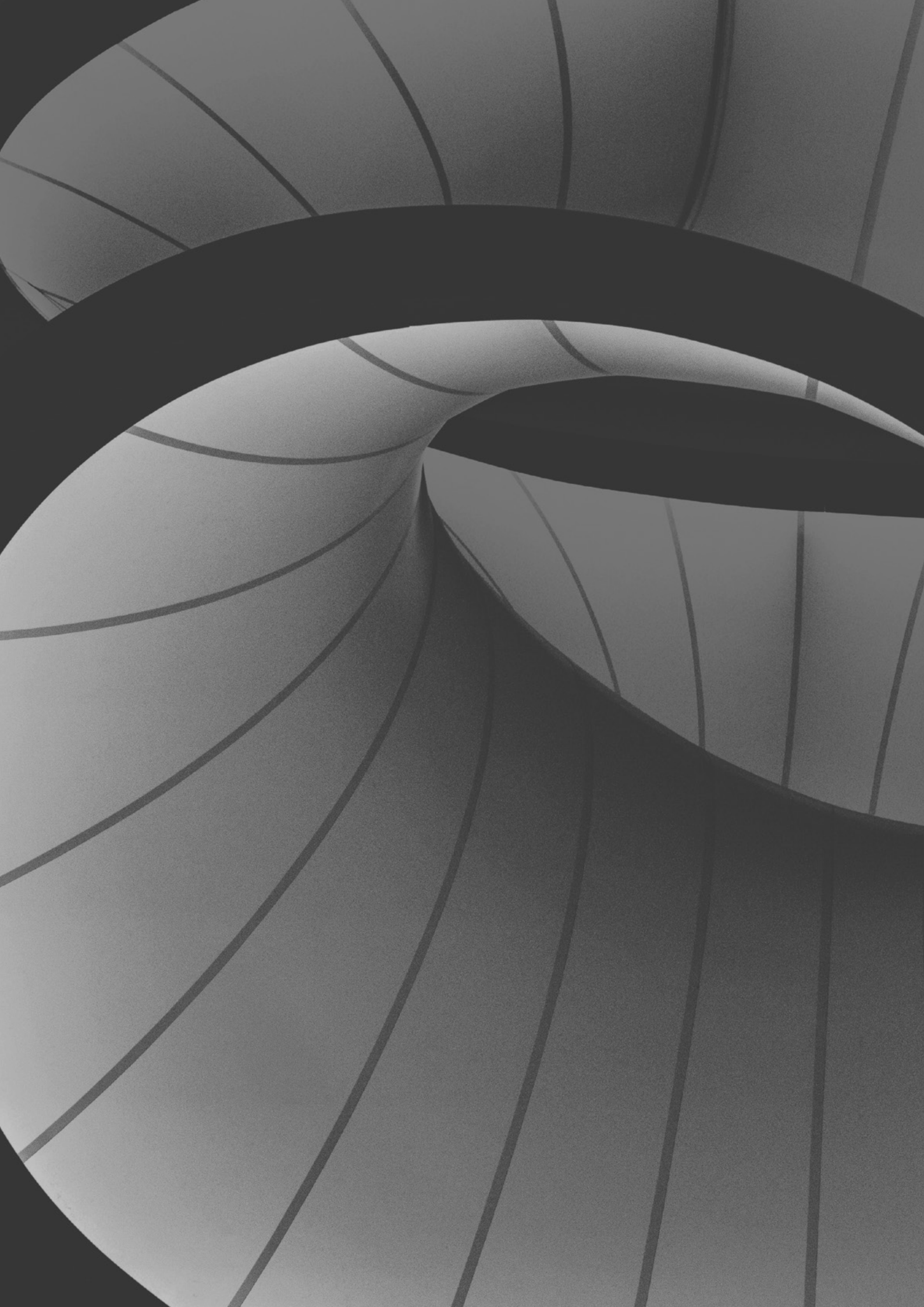
The **Blockchain Insurance Industry Initiative (B3i)** was formed in 2017 by a number of Europe's leading insurance and reinsurance companies, including Aegon, AIG, Allianz, Munich Re, and Swiss Re. The group was incorporated in 2018 and is now owned by 16 insurance market participants around the world. Over 40 companies are involved as shareholders, customers and community members<sup>17</sup>. Since 2017, B3i has endeavoured to put together a smart contract for property catastrophe excess-of-loss reinsurance that rapidly reconciles accounts between an insurer and its reinsurers, without redundancy or latency. Following an event, payouts are automatically calculated to affected parties. Product release is scheduled for late 2019.

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15 In 2014, the asset size of reinsurers in Ireland corresponded to over 30 percent of Irish GDP. Anne-Marie Kelly and Bridin O'Leary, "Reinsurance in Ireland: Development and Issues," *Quarterly Bulletin* 3 (July 2014) 82.

16 PwC estimates that a shared database over blockchain would save global reinsurers between \$5 and \$10 billion per year. See Stephen O'Hearn et al., *Blockchain: The \$5 Billion Opportunity for Reinsurers* (London: PwC, 2016).

17 B3i, "About Us," *B3i Services*, 2019.





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# Blockchain enabling new insurance practices

Blockchain enabling new insurance practices is about using smart contracts and dApps to conduct actual insurance with blockchain accounts. While such implementations are in many respects more radical and sometimes more speculative than insurance with blockchain, they present exciting opportunities for innovation that can result in new products and new markets. What is more, the low cost of smart contracts and their transactions means that products that are presently prohibitive in developing countries can become more competitive in those underinsured markets by using distributed ledger technology<sup>18</sup>. Notably, blockchains can lower the threshold of identity that is required to become insured<sup>19</sup>. Some areas of insurance on the blockchain that are already being pursued include index-based or parametric insurance and peer-to-peer (P2P) insurance.

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<sup>18</sup> Pauline Adam-Kalfon et al., *Blockchain: A Catalyst for New Approaches in Insurance* (Paris: PwC, 2017) 16.

<sup>19</sup> In many parts of Africa, much of the population does not have an official address. GPS coordinates of homes can be written into a blockchain to form a *de facto* land registry that can be used as the basis for home insurance.

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## INDEX-BASED OR PARAMETRIC INSURANCE

Index-based insurance relies on an underlying index to determine compensation to insureds. The index can be, among other things, in relation to temperature, rainfall, windspeed, or flight time. This type of insurance does not indemnify pure loss.

### ***Blockchain can further reduce the costs that are involved through comprehensive automation of every step of the index-based insurance process***

It pays out a certain lump sum upon the occurrence of an objective, pre-defined parametric within a set time period, such as 30 days of drought in a given region in a given year to compensate for likely crop

failure or herd loss. While index-based insurance is relatively cheap to administer by comparison with more conventional insurance products, blockchain can further reduce the costs that are involved through comprehensive automation of every step of the index-based insurance process, from contract to claims. Index-based insurance on a blockchain achieves such automation by using oracles that feed external data into smart contracts to initiate transactions that settle and clear between blockchain accounts within minutes.

Index-based insurance is especially effective in developing countries due to its simplicity<sup>20</sup>. In much of Africa and Asia, values insureds are typically very small scale while the administrative costs remain as large as developed countries, since in both cases claims are time-consuming and expensive to verify<sup>21</sup>. Index-based insurance can overcome this imbalance, and when conducted on a blockchain, automation goes even further toward rectification. Of course, index-based insurance also has a niche to fill in developed countries for products that are inherently parametric, such as flight delay and cancellation insurance. By reducing overhead, automating claims, and accelerating settlement, blockchain

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20 See, for example, IBLI Project, "FAQs," *Index-Based Livestock Insurance*, 2019.

21 Daniel Würtenberger, "Index-Based Insurance in Developing Countries: Rational Neglect?" Working paper, 14 December 2017.

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technology can render these products more cost-effective, and by enhancing overall convenience, it can make these products more attractive to consumers.

ConsenSys has its own oracle platform, Rhombus, with access to over five trillion real-world data points that can inform smart contracts across a range of applications<sup>22</sup>.

**Etherisc** is developing a number of index-based insurance products on the public Ethereum blockchain. Its first product, now licensed, was a dApp for flight delay and cancellation<sup>23</sup>. At the dApp website, a passenger who has already purchased an airline ticket can enter in his or her name and flight information. He or she signs and pays the prescribed premium to a smart contract. A pre-defined lump sum will be transferred to the passenger's blockchain account in the event that the flight is delayed by more than 45 minutes or cancelled. The trigger is fed into the smart contract by an oracle that is connected to an airline database. By comparison with conventional flight insurance, Etherisc is cheap, because everything is automated and there are no manual processes, and it is convenient, because payments are made without delay and without the need on the part of the passenger to contact an agent and file a claim<sup>24</sup>. A similar product, fizzy, has been rolled out by France's AXA.<sup>25</sup>

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22 Rhombus, "Connect Your Smart Contract with Real-World Data," *Rhombus Network*, 2019.

23 Christoph Mussenbrock and Stephan Karpischek, "Etherisc," white paper, 11 July 2017.

24 Etherisc, "Make Insurance Fair and Accessible," *Etherisc*, 2019.

25 Laurent Benichou, "fizzy.axa Reaches a New Milestone," *Medium*, 12 June 2018.

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## P2P INSURANCE

Peer-to-Peer (P2P) insurance involves a group with some degree of affinity (family, friends, business associates, etc.) who team up to contribute to insure each other against loss. Through rigorous selection, this pool, akin to a reciprocal, can produce a lower loss ratio and hence a lower cost for its members. What is more, funds that are available in the pool at the end of the coverage period can be refunded to the members, who are both policyholders and subscribers at the same time<sup>26</sup>. Blockchain can enhance the efficiency and transparency of this model and so render it more popular. Written premiums can be held in escrow on a smart contract. Claims can be paid out from this smart contract when the correct digital signature is applied<sup>27</sup>. The smart contract's code might designate that the signature come from a certain third-party assessor, but it can also require that signatures be received from multiple members of the pool to validate the claim. Members can be confident in the voting mechanism as the blockchain maintains an immutable record of everyone's decision.

**Teambrella** is a dApp that seeks to enable "teams" of "self-governing user communities" to cover each other for loss. Teams manage all coverage functions, including setting coverage rules, accepting new members, appraising claims, and approving so-called "reimbursements." Teams can be created around the likeness of its members (e.g. dentists) or the likeness of objects covered (e.g. bikes). Teammates make "reimbursements" from cryptocurrency wallets that they control. They underwrite new members, who pay premiums on the basis of perceived riskiness. A teammate's liability is never greater than the funds in his or her wallet, and no other member owes the teammate more than that amount in the event of a claim. These rules are governed by open-source code<sup>28</sup>. While this kind of arrangement is highly experimental, it does suggest the versatility of blockchain to invent and test new products.

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26 Richard L. Norgaard, "What Is a Reciprocal?" *The Journal of Risk and Insurance* 31:1 (1964) 51-61.

27 Sumit Ramani, "Peer-to-Peer Insurance: How Blockchain Is Challenging the Traditional Insurance Model," *Medium*, 14 September 2018.

28 Alex Paperno, Vlad Kravchuk, and Eugene Porubaev, "Teambrella: A Peer-to-Peer Coverage System," white paper, not dated.

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## CLAIMS HANDLING

Gathering and processing data on claims can be challenging as well as expensive. Data is manually entered and shared between different parties with different systems, which can produce errors in transmission. Blockchain technology can automate a great deal of claims-handling and reduce settlement times. For instance, a vehicle might one day be kitted out with a sensor that in turn informs a smart contract. In the event of a collision, the smart contract automatically alerts emergency services, confirms insurance, and launches a claim. Such automation would result in better service for insureds and cost-savings for insurers. Manual processes would be reduced or eliminated<sup>29</sup>.

**Blockchain technology can automate a great deal of claims-handling and reduce settlement times.**

**Insurwave** was launched in 2018 by EY and Guardtime in collaboration with other insurance industry leaders, including Maersk, ACORD, Microsoft, MS Amlin, Willis Towers Watson, and XL Catlin. This platform uses blockchain technology to support marine hull insurance<sup>30</sup>. A new vessel is registered on-chain and a premium is set by an algorithm with policy documents automatically distributed to carriers. The ship's travel is recorded in real time, from location to weather conditions. When the ship moves through a risky area, this fact is recorded in its file and used for future underwriting<sup>31</sup>. Premiums are made more accurate even as claims can be assessed and approved more quickly. Data quality is immeasurably improved, and the immutable record of the ship's life is accessible in real-time by various stakeholders for improved trust and transparency.

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29 Roberto Bosisio et al., *The First All-Blockchain Insurer* (Boston: Boston Consulting Group), 2018.

30 Lee Ann Farwell, "World's First Blockchain Platform for Marine Insurance Now in Commercial Use," *EY*, 25 May 2018.

31 Nicky Morris, "EY Maersk Blockchain Marine Insurance Platform Goes Live," *Ledger Insights*, 2018.

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# Regulatory Concerns

As with any emerging technology, there will be a period where existing regulations do not appropriately address the new possibilities that these provide, as many of today's regulations were written before the advent of numerous modern technologies.

It has been seen for example that there are a number of features of blockchain which have the potential to be seen as inconsistent with, or ambiguous under, current insurance regulations. In the context of GDPR in particular, regulators want to ensure that any policy or personal information being stored on a blockchain ledger is in compliance with existing privacy and data protection regulations.

Smart contracts could also face regulatory hurdles, with their self-executing nature which potentially could be implicated where an insured party asserts that a claim denial was inappropriate, or where a potential bug in the smart contract causes the contract to fail to perform as intended. The immutable nature of smart contracts could also pose a challenge in terms of GDPR rights to be forgotten, or in an insurance delinquency proceeding, where for example, a court-appointed administrator may seek to cut off or delay future claims payments.

These are some example of where regulations will have to catch up with blockchain technologies, however it is already being seen that nations and regulatory bodies are proactively looking to address these before issues arise. The European Union in particular has been very active in looking to effectively regulate blockchain technologies, and has set up the EU Blockchain Observatory to review and propose regulations, as well as expert groups such as the International Association for Trusted Blockchain Applications.

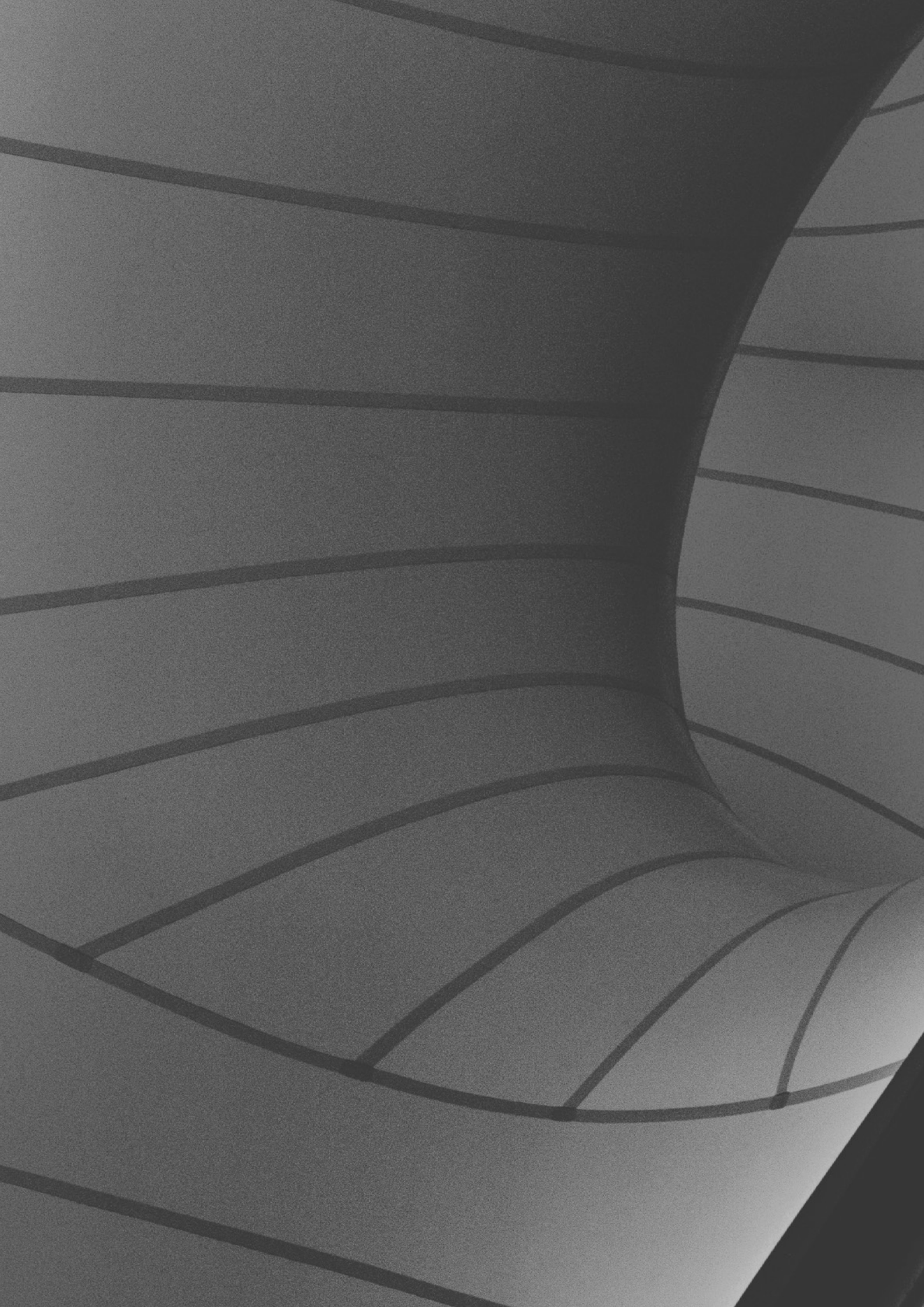


The **EU Blockchain Observatory and Forum** is a group established by the EU Commission which aims to accelerate blockchain innovation and the development of the blockchain ecosystem within the EU, and so help cement Europe's position as a global leader in this transformative new technology. ConsenSys have been chosen as the blockchain advisors to the EU Commission as part of this initiative. The mission of the initiative is to:

- Monitor blockchain initiatives in Europe
- Produce a comprehensive source of blockchain knowledge
- Create an attractive and transparent forum for sharing information and opinion
- Make recommendations on the role the EU could play in blockchain

ConsenSys has been involved in the production of a number of reports for the EU Blockchain Observatory and Forum around regulatory issues, notably 'Blockchain and the GDPR', which addressed how GDPR can coexist with blockchain technology<sup>32</sup>.

<sup>32</sup> EU Blockchain Observatory and Forum, "Blockchain and the GDPR", 16 October 2018.





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# Conclusion

Insurance with and on blockchain can transform the industry. The ability to break down data silos and move toward decentralization of information and power will save on costs and time while proving data quality. Smart contracts and oracles will allow new products to be developed that will better serve the needs of customers while also enabling the automation of many current, labour-intensive processes.

For the insurance sector to unlock the benefits of blockchain technology, the following points should be considered:

1. Collaboration and partnerships will be absolutely crucial
2. There must be a focus on open architecture and microservices to enable the shift towards new and improved business models powered by blockchain technology
3. Insurers will more and more be expected to quickly send and receive information in a way which is not possible through traditional means
4. The full benefits of blockchain technology will appear when insurers engage and trust partner organisations, and create an ecosystem where resources are pooled in shared ledgers

Benefits should encompass better KYC/AML, fraud mitigation, reinsurance, new parametric and peer-to-peer products, and more automated claims-handling. This report provides but a sample of the work that is being done and the ideas that are being explored in the realm of insurance and blockchain. Examples of implementation demonstrate the speed at which theory is becoming practice and the role that some important insurers are already playing in this space. Insurers in Ireland and elsewhere have much to gain by engaging with blockchain technology.

To discuss how blockchain can be leveraged by your organisation, reach out to ConsenSys in Dublin through one of the contacts below.

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This report was produced by the ConsenSys Dublin Innovation Studio. ConsenSys is Ireland's and the world's largest blockchain company. The Dublin Innovation Studio is ConsenSys's global delivery centre, with a highly skilled team focused on excellent delivery of both product and advisory. To discuss how blockchain can be leveraged by your organisation, reach out to ConsenSys in Dublin through one of the contacts below.

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Lory is a managing director with ConsenSys and leads ConsenSys Ireland. The ConsenSys Dublin studio is Ireland's largest blockchain team and Ireland's largest blockchain company. Prior to ConsenSys, Lory was a Director with Deloitte where he founded, set up and led Deloitte's Europe Middle East and Africa blockchain Lab. Prior to Deloitte, Lory worked as a management consultant with Accenture. He has over 12 years of consulting experience. Lory has led blockchain strategy and implementation projects for corporates and governments around the globe. With the IDA in Ireland (Industrial Development Authority), Lory was the founding member of the Ireland national blockchain initiative 'Blockchain Ireland'. This group includes over 150 entities made up of global enterprises, universities, government entities and start-ups. Lory is a Qualified Financial Advisor, registered stockbroker and is currently (and has been for the past 12+ years) an adjunct assistant professor on MBA programmes in Technology Trends, Strategic Management and Information Systems Strategy with the Business School in Trinity College Dublin.



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Claire has over 20 years' experience working for large multinationals (telecommunications, FMCG), two Big 4 consultancy firms, and as founder of a successful start-up acquired by a Big 4 firm. Claire leads the scaling of ConsenSys' Ireland. Prior to ConsenSys, Claire was a founder of Red Planet a consultancy bringing outside in start-up innovation to large corporates. Claire sold Red Planet to Deloitte in 2017. Prior to that Claire was CFO for Wayra Ireland, a start-up accelerator successfully invested seed capital across a wide range of digital start-up entities and successfully scaled a proven revenue-focused commercial acceleration programme.



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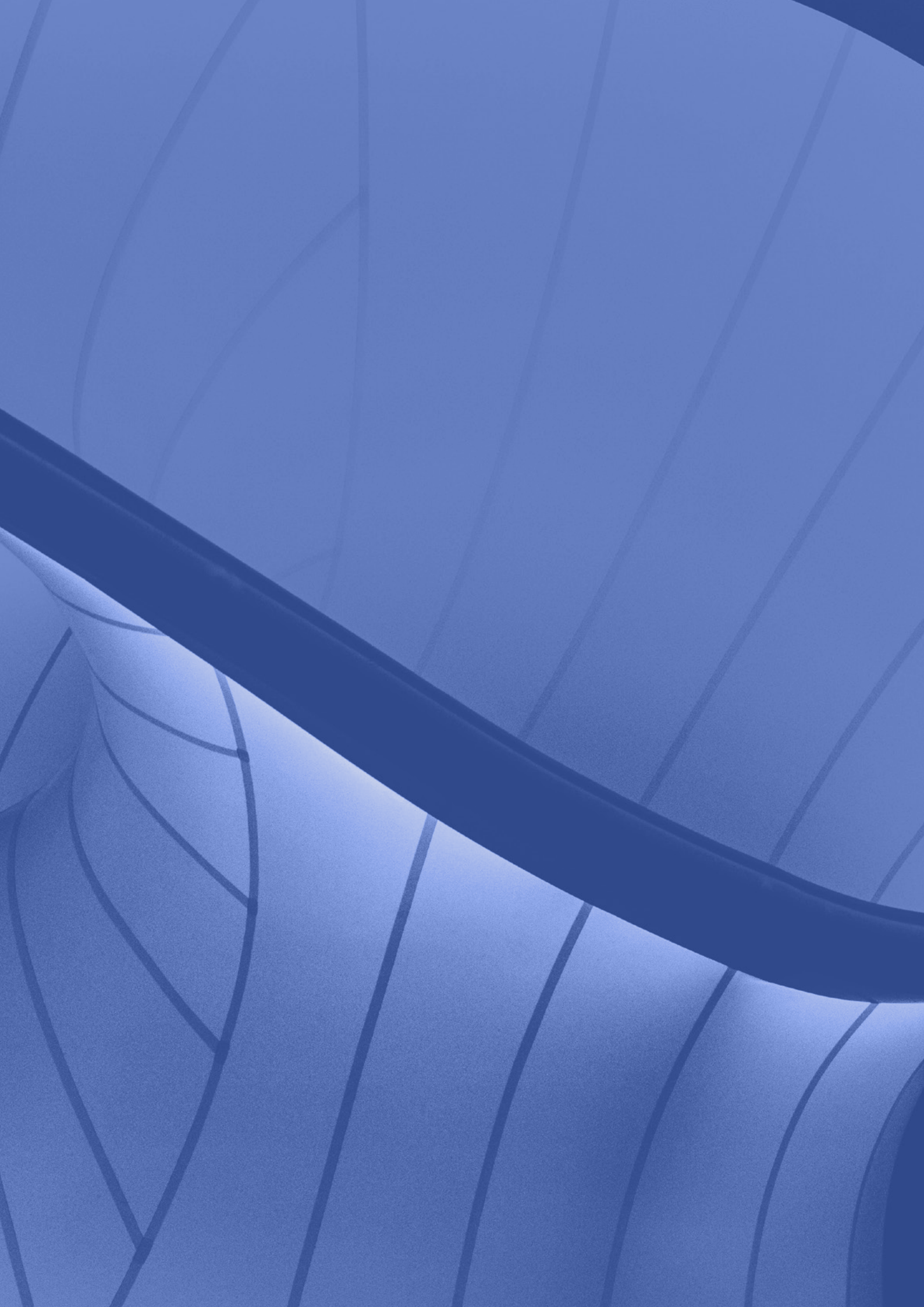
Eoin's skills are in solution integration, relational databases and data migration, bespoke corporate solutions, large project budgeting and business case validation. Eoin is a former Technical Architect for the Deloitte EMEA Blockchain Lab with over 18 years of experience as a technologist delivering development projects for financial, corporate and government clients. Eoin's current focus is continuing to learn more about Ethereum's capabilities in the enterprise space and the delivery of meaningful large-scale blockchain projects for clients.

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# Appendix

## WHY CONSENSYS?

ConsenSys is a leading venture studio of developers, entrepreneurs and subject matter experts from around the world who are committed to innovation and to a decentralized world:

- We are building an accessible internet of value, known as **Web 3.0**.
- We pioneer the development of blockchain **infrastructure**, developer tools, platforms, and **applications**, including supply chain, identity and access management, trade finance, cross-border payments, and **tokenization** of physical assets.
- We are a thought-leader in blockchain policy, market practices, and regulation. We have acted as an advisor to the European Commission in these areas.
- Our **talent base** comes with from major organizations, including McKinsey, Deloitte, EY, Goldman Sachs, UBS, PwC, BCG, Munich Re, R3, Microsoft, Cisco, Oracle, and IBM.
- Our clients and **partners** include Amazon, GlaxoSmithKline, J.P. Morgan, Microsoft, the World Wildlife Fund, the Monetary Authority of Singapore, Infosys, Santander, Smart Dubai, the South African Reserve Bank, Union Bank of the Philippines, and more.





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