



Allens < Linklaters

BLOCKCHAIN
REACTION

Nine months on

APRIL 2017

A background graphic consisting of a network of interconnected nodes and lines, resembling a blockchain or a complex data structure. The nodes are represented by circles of varying shades of gray, and the lines are thin, connecting the nodes in a web-like pattern. The overall aesthetic is technical and modern.

Blockchain Reaction: nine months on

In June 2016, we released *Blockchain Reaction*, a report examining distributed ledger technology (*DLT*) and its regulatory and legal challenges and opportunities. One year on, **Managing Associate Valeska Bloch**, **Senior Associate David Rountree**, **Senior Associate Elyse Adams** and **Associate Steve Meacher** examine the growth of the technology in both scope and maturity, its unexpected successes and challenges, and how the technology and its applications are progressing in 2017.

EXECUTIVE SUMMARY

- > After a year of consultation and consideration in 2016, regulators globally are (with some exceptions) addressing the risks associated with DLT while avoiding imposing broad and onerous obligations.
- > Ownership of IP in blockchains may become a critical issue, as we see organisations taking divergent approaches, from open sourcing to patenting blockchain innovation.
- > 2016 and early 2017 has seen attempts to overcome the hurdle of potential interoperability issues associated with DLT, including a move towards developing international standards for terminology, security and privacy issues. We expect these will progress throughout 2017 and beyond.
- > Consortiums became increasingly important on the DLT landscape in 2016, with major banks, industrials and tech companies investing heavily in joint research and development teams. This investment is already paying off – DLT is being used to revolutionise supply chains, and transform finance and trading – at a much faster pace than expected.
- > While the ‘hack’ of the distributed autonomous organisation (*DAO*) in June 2016 drew attention to challenges in the application of smart contracts, the incident reinforced the benefits of robust governance structures, the importance of thorough testing and acts as a reminder that code is not a replacement of law yet.



Resource > Your Chart
Business Chart - Visual

Business Chart

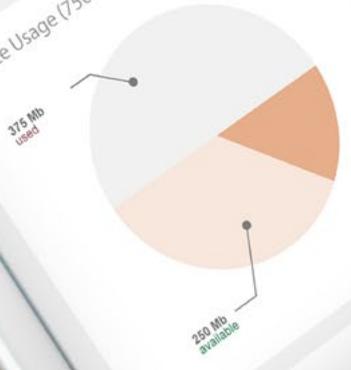


Who is your audience and what are their needs? This can help you better articulate the benefits of doing business with you and deliver a smarter product or service.

Interactive User
1,505
New Users Registration

18,321
Registered Users

Space Usage (750 Mb)



Realtime Dashboard



Focus on Your Finances
Whether you're a full time, part time or freelance photographer - or even if you make a few bucks on the side from your photography - you are your own business.

Target

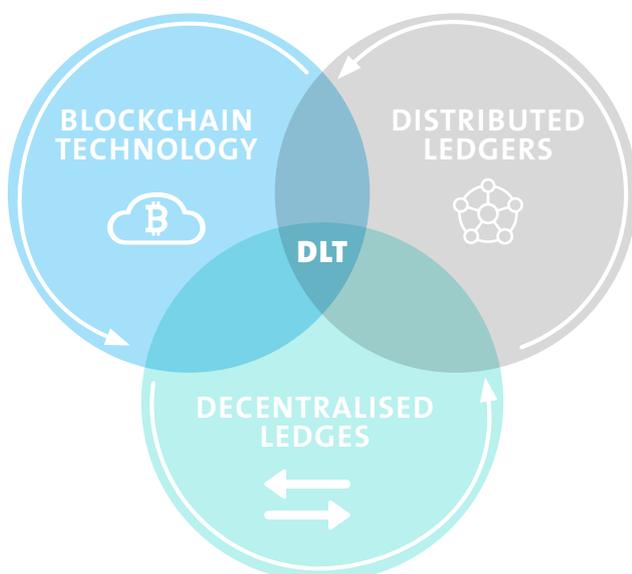


1 THE MODERN XEROX PROBLEM: CATEGORISATION OF TERMINOLOGY

In *Blockchain Reaction*, we discussed the important differences between 'blockchain' and 'DLT' terminology. It has been said that blockchain suffers from an iteration of the 'Xerox' or 'Kleenex' problem – situations where a brand name becomes the common term for a general class of product. The current view is that:

- > **DLT** is a digital record (or ledger) of transactions, shared instantaneously across a network of participants.
- > **Blockchain** is a technical component of the digital ledger, which refers to the chain of transactions that comprise the ledger.

It has now become even more important to use this terminology precisely. In February 2017, R3 Consortium (**R3CEV**) published a blog about Corda, its open-source DLT platform geared towards financial markets. R3CEV indicated that, while Corda was *inspired* by blockchain, its current iteration is not – technically speaking – a blockchain. Rather, Corda is an example of DLT that addresses the specific needs of the financial services industry. For example, Corda restricts access to data relating to an agreement to the parties who are specifically involved, rather than the entire platform network. ASIC also recently issued guidance on terminology, indicating DLT will be its terminology of choice.



2 REGULATORY RESPONSES: A GLOBAL PERSPECTIVE

Throughout 2016, regulators globally continued to investigate whether existing frameworks for banking, commodities, securities and consumer protection are sufficient to meet the technological challenges posed by DLT, or whether new legal frameworks are required.

In our 2016 Report, we identified an emerging consensus that various regulatory regimes appeared to be precisely and carefully addressing risks created by the use of DLT, not imposing sweeping and onerous obligations on the market. We also indicated this was preferable, given the rapidly evolving nature of DLT. Since our Report, we have seen a number of developments affirming this approach. ASIC here in Australia, as well as regulators in most jurisdictions, have adopted a technology-neutral approach, avoiding regulatory responses that are addressed at specific technical manifestations.



- > **AUSTRALIA:** In March 2017, ASIC published an information sheet (INFO 219) about DLT, citing ‘intense interest’ around the world, and anticipating that the range of potential applications will ‘grow exponentially’ over time. ASIC indicated Australia’s current regulatory framework is sufficient to accommodate DLT, but conceded additional regulatory considerations may arise as the technology matures. ASIC called for early and collaborative dialogue with industry players. In the interim, it released a checklist of six categories of questions which would inform ASIC’s consideration of any implementation of a DLT solution by a regulated entity, and which it encouraged businesses to consider. In particular, ASIC focused on six themes:
 - > **Usage:** The problem(s) DLT is being used to address, the nature of any information held on a DLT ledger and if and how smart contracts may be used in the solution.
 - > **Platform selection:** The reason(s) for selecting a particular DLT platform should be examined, including the relative strengths and weaknesses of different models being deployed.
 - > **Security:** The rules and protections around the use and storage of data by, on or through a DLT are critical.
 - > **Governance and control:** Close consideration must be given to the governance model in place and consensus mechanism to create a true record of information.
 - > **DLT and the law:** What framework of existing laws and regulations are relevant to the particular business application of DLT?
 - > **Connectivity and growth:** How will the DLT implementation interact with uses of DLT technology, including what scalability is available, and whether steps have been taken to enable interoperability.
- > **EUROPEAN UNION:** In February 2017, the European Securities and Markets Authority (**ESMA**) announced that it would not regulate DLT, deeming such regulation both ‘premature’ and potentially stifling. ESMA considers that its current regulatory framework does not pose a hurdle for adopting and developing DLT in the short term. In addition, cryptocurrencies utilising the blockchain platform will be treated as ‘currency’ and subjected to existing regulatory safeguards – including the EU Commission’s recent proposal to set an upper limit/threshold on cash transactions.
- > **ISRAEL:** Israel has indicated that it will not regulate bitcoin (the most well-known form of cryptocurrency), although it has proposed to treat it as a ‘virtual currency’ for taxation purposes.
- > **USA:** Various US states have taken diverging approaches to DLT regulation. In 2016, the tech community was near universal in its condemnation of New York’s ‘Bit License’, which gained widespread criticism for being heavy-handed and ill-conceived. California is currently considering a fee for digital currency business enrolment, which is also subject to ongoing debate. Conversely, some US jurisdictions have taken a lighter approach to regulation – such as Illinois, which has indicated it will not regulate cryptocurrencies. Delaware has also sought to encourage DLT innovation within the state, and has launched the ‘Delaware Blockchain Initiative’, which involves seeking to implement DLT into some of its governmental and regulatory functions (including allowing companies to file documents using DLT).

While the general consensus has been a light touch approach, some jurisdictions have sought to actively restrict or prohibit the use of DLT (and, more specifically, cryptocurrency) including the UAE and Nigeria. These efforts are largely focused on limiting the use of cryptocurrencies in these jurisdictions, rather than seeking to prevent broader DLT applications.

3 WHO OWNS BLOCKCHAIN? IP BATTLES

Patent battles and emerging technology markets often go hand-in-hand, but DLT's lineage is one where open sharing of intellectual property is encouraged (stemming from the original open-published Bitcoin white paper). Given the rapidly spreading reach and application of DLT, the approach to IP ownership of DLT will be an important area to keep an eye on, and we are already seeing several diverging approaches:

- **Open source:** Various DLT consortia, including R3CEV, have made their software platforms publically available. This is known as 'open source', and allows the public to access, scrutinise and adapt the technology. Open source offers benefits for interoperability and for platform operators, who hope that their technology will become the 'platform of choice' and become widely adopted.
- **Patent pledges and covenants:** The startup Blockstream pledged to abstain from IP disputes unless their patents are used offensively.
- **Patent protection:** In an unexpected turn of events, Australian businessman Craig Wright is seeking to patent aspects of DLT (in addition to claiming the identity of the mythical Satoshi Nakamoto), as he filed 73 patent applications in Britain in 2016. Other firms including MasterCard, Goldman Sachs, Coinbase, and 21 Inc. have also sought patent protection on DLT developments.

4 ON THE SAME PAGE: STANDARDS AND INTEROPERABILITY

One of the key challenges going forward with DLT implementation will be ensuring that different applications of DLT can interoperate smoothly with one another. There is no 'one' blockchain, triggering the possibility that different systems will develop in a diverging fashion.

In recent developments, the International Organisation for Standardisation (**ISO**) has approved Standards Australia's proposal to develop new international standards on blockchain and DLT to support interoperability and data interchange among users, applications and systems and create consistency in relation to privacy, security and terminology. Ultimately, it is hoped this will build market certainty and confidence in the technology. This development also offers real benefits to Australian banks and financial institutions, who will be positioned at the centre of global DLT standards development.

In March 2017, Standards Australia released its *Roadmap for Blockchain Standards Report* in advance of the first International Blockchain Standards meeting (to be held in Sydney in April 2017). This report aggregates views of more than 100 government, industry, academic and consumer stakeholders. It recommends that the standard (ISO/TC 307) should:

- prioritise privacy, security and identity issues in DLT, as well as governance and risk related issues, particularly around priority areas in financial services, government services and supply chain;
- work together with regulators in standards development; and
- not cover 'legal' requirements for 'smart contracts', privacy, security and identity in the standards, instead focusing on providing technical guidance for stakeholders.

While the decision to leave the legal aspects of the application of smart contracts and privacy issues to DLT is likely prudent, given ISO's role as primarily a technical body, it may have an important role to play in developing the necessary technical standards that will allow organisations to gain the legal certainty they require to utilise the technology. In particular, standards around security and development of smart contracts and DLT architecture will give organisations greater comfort in implementation, and will also provide a standard to which organisations can be held to account, particularly in contractual negotiations and disputes.



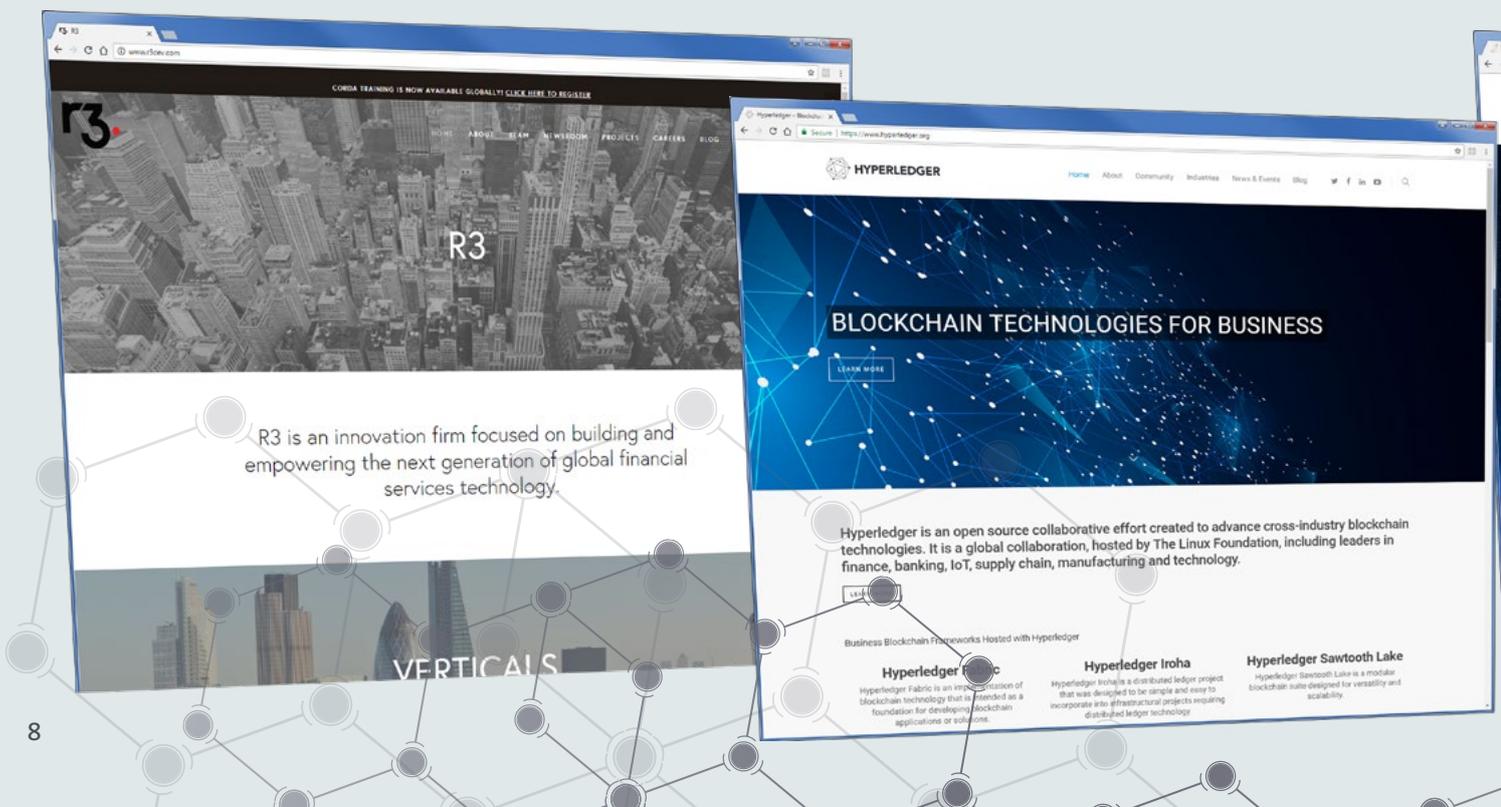
*There is no 'one' blockchain,
triggering the possibility
that different systems
will develop in a
diverging fashion.*

5 BETTER TOGETHER? DLT CONSORTIUMS

In *Blockchain Reaction*, we discussed the rise of R3CEV and its swift success in 2016 – including in running mock-trades and developing an industry-wide platform to synchronise financial agreements. Since that time, there has been a flux of members, with some existing R3CEV members (such as Goldman Sachs, Banco Santander SA and Morgan Stanley) declining to renew their membership, while new organisations continue to join the R3CEV consortium, including ABN Amro, the China Foreign Exchange Trade System and, most recently, the Hong Kong Securities and Futures Commission.

Other consortia met with significant success in late 2016, and continue to set ambitious goals in terms of research and product development. For example:

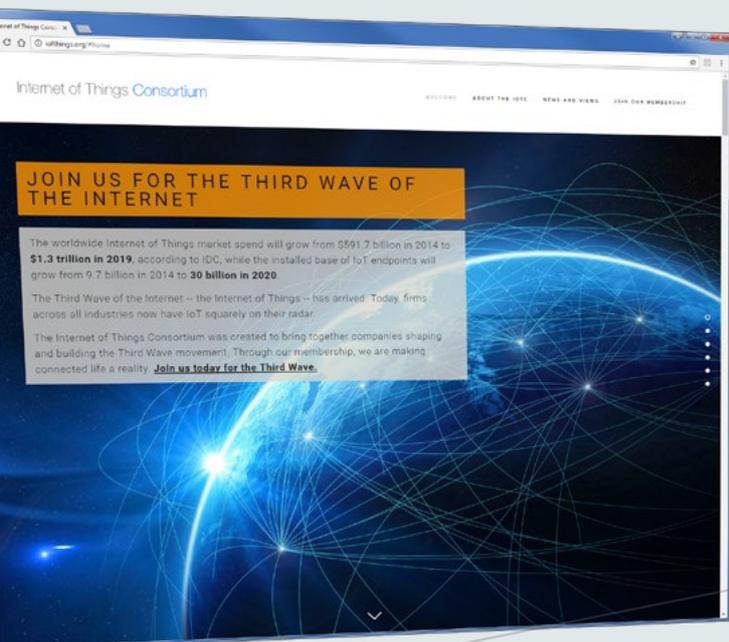
- > **The Hyperledger Project:** Hyperledger added industry giant American Express to its membership in January 2017, and now boasts a strong presence in China (where 25 per cent of its 100 members are based). Brian Behlendorf, Hyperledger’s Executive Director, has indicated that commercial deployments of the consortium’s code could be expected by the end of 2017.
- > **Japanese consortium:** In November 2016, 42 Japanese banks formed a consortium focusing on domestic and foreign exchange services. The consortium announced an intention to build a 24-hour real-time remittance infrastructure and proof-of-concept by March 2017.



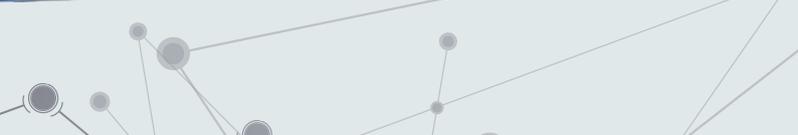


- **Internet of Things consortium:** In January 2017, a group of companies (including Cisco Systems, Bosch and Bank of New York Mellon) established a new consortium investigating the application of DLT to internet of things applications, focusing on additional security and better identity management for internet of things applications.
- **Global Payments Steering Group:** Six major banks (including Bank of America, Westpac, and the Royal Bank of Canada) formed the Global Payments Steering Group (**GPS Group**) in September 2016. The GPS Group is working to create a global DLT payments network using Ripple, a payments platform which utilises its own distributed ledger. This involves creating and maintaining Ripple payment transaction rules and formalising standards for activity using the Ripple platform.

Many of these consortiums are developing DLT that would be broadly described as **private ledgers** (networks with a permissioned set of participants) which offer a middle ground between a fully decentralised **public ledger** (such as the Ethereum or the Bitcoin network) and a traditional scenario where parties rely on a central intermediary or custodian (such as a bank or clearing house). There is no clear consensus on whether private or public ledgers offer the best solution – and the answer to the question of what to implement may ultimately rest on the necessary design choices for a particular use case. In addition, some of the challenges of the various iterations of DLT are continually being addressed – such as the issue of commercially sensitive information (like the volume and timing of transactions) being stored on the ledger for other participants to view, with various new solutions being trialled and implemented to protect confidentiality when using DLT.



The key legal challenge for DLT consortiums going forward is likely to revolve around the need to implement robust governance arrangements, including managing everything from how members interact with each other to how they share risk in their enterprises. The success of consortiums depends on clearly delineating how participants will work together, on-board and off-board, resolve disputes, and make strategic decisions. Developing such governance frameworks may be a growing area for legal assistance in the future.



6 APPLYING DLT: 2017 USE CASES



Supply chains

One of the primary challenges in supply chain management is the lack of information of goods moving through and interacting with the supply chain. A distributed ledger offers a smart solution – by recording the transfer of the materials and goods at various stages, each new purchaser can view accurate and secure information about the product's price, date, quality, location and state throughout its lifetime.

We have already seen a number of applications across various supply arrangements:

- > **AgriDigital:** Featured in our initial *Blockchain Reaction* report under the name 'Full Profile', AgriDigital have been implementing blockchain solutions for commodity management and supply chain finance, particularly in the grains industry. In December 2016, AgriDigital executed a pilot featuring the world's first live settlement of grain between a buyer and a seller on a blockchain, utilising smart contracts. This enabled immediate payment on delivery, rather than the typical two to five weeks, eliminating counterparty risk for the grower. Further pilots are expected from AgriDigital in 2017.
- > **CBA trade finance:** The first cross-border transaction between banks using DLT occurred between CBA and Wells Fargo & Co in October 2016. An Australian cotton trader purchased a shipment of cotton from Texas, with a smart contract used to trigger payments automatically when the cargo reached certain geographic locations. Ordinarily, this trade would have relied on a letter of credit between banks to guarantee payment on arrival.
- > **Everledger:** Everledger, a London-based startup, is using public ledger technology to tackle fraudulent insurance claims relating to diamonds. The register includes information about more than one million diamonds (identified using unique features and serial numbers) alongside police reports and insurance claims. A diamond's ownership can be traced over time, with instances of theft identifiable at the point of sale.
- > **BHP Billiton:** In September 2016, BHP Billiton announced it will use DLT to record movements of wellbore rock and fluid samples, allowing continual communication between all parties to mining transactions such as geologists, shipping companies and vendors.



Land registries

DLT also presents interesting opportunities for land registries, which enable property authorities to create permanent ledgers of all transactions. This offers a number of benefits, including a reducing the risk of fraud, lessening expenditure on title insurance, and ensuring efficient, virtual title transfer and notarisational services. For example:

- > **Sweden:** The Swedish Land Registry, in cooperation with software company ChromaWay, is building a public ledger for property acquisitions. Once a contract is formed between a vendor and purchaser, the contract will be recorded in a public ledger. This will allow banks, government authorities, agents and parties to track the transaction. Public testing was slated to begin in March 2017.
- > **Georgia:** The Republic of Georgia has shown interest in this area, investigating the Bitcoin blockchain network as a platform for recording property transactions. The Bitcoin blockchain was preferred precisely due to its public and transparent nature, given the nature of the records, as well as its proven resistance to fraud. The Georgian Government has signed a memorandum of understanding with Bitcoin company BitFury, pledging to investigate how blockchain can be used to register new land titles and facilitate mortgages, purchases and sales.

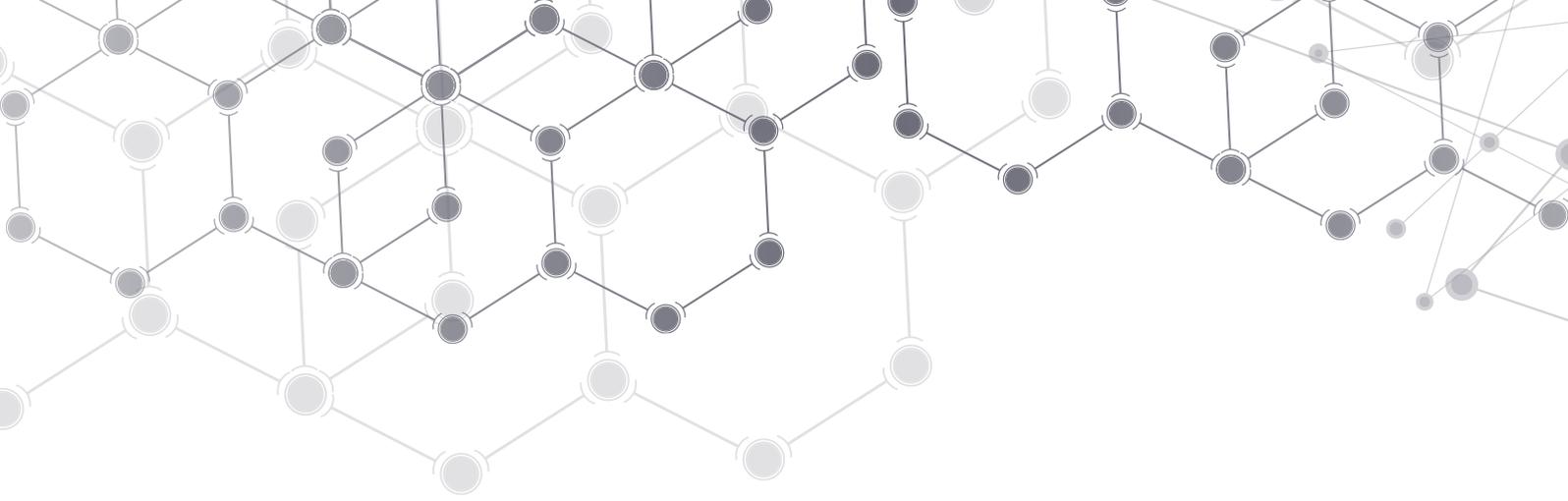


Banking & securities

Unsurprisingly, financial institutions and securities traders embraced 'blockchain' as a buzz-word in 2016. DLT offers these players an innovative path forward, and the chance to replace outdated and onerous manual technologies. IBM reported recently that banks and financial institutions are adopting DLT 'dramatically faster' than expected, with 15 per cent of global banks expected to launch full-scale commercial DLT products in 2017, and 65 per cent of banks launching within three years.

Key developments include:

- **Commonwealth Bank of Australia (CBA) bonds:** In January 2017, CBA announced its DLT for debt capital markets had been successfully tested by the Queensland Treasury for the issuance of semi-government bonds. The system employs a smart contract to manage ownership transfer and automatic payments, with title exchange and payment occurring at the same time to minimise transaction risk. CBA has indicated that it will discuss this platform with APRA, ASIC, Austrac and the RBA in coming months.
- **Australian Stock Exchange (ASX):** In June 2016, the ASX announced it would increase its \$14.9 million stake in Digital Asset Holdings by a further \$7 million, bringing its share to 8.5 per cent. The ASX has entered into an agreement officially appointing Digital Asset Holdings as its preferred partner to develop an instantaneous system for clearing and settlement. The progress of this program is being closely monitored both in Australia and internationally.
- **APX Settlement:** In October 2016, APX Settlement revealed a prototype of its smart register, which will allow equity securities to be issued and allocated in real time. APX Settlement is a joint venture between Sydney Stock Exchange and Bit Trade Labs. It is hoped that the register will be extended beyond equity into commodities markets, creating new opportunities for government and industry collaboration.
- **Depository Trust and Clearing Corp:** In January 2017, the Wall Street securities trader announced that it will replace its central database with distributed ledger clearing technology by 2018.
- **SETL:** In November 2016, Deloitte and London-based fintech SETL announced a payment card enabling instantaneous processing and settlement of retail payments via DLT. Questions remain about scalability, but SETL claims that its card can process billions of transactions per day, allowing it to compete with networks such as Visa and MasterCard. SETL's card has been tested by 100 users, and may be available publically as early as late 2017.



7 SMART CONTRACTS AND SMART LAWYERS

In *Blockchain Reaction*, we argued that smart contracts (self-executable programs that operate on DLT and can automate previous manual processes and mechanisms) are one of distributed ledger technology's most interesting and potentially transformative uses. They offer the potential for tangible reductions in cost, delays and compliance obligations, particularly in the context of processes that can be repeatable or automated. While current legal opinions are relatively consistent that traditional contract law can be applied where elements of a contract, or the execution of a contractual obligation, are automated by smart contract, there is no clear view on how to deal with some of the challenges if things go wrong – for instance if errors in the code result in an unintended outcome, who will be responsible for that outcome?

The most prominent example of this challenge was the dramatic rise and fall of the DAO, constituting a network of smart contracts that sought to create a virtual corporation on the Ethereum distributed ledger. Participants in the DAO effectively acted as shareholders of this entity.

In June 2016, only weeks after we noted the DAO as an experiment to watch in *Blockchain Reaction*, the DAO was subject to a 'hack'. A user exploited an error in the code to divert more than 3.6 million Ether valued at US\$50 million, about one third of the DAO's total worth, outside of the DAO network. The combination of coding errors and lack of a clear governance solution to the problem highlighted some of the challenges associated with smart contracts, which sit at the intersection of technology and law.

Members of the DAO community clashed about how to resolve the hack in its aftermath. The choice was between a 'soft fork' (temporarily putting the transactions on hold), or a 'hard fork' (reversing the stolen Ether). Following a realisation that the 'soft fork' would open the DAO to operating system vulnerabilities, the community pursued the 'hard fork', restoring virtually all funds to the original contract, and breaking the Ethereum into two separate cryptocurrencies. However, critics have argued it sets a dangerous precedent of undermining the immutability of DLT, which is seen as a key strength of the technology.

So, what can we learn from the DAO hack?

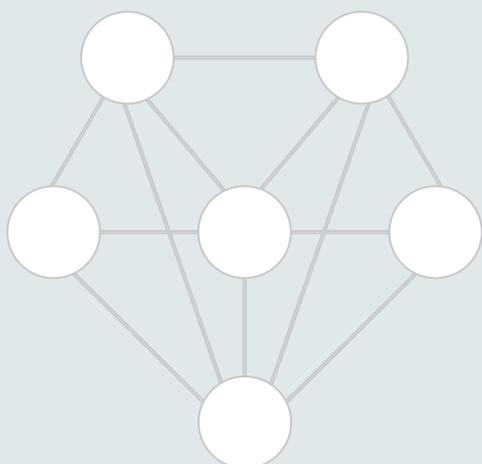
- Robust governance arrangements and voting mechanisms must be carefully formulated in DLT. By its very nature, a consortium has no centralised leadership, and neither does a particular DLT implementation. However, the hack reminds us that consortiums and entities looking to implement DLT should be developing tools to submit and debate opinions, and should be determining in advance how a consensus will be formed in a crisis or dispute.
- Smart contracts (like any piece of software) are only as good as the code with which they are written.
- Fully decentralised ledgers carry very real risks regarding control of outcomes on the ledger. When starting out, consortiums should consider the benefits of partly centralised or private ledgers, and scale at an appropriate pace.

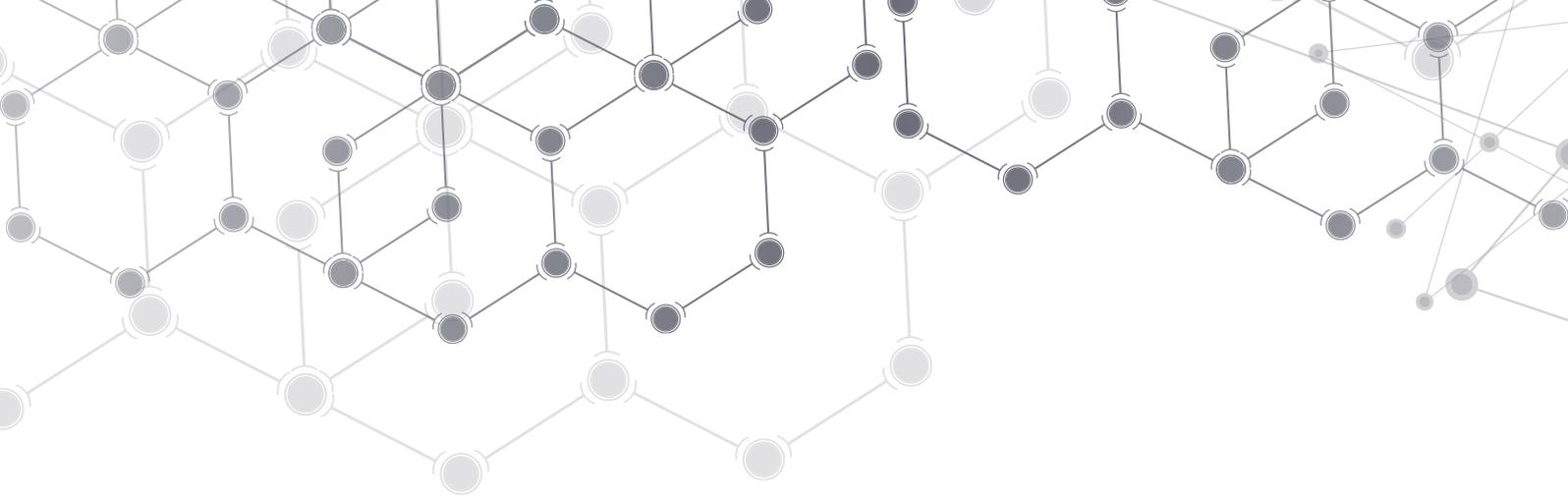


Final remarks

DLT offers solutions to existing problems, and will continually offer more as the technology matures. As yet, its full potential is unknown and unexplored.

In 2016, we encouraged you to consider what problems you could solve using DLT, and what edge this technology could give you. In 2017, that need is even more urgent as businesses in a range of industries flock to research and invest as DLT edges towards the tipping point of entry into the mainstream.





KEY CONTACTS



Gavin Smith
Partner, Technology,
Media &
Telecommunications
T +61 2 9230 4891
M +61 428 254 219
Gavin.Smith@allens.com.au



David Rountree
Senior Associate
Technology, Media &
Telecommunications
T +61 2 9230 4773
M +61 432 628 467
David.Rountree@allens.com.au



Elyse Adams
Senior Associate
Technology, Media &
Telecommunications
T +61 3 9613 8534
M +61 417 714 871
Elyse.Adams@allens.com.au



Valeska Bloch
Partner, Technology,
Media &
Telecommunications
T +61 2 9230 4030
M +61 409 031 622
Valeska.Bloch@allens.com.au



Michael Morris
Partner, Technology,
Media & Telecommunications
T +61 7 3334 3279
M +61 409 512 885
Michael.Morris@allens.com.au



Tim Stewart
Partner
Banking & Finance
T +61 2 9230 4109
M +61 421 150 601
Tim.Stewart@allens.com.au



Shaun Cartoon
Managing Associate
Tax
T +61 9613 8931
M +61 420 927 953
Shaun.Cartoon@allens.com.au



Phil O'Sullivan
Managing Associate,
Technology, Media &
Telecommunications
T +61 7 3334 3295
M +61 466 080 626
Phil.O'Sullivan@allens.com.au



Simun Soljo
Senior Associate
Financial Services Regulation
T +61 2 9230 4635
M +61 419 579 685
Simun.Soljo@allens.com.au



Steve Meacher
Associate
Banking and Finance
T +61 8 9488 3915
M +61 414 892 998
Steve.Meacher@allens.com.au



Emin Altiparmak
Partner
Corporate, M&A
T +61 3 9613 8510
M +61 417 995 445
Emin.Altiparmak@allens.com.au



Michelle Levy
Partner
Financial Services Regulation
T +61 2 9230 5170
M +61 407 890 715
Michelle.Levy@allens.com.au



Evan Wilcox
Patent Attorney
Intellectual Property & PTA
T +61 2 9230 4671
M +61 406 728 636
Evan.Wilcox@allens.com.au



Allens is an independent partnership
operating in alliance with Linklaters LLP.