Chain reaction

Published 11 April 2019

We've all heard of Blockchain. But what is it, how does it work, and why does it matter? Tim Ryan, partner and head of technology at DAC Beachcroft, provides a beginner's guide.

Blockchain is a hot topic in the legal sector – and across sectors. It's mostly known for how it's used for cryptocurrency transactions, but the opportunities are much broader and more exciting.

What is DLT?

Distributed ledger technology (DLT) is a mechanism to store and distribute information. The information is stored in the form of a digital 'ledger' which is, put simply, 'distributed' across a wide range of electronic locations.

This means that no single entity owns or controls the ledger in DLT. Having the information decentralised across a broad range of locations means that, if one instance (or several instances) of the information is corrupted, tampered with or destroyed, there will be multiple other iterations of the information stored elsewhere. So, perhaps counterintuitively for some, distributing the ledger is actually part of what supports the integrity of the data in it. This fundamentally differentiates DLT from, say, a spreadsheet or other type of more traditional database which, generally, only exist at a single location (perhaps with back-ups at different locations, but data back-ups of information are a completely separate and distinct concept to decentralised data in this context). Lawyers tend to like certainty wherever possible, so it may be helpful think of DLT as a means of utilising multiple, decentralised, 'points of truth'.

What is blockchain?

Blockchain is a form of DLT. It is a ledger of data, and the decentralised locations at which the data is stored are often referred to technically as 'nodes'. There is likely to be a large number of nodes, typically widely spread geographically. Helpfully, blockchain is a compound term, and the component elements 'block' and 'chain' help us to understand and visualise how a blockchain technology works in practice. We will come to that shortly.

First, let's consider what information may be stored using blockchain technology. The answer, fundamentally, is that any information may be stored in a blockchain, however simple or complex it may be – I address some use cases below. Do note that one should refer to 'a' blockchain, not 'the' blockchain – it is certainly a plural concept, given that there are different variants of blockchain.

How it may be used

The use cases are many and varied. Some already exist in practice, others are currently being developed or could be in future. For example, ownership of an intellectual property asset may be logged or tracked using blockchain, a physical asset similarly so (particularly useful where demonstrating provenance is crucial – in, for example, the medical component industry), or it could be used as part of a platform to establish title to some real estate. Financial transactions may be executed using blockchain (perhaps one of the most well-known, albeit broad, use cases) or the technology could be used in the insurance industry to, say, support the integrity of a claims process. Looking at wider uses, a voting system could be operated on a blockchain platform.

How does it really work?

So, back to 'block' and 'chain'. When a block of data – let's say data which represents a simple transfer of value between A and B – is added to a blockchain, it forms the next block in a chain of data entries, and so on. The next block may represent value being transferred from B back to A, or from B to C. Each block is then 'hashed' (effectively, fixed in place by cryptography, underpinned by complex mathematics), and every instance of the blockchain ledger is updated to reflect the new block in the chain at every location where the ledger is stored. Accordingly, not only is there a distributed ledger of the information, but each entry on the blockchain is immutable; it cannot be altered. To update or change the current

representation of the information in the blockchain, further blocks may be added to the chain, but previous blocks remain in place. They are always 'there' and never deleted, and the cryptography maintains the ongoing integrity of the blockchain in question.

While the attractiveness of a clear and tamper-proof audit trail is fairly obvious, the permanence of records described above may cause some data protection specialists to wince, particularly bearing in mind certain provisions of the General Data Protection Regulation (GDPR). While the regulatory aspects of blockchain technology are beyond the scope of this article, suffice it to say that they may be many and varied, so consideration of law and regulation is key in this area when developing a blockchain system. In practice, the legal and regulatory landscape may steer the usage of different variants of blockchain technology, including hybrid blockchain solutions which utilise both 'private blockchains' (databases within isolated corporate environments) as well as the types of public blockchain technology which are more commonly known. That being said, a likely outcome is that law and regulation will itself need to adapt and evolve to keep pace with the technology (not an unusual consequence, after all).

Some readers may be wondering at this point why there hasn't been any mention of cryptocurrencies, given that the most well-known of these, Bitcoin (₿) has entered common parlance, and the blockchain which underpins Bitcoin was indeed pioneering technology. Well, Bitcoin *et al* are an example of how blockchain may be used, but they are just that: an example. Blockchain is the enabling technology, or platform technology, whereas a cryptocurrency is something which is built upon or facilitated by it (though note that not all cryptocurrencies are blockchain-based; again, outside of our scope here). A cryptocurrency is a digital token for transferring value from one individual or organisation to another without the need for a central financial intermediary (a bank or otherwise) to facilitate the transaction. Note the use of 'token' here rather than 'asset', because a cryptocurrency such as Bitcoin does not of itself have any intrinsic value (though at the time of writing, 1₿ has an 'exchange rate' of nearly US$4,000 – clearly a very significant number, but down markedly from a high of nearly US$20,000).

Many argue that there has been excessive hype around cryptocurrencies and, arguably, that this has detracted from the very real and potentially very valuable underlying blockchain technology. This is true in some cases, though it is also true that those who understand blockchain recognise this merely as a bump in the road, and it should not of itself unduly stifle the adoption of blockchain where there is a good reason to do so.

The future of blockchain

As with all evolving tech, a crystal ball would be handy. However, it's fair to say that blockchain has shone a powerful spotlight onto platform systems, the importance of data and how data models (particularly distributed data models) may work now and will work in the future. The technology continues to mature and its use in certain areas – including finance, insurance, health and real estate – continues to expand. Blockchain isn't *the* solution, but for many, it's certainly part of it.

This article was originally published in the April edition of the Law Society's Managing for Success.

Authors

Tim Ryan
London - Walbrook
tryan@dacbeachcroft.com