



**Legaler**

Blockchain  
for Lawyers  
**eBook**

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Jargon

# The Era of Digital Trust

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THE GREATEST LEAPS OF  
CIVILISATION HAVE OCCURRED  
WHEN WE HAVE FOUND NEW  
WAYS TO TRUST ONE ANOTHER.



**BLOCKCHAIN IS THE NEXT STEP.  
IT IS HAPPENING NOW AND IT  
PROMISES TO CHANGE EVERYTHING,  
INCLUDING LEGAL PRACTICE.**



THE IMPACT OF BLOCKCHAIN TECHNOLOGY ON LEGAL ADVICE CANNOT BE OVERSTATED. A GENERATIONAL SHIFT IN THE DELIVERY OF LEGAL SERVICES IS JUST STARTING, WITH NEW OPPORTUNITIES FOR TECHNOLOGICALLY LITERATE LAWYERS EMERGING.

FROM ADVISING ON BRAND NEW FINANCIAL PRODUCTS AND FUNDRAISING OPPORTUNITIES TO SMART LEGAL CONTRACT DESIGN, LAWYERS WILL NEED TO HAVE A WORKING KNOWLEDGE OF BLOCKCHAIN TECHNOLOGY TO KEEP UP WITH CHANGING CLIENT DEMANDS.

Michael Bacina, Partner, Piper Alderman



New technologies are difficult to understand. Terms like 'protocol' and 'network' can be confusing. However, they describe revolutionary concepts in the history of human recordkeeping. MIT's Michael Casey says these revolutions form the foundation of human history. We are on the verge of another such revolution.



Language is a set of rules by which we communicate. It was the first 'protocol', arising hundreds of thousands of years ago when humans are believed to have started talking.



Tribes and kinship groups allowed individuals to trust one another. They were the first 'P2P networks'.



Accounting arose as a means to record transactions between parties when memory would not suffice, after social groups grew beyond 150 members, known as Dunbar's number.



Most recently, we have become increasingly reliant on systems to record and remember our dealings and data. Today, massive, private companies store our private information and money.

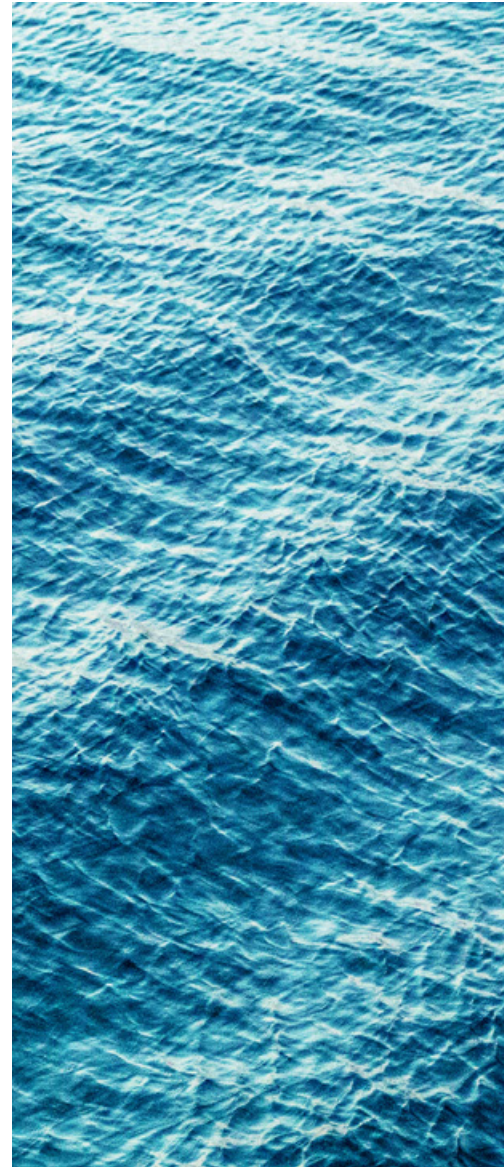


## **Blockchain technology is the next big change.**

It all started in 2008, when an anonymous author dubbed Satoshi Nakamoto wrote a whitepaper called “Bitcoin: A Peer-to-Peer Electronic Cash System”. The paper established a key concept in the next chapter of information technology. Blockchain allows users to inject digital trust into any software, process or organisation, eliminating the need for middle men to intermediate dealings between untrusting parties. It will make business more efficient, decrease overhead costs associated with centralisation and democratise information as we know it.

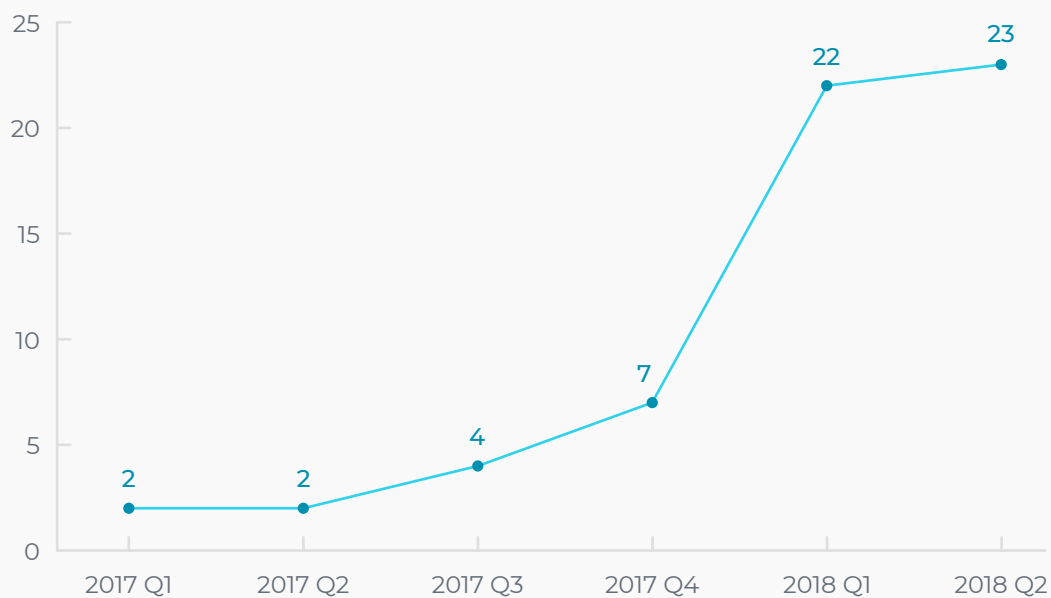
The law is one institution that will be transformed by blockchain. Like medicine and government, the law is a vital institution to civil society that is capable of affecting our rights and outcomes in a profound way. It can award people millions of dollars, it can incarcerate criminals and it can grant special rights to specific groups. With this power comes a highly specialised set of requirements for legal practice, like standards of behaviour, trust accounting and confidentiality. At the core of all these requirements is trust. Previous technologies have been unable to accommodate such a concept. As a result, the practice of law has famously lagged in innovation, remaining ‘analogue’ while other services like banking and accounting continue to transition online.

The blockchain answers this problem. It embeds the missing element of trust into online services. This will allow anybody with a mobile phone to engage legal advice online with confidence. It will provide the infrastructure for contracts to run online. It will empower users to verify legal identity. It will enable fractional ownership of assets, and more.



Legal questions regarding the application of blockchain abound. Are automated agreements legally enforceable? Who ought to be held responsible for decentralised systems, if anyone? Can alternative dispute resolution platforms produce binding decisions? These questions and more remain unanswered. Regulators are catching up slowly, as reflected in a steady increase of crypto-related litigation. Not only will it fundamentally update the way legal services are delivered, it will create a new practice area for law firms. As blockchain platforms and tokenised fundraising become more popular, the potential for lawyers to grow their business is massive.

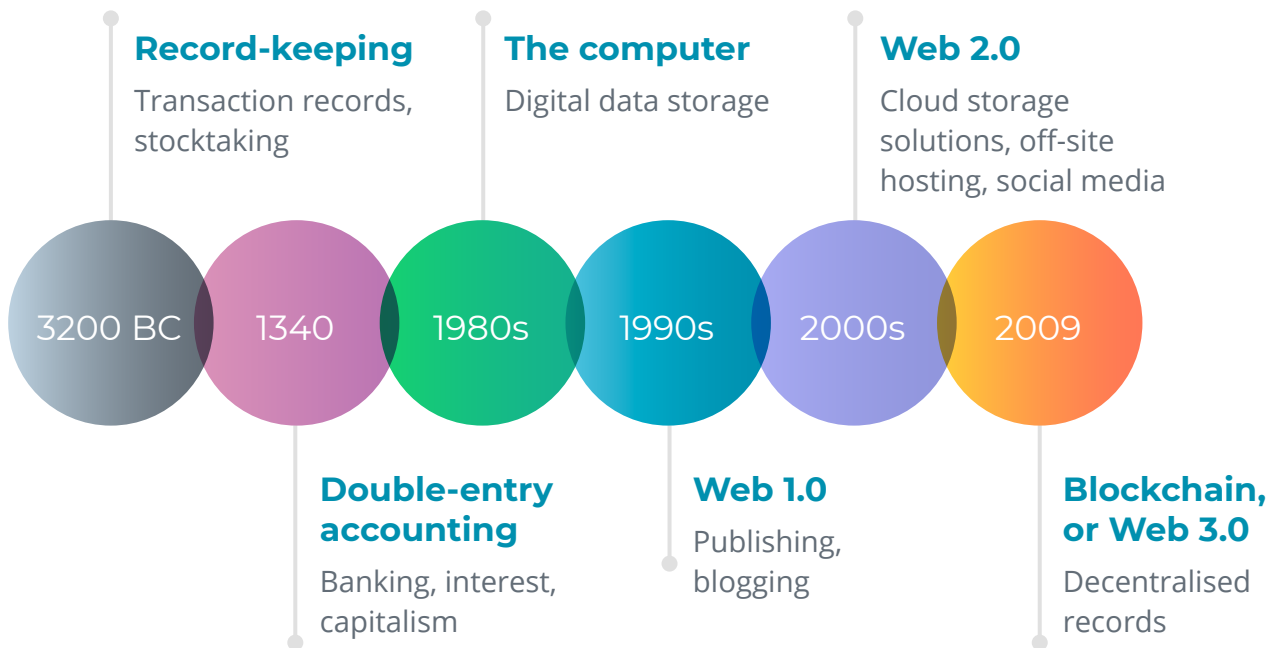
### Number of blockchain- or cryptocurrency-related securities cases in the US



Data from Lex Machina 2018 Securities Litigation Report 1

This eBook will show the importance of blockchain in layperson's terms and explain why it matters to legal practice. It will serve as a useful guide for forward-thinking lawyers looking to ready themselves for the future of the sector.

# History of Information Technology



The invention of the 'ledger' marked a watershed moment in the history of information technology. It served as a means to record transactions, often controlled by a trusted person like a scribe.

## Record-keeping, 3200 BC

The need for accounting precipitated the earliest form of writing known to history. Ancient Mesopotamians used pictographic tablets partitioned into rows and columns to account for stocks and debts. They were signed by an account keeper and authenticated with a cylindrical seal to prevent fraud.

## Double-entry accounting, 1340 AD

The treasurer's accounts of the Republic of Genoa marked the advent of the double-entry system, believed to revolutionise accounting and, according to some historians, trigger the spread of capitalism. Clerks recorded all expenses and loans and their effects on both debit and credit accounts. These ledgers were securely stored in the Banco di San Giorgio.

## The computer, 1987

As personal computers began to enjoy widespread use throughout the 80s, the development of spreadsheet software had a significant impact on accounting. Though it followed on from predecessors like VisiCalc and Lotus 123, Excel enabled anybody to easily create ledgers and store them on their home computers.



## Web 1.0, 1990s

The entry of ADSL technology into the homes of millions of people around the world marked the first wave of the democratisation of information. The power to broadcast information was no longer the sole province of newspapers or radio stations. Anybody could create a website or blog and share their ideas with the world.

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<sup>1</sup> [http://pages.lexmachina.com/Email\\_Securities-Report-2018\\_LP-Social.html](http://pages.lexmachina.com/Email_Securities-Report-2018_LP-Social.html)



## Web 2.0, 2000s

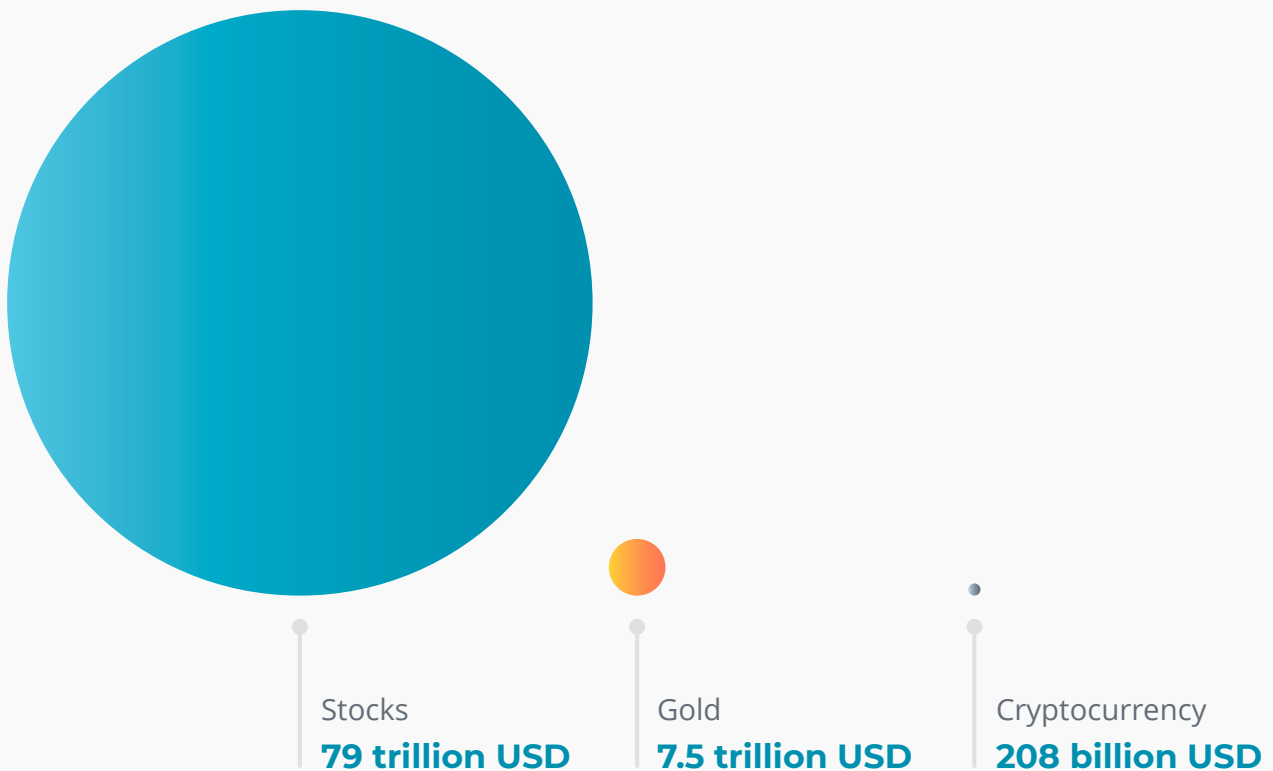
Cloud computing was a key step in the development of data security, allowing enterprises and later individuals to store files offsite in secure server rooms highly resistant to fire and flood. While this paved the way to enabling large-scale storage of digital information, it centralised custody of sensitive information to a handful of powerful players like Google and Amazon Web Services.

## Blockchain, 2009

“Bitcoin: A Peer-to-Peer Electronic Cash System” authored by anonymous Satoshi Nakamoto was released in 2009, making the case for a cryptocurrency called bitcoin and a technology called blockchain. Blockchain solved the double spending problem by using a network of computers to establish trust by consensus, creating digital scarcity for the first time.

### Value of Cryptocurrency

Despite the hype, the total value of cryptocurrency is still dwarfed by conventional assets.



# What is Blockchain?

A blockchain is a ledger. Unlike a database, which is another type of ledger, it is not stored in any one place. Instead, it is composed of a **decentralised** network of validator nodes, or 'miners'. All new entries to the blockchain must be verified by a majority of these nodes. Verification occurs by executing energy-intensive cryptographic calculations. These prevent double spending and thus maintain **scarcity**. To incentivise this validation, a reward of newly minted tokens is given to one validator node. Once validated, a 'block' of entries is committed to the 'chain'. These may never be removed or edited. That is, the blockchain is **immutable**.

Blockchain is a technology. There is no single blockchain. There are many. Bitcoin is just one example of a blockchain.



BLOCKCHAIN'S ABILITY TO CREATE DECENTRALIZED ASSET OWNERSHIP AND RIGHTS DISTRIBUTION, WITH AUTONOMOUS SMART CONTRACTS, GIVES LAWYERS WHO HAVE THE INCLINATION TO DIVE INTO THE TECHNICAL DETAILS A NEW WAY PARTICIPATE IN COMMERCIAL TRANSACTIONS. IT IS AN EXCITING TIME TO BRING LEGAL TRAINING IN THIS SPACE.

Aaron Wright, Founder of Open Law



## Decentralisation



### Simply:

Data on the blockchain is not stored in any single place. Instead, it is distributed across many different nodes. This makes it highly resistant to attack.

The blockchain is highly resistant to local breaches or failures such as natural disasters or hacks. In order to add a fraudulent transaction to the blockchain, a bad agent must simultaneously hack the majority of validator node servers in the world in the ten-minute period before a block is committed to the blockchain. This is called a 51% attack. Thus, blockchains with more nodes are more decentralised and are harder to breach. This may be contrasted with permissioned, private blockchains whereby network control is centralised to a single administrator responsible for approving nodes. If this centralised administrator is hacked, the entire blockchain may be breached.

Bitcoin currently has

**more than 10,000**  
nodes around the world<sup>2</sup>

## Immutability



### Simply:

Once an entry is added to the blockchain, it cannot be removed, edited or backdated. This makes it a highly reliable attestation to past transactions.

The blockchain is append-only, meaning no entry in the blockchain may ever be erased or altered. That is, there is a permanent, public record of every transaction committed to the blockchain since its inception. This forms an indisputable source of evidence in disputes between parties.

<sup>2</sup> <https://bitnodes.earn.com>

## Scarcity



### Simply:

The total number of tokens is controlled by code. Many believe this scarcity is inherently valuable, as is the case with gold.

Supply of tokens is strictly defined by source code, which itself cannot be altered. New tokens may only ever be created through the allocation of miner rewards. The size of miner rewards gradually decrease according to a strictly defined logarithmic function. For example, the current reward for mining bitcoin is 12.5 BTC. This will halve in 2020. It will continue halving such that only 21 million bitcoins will ever exist. This restricted supply differs from fiat currencies, where central banks may mint cash, changing the money supply.

No more than

**21,000,000 BTC**

will ever exist

Once mined, tokens cannot be duplicated or 'double-spent', unlike other digital assets like images or audio files. All proposed transactions must result in an decrease to the balance of the sender's wallet and an equal increase to the balance of the receiver's wallet. This is ensured by the cryptographic calculations performed by validator nodes. Tokens are thus scarce, which is believed to create value.



## Public vs Private Blockchains

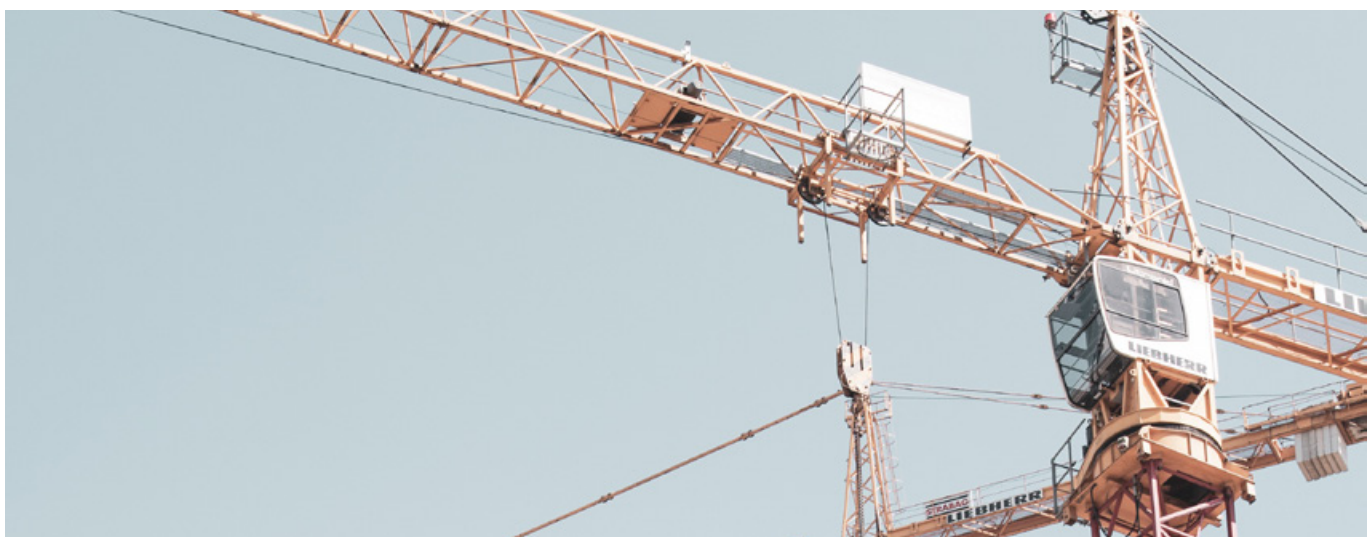
Not all blockchains are equal. Blockchains and databases are both types of ledger, with different levels of centralisation. However there is also significant variance amongst different blockchains. The most important distinction is that between public, permissionless blockchains and private, permissioned blockchains.

### Public blockchains

Anyone can edit, view or validate entries on a public blockchain. The entire ledger is public. In the case of bitcoin, each entry includes the addresses of the sender and receiver wallets and the amount transferred. Wallet addresses are pseudonymous, mostly taking the form of 34-digit strings of alphanumeric characters. Similar to an email address, the identity of wallet address owners cannot be determined without further information or inference.

### Private blockchains

Private blockchains, on the other hand, have enjoyed adoption for internal enterprise uses as there is no need to share sensitive information with the public. Private blockchains are more closely related to local databases than public blockchains. Entries may not be publicly viewable, editing permissions may be restricted and nodes may need approval by a system administrator. They may even be able to be edited retrospectively. While this implementation has benefits for data security, it centralises control to a few parties. This detracts from the benefits of decentralisation and immutability of public blockchains.



## What are smart contracts?

Smart contracts are automated 'contracts' that execute when triggered by specified events. There is significant debate on whether they can truly be called contracts. In addition to representing legal relationships (as paper contracts do), smart contracts are also able to enforce and execute rules and restrictions.

Smart contracts predate blockchain by decades, with many pointing to the vending machine as an early example. Upon insertion of money, the machine will dispense an item like a can of soft drink. Legally, once the money is inserted, the purchaser is taken to have expressed an intention to enter into a contract. Once the contract is set in motion, it cannot be reversed.

Blockchain makes the smart contract concept much more powerful. In this context, smart contracts are programs that run on the blockchain. On these blockchains, like Ethereum, contract states are recorded (rather than just wallet balances). Upon the occurrence of a certain trigger event a transfer will be executed. For instance, a smart contract can be set up to distribute funds from a wallet once it reaches a certain balance. Alternatively, it may hold funds until all parties agree to a payment.

The use case for legal practice is clear. Onerous, costly services like trust accounting and tracking custody of assets will be massively simplified. This will increase affordability for clients, expanding business into new markets. It will reserve resources for lawyers to focus on more complex issues. Not only will it transform current modes of doing business, but it will see a proliferation of new models for legal practice.

To find out more about the myriad potential use cases for blockchain and smart contracts, check out *Legal Use Cases for Blockchain*.

# Why Legal Needs Blockchain

Legal practice, as we know it, involves significant costs. These include administrative overheads, regulatory compliance, minimised client bases and the time required to attract and retain clients. These costs all contribute to a competitive, restricted business environment. Many of these costs are related to establishing trust between clients, lawyers and bar associations.

Blockchain will remove many of these costs, allowing untrusted parties to do business more quickly and easily than ever before. It will lower barriers to access for underrepresented clients who would not previously seek legal advice. It will expand business into new practice areas. And it will pave the way for new business models, including unbundled legal services, partially- or totally-automated legal advice and remote consultation.

Legal services are a vital element of civil society. They enable people and companies to enforce their rights and resolve disputes. The United Nations Development Programme believes access to justice is a basic human right as well as an indispensable means to combat poverty, prevent and resolve conflicts.



**BLOCKCHAIN IS A PROMISING TOOL TO STREAMLINE LEGAL DELIVERY, REDUCE ITS COST, AND DEMOCRATIZE ACCESS. THESE ARE COMPELLING REASONS FOR THE LEGAL ECOSYSTEM TO IDENTIFY WAYS TO HARNESS BLOCKCHAIN'S POTENTIAL FOR THE BENEFIT OF LEGAL CONSUMERS AND SOCIETY.**

Mark A Cohen, CEO at Legal Mosaic New York



Blockchain presents a unique opportunity to realise these goals. It provides the trust infrastructure to make online legal services viable for the first time. Legal advice may finally be accessed by those who were geographically or financially excluded from engaging a conventional lawyer.

Further, the ability of the blockchain to track activity presents a unique opportunity to incentivise behaviour. This stands to transform the state of charity including, critically, pro bono legal advice. Where pro bono regulations have previously suffered from inadequate enforcement and fraud, the giving of free legal advice may be tracked and rewarded using blockchain technology.

“Promote the rule of law at the national and international levels and ensure  
**equal access to justice for all**”

Goal 16.3 from the United Nations Sustainable Development Goals<sup>3</sup>



<sup>3</sup> <https://sustainabledevelopment.un.org/sdgs>



## Access

### Four billion people

around the world live outside  
the protection of the law

Organisation for Economic Cooperation and Development (OECD)<sup>4</sup>

Research carried out by the World Justice Project shows that many people around the world attempt to resolve legal issues without courts or lawyers and that many legal issues remain unresolved.<sup>5</sup> **Blockchain allows anybody with access to the internet to engage legal advice.**

## Trust

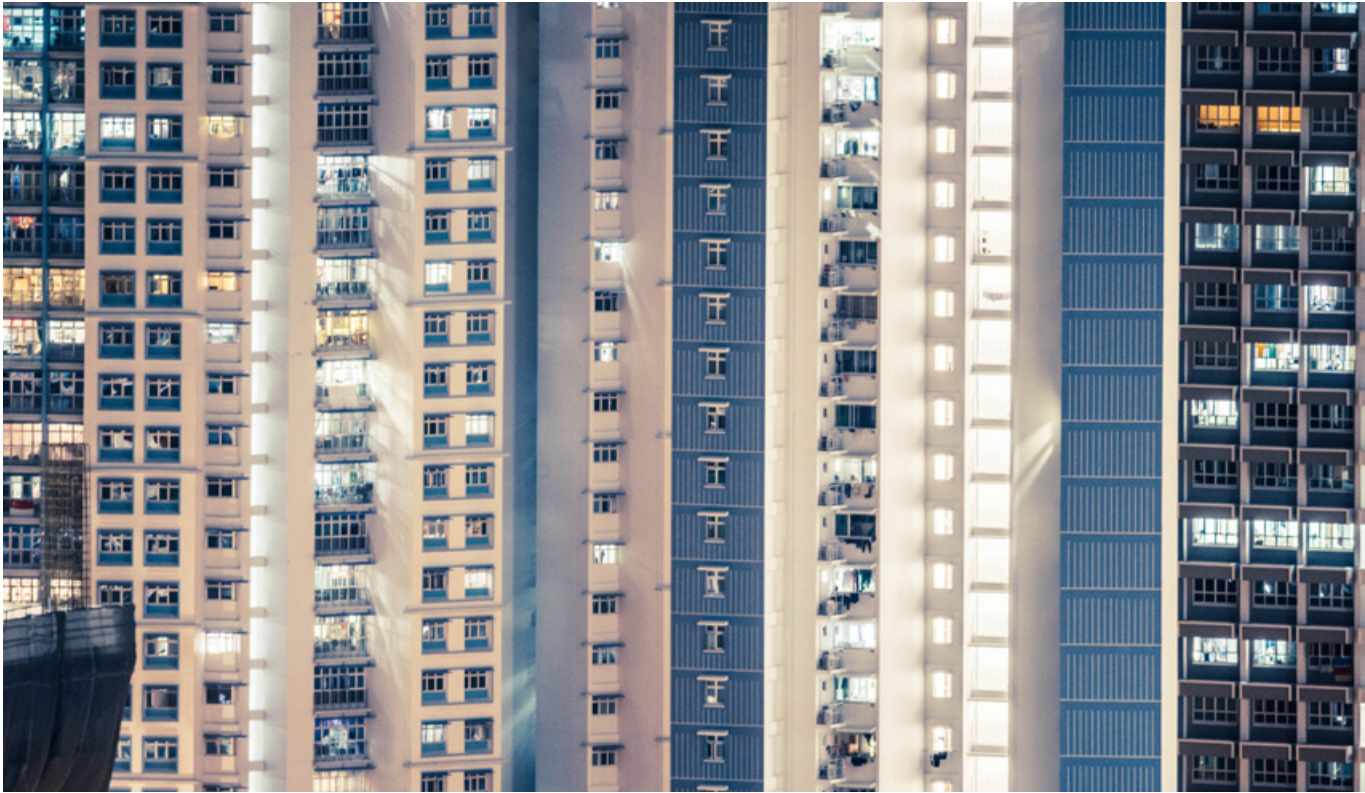
Legal advice is different from other services, like banking or travel broking. It often involves sensitive information and confidential documents and requires a greater level of trust between lawyer and client. While virtual law firms have existed as far back as 1996, they remain encumbered by their inability to provide this trust. Instead, lawyering has scarcely changed since the previous century, where trust is established through face-to-face meetings, the use of firm letterheads and inked signatures. **Blockchain-powered identity empowers clients to verify lawyers' qualifications with certainty.**

## Lacking legal knowledge

Legal knowledge is highly complex and often unintelligible for the layperson. Many experience difficulties preliminary to seeking legal advice, such as identifying legal issues or knowing when their rights have been breached. While community legal education goes some way to directing people to the correct resources, there remains a large untapped market of clients not seeking legal advice. The availability of legal information online is scarce, meaning potential clients are faced with a decision to proceed with conventional legal advice or ignore their legal issues. **Artificial intelligence platforms make automated legal advice viable for the first time ever.**

<sup>4</sup> <https://www.oecd.org/gov/delivering-access-to-justice-for-all.pdf>

<sup>5</sup> [https://worldjusticeproject.org/sites/default/files/documents/WJP\\_Access-Justice\\_April\\_2018\\_Online.pdf](https://worldjusticeproject.org/sites/default/files/documents/WJP_Access-Justice_April_2018_Online.pdf)



## Cost

Legal services are costly. They are subject to high overheads such as professional indemnity insurance and onerous professional obligations imposed by ethics rules. The industry remains a fraternity that is protective against internal price competition. Finally, hearing and issue fees charged by courts might outweigh the benefits of pursuing small claims. The demand for more accessible legal services has been reflected in moves to fixed fees, unbundled legal services and even calls for ‘limited license legal technicians’ to provide basic legal advice without bar qualifications. **Blockchain enables legal services to go online without compromising trust, cutting the prohibitive cost of seeking a lawyer.**

# Why Now?



## Mobile penetration

Widespread global mobile phone penetration is enabling engagement with service providers not before possible. According to the Global Mobile Consumer Trends Survey conducted by Deloitte, developing countries have reached 90% mobile penetration and 82% smartphone penetration.

Developing countries have reached

**90% mobile penetration and  
82% smartphone penetration**

Deloitte Global Mobile Consumer Trends Survey<sup>6</sup>



## Business is digital

Services of all kinds are going online. Privacy and trust are paramount in legal practice, which has limited the viability of virtual law firms. However, as more consumers do their business online and as more complementary services such as banking and accounting go digital, legal practice must follow suit.



## The Blockchain is ready

While Blockchain technology remains relatively new, recent developments like the popularisation of private, permissioned blockchains for use by enterprise and cryptographic implementations like zk-SNARKS mean that the blockchain is ready to provide for the specific privacy requirements of hosting legal platforms.

<sup>6</sup> <https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/global-mobile-consumer-survey-us-edition.html>

# Use Cases for Blockchain

The potential applications of blockchain technology to legal services are numerous. Below are just some of them, three of which are expanded in further detail below. For further information on the players, please see 'Big Players'.



## Litigation funding

Tokenisation enables crowdsourced litigation funding and fractional interest in awarded damages



## Identity

Self-sovereign identity gives users granular control over their personal information



## Evidence

Users can trace digital documents for evidence of contract versioning or proof of prior art



## Blocknotary



## Signatures

eSignatures are hashed to the blockchain with a timestamp, preventing further unauthorised edits



## Certification

Institutions can issue certificates for bar qualifications and university degrees which can be verified by anyone



## Paper documents

Important documents like property deeds can be stored on the blockchain, preventing loss or destruction



## Legal Uses for Blockchain



## Courts, disputes and mediation

ADR platforms distribute contested funds via smart contracts according to adjudicated decisions



## Contracts

Automated agreements allow for repeated or recurring cryptocurrency payments and smart 'legal' contracts



## Fractional asset ownership

Token ownership confers fractional ownership of real-world assets like real estate or fine art



## Trust accounting

Smart escrow 'locks up' cryptocurrency so no party can access it until it released by a defined trigger event



## Pro bono

Tokenised reward systems incentivise pro bono legal work







COMPARED TO MOST SECTORS, LAWYERS HAVE NOT HAD THEIR SECTOR DISRUPTED BY ADVANCES IN TECHNOLOGY. BLOCKCHAIN WILL ENABLE BETTER AND MORE COST EFFECTIVE LEGAL SOLUTIONS. IN THE NEAR TERM IT WILL DEFINITELY IMPACT STRAIGHTFORWARD (YET LUCRATIVE) LEGAL SERVICES SUCH AS ESCROW, CUSTODY, SIMPLE CONTRACTS AND TRACKING OWNERSHIP OF ASSETS. HOWEVER, THERE WILL STILL BE A ROLE FOR LAWYERS. A FUNDAMENTAL SHIFT IN TECHNOLOGY WILL LEAD TO A NEED FOR NEW LEGAL SOLUTIONS TOO.

Mark Schaub, International Partner at KWM London



## Identity

Legal identity is a fundamental human right. It is instrumental in empowering people to protect themselves against exploitation and disenfranchisement.

**2.4 billion people**  
around the world lack  
any official identification

World Bank, World Development Report 2016<sup>7</sup>

Those without legal identities experience legal, political and economic exclusion. Even those who do have the privilege of identification documents remain controlled by centralised organisations like passport offices. Identity documents are securitised using outdated features like holograms which can be replicated by advanced counterfeiters for serious identity crime.

<sup>7</sup> <http://www.worldbank.org/en/publication/wdr2016>

## “Provide legal identity to all, including free birth registration, by 2030”

Goal 16.9 of the United Nations Sustainable Development Goals<sup>8</sup>

Blockchain removes the need for identity to be stored or managed by a centralised institution. Instead, identity is self-sovereign, meaning each user controls their own identity. Combined with the power of zk-SNARKS technology, third parties may make zero-knowledge inquiries about users. For instance, an eCommerce store may confirm a customer is over 18 without revealing their birth date (or any other extra information such as home address and nationality). Blockchain identity is far more secure than its physical counterparts.



SECURE AND VERIFIABLE IDENTITY SOLUTIONS POWERED BY DISTRIBUTED TECHNOLOGY HAVE THE POTENTIAL TO FUNDAMENTALLY TRANSFORM OUR GLOBAL FINANCIAL SYSTEM. IN AN INCREASINGLY DIGITALIZED WORLD WHERE DATA AND IDENTITY FRAUD BECOME A PERSISTENT PROBLEM, A RESILIENT AND PRIVACY PRESERVING DIGITAL IDENTITY SOLUTION IS KEY TO THIS BILLION DOLLAR PROBLEM.

Bonnie Yiu, Co-founder of Consulere.io  
& Head of APAC for Tykn



<sup>8</sup> <https://sustainabledevelopment.un.org/sdgs>

## Smart Contracts

Contracts form the backbone of business relationships around the world. They are tools for establishing agreements, negotiating terms and enforcing obligations. Valid contracts grant parties protection by courts, compel performance and determine remedies. However, they are also a major source of dispute in business. Discrepancies between multiple document versions, errors in interpretation and the use of generic boilerplate templates all give rise to major legal issues.

Blockchain solves many of the issues with contracting. The immutable ledger, combined with the power of one-way hashing technology, ensures all parties they are dealing with the same version of the document. The development of the Ethereum blockchain brought the ability to execute smart contracts using blockchain, paving the way for self-executing agreements that, for instance, release money from an escrow account on the occurrence of specified trigger events.



IF WE ARE TO REALLY USE SMART CONTRACTS THEN THE USE OF BLOCKCHAIN TECH MAY WELL BE VITAL. IT MAY NOT MATTER TO THE USER, NOR MAY THE USER EVEN KNOW, THAT A BLOCKCHAIN IS WORKING TO SUPPORT THEIR SMART CONTRACT, BUT NEVERTHELESS, IT MAY BE ESSENTIAL TO THE PROCESS.

Richard Tromans, Principal at Tromans Consulting  
and Writer at Artificial Lawyer



## Property

Property is susceptible to a range of problems. Property deeds and contracts stored on paper or digitally in a centralised server are subject to unauthorised alteration or destruction. Further, where assets pass between multiple actors, such as shipments of goods or financial securities, chain of title is complex and discrepancies between parties' records may give rise to protracted disputes. Finally, dividing ownership of high-value items such as real estate or fine art incurs prohibitive administrative costs involved with establishing unit trusts or REITs and distributing dividends amongst members.

Blockchain allows ownership of property to be tracked (or, in the case of digital assets, stored) on an immutable public ledger. This extends the ability to prove land title to anybody with a mobile phone, empowering millions around the world to protect their property rights. It gives untrusting counterparties in business a unified system to trace asset ownership with certainty. And it allows for infinitesimal division of assets and automated distribution of money amongst members.



**BLOCKCHAIN WILL CREATE AN ENTIRELY NEW PRACTICE AREA FOR LAWYERS. AS THE INDUSTRY MOVES TOWARDS SECURITY TOKEN OFFERINGS, IT WILL REQUIRE LAWYERS TO HANDLE MUCH MORE SECURITIZATION WORK AS MANY MORE ASSETS BECOME DIGITIZED AND TOKENIZED, ALL GOVERNED BY SECURITIES LAWS AND REGULATIONS.**

David Hong, Director of Business Development  
at Heyi Blockchain Shanghai





# Big Players



Consortiums & Groups



Smart Contract Creation Tools



Smart Contract Layers and Protocols



Blockchains



### Accord Project

The Accord Project is a not-for-profit organisation that is developing open source code for the standardised creation of smart contracts. It comprises a series of working groups, each with a different focus, ranging from dispute resolution to venture & token sales. Clause is a creation of the Accord Project.



AUSTRALIAN  
NATIONAL  
BLOCKCHAIN

### Australian National Blockchain

The Australian National Blockchain is a private, permissioned blockchain developed in partnership with King & Wood Mallesons, Herbert Smith Freehills, CSIRO and IBM. It intends to set the standard for enterprise blockchain solutions around the world.



### Agreements Network

The Agreements Network is a blockchain layer that will provide the infrastructure to distribute and execute smart contracts or 'active agreements'. It also includes a contract management platform that will use smart contract technology to create, prove and operate legal agreements.





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### Clause

Clause is a tool for the creation of smart contracts, created in partnership with the Accord Project. It enables enterprises to connect text-based agreements with external data sources, or to add programmable Smart Clauses to pre-existing text-based agreements.



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### Global Legal Blockchain Consortium

The GLBC is a consortium of a wide range of organisations including law firms, tech startups and universities. It aims to develop standards to govern the use of blockchain technology in legal business, including data privacy, information authenticity and interoperability.



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### Integra Ledger

Integra Ledger is a private, permissioned blockchain based on the Hyperledger Fabric blockchain and hosted on the IBM Blockchain Platform designed to confirm the authenticity of legal data such as smart contract status and improve the security of data exchange between legal departments.



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### Kleros

Kleros is a blockchain-based dispute resolution platform. Individuals may submit online disputes adjudicated by randomly selected jury members. Jury members are paid in 'pinakion' tokens fees, and are incentivised to make genuine decisions and reduce fraud.



### Legaler

Designed for the \$1 trillion global legal industry, the Legaler blockchain and developer tools provide the infrastructure to easily build secure and scalable decentralised applications for legal services without the need for intermediaries.

### MATTEREUM

#### Mattereum

Mattereum is a 'legal-technical interface' between smart contracts and conventional contracts. The platform enables users to automate existing commercial agreements and obligations using smart contract code and, conversely, provides conventional, legally enforceable Ricardian contracts that reference digital agreements.

### MONAX

#### Monax

Monax is an API for the creation of smart contracts and purchase of template contracts. It uses smart contract technology to allow for the creation of 'active agreements' which execute on the Agreements Network.





## OpenLaw

OpenLaw is a blockchain-based language for the creation and execution of legal agreements. The OpenLaw markup language can be used to wrap executable logic around traditional legal prose. Contracts created with OpenLaw can be uploaded to a public repository, with the goal of creating a 'knowledge commons' of smart legal agreements, or kept secure in a 'private instance'.



BLOCKCHAIN TECH NOT ONLY HAS THE POTENTIAL TO CHANGE HOW LAW IS PRACTICED FOR THE BETTER, BUT IT ALSO HAS THE POTENTIAL TO CHANGE HOW IT IS UNDERSTOOD AND DEVELOPED. FOR EXAMPLE, CRYPTO MAY FORCE COUNTRIES TO OVERHAUL THEIR REGULATIONS IN A WAY THAT APPLIES TO ALL SORTS OF EXISTING ASSETS. IN OTHER WORDS, BLOCKCHAIN MAY FORCE LAWYERS TO CHANGE HOW THEY CONCEIVE OF CERTAIN LAWS AND ULTIMATELY LEAD TO REGULATION OF ALL ASSETS THAT MORE ACCURATELY REFLECTS THE REAL WORLD THAN WHAT WE HAVE NOW.

Reginald Young, Associate Lawyer at  
Cole-Frieman & Mallon LLP



# Best Resources

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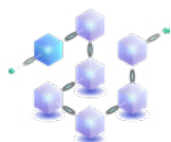
## ARTIFICIAL LAWYER

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### Artificial Lawyer

UK-based lawyer Richard Tromans' website is a frequently-updated resource for the latest news in legal tech with a particular focus on the application of artificial intelligence to legal practice. Content also includes fantastic opinion pieces and trend reports from Tromans himself.

> [artificiallawyer.com](https://artificiallawyer.com)



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### Blockchain for Law Community

Blockchain for Law is an exclusive, online community for lawyers interested in the intersection of blockchain and the law. Currently based on Slack and now over 600-strong, Blockchain for Law has attracted lawyers from a wide variety of jurisdictions and fields to come together to discuss the most pressing questions of this rapidly growing space. Such topics include the regulation of ICOs, the taxation of cryptocurrency gains and the legal status of smart contracts.

> [blockchainfor.law](https://blockchainfor.law)

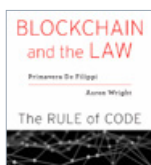




### The Legal Tech Book

The Legal Tech Book compiled by Markus Hartung presents the current landscape and future developments of legal technology. The book provides concrete examples of individual implementations of artificial intelligence, document automation and contract management across multiple jurisdictions around the world, covering Germany, the UK, the USA and more.

> [bloomsburyprofessional.com/uk/legal-tech-9781509926329/](https://bloomsburyprofessional.com/uk/legal-tech-9781509926329/)



### Rule of Code

Blockchain and the Law: The Rule of Code by Primavera De Filippi and Aaron Wright outlines the potentially significant implications of blockchain and its legal position in key jurisdictions around the world. The authors make a strong case for legal reform to maximise the impact of this new technology.

> [hup.harvard.edu/catalog.php?isbn=9780674976429](http://hup.harvard.edu/catalog.php?isbn=9780674976429)



### World Survey of Cryptocurrency Regulation

The Library of Congress World Survey of Cryptocurrency Regulation catalogues the current legal status of cryptocurrencies in various jurisdictions around the world. This includes issues such as reporting requirements for exchanges and criteria for ICOs constituting security offerings.

> [loc.gov/law/help/cryptocurrency/world-survey.php](https://loc.gov/law/help/cryptocurrency/world-survey.php)



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### **The Blockchain: A Guide for Legal and Business Professionals**

This is a comprehensive guide targeted to lawyers, accountants and business executives, providing readers with an in-depth understanding of the key areas of blockchain technology such as smart contracts, decentralised autonomous organisations and digital identification. These topics specifically address how they might be used in legal practice.

> [amazon.com/Blockchain-Guide-Legal-Business-Professionals/dp/0314876111](https://www.amazon.com/Blockchain-Guide-Legal-Business-Professionals/dp/0314876111)



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### **Blockchain: Transforming Your Business and Our World**

Available in both hard copy and as an eBook, this work by Dr Philippa Ryan and Mark Van Rijmenam is an in-depth look into the ways blockchain may be utilised not only to make business more efficient, but also how it can help achieve the UN's Sustainable Development Goals.

> <https://blockchain4ourworld.com/>

# Jargon

<b>Artificial intelligence</b>	The capability of computers to perform high-level tasks normally completed by humans, including decision making, pattern recognition and prediction. In a legal tech context, artificial intelligence is often employed for contract review and predictive justice.
<b>Blockchain</b>	A blockchain is a decentralised, immutable ledger whereby commitment of items is determined by consensus between validator nodes or 'miners'.
<b>Bitcoin</b>	The first ever cryptocurrency and implementation of blockchain technology. A fungible unit of value, of which there is a limited supply, that is unable to replicated.
<b>Chatbot</b>	An artificial intelligence application, often incorporated on websites. It uses natural language processing to identify key words in users' requests to fetch information from databases, emulating a conversation with a real human.
<b>Computational Law</b>	The capability of computers to automate some aspects of the law, particularly judicial decision making.
<b>Decentralised</b>	Lacking any centralised server or agency, significantly reducing the risk of local breaches caused by bad actors, hacks or natural disasters.
<b>dApps</b>	A decentralised application that executes functions on the Ethereum blockchain.

<b>Document analysis</b>	A data collection technique which evaluates documents, grouping together key words and important pieces of information.
<b>ERC-20</b>	A standard of token that allows compatibility with the Ethereum network. Most tokens distributed in ICOs are ERC-20 tokens.
<b>Ethereum</b>	An alternative blockchain developed by Vitalik Buterin to address the problems of the Bitcoin blockchain. Unlike Bitcoin, Ethereum allows for the transfer of states, not just the transfer of value. This is because Solidity, the language of Ethereum, is 'Turing complete', allowing for programming of smart contracts and decentralised applications or 'dApps'. Ethereum will transition from a proof-of-work to a proof-of-stake consensus rule.
<b>ICO (initial coin offering)</b>	Distribution of a given allocation of a platform's proprietary tokens, often in exchange for established cryptocurrencies like Ethereum or bitcoin. Termed initial coin offerings in reference to initial public offerings, though many argue this is not accurate. While they are a popular method for fundraising, token ownership rarely conveys equity in the platform. Also called a TGE (token generation event).
<b>Legaltech (or lawtech)</b>	Technology that assists the delivery or practice of legal services.
<b>Permissioned blockchain</b>	A blockchain where only authorised parties have permission to write to the ledger.

<b>Permissionless blockchain</b>	A blockchain where anybody has permission to write to the ledger.
<b>Predictive justice</b>	Applications that use big data to compare a fact scenario to a database of previous court decisions to output a chance of success.
<b>Public blockchain</b>	A blockchain whose data is hosted on any node around the world that wishes to join.
<b>Private blockchain</b>	A blockchain that is hosted only on selected private servers and whose data is therefore owned by a specific party.
<b>Protocol</b>	A protocol is a set of rules for standardising and transmitting data between separate systems.
<b>Proof-of-stake</b>	A consensus rule whereby validator nodes or 'miners' stake tokens on the validity of their calculations. Rewards are paid commensurate to the amount staked. Nodes which add fraudulent transactions surrender their staked tokens, creating an economic incentive to perform valid transactions. The Ethereum foundation has stated it will move to a proof-of-stake consensus rule.

<b>Proof-of-work</b>	A consensus rule used by Bitcoin whereby validator nodes or 'miners' are rewarded for calculations completed, which will eventually result in a 'block' of transactions being committed to the blockchain. Such calculations favour purpose-built mining machines called ASICs, which results in mining pools controlling a disproportionately large portion of the network. The high cost of performing these calculations is a disincentive to adding fraudulent transactions.
<b>Smart contract</b>	A program that automatically executes a contract when triggered by specified events. Vending machines are often used as an early example of smart contracts, whereby the insertion of money automatically initiates an irreversible transaction that outputs a product such as a soft drink. In the blockchain context, smart contracts are accounts of value that can be programmed to distribute funds on the occurrence of specified trigger events.