

Blockchain, and how it will change everything

By James Eyers, Sydney Morning Herald, 6 February 2016

In May, British billionaire Richard Branson invited a select posse of entrepreneurs, venture capitalists and technology advisers to his Caribbean residence for an exclusive pow wow on an issue occupying some of the top markets minds in the world.

Blockchain

The topic for discussion on the picturesque Necker Island was the "blockchain".

Every now and then, something comes along that might just change everything. And this is one of those moments.

ASX chief executive Elmer Funke Kupper

In case you're one of the many yet to wrap your head around the promising technology, blockchain, on a simple level, uses computer code to engender trust in digital-economy transactions

One of the attendees at Branson's island was Brian Forde. A technology entrepreneur, Forde was, until recently, President Barack Obama's senior adviser for mobile and data innovation in the White House.

During a visit to Sydney this week, Forde predicts many businesses from a variety of sectors and governments will be forced this year to think about how blockchain technology might affect them through streamlined processes, reduced costs and enhanced service delivery.

"Banks and other financial institutions are thinking about this, and you can see that reflected in how quickly they are moving. Now what we will start to see in 2016 and 2017 are responses from the other industries that will be impacted by blockchain."

ASX chief executive Elmer Funke Kupper says blockchain could change "everything".

There is massive hype around blockchain in certain circles even though there are yet few working networks. However, extensive testing of the technology is now beginning.

Australian banks are exploring the chain

It has certainly caught attention at the highest levels of Australian finance.

Commonwealth Bank of Australia chief information officer David Whiteing predicts blockchain will disrupt systems.

Commonwealth Bank of Australia has joined a consortium of global banks that have already tested a blockchain to transfer value between each other.

"It is clearly, in very clear terms, faster, cheaper and more transparent than some of the existing practices we have today," says CBA's chief information officer David Whiteing.

The Australian Securities Exchange is building a blockchain to test whether the technology will replace its existing settlement systems, moving them close to real time.

Reserve Bank of Australia governor Glenn Stevens says development of blockchain is important.

Might just change everything

"Every now and then, something comes along that might just change everything. And this is one of those moments," says ASX chief executive Elmer Funke Kupper.

The potential cost savings from blockchain have been noted at the very highest levels of Australian finance.

Reserve Bank of Australia governor Glenn Stevens recently noted that if banks could demonstrate that using blockchain were more efficient and cheaper, it would rapidly drive wider adoption.

He described the banks' work testing the systems as "fascinating, and ... important".

Overseas, governments are also rolling out tests, to determine whether blockchain can help them better service their citizens. For example, the US state of Vermont is testing a blockchain to store government records, while the central American nation of Honduras is doing likewise for property transactions.

"We say sunlight in government is the best disinfectant, and blockchain makes things more open and transparent," says Forde.

Yet in order to understand why blockchain is getting so much attention and to appreciate how broadly it might be applied, it is worth taking a few minutes to think about what a blockchain is and how it works.

What is Blockchain?

When Satoshi Nakamoto (a nom de plume) published the first paper describing bitcoin in 2008, he set out a process allowing the crypto-currency to be transferred between owners without the need for an intermediary to ensure that a particular dollar is not traded twice.

This was a revolutionary innovation. It overcame one of the biggest headaches when shifting digital assets around – the potential for duplication.

This won't be a concern if you are copying a photo from a hard drive to send to friends or post on social media. However, when the digital asset is money, duplicating it is not an option.

And so banks have worked as intermediaries, or "trusted third parties", to ensure that digital ledgers are counterbalanced and reconciled so that money moving through the system is spent only once. But bitcoin can be transferred – over the blockchain – without that central party.

The technology uses a network of databases held on various computers that records transactions in "blocks". These blocks provide proof of who owns what at any given point in time.

Each computer on the network must approve a transaction before it is recorded in a new block and added to all the previous blocks, forming a "chain" of computer code.

The ledger is distributed rather than central. It is also public, allowing every participant to check whether a transfer comes from the rightful owner, and is secured by sophisticated cryptography.

Banks are adapting Nakamoto's vision

Since the creation of bitcoin and its public blockchain, banks are adapting Nakamoto's vision by developing closed systems that can be shared among themselves and regulators. These are known as "permissioned" blockchains.

Distributed ledgers have two obvious advantages. One is security: because the ledger is shared by many parties, it becomes almost impossible to tamper with. It also provides extremely reliable records on the history of asset ownership.

Another advantage is efficiency: because the middle man is cut out, assets can be transferred at faster speed and with lower costs.

There is a great irony in how fast the blockchain circle has turned. When it was created nearly eight years ago, Nakamoto's bitcoin sought to bypass the intermediaries in the financial system.

It was radical because it sought to overthrow the monetary system by removing the need for banks. Anonymity has allowed it to fund drugs and terrorism. Not surprisingly, bitcoin has always been popular with libertarians.

However, now the technology that gave birth to bitcoin is going mainstream. There are many challenges still to be worked out, including the blockchain's scalability and its energy consumption.

But it seems increasingly likely that after years of stress-testing by bitcoin aficionados, blockchain has proved an efficient and effective way of exchanging value. It looks ready to functionally overhaul the way value is moved in the digital age.

What is the 'killer' application?

In order to illustrate the way in which blockchain might be used in the economy, BusinessDay has chosen five potential applications of the technology going broader than bitcoin.

The first two, interbank payments and equities settlement, relate to finance. But blockchain may also disrupt the legal industry through the development of "smart contracts" and promises to remove corruption from developing-country governments and by protecting property rights, enhancing economic growth and financial inclusion.

Interbank payments

While money has been digitised for many years and customers have broadly adopted mobile and internet banking, banks themselves have been slow to modernise their own internal systems

and interactions with each other. Blockchain provides a solution to these cumbersome processes.

Payment systems are mostly still centralised. Banks have to maintain a costly and complex web of "corresponding bank" relationships to move money across borders.

Transfers are cleared through central banks. Synchronising internal bank ledgers can take several days. Money can still get lost. Reporting is complex and arduous. All this increases costs, time and risk.

A report last year by Spanish bank Santander said banks could reduce infrastructure costs for cross-border payments, the trading of securities and regulatory compliance by \$US15 billion to \$US20 billion a year from 2022 by employing blockchains. Not surprisingly, given the quantum of potential savings, global banks have begun busily testing blockchains.

CBA completed a successful test with 10 other global banks last month using a private, peer-to-peer distributed ledger for trading with each other.

Separately, CBA has built a blockchain in an innovation lab in Sydney that will be used to show regulators, who must sign off on the technology, before real money is sent across the system.

CBA, Westpac and ANZ are also working with another blockchain start-up, Ripple, which is developing a system for international payments backed by venture capital funding from Andreessen Horowitz and Google Ventures.

Equities settlement

Just like it takes the world's biggest banks days to synchronise their ledgers, when investors want to settle a stock trade, it usually takes three business days from the time the order executes to do the payment and transfer legal ownership of the security.

Blockchain promises settlement that could be very close to real time. That has attracted the attention of the ASX, which has to assume risk during the T+3 settlement period.

"We think if we can get this right, we can get very close to real-time settlement," Funke Kupper said last month after ASX said it had taken an equity stake in a New York-based fintech start-up, Digital Asset Holdings, to build a blockchain that could ultimately replace the clearing and settlement systems provided by the CHESSE platform.

"You should be able to sell shares at your desk right now and walk to the nearest ATM to get your money ... The moment we are able to do that, we remove a lot of risk from the system."

Other exchanges are also innovating. Nasdaq launched a blockchain management tool for shares in private companies, Linq, in October. Investment banks are also exploring how the technology can be used to settling and trade bonds without a clearing house.

Goldman Sachs, Citi and JP Morgan have also invested in Digital Asset, which is also exploring applications for syndicated loans, while UBS has embedded a team of engineers in the Level39

fintech hub in Canary Wharf in London and have executed bond trades using a blockchain system.

Contracts

When Sir Richard Branson gathered his group of blockchain experts on his Caribbean island in May, another participant was Paul Brody, who used to run IBM's "internet of things" division in Silicon Valley and is now technology strategy leader for the Americas at global consulting firm EY.

In an interview late last year, Brody described the blockchain as "the glue that is going to drive a productivity revolution across the globe on par with what Henry Ford did with the automobile".

He pointed to toilets being manufactured with cheap computer chips attached, allowing them to be tracked through customs, delivery trucks and onto building sites, thereby enabling builders to co-ordinate installation times and efficiently sequence work flow.

At IBM, Brody worked on its Autonomous Decentralised Peer-to-Peer Telemetry (ADEPT) project, in partnership with Samsung, employing a protocol built by the start-up Ethereum that uses a blockchain to connect household devices and allows them to transact over the "internet of things".

Ethereum has developed a programming framework that allows a blockchain to host "smart contracts", legal agreements or sets of business rules, that execute automatically when the rules set out in the code are satisfied.

An example might be a share certificate that automatically sends their owners dividends if corporate profits reach a certain level.

A drinks vending machine could use the blockchain to order new drinks when it is running low and to pay for them upon delivery. A driverless car could use the money earned from taxi fares to pay for repairs, petrol or parking, effectively operating autonomously.

Banks could use smart contracts to allow for digital repossessions; blockchain could be used to shut down a car electronically if payments are not made.

Financial inclusion

Another guest at Necker Island for the Branson shindig was Hernando De Soto, the economist and president of the Institute for Liberty and Democracy who *Time Magazine* described as one of the five leading Latin American innovators of the century.

De Soto is author of the book *Mystery of Capital*, which argues that no developing nation can build a vibrant [market economy](#) without an information framework that allows citizens to record the ownership of property and other economic information.

Without proper records, and in places where corruption is rife, a lack of secure property rights is an endemic source of injustice.

Forde, who left the White House last year to join the MIT Media Labs as director of digital currency, describes this as the "corruption of the stamp": officials in corrupt regimes can abuse their discretion with old technology like a stamp to deny fundamental rights

However, with the blockchain, this middle man can be erased. A government could deliver instantaneous property ownership by holding its land titles records on a blockchain.

Boosting financial inclusion can be a big boost to economies due to the velocity of money: more funds can be spent if they are cleared and made available in faster time.

The use of digital currencies over the blockchain also promises to open up online retail shopping markets to those under 18 who don't have access to a credit card. For example, Microsoft accepts bitcoin to pay for content on the Xbox.

Record keeping

Property conveyancing is also cumbersome in the First World. Think of certificates of title being stored in land title offices, amended on paper by multiple law firms and real estate agents, and copied and stamped and moved by couriers.

But a decentralised ledger could keep track of the multiple transactions that take place and all the amendments that are made to contracts and other documents, reducing costs and headaches associated with managing the process.

If governments were to put property titles – or other pieces of information such as business licences or birth certificates – on the blockchain, citizens would be enabled to digitally conduct transactions without lawyers, notaries or queuing at government offices.

Forde says governments will start to see the blockchain as an application that can be used to achieve policy goals, whether that be increasing trust and transparency through property title, or "eliminating bureaucracy by creating "responsive open data", which interacts with government ledgers "without having to interface with people using the rubber stamp".

While financial regulators are already closely scrutinising blockchain technology to determine whether they will approve its use by financial services players, Forde says governments will need to think about blockchain outside the financial regulatory framework. Inter-disciplinary policy groups will be important, he suggests.

As the federal government of Prime Minister Malcolm Turnbull seeks to lift economic growth by encouraging more innovation, it seems likely that blockchain applications will be on the agenda of the Digital Transformation Office.