



BLOCKCHAIN – THE BASIS OF A NEW PARADIGM FOR THE SUPPLY CHAIN.

You've probably heard of Blockchain. If not, I can assure you that this will be the first of many articles that will come your way in the next year!

Blockchain is a disruptive technology that has enormous potential to impact banking, law, governments and **especially global supply chains**. While the momentum initially came from these other applications, it is quickly becoming clear that some of the biggest opportunities lie in the many intractable problems at the heart of global supply chains.

What is blockchain?

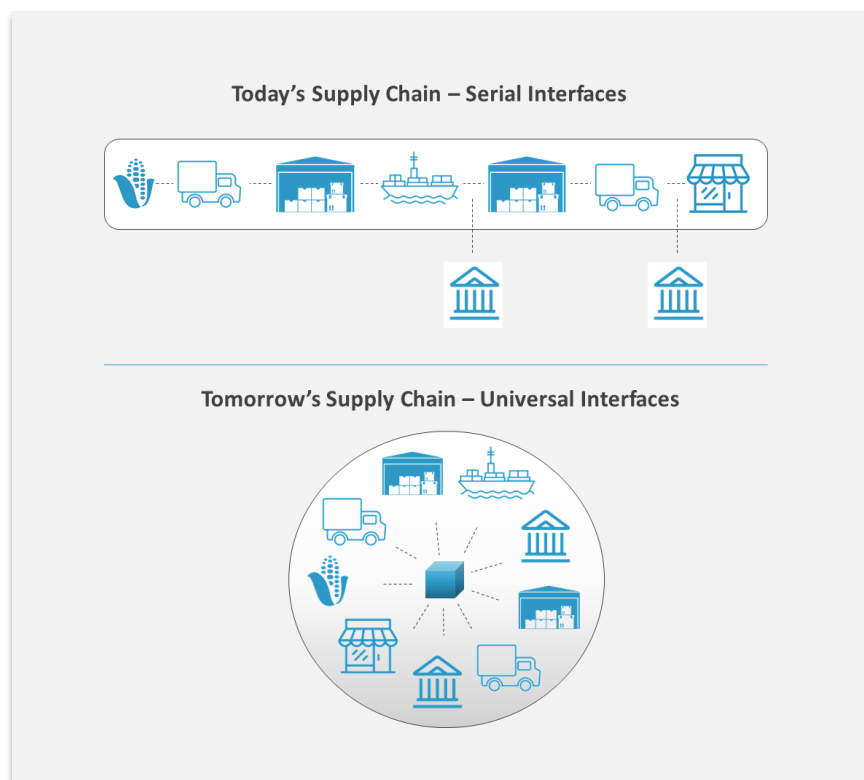
'Blockchain' refers to a distributed or shared ledger that can store the history of transactions conducted between organisations, and which can potentially be viewed by all the parties involved in the transaction.

As each transaction occurs it becomes a 'block'. Each 'block' is connected to the one before in an irreversible chain over time – hence 'blockchain'. A key strength of the database that blockchain builds, is its trustworthiness. The blocks are recorded on many servers, simultaneously, and the wide distribution of information makes it much more secure than single instances of data.

Blockchain is based on the same concept of security and validity, achieved via distributed computers capturing identical information, that is the underpinning of bitcoin, the cryptocurrency.

Blockchain in the supply chain

In supply chain terms, relationships traditionally occur between each adjacent party in the chain and banks have arrangements with specific parties, and with each other. Although the relationships would stay the same, Blockchain would enable many parties in a chain to have access to, and interact with, some or all of the information embodied in the transactions without the need for a trusted third party.



Blockchain also supports other supply chain functions, such as improved work flows and ‘smart contracts’. Smart contracts are commonly agreed terms between parties which will automatically execute once specific conditions (e.g. delivery within temperature bounds by a specified date) are met.¹

One of the key benefits from blockchain is expected to be the increased **efficiency**, and thus reduced cost, of conducting transactions, particularly those associated with the transfer of ownership of goods or assets. For importers and exporters, faster and easier cross-border movements are envisaged by replacing manual documentation flows and the cumbersome and slow international payments practices such as letters of credit.

The other key benefit is **traceability** - the ability to capture real-time information about the origin of a product or material, and its physical condition and location at any time along the supply chain. A record, once captured, cannot be altered by any one party. This secure history and record-keeping aspect is known as the ‘immutable record’ feature. Blockchain could also capture ‘certification’ of the origin of sensitive materials e.g. palm oil.

Traceability is the feature that is attracting a lot of interest in blockchain from the agricultural industries. Providing assurance for retail customers and consumers of the source or ‘provenance’ of their beef, canola, fish or infant formula, for example, is expected to provide early adopters of the technology with tangible advantage in premium markets and in markets such as China where food safety has been a concern. The other important flow-on effect of traceability is that when there IS a quality problem, fast and targeted recalls can be initiated (vs the very general recalls that can undermine confidence in a product category or source broadly e.g. all New Zealand milk powder). This is one of the key drivers for



Wal-Mart's interest in blockchain. They are currently tracking pork shipments within China, and produce from Latin America to US markets.

Blockchain and the IoT

What will enhance blockchains ability to support traceability and quality management, is the parallel developments in the Internet of Things or 'IoT'. Location and temperature information related to the transit of a shipment, and each unit within the shipment, could be captured and communicated to the internet at regular intervals. Blockchain provides a means for this data to be recorded securely, in a standard format, and accessed by approved parties in the chain.

End-to-end visibility

Information about a shipment would be captured in real time based on specified events, documents, IoT data, approvals, certifications etc. Each participant in the supply chain ecosystem can view progress ('loaded on vessel'), condition ('4^o centigrade at 14.02hrs'), status ('awaiting inspection') and history of the shipment ('certified grain-fed beef; source Margaret River, WA') based on their level of permission. No one party can change or delete a record without the consensus from others on the network.

Global momentum

There is significant investment occurring in developments and trials around the world and a large number of start-up companies are working on specific aspects of distributed technology (the generalised version of blockchain). IBM has been a key driver, and in terms of supply chain the most prominent, with joint trials conducted with Maersk, the world's largest shipping company.

An IBM and Economist Business Unit study of 200 banks in 16 countries indicates that 66% of banks will have commercial, scaled blockchain solutions in place by 2020ⁱⁱ.

IBM alone currently has 400 clients testing blockchain, and has 650 staff dedicated to its development.ⁱⁱⁱ Microsoft is partnering with JPMorgan Chase and several other large corporates on competing software to IBM, and there are also smaller software providers emerging.

Australia at the forefront

Australia is emerging as one of the leaders in blockchain developments. Each of the major trading banks have teams working on aspects of blockchain, and CBA, NAB and Westpac are part of a global financial consortium known as R3 CEV which aims to design and deliver distributed ledger technologies for global financial markets. The CBA appears most active in the supply chain space, conducting a well-publicised trial shipment of cotton from the US to China in November 2016.

Australia Post is assessing blockchain as a solution for digital identities, and is working with Alibaba to explore ways to use it and other technologies to reduce food fraud in China. The Australian Stock Exchange (ASX) is testing options for potentially replacing its settlement process with a blockchain-



based solution. BHP Billiton has announced that it will use blockchain to securely record and track key sample data in its mining processes.

The International Committee for Standardisation has also announced that Australia will lead a committee tasked to develop global standards for blockchain, and Standards Australia has started consultations with different sectors to prioritise the requirements.

Does it matter – yet?

The biggest barrier to widespread adoption of blockchain is governance. Hidden under the covers of the internet are several official bodies which have created standards and protocols that have ‘figured out’ the rules about how we all access and use the internet (well, most of them). Similar protocols are needed before the universality efficiencies of blockchain are available. But, considering the level of investment and focus from the ‘big end of town’ – IBM, Microsoft, the banking industry, the major consulting firms and the legal fraternity – there is little doubt that this will happen in the foreseeable future. The pundits seem to be betting on 5-10 years before usage moves from the trailblazers to more widespread adoption.

The potential advantages for global supply chains – in terms of time and cost reduction, and improved traceability are massive. It is estimated that up to 20% of the cost of global transport costs are associated with document processing and administration^{iv}. In addition, there is the inventory cost of containers and air shipments awaiting clearances, and the cost and revenue impact of recalls. Some industries have a lot more to gain by adding value to their product and reducing risk, especially agriculture – and these are where we’d expect to see the earliest adoption.

Unlike the big IT projects of the past, no one is ‘betting the house’ on their blockchain decision – at least at this stage. Most blockchain applications are following the innovation playbook – using trials and feasibility studies; low commitment, low risk, step-by-step assessments. Considering the potential for improved efficiency, reduced risk and finally being able to operationalise the ‘end-to-end’ supply chain, this is a digital initiative that deserves a close look.

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ⁱⁱⁱ The New York Times, *Blockchain a better way to track port chops, bonds, bad peanut butter*, March 4th, 2017

^{iv} IBM Press Release, 5 March 2017 *Maersk and IBM Unveil First Industry-Wide Cross-Border Supply Chain Solution on Blockchain*. <https://www-03.ibm.com/press/us/en/pressrelease/51712.wss>