

# Blockchain for trade facilitation: Ethereum, eWTP, COs and regulatory issues

*Leonardo Macedo*

## Abstract

Blockchain is a peer-to-peer (P2P) technology that records and verifies transactions in a decentralised, cryptography-secure manner. Blockchain applications can globally manage records of any sort, such as import-export declarations, invoices, bills of lading (BLs) and certificates of origin (COs). It is a promising technology for several areas, including international trade. This paper presents blockchain, comments on blockchain platforms such as Ethereum, gives examples of private sector initiatives, shares an idea for a CO blockchain application, and discusses regulatory issues. In doing so, the paper aims to attract attention for blockchain in international trade.

## 1. Introduction

‘The technology is not what matters’, writes Ursula K. Le Guin (2017, p. 6), ‘Words are what matter. The sharing of words. The activation of imagination through the reading of words.’

Thus, it is by sharing words that we free imagination, transform lives and societies. Satoshi Nakamoto did that. He shared words in a paper, *Bitcoin: A peer-to-peer electronic cash system*, published in 2008. According to Nakamoto, electronic cash, now known as crypto-currency, would work in a peer-to-peer (P2P) network using digital signatures and proof-of-work timestamps. In Nakamoto’s words (2008, p. 1):

A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work.

Nakamoto’s P2P solution works in a decentralised way, creating hashes<sup>1</sup> of all transactions in a continuous chain, which became known as blockchains.

Many scholars believe that blockchain is a disruptive technology for several areas. For instance, Don Tapscott, co-author of *Blockchain Revolution*, explains in an interview with McKinsey & Company that blockchain is revolutionary because it facilitates P2P transactions without intermediaries, keeps users’ information anonymous, and validates and has a permanent public record of all transactions.

The blockchain is basically a distributed database. Think of a giant, global spreadsheet that runs on millions and millions of computers. It’s distributed. It’s open source, so anyone can change the underlying code, and they can see what’s going on. It’s truly peer to peer; it doesn’t require powerful intermediaries to authenticate or to settle transactions. (Tapscott, 2016)

According to Tapscott (2016), blockchain sets the foundations for the internet of value, where instead of exchanging information the internet is used to exchange value. In simple words, blockchain solves the ‘double spend problem’ and its big advantage is that people and business can trust each other without the need, for example, of banks, credit-card companies, governments, associations, and notaries.

## **2. Ethereum<sup>2</sup> and Dapps moving value in international trade**

In the years after Nakamoto’s paper, several crypto-currencies appeared in the markets—bitcoin, litecoin, ether, dash, ripple, zcash and other dozens of crypto-currencies are available today.

In 2013 Vitalik Buterin proposed a platform to build and use decentralised applications that run on blockchain: Ethereum. Buterin’s platform allows developers to build all sorts of applications to run on blockchain. According to the Ethereum homestead documentation (Ethereum, 2017):

Ethereum is a programmable blockchain. Rather than give users a set of pre-defined operations (e.g. bitcoin transactions), Ethereum allows users to create their own operations of any complexity they wish. In this way, it serves as a platform for many different types of decentralized blockchain applications, including but not limited to cryptocurrencies.

Hence, Ethereum is an open blockchain platform to build decentralised applications (Dapps). Dapps, also referred to as smart contracts or smart contract codes, are programs that define how value moves. Everything that has a value—such as money, metals, real state, goods and services—can benefit from Dapps.

Some of the advantages of Dapps are the elimination of servers and massive scalability. Authors refer to Dapps as the serverless internet or the post-server internet, meaning the use of applications on the internet that are no longer based on any single server or company. The applications are based on the internet itself.

For me, blockchain and Ethereum matter because international trade requires technological solutions that can run globally anywhere where there are business opportunities. It also matters because it reduces trade costs, increases security and allows for integration with other data systems.

## **3. B20, G20 (eWTP) and the UN blockchain white paper**

The 2016 Business 20 (B20) Summit issued a document recommendation about an Electronic World Trade Platform (eWTP) initiative to facilitate the inclusion of small to medium-sized enterprises (SMEs) in global value chains (B20, 2016):

Encourage robust international trade and investment by strengthening the multilateral trading system and rolling back protectionist measures, ratifying and implementing the Trade Facilitation Agreement, enabling the e-commerce environment through support of the Electronic World Trade Platform (eWTP) initiative, backing actions to facilitate SME’s inclusion in global value chains, and enhancing the global investment policy environment.

The B20’s recommendation is aligned with the World Trade Organization (WTO) Trade Facilitation Agreement (TFA) and intends to support SMEs in international trade. About the eWTP initiative, Jack Ma, Alibaba’s Chairman, comments:

The vision for the eWTP is that it will be driven by businesses, with support from governments. Businesses can create hubs for e-commerce and governments can create virtual free trade zones for small business. (Alibaba Group, 2016)

Thus, the main idea of the eWTP initiative is to reduce trade costs for SMEs by creating virtual free trade hubs (eHubs), which use blockchain technology to allow large-scale connection to the eWTP. Malaysia is one of the countries that will have an eHub under the eWTP initiative. The Malaysian e-Hub should have an e-fulfilment hub, a one-stop online cross-border trading services platform and cooperation in e-payment and financing.

The eWTP initiative made by B20 was officially included in the 2016 G20 Leaders' Communique as follows (G20, 2016):

#### **2016 G20 Statement**

##### **6. Promoting e-commerce development**

G20 members take note of the B20's initiative on an Electronic World Trade Platform (eWTP).

In sum, the eWTP initiative runs on a blockchain and is intended to manage eHubs around the globe and facilitate trade for SMEs.

In 2017, as part of their exploration of possibilities for blockchain, the United Nations (UN) Centre for Trade Facilitation and Electronic Business (CEFACT) published a project proposal to write a white paper on the use of blockchain for trade facilitation:

Blockchain technology has an immense potential for facilitating supply-chain and trade processes. The purpose of this project is to look at this technology in the context of UN/CEFACT's mandates in order to provide input to the Bureau, Programme Development Areas and Domains on: 1) Possible future work and a possible common approach to Blockchain-related projects; 2) Blockchain developers as a potential new user group for UN/CEFACT standards. (UN, 2017)

Reading the UN CEFACT proposal, it is evident that the UN recognises the need for the trade community to work on the topic. It also recognises the need to engage blockchain developers, thus people and companies that can develop Dapps to work with UN/CEFACT standards and systems.

In sum, international bodies and organisations, such as the B20, the G20 and the UN CEFACT, are acting on the use of blockchain to support international trade.

## **4. IBM blockchain trade pilot projects**

On the use of blockchain for international trade, companies like International Business Machines (IBM), Microsoft and SAP are exploring possibilities. For instance, IBM is already testing blockchain on two pilot projects: the Singapore Customs Declaration initiative and the cross-border shipping operations of flowers from Mombasa (Kenya) to Royal Flora (Netherlands).

The Singapore Customs Declaration initiative is led by IBM's blockchain innovation center in Singapore in partnership with several Singapore entities, including the Monetary Authority of Singapore (MAS), the Port of Singapore Authority, the Infocomm Development Authority of Singapore (IDA) and PSA Singapore Terminals. About the initiative, Robert Morris, vice president, global labs, IBM research, said:

This is IBM's first collaboration with the private sector and multiple government agencies within the same country to explore the use of Blockchain and cognitive technologies to improve business transactions across several different industries. (IBM, 2016)

Hence, multiple government agencies in Singapore are engaged to create an ecosystem that connect emerging financial technologies with the physical world of global trade and logistics.

The cross-border shipping operations of flowers from Mombasa (Kenya) to Royal Flora (Netherlands) is a partnership between IBM and Maersk ocean shipping company, to work with shippers, freight forwarders, ocean carriers, ports and customs authorities to establish transparency among parties. Bridget van Kralingen, IBM's senior vice president, industry platforms, said:

Working closely with Maersk for years, we've long understood the challenges facing the supply chain and logistics industry and quickly recognized the opportunity for blockchain to potentially provide massive savings when used broadly across the ocean shipping industry ecosystem. (IBM, 2017)

Reading the IBM material for the pilots, it is possible to understand that the blockchain solution intends to reduce documentation, fraud and errors. However, it is still too early to measure the impact of such initiatives.

## 5. A blockchain application for certificates of origin

In this paper, we explore the idea of a blockchain application to facilitate trade. The scenario is for an application that contributes to security and facilitation in preferential trade, making use of certificates of origin (COs). It is admittedly an application for documentary improvement where chambers of commerce simply make use of the technology to improve trust.

It is a preliminary scenario to illustrate a possible use of a blockchain application in international trade. The scenario (issue, justification and proposal) for the application is below.

### 5.1 Blockchain for COs

**Issue:** The multilateral crisis contributes to an increased number of bilateral and regional trade agreements. The WTO recognises this growth, and that all its members have regional trade agreements (RTA):

Regional trade agreements (RTAs) have risen in number and reach over the years, including a notable increase in large plurilateral agreements under negotiation. Following the notification of the RTA between Mongolia and Japan in June 2016, all WTO members now have an RTA in force. (WTO, 2016)

The increasing number of free trade agreements (FTAs) without clear origin rules creates trade bottlenecks. Consequently, the management of preferential rules of origin is a challenge for governments and companies. Each preferential agreement has its own rules as countries negotiate differently, depending on their trade patterns. In other words, depending on the agreement, countries can have different rules for the same type of goods. This creates a challenge both for companies and border agencies to administer and control.

In the 2017 WCO Global Origin Conference, held in Addis Ababa, Ethiopia, Donia Hammami, Head, Customs and Trade Facilitation, International Chamber of Commerce (ICC) stated:

Businesses of all sizes find themselves unable to manage the complexity and administrative burden of origin requirement procedures, which gradually form a behind-the-border barrier to trade. Streamlining the certification of procedures will go a long way towards making this easier for traders. (Asia Customs and Trade, 2017)

Many of the preferential agreements require COs as proof of origin of the goods. The ICC defines a CO as:

A Certificate of Origin (CO) is an important international trade document that certifies that goods in a particular export shipment are wholly obtained, produced, manufactured or processed in a particular country. They also serve as a declaration by the exporter. (ICC, 2017)

COs are important for international trade and can be described as birth certificates for goods. These are normally expedited by different chambers in the country of exportation. The whole operation works similarly to notaries in a country. In fact, there are hundreds of chambers issuing thousands of COs every year around the globe.

Preferential COs are issued by chambers of commerce in export countries and are required by border authorities in import countries to concede preferential treatment to the goods.

**Justification:** Blockchain is a technological solution for environments where participants don't fully trust each other. The level of sophistication on issuing and storing COs varies greatly among countries and within chambers. For instance, while a few still issue paper-based COs others issue electronic certificates of origin (eCO).

As such, due to the level of sophistication, complexity of rules and requirements, some customs administrations might consider imports of goods under preferential trade as riskier than imports of the same goods from third parties. In other words, there might be a lack of trust in COs.

The lack of trust in COs increases costs and creates trade bottlenecks. Hence, chambers and Customs worldwide would benefit from a solution to promote trust, expedite preferential trade and contribute to trade facilitation. It would increase predictability, avoid fraud and expedite the clearance of goods under preferential trade.

**Blockchain CO DApp proposal:** The proposal is for the WCO to engage with the International Chamber of Commerce (ICC) and design a pilot project using blockchain to issue, store and share preferential COs for preferential trade agreements (PTAs).

The proposal is aligned with the ICC recommendations to address the growing divergence in origin rules. The ICC recommendations were issued in 2017 when Customs and business representatives from all over the world convened in Addis Ababa, Ethiopia, to discuss the complexities behind rules of origin at the WCO Global Origin Conference.

Some of the advantages of a blockchain application for COs would be immutability of CO registers; unlimited CO storage capacity; scalability; and cryptography. Also, blockchain Dapps would allow for a technological solution that could later integrate with blockchain single windows (BSW) and eWTP.

As for execution, the proposal is that execution should use the Linux Foundation Hyperledger platform.

## 6. Blockchain regulatory issues

To facilitate the development of blockchain applications, the Linux Foundation created the Hyperledger. The Hyperledger is an open source collaborative effort for blockchain with a community of participants that share information and work together in projects. The Hyperledger (2017) website gives the following reason for its existence:

Only an Open Source, collaborative software development approach can ensure the transparency, longevity, interoperability and support required to bring blockchain technologies forward to mainstream commercial adoption. That is what Hyperledger is about – communities of software developers building blockchain frameworks and platforms.

Although companies rarely admit it, there is a challenge to regulate the use of the technology. Thus, the main purpose of the Hyperledger is to develop protocols and standards that support different components for different uses. For example, a relevant discussion is about public and private chains.

While public chains allow the submission of all sorts of applications to the chain, in private chains only authorised participants can submit or modify applications in the chain. Thus, standards are necessary to guarantee the interoperability between private and public chains.

Another relevant discussion relates to the operational costs of private and public chains. It is likely that in private chains participants will have to pay to use blockchain applications in a format known as Blockchain as a Service (BaaS). As for public chains, the operational costs of an application mostly consist of the total of transaction fees required to operate it.

In sum, there are key regulatory issues that need attention. In fact, I think that it is time for international organisations to reflect on more serious regulatory issues. In my view, blockchain is supposed to be an open, distributed, global platform and it can only achieve its potential if there is room for public chains in every sector. So, countries should be able to develop their own applications in public chains without being forced to pay for BaaS applications.

On a related matter, on March 2017, Jerry Brito, executive director of Coincenter (a non-profit research and advocacy centre), in a letter to the India Department of Economic Affairs, listed six principles that should be considered when creating regulations for cryptocurrencies. I believe these principles should also be known by non-financial organisations that soon will deal with blockchain applications. Brito's (2017) principles are:

1. understanding who and what can be the subject of regulation
2. clearly articulating the goals of a cryptocurrency regulatory policy.
3. only regulating persons with 'control' over consumers' cryptocurrency
4. cooperating with businesses to preserve visibility
5. treating all cryptocurrencies equally
6. ensuring that regulatory requirements are reasonable.

The principles are intended to guide India in producing a proper regulatory framework for cryptocurrencies such as bitcoin. The letter makes it clear that it is difficult to regulate a decentralised network and that any regulatory framework should focus on clear defined goals, such as consumer protection or money laundering. I believe that for international trade, defined goals would include supply-chain security, trade facilitation and taxation. However, these goals should take into consideration the ability of actors to develop applications.

As with crypto-currencies, any regulation would require cooperation and equal treatment between non-blockchain and blockchain applications. Finally, regulation should be reasonable.

## 7. Conclusion

Blockchain is a P2P technology that records and verifies transactions in a decentralised, cryptography secure manner. Blockchain applications can globally manage records of any sort such as import-export declarations, invoices, bills of lading (BLs) and COs.

It is a technology with promising applications for many sectors, including international trade, supply chain and financial services. International organisations are discussing blockchain applications. For instance, the B20 eWTP project has several eHubs that can assist SMEs in international trade. Also, IBM has blockchain projects that show great potential to facilitate trade.

This paper suggests a blockchain application for COs. The application involves the ICC and the WCO with an objective to increase trust and facilitate trade for preferential COs.

Finally, and most important, I have concerns on whether standards to implement blockchain applications will promote interoperability, have reasonable costs and be open. In other words, if blockchain applications will run on public chains, private chains or hybrid chains and if the technology will be as inclusive to governments and trade as it is meant to be.

## REFERENCES

- Alibaba Group. (2016). *Electronic World Trade Platform: Fact sheet*. Retrieved from <http://www.alizila.com/wp-content/uploads/2016/09/eWTP.pdf?x95431>
- Asia Customs and Trade. (2017). *ICC recommends rules of origin in preferential trade agreements*. Retrieved from <http://customstrade.asia/2017/05/05/icc-recommends-rules-of-origin-in-preferential-trade-agreements/>
- B20 2016 China. (2016). *Towards an innovative, invigorated, interconnected and inclusive world economy: B20 2016 policy recommendations to the G20*. Retrieved from [https://www.b20germany.org/fileadmin/user\\_upload/documents/B20/b20-policy-recommendations-2016.pdf](https://www.b20germany.org/fileadmin/user_upload/documents/B20/b20-policy-recommendations-2016.pdf)
- Brito, J. (2017). Letter to the Government of India, Department of Economic Affairs. Retrieved from <https://coincercenter.org/entry/letter-to-the-government-of-india-department-of-economic-affairs>
- Ethereum Homestead. (2017). *What is Ethereum?* Retrieved from <https://ethereum-homestead.readthedocs.io/en/latest/introduction/what-is-ethereum.html>
- IBM. (2016). *IBM to open blockchain innovation center in Singapore to accelerate blockchain adoption for finance and trade*. Retrieved from <http://www-03.ibm.com/press/us/en/pressrelease/50163.wss>
- IBM. (2017). Maersk and IBM unveil first industry-wide cross-border supply chain solution on blockchain. Retrieved from <https://www-03.ibm.com/press/us/en/pressrelease/51712.wss>
- International Chamber of Commerce (ICC). (2017). *Certificates of Origin*. Retrieved from <https://iccwbo.org/resources-for-business/certificates-of-origin/>
- Le Guin, U. K. (2016). *Words are my matter: Writings about life and books, 2000–2016 with a journal of a writer's week*. Easthampton, MA: Small Beer Press.
- Nakamoto, S. (2008). *Bitcoin: A peer-to-peer electronic cash system*. Retrieved from <http://www.bitcoin.org/bitcoin.pdf>
- Tapscott, D. (2016). *How blockchains could change the world*. Interview May 2016 with McKinsey & Company. Retrieved from <http://www.mckinsey.com/industries/high-tech/our-insights/how-blockchains-could-change-the-world>
- United Nations (UN). (2017). *UN World Data Forum Bulletin. South Africa 15–18 January 2017*. Retrieved from <http://enb.iisd.org/undata/forum1/>
- World Trade Organization (WTO). (2016). *Regional trade agreements*. Available at: [https://www.wto.org/english/tratop\\_e/region\\_e/region\\_e.htm](https://www.wto.org/english/tratop_e/region_e/region_e.htm)

## Notes

- 1 A hash function is a mathematical process that takes input data of any size, performs an operation on it, and returns output data of a fixed size.
- 2 Ethereum is a popular blockchain platform, but there are other blockchain platforms.

**Leonardo Macedo**



Leonardo Macedo worked as a technical officer at the World Customs Organization, providing technical assistance on customs valuation, tariffs and trade facilitation matters. During this time, he was also involved in customs valuation (royalties, software and transfer pricing) discussions with other international organizations, such as the WTO and the OECD. Before joining the WCO, Leonardo worked at the tax - customs department at the Brazilian Ministry of Finance, being Director for Trade and Tariffs Affairs and Head for Customs Valuation. He holds a master in economic law and bachelors' in law and economics. He is a PhD fellow in international trade law at Maastricht University. Leonardo is currently a judge at the administrative tax - customs court based in Brasilia.