



PERMANENT  
TECHNICAL  
COMMITTEE

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### **FUTURE OF CUSTOMS**

- b) Blockchain: policy and legal considerations, interoperability, standardization and governance model – Round table discussion

#### **(Item XI.b on the Agenda)**

#### **I. Introduction**

1. The blockchain is a sophisticated cryptographic distributed ledger architecture. The most popular use of technology to date - in Bitcoins - is like the early uses of the Internet for e-mails. The blockchain technology with its distributed code-based ledger could have significant potential in various business processes that involve multiple parties. It has the capability to move any kind of data swiftly and securely and, at the same time, make a record of that change, movement, or transaction available instantly, in a trusted and immutable manner, to the participants in a Blockchain network, called validators or nodes. Blockchain can enable interactions among unknown actors without a central authority, proving trust and reducing costs.
2. The blockchain technology may provide several important features that could be leveraged in the international supply chain management :
  - **Distributed ledger**: The technology operates on a distributed, rather than centralized, platform, with each participant (node) having access to exactly the same ledger records.
  - **Trust**: It provides “trust” between and among unknown parties to transact business and exchange information without an intermediary, whilst ensuring data integrity and providing a full audit trail.
  - **Immutability**: Transactions are verified and approved by consensus among participants in the network, making fraud more difficult.
  - **Provenance**: The full chronology of events/transactions from the source that takes place is tracked, thus allowing anyone (having access) including regulatory authorities to trace or review prior transactions.

3. Although blockchain has initially been thought about mainly from a financial services perspective, the distributed ledger technology (DLT) can serve as a basis for many useful applications including information management and processing far beyond monetary transactions.

## **II. Global developments**

4. In 2018, two blockchain initiatives sprung in the maritime shipping field. Maersk and IBM's joint venture TradeLens<sup>1</sup> was launched in early 2018. Then in November, nine ocean carriers and terminal operators joined forces to create the Global Shipping Business Network (GSBN)<sup>2</sup>.
5. In addition, there are already a number of initiatives and pilots being undertaken by the private sector and some Customs administration with respect to the use of blockchain in the end-to-end supply chain management and Customs/border regulatory processes.

## **III. Use of blockchains in Customs and border management processes**

6. With the blockchain technology, efficiencies in the supply chain can be improved not only in the reduction of intermediaries and paper/manual tasks but also in improving certainty and predictability based on the reliable real-time data available to all the stakeholders in a supply chain (the participants in a blockchain). The availability of real-time data allows for traceability and end-to-end visibility, thus enhancing supply chain security and facilitation.
7. Solutions based on blockchain could open new possibilities for Customs administrations and other border regulatory agencies to access more diverse and reliable supply chain data available within or through blockchain environment provided by different supply chain stakeholders (nodes). This supply chain data could be used to complement goods/cargo declaration dataset traditionally provided by a declarant<sup>3</sup>, potentially eliminating the requirement of supporting documents. This approach to accessing wider supply chain data through blockchain could significantly simplify the complexities of cross-border regulatory procedures, eliminate redundancies in regulatory data requirements, and improve Customs administrations and other border agencies' capacity for risk analysis and targeting, thus contributing to greater trade facilitation.
8. The blockchain technology can potentially be used in Customs and other border regulatory business processes to validate transactions/actions of different parties in the international supply chain through permissioned blockchains - clearly defining roles, responsibilities, levels of access, and rights of validation for each party. It could equip Customs with the necessary tools to tackle problems of compliance, as it provides an unbiased tool essentially designed for uploading and sharing information between unrelated parties. Blockchain can help in the end-to-end seamless integrated supply chain management in a transparent and trusted manner.
9. At its recent past sessions, the Information Management Sub-Committee (IMSC) had explored potential opportunities for the use of blockchain technology and examined the early outcomes of some of the related pilots and other emerging initiatives concerning its

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<sup>1</sup> <https://www.tradelens.com/>

<sup>2</sup> <https://www.cargosmart.com/en/news/top-ocean-carriers-and-terminal-operators-initiate-blockchain-consortium.htm>

<sup>3</sup> Declarant is defined in the WCO Data Model as : A party who makes a declaration to an official body or - where legally permitted - in whose name, or on whose behalf, a declaration to an official body is made.

use in regulatory and supply chain management processes. It also identified several use cases of Blockchain technology in Customs business processes and overall supply chain management. Potential use cases in Customs and border regulatory processes are outlined in an Annex to this document that mainly include data exchange, Single Window, data pipeline, identity management, and risk management in conjunction with other technologies (e.g., data analytics, artificial intelligence, machine learning), as well as the implementation of Authorised Economic Operator (AEO) - Mutual Recognition Arrangements/Agreements (MRAs) and Free Trade Agreements (FTAs).

10. Based on the work done thus far, the IMSC, at its November 2018 meeting, identified the following key issues, for carrying out future work through engagement with international organizations, technology solution providers and other stakeholders :
  - i. Use of blockchain in Customs and other border regulatory processes,
  - ii. Interface of Customs systems with, and interoperability of, blockchains, and
  - iii. Standardization of data in blockchain (including pre-shipment data, much early in the supply chain).
  - a. **Policy and legal considerations**
11. Leveraging blockchain's potential depends on the integrity of processes and data quality, and requires adequate policy and legal measures. Governments and the international Customs community can play a significant role in shaping policy and regulatory frameworks that are aligned with the emerging challenges, fostering transparent, fair and stable regulatory environment as a basis for the development and use of blockchain.
  - **Regulatory challenges**
12. Various laws including trade and Customs laws and relations of traditional trade need to be adapted to create enabling provisions for, and to regulate, the use of blockchains. For example, in a diffused network which and how a node could be made a responsible party for regulatory compliances. In other words, who will be eventually responsible for the accuracy and timely availability/submission of data and documents to government authorities?
13. There are issues of jurisdiction and ownership in terms of where the data is stored and where it is used as a declaration to government authorities. Furthermore, how will smart contracts be enforced, as they are still not recognized by law in several countries/jurisdictions? The jurisdiction issue also concerns how various stakeholders operating in different countries (such as country of export, transit or import) would legally provide data to regulatory agencies situated in different jurisdictions. Additionally, countries/jurisdictions may have different laws and regulations with regard to the protection of commercial and personal data, thus potentially hindering the transfer/access of data on blockchain. Finally, what kind of regulatory frameworks would be needed to deal with data placed by a node on blockchain when that node decides to leave the blockchain?
  - **Operational challenges** : misuse of Blockchains (including bitcoins) for illicit trade, evasion of duties and taxes/VAT, IPR violations, money laundering and other financial crimes

14. Organized criminal syndicates could simply start a blockchain of false data and carry out illicit activities, misleading Customs and other border regulatory authorities. Blockchain does not replace the need for intelligence and risk management but the availability of 'big data' could conceivably improve the efficiency of targeting. However, the capacity of Customs and other border agencies in handling data would need to be enhanced and their practices, some of them deeply ingrained, would also need to be changed.

- **Technological challenges**

15. There are growing challenges in establishing interfaces between and among various blockchains, as well between blockchain-based and non-blockchain processes and activities. The issue is how to ensure seamless integration between paperless and manual processing.
16. There are associated challenges in ensuring the physical activities and blockchain-based transactions. For example, blockchain may provide proof that a transaction has taken place but how can it guarantee that the terms of that transaction was actually done physically - whether goods of right quality were actually loaded into a container.

**b. Standardization and Interoperability**

17. Despite being created for very similar purposes, multiple blockchain initiatives are developing, operating on different platforms, identifying and collecting information differently, and with different governance structures. This practice could lead to the introduction of 'island of blockchains', where blockchain platforms would be fragmented and disconnected.
18. Given the growing development of different blockchain platforms/consortiums, there are already some talks around developing standards for their further development in a standardized manner to enable their seamless interfaces and interoperability, avoiding a technology fragmentation.

- **Interoperability**

19. A standardized development of blockchains will assist with achieving interoperability between and among them, as well as connectivity/integration with Customs IT systems/Single Windows for data access. This will also make the migration from one blockchain platform to another much simpler, being platform agnostics.
20. Apparently, there is a need to prevent vendor lock-in by championing globally interoperable specifications and standards, outlined below as an example:

## Using Standards to Prevent Vendor Lock-In

Decentralized Identifiers	Verifiable Claims Data Model	Decentralized Key Management System
<ul style="list-style-type: none"> <li>• Globally Unique Identifier without the need for a central registration authority               <ul style="list-style-type: none"> <li>• Immutable                   <ul style="list-style-type: none"> <li>• Identifier is permanent</li> </ul> </li> <li>• Resolvable                   <ul style="list-style-type: none"> <li>• Identifier can be looked up to identify metadata about entity it identifies</li> </ul> </li> <li>• Cryptographically Verifiable                   <ul style="list-style-type: none"> <li>• Identifier's ownership can be established and verified using public/private cryptographic keys</li> </ul> </li> <li>• Path to Standardization via World Wide Web Consortium (W3C)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Data Interoperability across issuers, holders and verifiers               <ul style="list-style-type: none"> <li>• Standardization of data formats</li> <li>• Standardization of digital signature schemes</li> </ul> </li> <li>• Digital version of physical credentials/attestations               <ul style="list-style-type: none"> <li>• Driver's Licenses</li> <li>• Passports</li> <li>• Training Certificates</li> <li>• Educational Certificates</li> <li>• More ...</li> </ul> </li> <li>• Path to Standardization via W3C</li> </ul>	<ul style="list-style-type: none"> <li>• Tackling the challenge of distributed key management               <ul style="list-style-type: none"> <li>• Provisioning</li> <li>• Revocation</li> <li>• Re-Issuance</li> </ul> </li> <li>• Based on <i>NIST Special Publication 800-130: A Framework for Cryptographic Key Management Systems</i></li> <li>• Path to standardization via OASIS</li> </ul>

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(Source: the US CBP)

21. Recently, two of the largest blockchain organizations - Ethereum and Hyperledger - joined forces to facilitate the creation of blockchain-based enterprise tools<sup>4</sup>. The Enterprise Ethereum Alliance (EEA) is a global standards organization driving the adoption of Enterprise Ethereum, and Hyperledger is an open source blockchain initiative designed to help industries build and adopt tools utilizing blockchain.
  22. The EEA-Hyperledger partnership is expected to offer members a wider array of resources to use in developing blockchain-based tools and greater assurance that any tools they create will be compatible with other software they may need to interact with down the line
  23. Standards, specifications and certification will help enterprise blockchain customers commit to implementations with confidence since they have better assurances of interoperability as well as multiple vendors of choice. Blockchain technology has plenty of applications within organizations, but its ability to transform the supply chain through increased efficiency and tracking capabilities would come from cooperation between disparate players through interoperable blockchain platforms. In order to do this on a large scale, developers need to conform to common standards to ensure interoperability between systems.
- **Data Standardization**
24. The issue is what kind of standardized development of blockchains could or should be foreseen by Customs administrations and what role the WCO and Customs administrations could potentially play in the context of standardization of blockchains.
  25. One of the key issues in blockchain is the difficulty in controlling data quality in a distributed ledger environment where different nodes can initiate a transaction and add associated data elements.

<sup>4</sup> <https://www.hyperledger.org/announcements/2018/10/01/enterprise-ethereum-alliance-and-hyperledger-to-advance-the-global-blockchain-business-ecosystem>

26. The data quality issue becomes more important where the initiator of a supply chain can add data at the source in a non-standardised manner and without ensuring its quality. Widely known as the “Garbage in Garbage Out” issue where the information entered on the blockchain is only as good as its source. In addition, the blockchain environment could introduce unprecedented supply chain data elements that might be potentially useful, but would have never been recognized and processed by Customs and other border regulatory agencies. This subject could be a potential opportunity for the WCO and Customs administrations to examine and carry out work related to data definition, harmonization and standardization and data quality in the blockchain environment.
27. As an example on the importance of data standardization and data quality, a number of farmers in an agriculture supply chain using blockchains<sup>5</sup> will capture and introduce a host of data elements concerning an agricultural produce early in the supply chain, potentially not being fully aware of the imperatives of standardized and quality data for downstream operations in the supply chain, thus bringing in inherent deficiencies in respective blockchain platforms.
28. Agriculture supply can potentially leverage open standards to create Application Programming Interfaces (APIs) that help farmers more effectively gather, analyze and share quality data.
29. The Open Ag Data Alliance (OADA)<sup>6</sup> is engaged with developing standards to improve agricultural data gathering processes and analysis. They are building up processes for open standards that can shape the Internet’s networking, security, web and data standards. The OADA will help develop standards for APIs that companies can utilize to provide open sharing.
30. The WCO could collaborate with such bodies and other partners engaged with different sectors to initiate exploratory work in the area of standardization of data elements available much earlier in the supply chain (e.g., pre-shipment data)

**c. Governance model**

31. Blockchain environment will normally involve many stakeholders. In order to cater the interest of all involved stakeholders, a robust governance mechanism is needed. The governance structure should explain clear mandate and scope, ensure efficient coordination and elaborate roles and responsibilities of each entity. In addition, such a mechanism will help maintain the blockchain application (source code). As in the blockchain, the blockchain application code is regarded as law and should be respected by all stakeholders in the blockchain environment; every change to the blockchain application code should be transparent and follow decision making processes as defined in the governance framework.
32. Different type of Blockchain implementation may require different governance approach. In addition, making use of an existing governance structure to include additional topics relating to blockchain could also be considered. For example, when blockchain technology is considered to be implemented for an existing Single Window environment,

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<sup>5</sup> <https://www.zdnet.com/article/from-farm-to-plate-via-blockchain-solving-agriculture-supply-chain-problems-one-grain-at-a-time/>  
<https://www.finextra.com/blogposting/13286/blockchain-can-it-be-of-help-for-the-agricultural-industry>

<sup>6</sup> <https://open-stand.org/open-ag-data-alliance-how-open-standards-fuel-the-future-of-farming/>

the existing Single Window Governance could be considered to handle the Blockchain implementation related topics.

**IV. Potential considerations:**

33. The round-table discussions may like to focus on the following points (but not limited to) :
- Creating international standards for blockchain development including interoperability between and among various blockchains, as well as with existing/new commercial and regulatory IT systems (i.e., Single Window, data pipeline).
  - Building up a consensus and a common approach on data security and privacy issues in the context of blockchain.
  - Adapting Customs and related laws and jurisdictional issues with new realities presented by blockchain.
  - enhancing international cooperation on abuse and misuse of the technology.

**V. Action Required**

34. Following the round-table discussion, the PTC is requested to :
- consider and provide guidance on the use of blockchain in Customs and other border regulatory processes, including those outlined in Annex to this document.
  - discuss the need for standardization and interoperability of blockchains, as well as explore the associated opportunities for the WCO in the area of standardization of data in blockchain (including pre-shipment data), and
  - examine the issues relating to an interface of Customs systems with, and the interoperability of, blockchains and the potential work that could be carried out by the WCO in coordination with other international organizations and relevant stakeholders.
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