REPORT REPRINT

Blockchain in production: Four live and growing blockchain-based business networks

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By Csilla Zsigri

This spotlight report provides an update on four live blockchain-based business networks, underpinned by IBM's blockchain offering leveraging Hyperledger Fabric (IBM Food Trust, TradeLens and we.trade) and the Stellar protocol (World Wire).

Introduction

IBM has been working on a variety of blockchain-related use cases and projects with hundreds of clients since 2016 (blockchain is a multi-party collaborative effort, not only in its use but also in its development), and we have seen some of these projects going live in the past year. This report gives an update on four live blockchain-based business networks, underpinned by IBM's blockchain offering leveraging Hyperledger Fabric (IBM Food Trust, TradeLens and we.trade) and the Stellar protocol (World Wire). They have grown and their respective platforms have evolved throughout 2018 and 2019, and are all generally available (GA) now, except for World Wire, which is currently in limited availability but is planned to move to GA later this year. These networks may be different in scope, but they also overlap or complement each other, and are very similar when it comes to their goals: to increase efficiency, transparency and trust in inter-enterprise processes and commerce.

451 TAKE

Our research suggests that both actual use and interest in implementing blockchain technology have grown across a number of vertical markets throughout 2018 and 2019, with top areas of interest being – in a business-to-business scenario – industry-specific consortia and applications, supply chain management and finance-related use cases. We also believe that the more these networks grow in terms of geographic reach and scope, and the more feature-rich the platforms become (e.g., more workflows are automated), the more the involved parties will benefit. Additionally, it needs to be pointed out, that this is not just about blockchain, but also other technologies including data analytics, IoT and machine learning that in combination can make one plus one equal three. In terms of the evolution of these platforms, although more businesses have switched the conversation from the 'what' to the 'how' when it comes to blockchain technology, which shows that the market is maturing, an incremental approach as well as keeping innovation open (to both members and third-party technology providers) is the way to go. Additionally, it will be interesting to see these networks interoperate – e.g., Food Trust with TradeLens and TradeLens with we.trade – taking advantage of their complementarity and to see similar networks joining forces, like we.trade did with Batavia and eTradeConnect, for convenience reasons and to ultimately create a frictionless user experience.

Snapshot

Business network	IBM Food Trust	TradeLens	we.trade	World Wire
General availability	October 2018	December 2018	July 2018	March 2019 (limited availability)
Industry	Food	Shipping & Logistics (global trade)	Finance (trade finance)	Finance (cross-border payments)
Geography	Global	Global	Initially European, now global	Global
Members (number)	100+	100+	13	13
Members (type)	Farmers, food manufacturers, wholesalers/ distributors, logistics, retailers, restaurants, consumers	Inland and intermodal transportation providers, ports and terminals, ocean carriers, government authorities (e.g., customs), shippers, third-party logistics, and financial services companies	Banks (with plans to extend to other industry participants)	Financial institutions, money transfer operators
Business benefits	Near real-time traceability of food items and associated cost/ time savings, as well as potential boost in sales, supply chain efficiencies and transparency, improved food freshness and sustainability, and decreased food waste and fraud	Near real-time access to supply chain data including documentation, a connected global trade ecosystem, trusted and auditable transactions	Trusted and efficient trading between SMB buyers and sellers, effective pricing of financial products for SMBs	Near real-time settlement, reduced number of intermediaries and associated cost/ time savings
Technical features	Modular approach, multiple onboarding services and data uploading options, open APIs, trust anchors, smart contracts in private channels, remote deployment	Digitized documents, workflow automation, shipment planning and management, open APIs	Any device, multiple payment options, multiple languages, open APIs	Digital asset model, multi-currency, open APIs

Blockchain/ DLT protocol	Hyperledger Fabric	Hyperledger Fabric	Hyperledger Fabric	Stellar
Governance	Permissioned blockchain network where data owner is in control of its data and each node is controlled by a separate entity, advisory council overseeing governance policy, IBM operates/ maintains the platform but does not own any data uploaded by users onto the network	Permissioned blockchain network where data owner in control of its data and each node is controlled by a separate entity, advisory board overseeing governance policy, platform IP jointly owned by IBM and Maersk, IBM operates/maintains the platform	Permissioned blockchain network where each participating bank runs a node, we.trade joint venture company owns the platform IP, manages/ distributes it, IBM is the primary technology partner	Hybrid blockchain network where transacting parties agree on a bridge currency, IBM operates/maintains the platform

IBM Food Trust

Description

Launched in August 2017 and made generally available in October 2018, IBM Food Trust is a modular, blockchain-based SaaS offering that is aimed at creating a trusted connection among all participants of the food ecosystem and providing traceability to improve food transparency and supply-chain efficiency. The offering was launched after 18 months of testing, during which, according to IBM, millions of individual food products had been tracked by retailers and suppliers. IBM Food Trust is available as a subscription service for organizations in the food industry to join.

The 10 initial members of the network were Dole Food Company, Driscoll's, Golden State Foods, Kroger, McCormick and Company, McLane Company, Nestle, Tyson Foods, Unilever and Walmart. More recently, organizations such as Albertsons, Carrefour, Smithfield Foods, Topco Associates and Wakefern Food Corporation have joined the network. Also, Walmart issued an invitation to its leafy green suppliers to onboard the network.

Currently, the Food Trust ecosystem has over a hundred members running millions of transactions representing thousands of products and hundred-thousands of traces conducted to date.

Benefits

IBM Food Trust has evolved to focus not only on food safety, but also on improving food freshness and sustainability and reducing product loss, waste and fraud by improving transparency and efficiency across the whole food supply chain.

Traditionally, supermarkets have dealt with food traceability using a combination of information stored in their own ERP systems and those of their suppliers, as well as what was recorded on paper and in databases of auditors, a time-consuming and costly process that is prone to errors. Traceability and product insights with blockchain help save costs involved with product recalls by catching problems early and taking action quickly. Walmart, for example, in a pilot test case, was able to trace a package of sliced mangos back to the farm in 2.2 seconds, which previously – through a mixed digital and paper-based method – had taken nearly seven days. Carrefour has recently reported that the use of blockchain technology to track meat, milk and fruit from farm to store has boosted sales of these products.

Additionally, over time, when traceability and insights become business as usual, the generated data sets can be used to identify patterns and provide efficiencies that help retailers and suppliers improve productivity; e.g., optimize inventory and improve order accuracy. Also, damage to companies' reputation can be avoided by stopping bad products from reaching consumers and delivering high-quality products on time, with no delays.

Features

IBM Food Trust is built on IBM's Blockchain Platform, powered by the open-source, permissioned blockchain protocol Hyperledger Fabric. Trust Anchors are network participants collectively responsible for maintaining the integrity of the shared ledger. Trust Anchors run a full copy of the encrypted ledger in their nodes, but they have access only to the (decrypted) data they are entitled to see, and that's granted by the data owner. Any network participant can instantiate and run smart contracts in private channels with other members to automate transactions.

IBM Food Trust offers several modules. The initial general-availability modules were 'data entry and access' for secure data management, 'trace' to see a product's provenance in a matter of seconds and 'certifications' to digitize certificate storage and sharing. The 'fresh insights' module, providing more fine-grained details; e.g., average dwell time, time since harvest and time to expiration, has been added since.

Data can be uploaded in different ways, from direct entry through XML or Excel upload to automated upload. Onboarding options include self-guided, virtually guided and assisted. Additionally, open APIs can be used to build consumer applications. Carrefour in particular has built a consumer-facing app based on IBM Food Trust open APIs to let consumers learn about the details of the particular food item they are purchasing by scanning a QR code.

Governance

IBM Food Trust maintains a set of rules or governance policies overseen by an advisory council composed of a range of industry representatives. The governance model builds on fundamental principles (or rules of engagement) that enable a collaborative ecosystem designed to provide value to all participants, while also ensuring that all participants operate on those principles.

It is a permissioned blockchain network where each node is run by a separate entity and organizations own the data they upload and maintain full control over who can access it. As a participating member, IBM does not own any data uploaded by users onto the network and cannot use or share data for commercial or other purposes.

TradeLens

Description

Co-developed by IBM and Maersk, TradeLens (formerly known as Global Trade Digitization) is an open, digital supply chain platform for global trade, underpinned by blockchain technology. The beta release of TradeLens and launch of the early adopter program took place in January 2018. The formal launch of the platform happened in August 2018 and was commercially released in December 2018. Currently, TradeLens has over a hundred participants, including shippers, third-party logistics providers (3PLs), ports, terminal operators, customs authorities and ocean carriers; it manages over 10 million events and 100,000 documents per week. Latest onboards include ocean cargo carrier giants, France-based CMA CGM, Swiss-based Mediterranean Shipping Company (MSC), Japan's Ocean Network Express and Germany's Hapag-Lloyd, expanding the geographic reach and industry scope of the network.

Benefits

The TradeLens platform was created essentially to automate cross-organizational business processes related to global trade – for example, it enables the sharing of shipping milestones, cargo details, trade documents and sensor readings among trade parties.

By digitizing documents and sharing them in a permissioned model, authorized parties involved in the trading can immediately access data and take actions on it. There is one single source of truth that eliminates the need for manual reconciliation of data, which is inefficient and prone to error. Trade documents are immutable, traceable and auditable. Also, when a transport plan changes or cargo is being redirected or delayed, that information can be shared in (near) real time with all involved parties. A cargo owner, for example, can stay ahead of its deliveries and offer real-time sales support.

We expect further workflow automation on the platform to provide additional benefits in terms of efficiency and trust to the different parties in the global shipping and logistics ecosystem.

Features

TradeLens has three key components: a business network or ecosystem comprising all members that share information about a shipment and its journey, a platform where the collaboration takes place and an applications and services marketplace where members and third parties can publish purpose-built applications and services on top of the platform.

Digitized documents are stored on a single node and accessed at runtime by other nodes (on a channel) as the pre-defined permissions allow. The platform integrates with users' in-house systems via open APIs, and can also be accessed via the web, the TradeLens portal, without integration. (It uses Swagger, which is an open-source software framework for designing, building, documenting and consuming REST APIs.) There is a 'sandbox' zone, where newly onboarded organizations can test their applications.

TradeLens has started to look into interoperability. Currently, blockchain information exchange between ledgers can be done by using middleware; however, that will likely change in the future. It is exploring the use of the open-source Hyperledger Quilt, a Java implementation of the Interledger protocol (originally a payment protocol), currently in incubation status, aimed at enabling cross-ledger namespace and transfer of information between ledgers.

Governance

TradeLens is a jointly owned product (IP) between IBM and Maersk. Similar to Food Trust, it is a permissioned blockchain network where an advisory board of early adopters oversees the governance policy of the network overall. Nodes are run by separate entities, and data owners prescriptively determine the levels of permission for data access and control their data after it becomes part of the blockchain network. IBM operates and maintains the platform.

we.trade

Description

We.trade is a blockchain-based trade finance platform that brings together parties involved in trade – the buyer, buyer's bank, seller and seller's bank as well as transportation companies – and records the entire trade process, from order to payment, while guaranteeing automatic payment when all contractual conditions are met.

Previously known as Digital Trade Chain, we.trade was established in April 2018 by a group of nine European banks, including Deutsche Bank, HSBC, KBC, Natixis, Nordea, Rabobank, Santander, Société Générale and UniCredit, which teamed with IBM to build a fully automated platform for tracking and managing trade transactions between SMBs. CaixaBank, Erste Group, UBS (three of the founding banks of the Batavia project – another blockchain-based trade finance platform) and Eurobank joined the consortium later in the year. At the end of 2018, we.trade and the newly launched digital trade finance platform eTradeConnect in Hong Kong agreed on interconnecting their platforms for trade transactions. Besides onboarding more banks (that bring their customers) and expanding it geographically, opening up the platform to other participants in the trade value chain, including insurance companies, transportation firms and customs agencies, among others, is on the roadmap for we.trade.

Benefits

We.trade was created to enable businesses to make easy, fast, paperless and Know Your Customer (KYC) compliant trades – increasing access to trade finance and simplifying the process. It is primarily targeted at SMBs. Trading on the we.trade platform simplifies order and contract processes between trading parties (buyers and sellers). The platform was designed to reduce the risk of doing business with unknown partners while making the trading process more efficient. It makes international trade possible without prepayment and reduces barriers of entry for small businesses because they do not need to build and maintain a large department for international business. In addition, it may also help banks generate new revenue streams.

Features

We.trade is built on the IBM Blockchain Platform using Hyperledger Fabric. The platform is accessible from any connected device and is built with application programming interface (API) layers.

On the platform, all participating businesses are verified and must be a customer of one of we.trade's partnering banks (whether a founding bank or an onboarded member bank) to be able to sign up. Then, the signed-up businesses can find each other on the platform and conclude a deal. Trading is conducted based on a set of rules, all parties involved in the trade rely on the same documentation (single source of truth), and trades can be monitored from order to delivery. We.transfer is the function that takes care of connecting all parties involved in a trade transaction in one place.

Contracts can be drawn up in multiple languages, and trading parties can choose what events will trigger payments automatically and use different payment methods, all pre-determined via the smart contract created by the buyer on the we.trade platform. If the buyer lacks sufficient funds, the buyer's bank pays the seller anyway. The seller may also sell its invoice to the bank if it wishes to be paid sooner. Additionally, after the execution of a trade transaction, the buyer and seller can rate each other, based on, for example, timely delivery and payment.

Governance

The we.trade joint venture company, co-owned by the founding member banks, manages and distributes the platform, where each participating bank runs a node. The joint venture owns the IP of we.trade. IBM is the primary technology partner.

World Wire

Description

World Wire is a global clearing and settlement platform for financial institutions, offered as a service. The development of World Wire was first publicly announced in October 2017 (with 13 banks conducting pilots), and it has soft launched (limited availability) in March 2019. In essence, World Wire functions as a network provider for international payments and uses digital assets (e.g., cryptocurrency, stablecoin or central bank digital currency – an agreed-upon store of value that is exchanged between parties) to settle transactions with integrated instruction messages. Currently, World Wire is available in 72 countries, with 48 currencies and 44 banking endpoints (where people can send/receive cash).

Benefits

International money transfers today require several intermediaries for clearing and settlement, with each of them adding cost and time to the process. World Wire was created to help financial institutions remove pain points from cross-border payments, essentially by focusing on transfer speed and ease of creating digital assets. With World Wire, interbank settlements are reportedly done in a matter of seconds and at a fraction of the cost of correspondent banking. Time and cost savings can also be gained by reducing the need for dispute resolution and reconciliation.

According to IBM, financial institutions may be able to see about 20% operational savings in liquidity management and over 50% reduction in overall transaction cost.

Features

World Wire is built on the open-source Stellar protocol. Stellar is an open source, decentralized protocol for cross-border transactions, launched in 2014 and supported by the nonprofit Stellar Development Foundation. World Wire has three key participants: payment service providers (any authorized entity acting as, or on behalf of money senders), market makers (any entity authorized by regulators to handle money and/or perform exchange functions – fiat from/to digital tokens) and liquidity providers (any entity that issues digital tokens).

Financial institutions can connect to World Wire through APIs (that integrate with legacy systems) and convert fiat money into digital tokens. Reportedly, World Wire will be able to handle payments of any size to any destination and in a variety of asset types (at the moment it supports Stellar Lumens [XLM] and USD-based stablecoin Stronghold dollar).

Six banks – including the Brazilian Banco Bradesco, South Korean Bank Busan and Philippine Rizal Commercial Banking Corporation – have already committed to issue their own stablecoins (fiat backed) on the World Wire network. A stablecoin is typically pegged to a fiat currency or a basket of fiat currencies but may also be pegged to a basket of cryptocurrencies or a commodity.

Governance

World Wire is a hybrid blockchain network (with properties of both permissioned and permissionless systems), where parties transacting with each other agree on a bridge currency (digital token) that is used for payments clearing and settlement. IBM operates and maintains the platform.