Why Blockchain is Important for a Connected Supply Chain

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Blockchain, the technology that cryptocurrencies are built on, has the potential to transform more than just online transactions or the financial services industry.

They're perfect to enable real-time data sharing and data-driven decisions in digitized supply chains.

Modern supply chains have a constant problem with sharing data.

It's not an IT problem, it's more of an information exchange issue.

Supply chains need transparency and easy data exchange for disparate divisions to work together seamlessly. The problem is that a typical supply chain usually involves several external players like 3PLs, logistics partners, or other business associates, and they may not be as worried about data security as you are.

The more information you share, the more you bare, and there's always a possibility that shipment data, procurement orders, or other "need to know" information makes its way — knowingly or unknowingly — to a competitor, or worse, cargo thieves.

Even if supply chain companies overcome their reservations to create an easy information or data exchange, it's not always easy to trust.

Did the supplier really dispatch a full order?

Did the shipment really leave the warehouse on time?

Did the driver really take the shortest route to your depot?

Even in an age of easy information exchange, supply chains still have plenty of blind spots.

Supply chain management systems are looking beyond simple ERPs and APIs to integrate and share data within their networks. They're looking for something that can both send, secure, and validate the information exchanged among modern supply chain nodes.

And that, ladies and gentlemen, is where Blockchain comes in.

What is Blockchain?

Blockchain, simply put, is a database like system that keeps a permanent shared record.

Unlike a conventional shared database system however, the record doesn't just exist at one location. Rather, it's shared among thousands of systems around the world, all of which reflect the same current state of something.

That something could be anything – a contract, an object, or the thing you're trying to keep track of.

Each blockchain record (often referred to as a distributed ledger) is time-stamped, and every update to the something that's tracked — a change in location, ownership, or current state for instance — can be logged and appended to the record as a new block in that record.

By replicating the state and trail of that something on multiple machines (called nodes) around the world, it's easy to differentiate a genuine record from a fake one — all you need to do is check a record against the updated copies out there; if the changes don't add up, you can bet it's a fake.

The 4 Pillars of Blockchain

Consensus — all players in the chain need to agree that a record or transaction is valid. For a supply chain, it could be proof of dispatch, delivery, or inventory.

Provenance — all players in the chain need to know where a record or object came from. For a supply chain, it could be a proof of origin for goods, money, assets, or contracts.

Immutability — no single player can tamper or erase a record. For a supply chain, it means proof for things such as payments, deliveries, shipment conditions, or delivery timestamps cannot be edited in silos, they can only be updated in the shared record.

Finality — all players in the chain need to hold the same version of a record for it to be valid. For a supply chain, it means a proof of dispatch, delivery, or shipment temperature is void unless the information is consistent across all the nodes of the blockchain.

It's as simple as it is revolutionary — use a verifiable unbroken chain of transaction blocks to prove authenticity and safeguard trust.

Hence the name: Blockchain.

What are the Advantages of Blockchain in a Supply Chain

In its simplest form, blockchains can be used to execute and secure any standard transaction, agreement, as well as records like inventory or invoices in a supply chain.

While the concept is popular due to its application in cryptocurrency blockchains as well as financial services blockchains, they can be just as useful in other areas of business, industry, or even something as mundane as tracking library books.

Blockchains can work out well to improve three things in a supply chain.

1 — Visibility

The complexity (and lack) of effective information sharing in supply chains today is what's fueling interest in the blockchain's potential to transform the logistics and supply chain industry.

The advantage of blockchain in supply chains is it can allow organizations to both share information as well as restrict access to it, all in one neat package.

You can do that through a cryptographic key – the blockchain equivalent of user credentials.

A complete blockchain record can be publicly available, but it (or a part of it) is only readable to whoever has the right key.

It's possible to give different players in your chain different read or write privileges to specific parts of your shared record. That makes it infinitely easier to share information within a supply chain network without compromising your data privacy or data security. You can be sure your 3PL knows there's a shipment to be picked up, but they won't know what's in the box unless you want them to.

2 — Trust

Because blockchain is decentralized (a single record exists simultaneously on several computers across the world) their records are tamper-proof.

Unlike a conventional database, there's no single record to edit, which means anyone trying to tamper with a shipping record needs to update it simultaneously across hundreds (or thousands!) of computers before the clock runs out.

And the clock will always run out.

Blockchain networks are simply too widespread for them to be easily hackable, and anyone cross-checking a record can tell if something's wrong simply by checking it against the copies out there. Whichever version of the copy is most prevalent, that's the right one.

For supply chains, that means an invoice, a bill of lading, or the timestamp on an electronic proof of delivery (ePOD) is genuine beyond question.

Blockchains can be used to track, log, validate, and effectively audit any exchange of goods or services in the supply chain.

Instead of a central authority overseeing and validating every operation, blockchains can execute and validate every transaction in an organization's chain, and each player's machine — from the CFO down to the loading dock manager — can monitor and verify operations throughout the supply chain.

Supported by newer developments like digital supply chain contracts — smart contracts that can execute predefined operations based on the current status of a shipment or service — several lengthy processing and authorization tasks can be automated, which also makes auditing and operational compliance easier.

3 — Optimization

With constantly updated information that's trustworthy beyond doubt, supply chains stand to gain a lot through process optimization.

Instant invoicing, instant payments, as well as fewer delays from operations that rely on lengthy physical information exchange and verification processes, these are some of the biggest advantages for block chain supply chains.

The progressive aggregation of supply chain blockchain data can also help fuel better analytics, improve the efficiency of existing processes like procurement or general logistics, as well as improve the predictive accuracy for market demand generation forecasts.

A digitized supply chain with continuous real-time visibility into the current state of affairs can make it easy to spot bottlenecks and work out iterative improvements for day-to-day operations.

Implemented properly, a blockchain enabled supply chain can integrate into existing workflows easily enough that it doesn't feel like you're overhauling operations overnight.

The changes to existing processes may be subtle, but the improvements in operational efficiencies — and savings — will be dramatic, especially when combined with real-time visibility and data analytics.

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