BLOCKCHAIN IN TRANSPORT AND LOGISTICS

April 23, 2019

Written by

Anagh Narain, Ganapathy Subramanian K V, Rajeev Kumar Ranjan

lookdeeper@exlservice.com

ABSTRACT

When a shipment moves from its origin to its destination, it takes a shipper, a carrier, and several intermediaries. But what about a future where those intermediaries – or middlemen – might become irrelevant and disappear? Enter blockchain technology.

What is a Blockchain and how is it relevant to the Logistics Industry?

Blockchain is a technology that originated out of a branch of mathematics called cryptography. While the technical details may be complex, the business use is fairly straightforward.

A blockchain is a secure, replicated and immutable shared digital ledger. This ledger relies on the consensus of a global peer network to operate. The digital ledger is essentially a series of encrypted "blocks" that are linked together in a public "chain."

Modifying the data in one block is impossible without modifying the entire chain and receiving consensus of the entire peer network.

This makes it incredibly difficult to perform malicious activity or falsify data. Once it's in the blockchain, it's pretty much in there for good.

This technology can potentially be applied to the transportation and logistics industry to correct many inefficiencies.

For example, manufacturers have a hard time finding trucks to transport their goods, and that's not because of a lack of available capacity. Truckers drive more than 29 billion miles with partial or empty truckloads.

According to the American Trucking Association, there are roughly 1.5 million trucking companies employing approximately 3.5 million truck drivers. But 90 percent of these companies have six or fewer trucks. This enormously fragmented industry struggles to match the demand from shippers with the supply of carriers.

Current State:

The need of the hour for transport and logistics companies is authenticated, secure data to consistently improve their operations. The current systems for providing and recording this data—reliant on EDIs and APIs—is subject to misinterpretation or manipulation, which can have dire consequences on the global supply chain.


Traditional Chain Supply
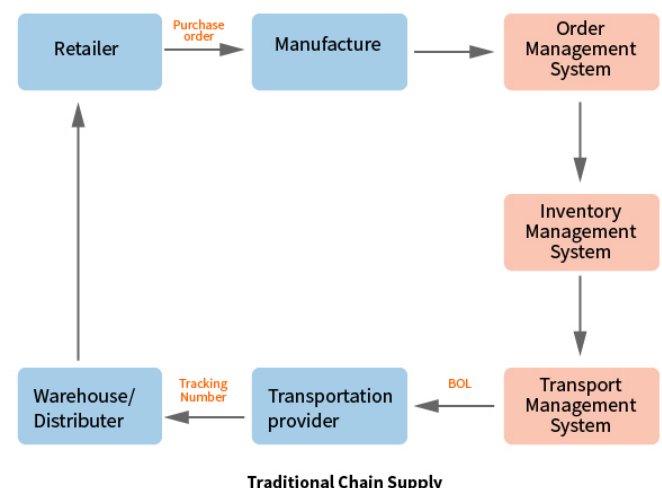
supply chain. As you can see, an additional instance of an order is created for each application where the order is entered. More times than not, orders are manually entered between applications, increasing the possibility of errors and missing information.

This problem is further aggravated when a single order is broken down into sub-shipments or when damaged orders need to be returned, making tracing an order through the value chain extremely complex and time consuming.

Future State with Blockchain

With the help of blockchain technology, none of these issues would exist to nearly the same degree.

By using the blockchain for data authentication, the entire network can contribute and validate data, making the system no longer subject to tampering.
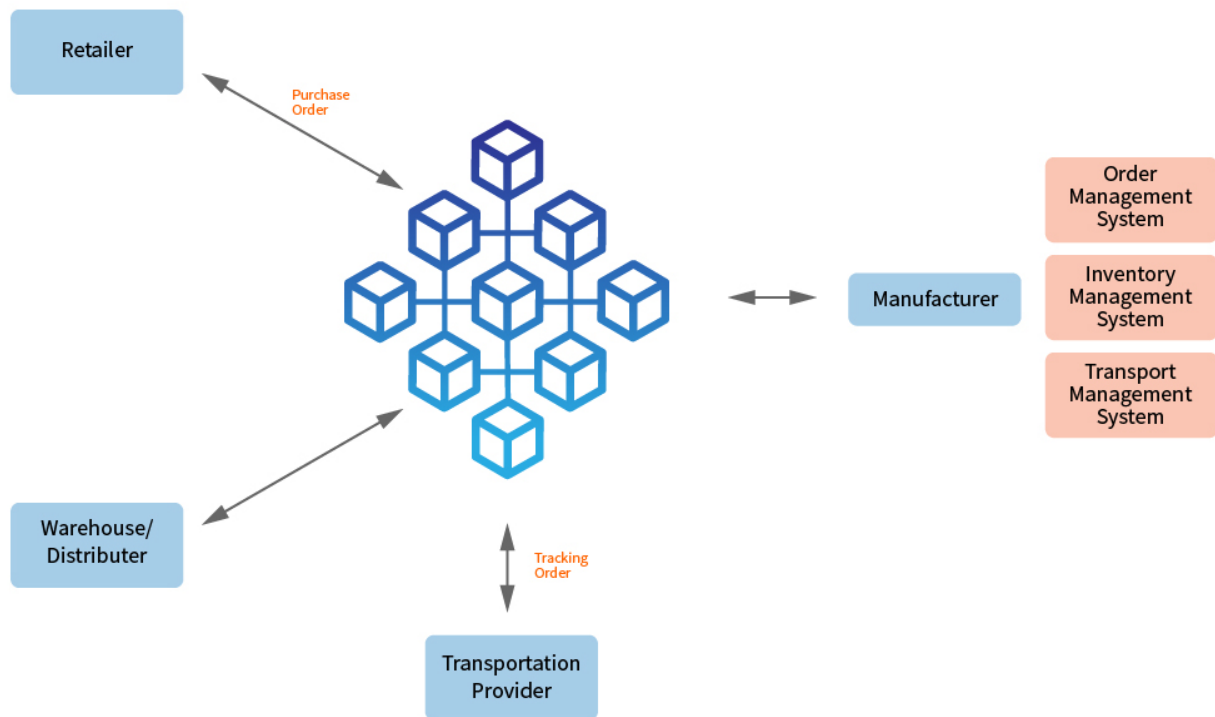
Chain Supply Using Blockchain

The above process diagram imagines the supply chain if Blockchain technology is implemented and shared by all entities in the value chain. Blockchain technology eliminates redundancy by having a single source of truth. Any additional information is appended to the original entry of the blockchain. For example, the tracking number can be added to the entry of the order in the blockchain.

Sometimes brilliant ideas cannot be implemented because technology to support that does not exist. Fortunately, this isn't the case for blockchain. Since blockchain comes after the cloud revolution, many

organizations won't need to invest in expensive hardware to start using blockchain-related solutions right away.

Current Blockchain Adoption in the Logistics Industry

While the applications of blockchain in some industries may not be obvious, its uses in the trucking industry are readily apparent. In fact, a new consortium called the Blockchain in Transport Alliance (BiTA) is working to apply blockchain to solve some of the most unyielding problems in trucking.

Companies hailing from each piece of the transport and logistics supply chain have joined BiTA, including UPS, Salesforce, EXL Service, DAT, Don Hummer Trucking and about 1,000 more members.

As a standards organization, BiTA aims to create a common framework to spur the development of blockchain applications for logistics management, asset tracking, transaction processing, and more.

Some companies opted to pilot blockchain projects.

- A large diamond company uses blockchain technology to track stones from the point they are mined right up to the point when they are sold to consumers. This ensures the company avoids 'conflict' or 'blood diamonds', and assures the consumers that they are buying the genuine article.

- A major mining giant plans to use blockchain to easily track and record data throughout their mining process with its vendors. This will make the process more efficient within the organization, as well as allow them to be more transparent in communicating with their partners.

- A multinational chain of supermarkets uses blockchain to keep track of meat sourced from Asia including where each piece of meat came from, where it was processed, how long it was stored for and what was its expiry date.

What are Smart Contracts in Blockchain?

Smart Contracts may be the single most impactful blockchain enabled feature to the freight industry. They are essentially self-executing tasks that are coded through the blockchain and executed only when a certain condition is met.

For example, say a company wants to pay its transportation company after a shipment reaches its destination. A smart contract can be created that automatically transfers the money once the package reaches a specified GPS coordinate.

The current paper-based systems of supply chains are extremely inefficient. When documents have to pass through multiple parties, the chances of errors, loss and fraud significantly increase.

Using blockchain, smart contracts could completely eliminate the need for all of these administrative steps, cutting costs and virtually removing all possibilities for error.

Taking into account the fact that administrative costs add up to almost 20% of the overall costs of transportation, the dollar impact of using smart contracts can be very significant.

Can Blockchain be paired with Internet of Things?

The Internet of Things (IoT) essentially extends the ability to exchange data with the internet from just computers and smartphones to a wide range of traditionally non-connected everyday objects. For example, consider internet-enabled GPS sensors in trucks or security cameras that connect to wireless networks.

The software component of these smart devices are vulnerable to hacks. Programs are written by people and can be tampered with; data can also be modified. How do we ensure that it is true from the source?

The solution is to upload true data to the chain, making it is tamper resistant.

Blockchain, with the help of innovations in IoT, can be particularly useful for capacity monitoring.

Volume often drives the cost of shipping freight. By using IoT sensors in trucks and other shipping vehicles, shippers and transportation companies can detect the amount of space taken and determine price accordingly. This volume information and the trusted source of that information can all be stored on the blockchain.

EXAMPLE:

8.5% of sensitive pharmaceutical shipments experience temperature deviations. Many of these shipments become too damaged to get to market.

With the use of blockchain enabled IoT sensors, a Swiss firm was able to create air freight containers for refrigerated biopharmaceuticals that monitor temperature, humidity and location and bring their temperature-deviation rate down to less than 0.1%.

Therefore, Blockchain provides a trusted source of data regarding the environmental controls on freight containers.

Seven Reasons to Implement Blockchain in the Supply Chain Industry

The main benefits of using blockchain in the supply chain industry can be summarized in seven points:

1. **Breaks Down Silos** – Increased transparency is the largest benefit of blockchain. A distributed ledger helps break down walls and redundancy between different parts of the supply chain.
2. **Better Traceability** – Since blockchain can trace updates throughout the value chain and across all processes, it provides rich information about the product at every step of its lifecycle including the manufacturing, supplying, logistics, distribution, and other details.
3. **Faster Payments, Easier Audits** – With so many intermediaries involved, payment processing can

take a lot of time, tying up cash which could have been used elsewhere. The payments processed may also have errors, and auditing may not identify all of the potential overbillings or overpayments as well. Such problems are easier to diagnose with blockchain technology, as it keeps track of all transactions in a central and simplified manner. Smart contracts can also help reduce delay and errors to almost zero.

4. **Easier Identification of Attempted Fraud** – Large amounts of data is created every second. It can be very difficult to scour through so much data when trying to audit for fraud. Blockchain make it impossible to make changes to past transactions, as even the slightest changes completely change the signature of the data. To the extent that alterations stick out like a sore thumb, they will be impossible to go unnoticed. This will allow companies to better recognize fraud and who initiated the change almost immediately, further driving down costs from poor employee practices or even potential fraud attempts.
5. **Greater Consumer Trust** – Customers will have better visibility into the origins and lifecycle of the products they purchase, hence developing increased trust. Blockchain can also help a company provide realistic delivery expectations for its truck drivers and more.
6. **Real-Time Feedback From Consumers** – The benefits of blockchain technology also include how customers respond to products. For example, a customer may seek to place future orders on produce when it drops below a specified rate after purchasing food items that were prepared with produce from a given farm. In addition, this feedback will be connected to the information of the supplier and manufacturer, which will help the supply chain create more accurate forecasts in real time.
7. **Better Scalability** – This benefit is actually a compounding benefit of real-time feedback, but it

is extremely important to denote how blockchain technology enables scalability for parts of the supply chain. Blockchain technology can be used to identify potential trends, and help an organization prepare to grow a business to respond to possible uptick in demand.

Challenges with Blockchain

The transportation industry will likely encounter a few challenges on the road to successfully implementing blockchain:

DATA STANDARDIZATION:

Getting one of the world's most fragmented and conventional industries to trust a new online network and embrace data standardization will take a lot of time and iteration. Data standardization is not easy. For example, electronic data interchange (EDI) is a standard in the logistics industry that has been around for more than 30 years, but there is no single overall EDI standard. Different companies use different versions of EDI, which results in very meticulous and time-consuming integration and development work before companies can collaborate. Each member in the blockchain must agree on how to characterize their data, including information such as the details every Bill of Lading must. BiTA is getting in front of this problem, discussing these standardization questions from the beginning.

DATA PRIVACY:

As blockchains are immutable, they cannot be changed. With greater emphasis on data privacy and the Right to Be Forgotten as per regulations such as GDPR and CCPA, some provisions would need to be built in to protect consumer data, and even delete it if required. Blockchain's immutability also becomes a concern as 100% percent correct data is rarely entered in the real world.

TECHNICAL CHALLENGES:

Blockchain's latency, or the time it takes to get all of the verifications created and replicated, still needs to be improved as it is not instantaneous.

There is a private and a public key to every blockchain transaction to control access to the information. If the private key that your organization has gets damaged, that blockchain is then lost. It is no longer verifiable.

How to Get Your Organization Ready for Blockchain

Blockchain is still in its infancy and holds great promise. Still, there are steps organizations can take today to ensure they are ready to take full advantage of blockchain.

- Participate in or monitor the standards from BiTA or other such groups. These groups are shaping the future of Blockchain in the transportation industry. There is no better way to ensure this technology suits your needs than being part of its development.

- Participate in a proof of concept or specific use implementation. As mentioned in the examples above, blockchain is already making a significant impact in the food and pharmaceutical supply chains.

- Find out from your vendors of systems (such as Transport Management System, Warehouse Management System, Enterprise Resource Planning) their roadmap for blockchain support and implementation. You vendors should already have a plan and vision for how blockchain can improve their products.

In conclusion, blockchain has tremendous potential in the transportation and logistics industry. Blockchain still needs time to mature before becoming ubiquitous. At the same time, organizations need to start thinking about and planning their Blockchain strategy now.

How far away is the industry from a matured implementation of blockchain? Most industry leaders

believe blockchain will gain critical mass in two to five years. As far as technology goes, blockchain will probably impact transportation and logistics companies long before fully autonomous trucks do, making it an important focus for these companies.

References

- https://www.winnesota.com/blockchain

- https://info.tmwsystems.com/blockchain-technology#blockchaindef

- https://www.forbes.com/sites/bernardmarr/2018/03/23/how-blockchain-will-transform-the-supply-chain-and-logistics-industry/#5acc218f5fec

- https://www.waltonchain.org/en/Uploads/2018-12-10/5c0e41aa64a69.pdf

- https://techcrunch.com/2018/03/02/blockchain-will-work-in-trucking-but-only-if-these-three-things-happen/

- https://www.ttnews.com/articles/blockchain-trucking

- https://medium.com/@preethikasireddy/eli5-what-do-we-mean-by-blockchains-are-trustless-aa420635d5f6

- https://www.fleetowner.com/electronic-security/blockchain-trucking-what-about-middlemen

- https://cerasis.com/2016/06/29/blockchain-technology/

EXL (NASDAQ: EXLS) is a leading operations management and analytics company that designs and enables agile, customer-centric operating models to help businesses enhance revenue growth and profitability. Our delivery model provides market-leading business outcomes using EXL's proprietary Digital EXLerator Framework™, cutting-edge analytics, digital transformation and domain expertise. At EXL, we look deeper to help companies improve global operations, enhance data-driven insights, increase customer satisfaction, and manage risk and compliance. EXL serves the insurance, healthcare, banking and financial services, utilities, travel, transportation and logistics industries. Headquartered in New York, New York, EXL has more than 29,000 professionals in locations throughout the United States, Europe, Asia (primarily India and Philippines), Latin America, Australia and South Africa.

This article is not intended to constitute legal, compliance, regulatory, privacy or similar professional advice, and EXL does not provide services to clients in those areas. The reader is advised to engage experts to provide professional advice on any legal, compliance, regulatory or privacy topics covered herein. For more information, see www.exlservice.com/legal-disclaimer

EXL

GLOBAL HEADQUARTERS

280 Park Avenue, 38th Floor
New York, New York 10017
T +1 212.277.7100   F +1 212.771.7111

United States • United Kingdom • Australia •
Bulgaria • Colombia • Czech Republic • India
Philippines • Romania • South Africa

EXLSERVICE.COM
lookdeeper@exlservice.com