An Introduction to Blockchain Technology in Logistics

Benefits, Use Cases & Why the Industry Needs Standards

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Blockchain, which first entered our lexicon with the arrival of cryptocurrencies like Bitcoin in 2008, is now a technology that promises to transform entire industries.

Blockchain technology is considered by many to have as much promise as AI (artificial intelligence) or machine learning. Private and public companies, colleges and universities, and government agencies are all working quickly to leverage blockchain technology's potential.

For the logistics industry, blockchain is promising to create transparency of all documents and transactions across the freight landscape, ultimately increasing the efficiency, agility and innovation of supply chains.

**Blockchain Can Solve Logistics Inefficiencies**

Every day, shippers, carriers, brokers and other logistics professionals must navigate a plethora of options and “what if” scenarios when sending a truckload of goods across the country, all while documenting each step of the journey with detailed paperwork. The current process of moving goods from origin to destination is complex and lacking a single source of truth to store and track all transactions and constituents involved.

Blockchain technology is particularly adept at simplifying complex and fragmented processes—like those that are commonly found within the logistics and supply chain industry. Blockchain facilitates the process of recording transactions, tracking assets, while creating a transparent and efficient system for managing all documents involved in the logistics process.

Companies across the trucking industry have coalesced to help shape and direct blockchain adoption in transportation and logistics. BiTA, which stands for Blockchain in Transport Alliance, includes the industry’s leading 3PLs (GlobalTranz is a member), carriers, freight brokers, shippers, and technology firms.

BiTA’s goal is to accelerate blockchain adoption in the industry and increase efficiency and transparency for the logistics and transportation space. BiTA will ultimately create essential blockchain standards.
How Blockchain Technology Works

Blockchain is a distributed ledger that digitally records transaction history between parties. Information gets stored in blocks of data that are “chained” together. Each data block added to a chain is date stamped, unique and encrypted, which makes it unalterable. Information in a blockchain can’t be hacked or counterfeited and is immediately “trusted,” and therefore, accepted by anyone with access to a chain.

Blockchain technology helps companies implement smart contracts—computer code hosted on a blockchain that defines and executes the terms of an agreement between parties.

In the typical scenario of shipping goods, numerous parties are involved—shippers, 3PLs, carriers and consignees. For every shipment, transactions and documents get executed and saved—BOLs (bills of lading), invoices, PODs (proof of delivery) and more. Each transaction becomes a permanent ledger record that’s easily validated by anyone with access to the chain. Using data from a blockchain, the network members can validate the block or payload of the transaction, creating a transparent and efficient system for managing all documents and transactions involved in the logistics and supply chain process.
10 Benefits of Blockchain in Logistics

With input from its member companies, BiTA (Blockchain in Transport Alliance) has identified several immediate benefits of implementing blockchain technology within the transportation and logistics industry:

1. Monitors Performance History
   Monitoring the performance history of carriers and other suppliers through a blockchain framework allows parties to see evidence of past performance, including on-time deliveries, on-time pickups and more.

2. Maintains History of High-Value Assets
   Having a trustless and accurate record of asset history is imperative to ensure it complies with safety standards from factory floor to delivery.

3. Improves Quality Assurance
   Every authorized member involved in a transaction can access critical data to validate its milestones. Evaluating freight at pick-up and delivery locations reduces unsubstantiated disputes.

4. Improves Compliance
   Blockchain and ELDs (electronic logging devices) are a natural pair. ELDs can send a stream of driver behavior and route data to a blockchain in real-time. Pairing this information with traffic data and weather data gives carriers and shippers a tool to improve routing.

5. Monitors Real-Time Freight Capacity
   In trucking, available capacity can change by the hour. Through blockchain transparency, you will know when and where capacity opens.
6. Improves Payments and Pricing Processes
Payment processing and settlement is secure in a blockchain, and transaction information is easily accessible, providing shippers with more data to determine rates.

7. Detects Fraud
Every transaction that takes place on a blockchain is visible to everyone on the network. Nothing can be removed without it being detected. This transparency obviates the areas where fraud occurs, such as double brokering. Through the common practice of notarization and nonrepudiation, shippers can securely track the creation and modification time of a document or transaction — confirming authenticity.

8. Prevents Theft
A blockchain can contain detailed information and rules, such as photo ID requirements for pick-up and delivery. Added precautions improve security, reduce freight theft and enable secure transfer of titles.

9. Proves Provenance
Provenance ensures that every shipped good includes a digital "passport" that proves its authenticity. These so-called passports include essential data such as where and when the product was manufactured and what steps it took throughout its journey.

10. Allows You to Issue Smart Contracts
The ability to issue smart contracts is considered by many to be the Holy Grail of blockchain technology. Smart contracts are enormous time and money savers. Says Entrepreneur, “With smart contracts, agreements can be automatically validated, signed and enforced through a blockchain construct.”
Barriers to Widespread Blockchain Adoption

Despite a large number of industries impacted by blockchain advances, there are still a handful of concerns that are slowing the technology's widespread adoption. Here are common barriers:

- **Lack of standards**: For blockchain systems to succeed, all constituents must agree to the characterizations of their data. For example, what details will every BOL, POD or invoice contain? And what actions should trigger if data is missing or not validated?
- **Cost**: Developing and maintaining software and hardware required to run blockchain technology can be expensive. Companies also need technically qualified people to run blockchain technology, which can be a significant cost.
- **Legacy system integration**: Companies must integrate blockchain technology into their legacy systems, which could include everything from an ERP to a TMS. According to Nasdaq.com, many organizations are reluctant to make a move to blockchain because of the planning, time and money required to be successful.
- **Maturity**: Blockchain is an emerging technology. While many are talking about the expected prominent impact it will have, blockchain's power is still uncertain and the market has very few standards or industry specifications for the adoption and use.

We Need Standards to Advance Blockchain Technology

Experts agree that one factor necessary for the advancement of blockchain technology within any industry is the creation of standards. Today, BiTA is the vanguard leading blockchain standards creation in the transportation and logistics industry. BiTA is actively working with its members (GlobalTranz is a founding member) investigating use cases and developing common framework for which the logistics industry can build revolutionary blockchain applications.

While it’s difficult to predict exactly when the logistics industry will experience wide-scale blockchain adoption, in the meantime, you can help by getting involved and watching for opportunities to pilot programs within your logistics operations and supply chains.
**Glossary of Blockchain Terms in Logistics**

**Distributed Ledger**
A type of database that is shared, replicated and synchronized among the members of a decentralized network. The distributed ledger records the transactions, such as the exchange of assets or data, among the participants in the network. ([ibm.com](https://www.ibm.com))

**Immutable**
Unchanging over time or unable to be changed. Once data has been written to a blockchain, no one, not even a system administrator, can change it. ([bitsonblocks.net](https://bitsonblocks.net))

**Nonrepudiation**
A method of guaranteeing message transmission between parties via digital signature and/or encryption. ([techopedia.com](https://www.techopedia.com))

**Provenance**
Enables every physical product to come with a digital 'passport' that proves authenticity (is this product what it claims to be?) and origin (where does this product come from?), creating an auditable record of the journey behind all physical products. ([Provenance.org](https://www.provenance.org))

**Smart contracts**
Computer protocols that facilitate, verify, or enforce the negotiation or performance of a contract, or that obviate the need for a contractual clause. Smart contracts usually also have a user interface and often emulate the logic of contractual clauses. Proponents of smart contracts claim that many kinds of contractual clauses may thus be made partially or fully self-executing, self-enforcing, or both. Smart contracts aim to provide security superior to traditional contract law and to reduce other transaction costs associated with contracting. ([blockchainhub.net](https://www.blockchainhub.net))

**More Blockchain Terms**

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**References:**
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- BiTA (Blockchain in Transport Alliance) website: https://bita.studio
- "Genius of Things: Blockchain and Food Safety with IBM and Walmart," IBM Video, 2017: https://www.youtube.com/watch?v=MMOF0G_2H0A

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