

Use of Blockchain and IoT such as smart container system

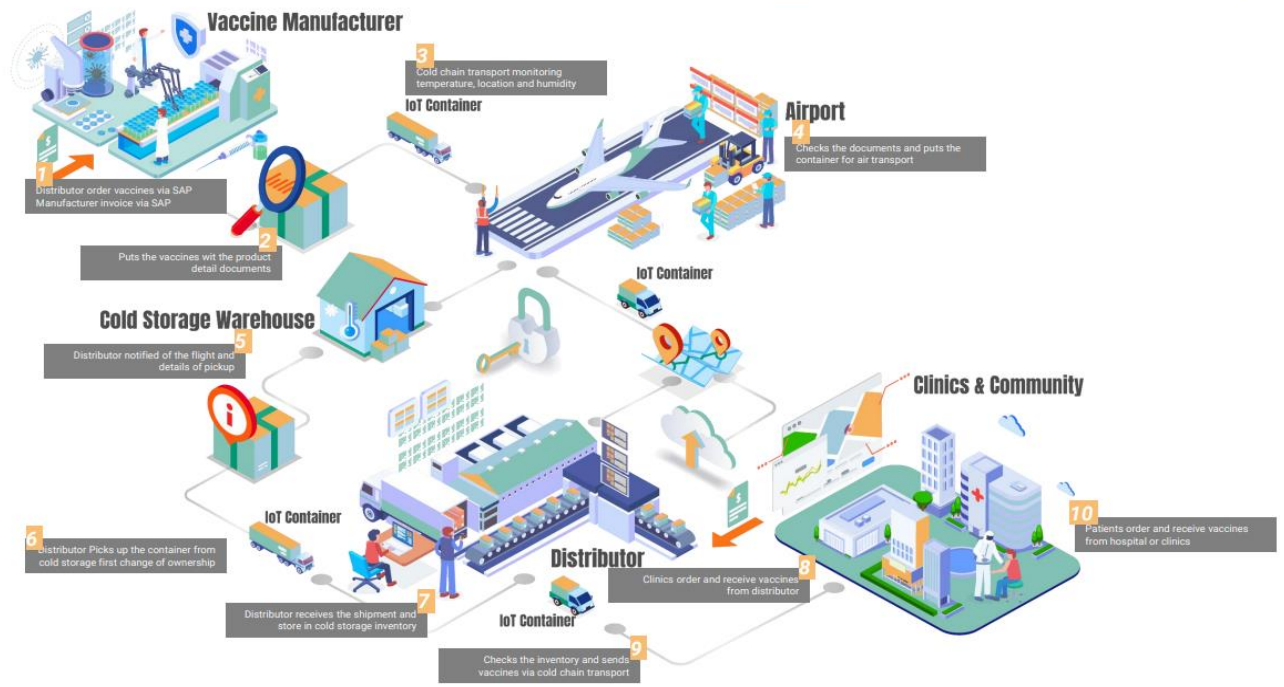
Using blockchain to trace products is especially promising for certain industries, including the temperature-sensitive pharmaceutical and healthcare products (including covid-19 vaccine figure 1.0 below), cold chain food categories, high-value fashion and other regulated products industries.

Certain benefits of using blockchain for global supply chain management is the ability to manage and track timing of raw materials and sub-components in the production process. Supply chain management systems may be configured to monitor and generate notifications and scheduling updates based on updates to the blockchain to help manufacturers and distributors with production and distribution timing and cost projections.

Tracing Challenges and Blockchain Solutions

- **Unintegrated Legacy Digital Systems.** Even if a company already uses a digital system for tracking products, that system may not integrate with different digital systems used by other members of the applicable supply chain. Helpfully, blockchain can lie on top of these enterprise applications and provide the connection between them. Blockchain can integrate enterprise resource planning systems, customer relationship management systems, warehouse management systems, and manufacturing execution systems to increase transparency of the supply chain and reduce the cost of tracking products and running reports.
- **Inconsistent and Duplicative Records.** Because companies in a supply chain tend to keep their own records using centralized databases, these companies frequently have duplicate copies of, or inconsistent records relating to, the same transaction. In contrast, blockchain stores information on an immutable, decentralized ledger accessible by all members of the supply chain. This structure allows all members of the supply chain to have eyes on the same data and to have confidence that the data is accurate. Ultimately, companies can use blockchain to **reduce costs** associated with reconciling records across the supply chain.
- **Root Cause Determinations.** In order to identify product shortages and defects, companies typically audit supply chain partners. However, while auditing helps determine if a problem exists, it is less adept at determining the root cause of that problem. For instance, an audit of inventory held by a warehouse could reveal missing product, but the audit may not reveal the reason the product went missing. Did a stocker misplace the product after it arrived at the warehouse? Did a warehouse employee make an error in tracking product quantities?

Having all members of a supply chain participate in a blockchain solution would assist in the determination of root cause because the blockchain process affixes a timestamp to every transaction entered onto the blockchain, and the transaction history is immutable. Blockchain technology can automatically provide visibility into all stages of the supply chain, allowing for decreases in the costs of labor-intensive in-person auditing.



Use of Blockchain and IoT with AI