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In theory, anyone, anywhere can use a blockchain to transmit data securely. Instead of linear, batch-oriented transactions, a blockchain has complex transaction validation requirements that usually involve multiple parties. This effectively eliminates the single point of failure (i.e. no single point to hack into) of traditional data exchange systems.

Additionally, information is immutable, meaning it cannot be modified or deleted. All parties have visibility into what is replicated, shared, and synchronized across multiple geographic locations. This structure makes the data less vulnerable and more trustworthy.

Blockchain also supports “smart” contracts, meaning the automated execution of terms, conditions, and business rules. Through this feature, trading partners can automatically enforce terms and conditions as previously defined, eliminating the errors and inefficiencies associated with the current manual processes based on legacy systems. A trading partner is prevented from writing a business transaction to the blockchain ledger that is outside of the rules specified in the smart contract, which could lead to fewer item substitutions in the supply chain, more certainty around what is being shipped and when, and fewer discrepancies downstream.

#### **ENTERPRISE BLOCKCHAIN DATA SHARING**

Blockchain terminology might be confusing, especially when media articles or social networks refer to terms like “mining” and “consensus” with relation to blockchain. These are words commonly connected to the public use of blockchain for cryptocurrency, such as bitcoin or ethereum.

On a public blockchain, “mining” refers to a reward system that awards a token of some sort to participants that validate transactions through a complicated “consensus” algorithm. This means that all parties involved in the distributed ledger have the ability to validate information anonymously. If enough parties (could be in the thousands) agree the information is valid, it is permissioned to be exchanged.

While you may personally have aspirations to join the ranks of Tyler and Cameron Winklevoss and the rest of the emerging group of “bitcoin billionaires,” these two principles are largely eschewed for enterprise blockchain purposes. The fact is public blockchains are large, expensive, slow databases that are too anonymous and open to work for supply chain. But since public blockchains have been in operation for several years, technology providers including IBM, Microsoft, and several industry-specific startups are taking the best parts of what works and creating a fast, secure and manageable space for enterprise use.

An enterprise blockchain is generally an index that references off-chain data that will be maintained in traditional data stores and leveraged by business applications that support complex features and processes. This helps keep the size of the ledger reasonable, and enables fast sharing of information about events and contracts.

Data that is familiar to supply chain business applications could be shared in an enterprise blockchain ledger, such as event data, transactional data, and even master product data. Pointers to data (or “hashes” of that data) may also be shared in an enterprise blockchain ledger. The ledger is also able to prove through pointers and hashes that the off-chain data was not tampered with.

## About CSCMP Hot Topics

Issues of *CSCMP Hot Topics* may include early results from ongoing research being conducted for CSCMP or other organizations; new supply chain practices, thought-provoking ideas, or emerging trends; discussions of changes in the broader business and regulatory environment that may impact the supply chain and logistics field.



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## SUPPLY CHAIN STANDARDS AND BLOCKCHAIN

At this early stage of blockchain's maturity in supply chain, pilot programs are key to revealing the technology's most useful applications. They are also underscoring what many in the supply chain profession have believed to be true since blockchain entered the lexicon—interoperability is essential now more than ever.

Take, for instance, Walmart's highly publicized pilot program to improve food safety. The retailer's blockchain pilot involves the traceability of mangoes from Mexico to the U.S. in order to speed up a food recall. Pallets of mangoes originating from a farm in Mexico were tagged with numeric identifiers. Every time the product made stops throughout the supply chain, their status was updated on the blockchain ledger. After the pilot was completed, Walmart was able to access all relevant traceability information in seconds, compared to what historically would take a week to procure.

Now we are starting to see consumer packaged goods companies like Coca-Cola test blockchain for even more specific use cases—in their case, the tracing of records to ensure fair wages for workers in its sugar supply chain. Other major companies, including Cargill, are experimenting with blockchain for product information transparency. Last Thanksgiving, information collected through a blockchain pilot was available on Cargill's website for consumers to trace their turkeys back through their supply chain journeys to the exact farm where the turkey was raised.

DHL recently worked with Accenture on a report describing how blockchain can be applied to many different industries, most notably to the pharmaceutical industry, where counterfeit medications account for up to 30% of pharmaceutical products sold in emerging markets. They concluded that blockchain success depends on all parties working together to transform legacy processes and to jointly adopt new ways of creating logistics value.

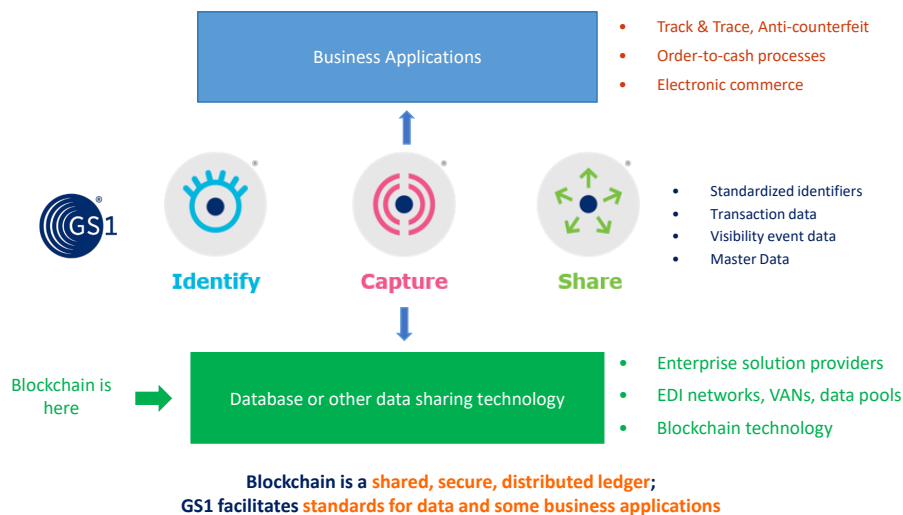
Forward-thinking companies that are already leveraging the common language of GSI Standards as a foundation for supply chain visibility will be best positioned to reap the benefits of blockchain. Thousands of organizations are using standards today to meet the needs of consumers, who are driving forward a rate of change like never before. In just 10 short years, consumers have become empowered through technology to ask important questions about their products—how was this made? Where did it come from? What is the environmental impact? They expect industry to have answers readily available and they reward the companies that deliver. In fact, a recent consumer survey from Label Insight found that 94 percent of respondents were likely to be loyal to a brand that offers complete transparency.

Standards have demonstrated their value for decades to not only create efficiencies, but also to align trading partners to make innovation possible. Pilot organizations will need to adopt standards as best business practices before distributed ledgers will bring the expected value—they are the basic building blocks of supply chain visibility that need to be in place before you build a blockchain.

Standards creates an ecosystem of platforms, applications, and networks that securely links people, places, and things. For several decades, GSI Standards have been woven into the fabric of supply chain operations, supporting key innovations in e-commerce and omnichannel scalability, automating order-to-cash processes, and adding layers of product identification that helps combat the circulation of

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counterfeit goods. With all of these standards available, the industry is taking a crucial first step that can lead to a truly profitable implementation of blockchain in the future.



Ultimately, blockchain is in its infancy but represents a truly exciting acceleration of data management best practices that can benefit nearly every corner of the supply chain world. As the supply chain evolves to become truly more consumer-centric, education at this time is crucial to separate fact from fiction. Take the necessary steps now to learn how the existing framework can be leveraged and extended for future success.

*Melanie Nuce, senior vice president, corporate development, GS1 US, has more than 20 years of experience in retail technology. She oversees a team that investigates new technologies, partnerships and investment opportunities to increase the relevance and reach of GS1 Standards in e-commerce, mobile, social media and supply chain business processes. More information is available at [www.gs1us.org](http://www.gs1us.org).*



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