The ever-present problem faced by companies that serve a market with products and depend on multiple suppliers as part of an extended value chain is a lack of transparency and accountability across these increasingly complex supply chains. For years, it has been difficult for supply chain trading partners to effectively plan, collaborate, monitor, and execute commerce with their trading partners on a consistent basis across all levels of interaction.

While core commercial transactions such as purchase orders or invoices are effectively exchanged, in many cases, managing the variability, reconciliation, accountability, and security around these exchanges has not really been addressed. In fact, upon closer inspection, most interactions between the extended supply chain largely have never moved out of spreadsheets.

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Bumps, Cracks and Opportunities

Lora Cecere, CONTRIBUTOR
Lora Cecere is the Founder of Supply Chain Insights.
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Bumps in the road? Cracks in the armor? Opportunities to do better? Yes, I think so. This week, I worked with nine manufacturing clients that have something in common. What? Each manufacturing company has spent millions on the implementation of SAP and JDA supply chain planning software, and they don't use it. Instead, the planning for these large companies is being done in spreadsheets. It is a dirty little secret in the industry. People pretend

Here Comes Blockchain

Increasing global competition and the drive towards "digital" is elevating the need for data and process alignment in the extended supply chain. If you look at the process inputs needed to align your extended supply chain, there are many including internal and external transactional data sources, calculations for dependent data, human input, and other business process information. A key point—all of this data is constantly evolving over time with multiple parties working separately but in need of a common data view for their unique supply chain process.
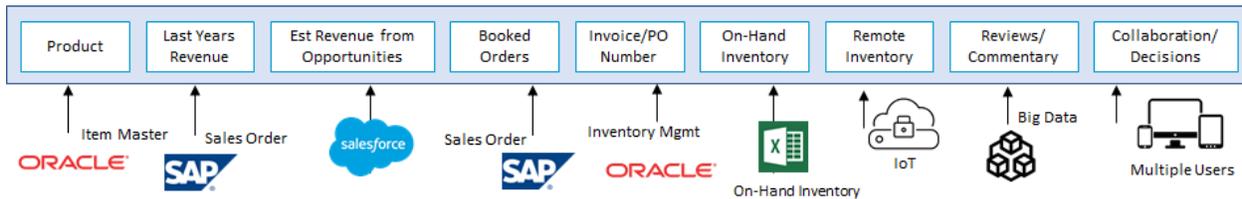
Traditional database technology does a poor job integrating all these multiple data sources into a single data environment because data used in a traditional database needs to be defined before it can be utilized in an application. It also does not support multi-party collaboration from a usability perspective because multiple people or operations cannot make changes to different parts of the same related data at the same time. In addition, the security of these transactional exchanges over time between parties has never really gone beyond exchanging POs and invoices using email or EDI systems with the hope that the reconciliation comes out right.

Blockchain is evolving from its roots in Bitcoin to a technology platform that supports secure, immutable transactions for public and private business networks. Instead of each participant in a business network maintaining their own data view of the business transaction, Blockchain provides a distributed ledger that reflects the state of the transaction process itself as all parties enter their secure transactions into the chain. It can also be extended to support private contracts that trigger transactions against a set of predefined and agreed upon triggers. While Blockchain provides immutable transaction control, many of the challenges around data alignment outlined above are not eliminated. Blockchain enabled application platforms, both private and open source, need capabilities that address both data integration and alignment plus transaction verification.

Boardwalktech & Blockchain

Boardwalktech is a technology company with patented software (Boardwalk) that mirrors many of the characteristics of Blockchain technology. Unlike traditional database technologies, Boardwalk is a neutral, single schema database that manages atomic units (cells - instead of records with fields). Central to the Boardwalk technology is the versioning of cell-level changes when a user or external system submits a change via a UI or through integration. Only the cells that have changed are exchanged between clients and server and every transaction or submit/refresh has an audit trail. All updates are inserts (there are no updates – much like the Blockchain ledger system) and a new version of the changed cells is created and given an immutable transaction ID.

Boardwalk also has the ability to bring data from external systems into the Boardwalk data environment without having to do the traditional data definition work. This enables Boardwalk to be integrated with the extended digital enterprise, and for application data to be available across multiple platforms and devices within a secure, controlled application environment. This solves many of the data alignment challenges mentioned above.

While permissioned Blockchains allow for restricting consensus participants for the transaction verification process, Boardwalk extends the notion of permissions to include business process access control enabling participants to play different roles with different access control rights within a given business network. It also supports multiple people working on the data at the same time with no locking. In effect, Boardwalk operates like a distributed ledger mirroring the private Blockchain by modeling the business networks' rules, states, workflow, contracts and access control rights—capabilities required to support "smart contracts" in Blockchain.

Finally, Boardwalk links the business network with Blockchain through its unique transaction ID. Grouped cells of enterprise information which carry a specific temporal transaction ID can be delivered into a private Blockchain environment which can return a corresponding Blockchain transaction ID creating a transaction that is specific to the grouped cells of data and is verified, trusted, and immutable. Boardwalk can effectively transform a cooperative business network into a trusted exchange between supply chain trading partners working within a Blockchain environment.

Health Care Use Case

Consider the flow of goods and services within a health care supply chain system. Boardwalktech provides a data environment which can address the collaborative needs of each member of the supply chain and can integrate all the disparate data elements for a common supply chain ledger used to manage the time-based evolution of the data. As members interact and evolve this shared business environment, all updates are assigned an immutable transaction ID as the changes are inserted into the database, the changes are available to other users based on process access control and security definitions, and all changes are auditable.
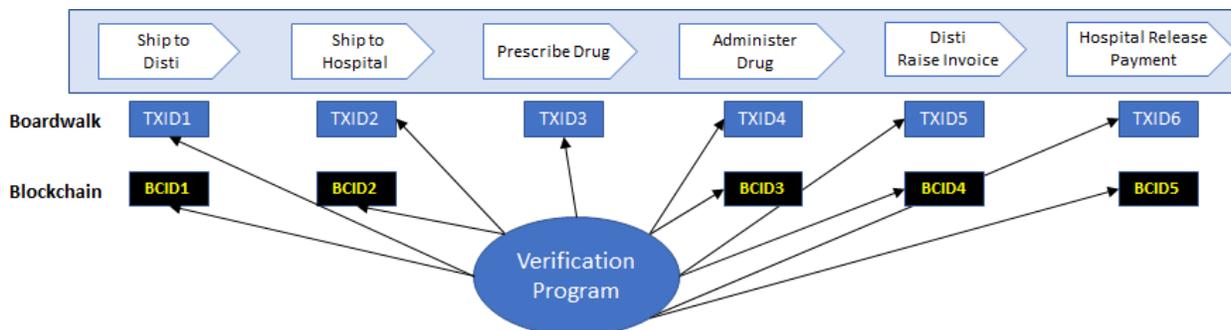
Boardwalk extends the private Blockchain by allowing users to attach digital tokens to the terms for payment and certification of delivery of intermediate goods and services along the production, shipping, and consumption phases of a supply chain as title to them passes between different players. At each transactional step which requires validation, Blockchain provides a Blockchain transaction ID which can be combined into the business data stream with the Boardwalk transaction ID providing an independent and permanent/immutable validation of each attribute or transaction.

Flexible, Validated, Trusted, Smart Supply Chain Interactions

By combining Boardwalktech's flexible, temporal data management environment with Blockchain's trust and validation capabilities, you end up with dynamic "smart contract" enabled demand chains in place of rigid supply chains, resulting in a more efficient environment. The combined Boardwalktech and Blockchain environment provides a powerful system for facilitating more efficient trade, establishing trust, supporting enhanced selective transparency, and enabling better control for businesses and their customers.