# A universal model for selectively permissioned blockchain for all the supply chains

The growth of merkle chain based hashes to record, store and selectively disclose details of transactions and other data have enormous potential to rejuvenate the supply chains badly damaged by successive global crisis.

The problem solved in this juncture by this model of the blockchain provides the following advantages :

Immutable transactions.

Instantaneous settlements

Instantaneous transmission of compliance status

Instantaneous availability of records for inspecting regulators or auditors

Highly efficient for all participants in the blockchain.

Obviously the more open the blockchain is, the greater the use for the supply chain.

Current supply chain information systems are fragmented, inefficient and wasteful. For example, to compare, take a particular area: Vendor management platform. Currently these are bulky, slothful and expensive for what they can deliver.

Current Inefficient Vendor Management Platforms.

Inefficient: Current vendor management platforms are a wasteful resource, require multiple submissions, are highly redundant and wasteful.

Provenance: Provenance of data in current practice is for flow of data only through shared databases or peer-to-peer transmission of the data. Distant players in the supply chain cannot directly check authenticity of data – it is cumbersome at best, highly disorganized as matter of fact, and lacks provenance at its worst.

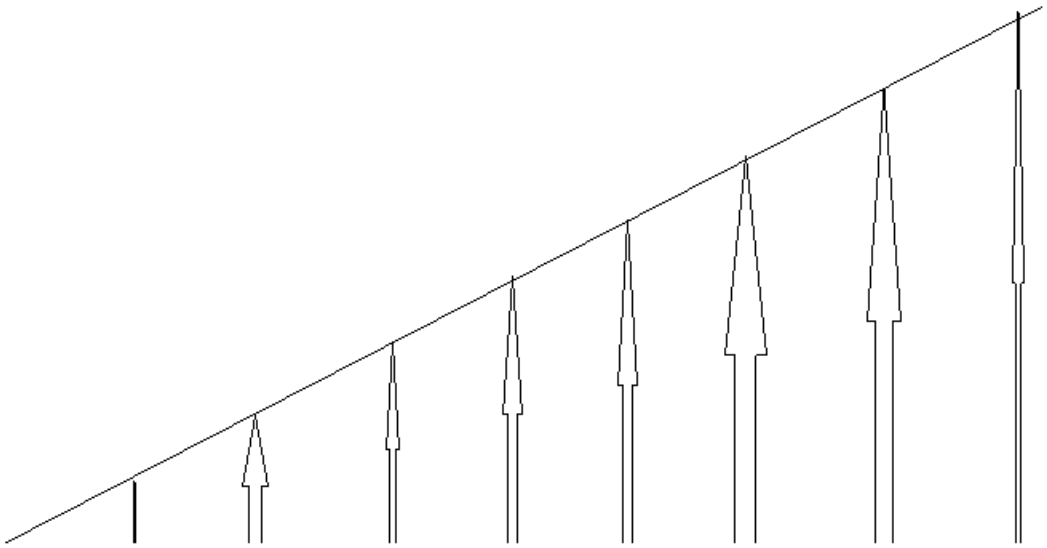
Data not where it can be used: Silo-ing of data is common in current vendor management platforms. Thus data is not readily available for PLM and waste reduction strategy implementations.

Costly: Current vendor management platforms are very costly and slothful.

False claims: Current vendor management platforms, lacking transparency make multiple false claims.

Not scalable: Current vendor management platforms do not scale up well, but rather linearly.

The blockchain Model: The blockchain as propagated from individual transactions-



Individual supply chain transactions recorded on the blockchain

The picture shows the propagation of the blockchain with upward arrows indicating the transactions that are recorded and the incline is the merkle chain, as at each point of intersection, the new hash is based on the previous hash and the new transaction hash. Speed is ensured by just computing the hash a single time. In a permissioned blockchain these transactions are signed using the private key-public certificate protocol. Thus, anyone can verify the recorder/creator/originator of each transaction. In addition, the record blocks are themselves are made up of these individual optional blocks (when format is to anything other than text, the schema is required/ mandatory) as follows:

Data to be recorded.

The schema for this data.

Supporting data

The schema for the supporting data.

Ownership data

The schema for the ownership data.

When ownership data changes, a related block is recorded showing the change- the underlying data and supporting data will be the same and the related block will refer to the original block. This allows for supply chain participants to selectively allow the original data to be viewed and shared by anyone only they authorize. At the same time, anyone in the supply chain who gets the data in an authorized manner (example distributors who are far removed from manufacturers will get product data through various channels) will be able to authenticate that data without having to be given access to various corporate databases.

Efficiency: These are very highly efficient, very much more so that current vendor management platforms.

Provenance: Provenance of data in blockchain is direct and easy. Anyone with the correct data with easily verify it and authenticate it.

Data where it can be used: Blockchain allows easy access from all platforms. The data behind it is ubiquitous for those authorized to receive it and use it.

Economic at scale: Highly economic considering the efficiency.

Transparency: The whole process is transparent and auditors or inspectors can easily check every node of each transaction.

Highly scalable: this methodology is highly scalable.

Papros Inc has implemented pSSChain$^{2}$ ™ to solve problems in the supply chain and increase efficiency, transparency and promote economy of scale. https://www.papros.com