Doing Business on the Blockchain – Applications for the Lubricant Sector

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Mention blockchain and many people will immediately think of Bitcoin or other cryptocurrencies that have been dominating headlines over the past few years. Although cryptocurrencies are an example of blockchain technology, there are many other uses for the underlying fundamental properties that blockchains provide.

A general definition of blockchain is a distributed, append-only, immutable digital ledger. A blockchain is the connecting (or chaining) of packages of information together in a verified record by a network of users with an agreed upon protocol. This network of users and the record may be publicly available like the well-known cryptocurrencies, or it may be private and require permissions to access like the Hyperledger Fabric that is the basis of many commercially available blockchains for business use.

The protocols in different blockchains may have different advantages for different applications, but the important concept is that the ledger entries (data) are used as the input to a function. That digital data is used as a set of inputs to a protocol (mathematical functions), the output of which is another set of digital data. Once calculated (and validated by multiple parties) the ledger of transaction is updated with the new entries (a new block), and the answer to the function is published (added to the chain). These answers for each block are intertwined in the protocol so that all the past entries and the values calculated for the ledger cannot be changed without a different answer being arrived at by the algorithm. The new blocks would fail to give a correct answer, and nothing would be added to the chain.

The shared possession and processing of the blockchain amongst users acts as a means of instant validation of a historical set of data in that blockchain. No data can go into the blockchain unless it is formatted correctly, processed by the agreed upon protocol, and the new blockchain confirmed by multiple parties as being a valid record given those inputs. In the purely digital world, a blockchain can provide assurance that the all steps taken in a procedure have been undertaken, approved, and immutably recorded for future reference.

However, when we tie a blockchain to the physical world, more elements are needed to ensure a secure record of transactions is produced. While a ledger provides a record of a series of steps or transactions involving digital data, the generation of data such as ASTM test results, API certifications, or volumes of a product shipped between parties must also be done in a way to ensure the data produced is authentic. As in other supply chain solutions, the key is to design the protocol by which the physical to digital transformation of data is robust to accepting falsified data.

In the development of a finished lubricant, a blockchain could be used to carry the complete audit trail in the various production process. For example, the specifications, batch, and quality control results for base materials and additives can be recorded as they are produced according to accredited suppliers' quality management systems. The procurement of such accredited materials can be tracked, and their use in a blended product verified by the production systems in place at blending facilities. The final QC values of finished goods can be recorded by the approved methods internal to producers or by independent third parties. All information can then be associated with batch, lot, or even individual container identifiers as part of the delivery and distribution process.

With proper physical controls in place, a blockchain can provide a validated audit trail of digital data that would accompany a finished product to verify the authenticity, provenance or properties of the products in the marketplace. When following established protocols for sampling, testing, and distributing physical products, tying a blockchain to a lubricant production process would allow quick verification of compliance. This would replace the disparate information systems, third-party audits and lack of common protocols that make fast and easy validation of materials difficult today.

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