



What is BLOCKCHAIN?

AND WHAT DOES IT MEAN FOR
THE FRESH PRODUCE SECTOR?

EXECUTIVE SUMMARY

BLOCKCHAIN is all about verifying provenance, and ensuring the verification cannot be tampered with. It's prime use in 'our world' is supply chain tracking.

Its relevance to the Fresh Produce sector is thus clear for all to see. Retailers and consumers alike want to know where the produce is grown and sourced, and they want assurance that the provenance information is tamper-proof.

Blockchain provides immediate visibility into any transaction.

It combines the 'openness' of the internet with the security of cryptography to give everyone a faster safer way to verify key information and establish trust.

Its application is clearly broader than just Fresh Produce. It can potentially change the way in which we buy and sell, interact with Government, establish legal 'titles'... its potential reach is vast.

READ TO LEARN HOW TO

**ACHIEVE
COMPLETE
TRACEABILITY**

*Using Blockchain
technology.*

**IMPROVE BUSINESS
IN THESE AREAS:**

Traceability
Quality Control
Supply Chain
Recall Management

A Brief History of Blockchain

Blockchain technology was originally developed as part of the 'digital currency' Bitcoin, but has a much broader application. It is already being used for peer-to-peer payment systems, supply chain tracking and more.

Inside Blockchain

At its heart, a blockchain is a record of transactions, like a traditional ledger. These transactions can be any movement of money, goods or secure data—a purchase at a supermarket, for example, or the assignment of a government ID number.

Blockchain is designed to store information in a way that makes it virtually impossible to add, remove or change data without being detected by other users.

Today, transactions are verified by a central authority—like a government or a credit card clearing house. Blockchain applications could replace these centralized systems with decentralized ones, where verification comes from the consensus of multiple users.

How Does It Work?

A blockchain needs to do two things: gather and order data into blocks, and then chain them together securely using cryptography.

Blockchain can bring great advantages to the food value chain



FARMER/INPUTS SUPPLIER

- Optimize yield and operational management
- Anticipate future developments
- Provide product and process guarantees



OFFTAKERS

- Enable market and consumer-driven production
- Shorten and optimize production chains



Farm Inputs



Primary Sector



Trade & Export



Processing



Retail



Consumer

VALUE CHAIN

- Predict market dynamics to anticipate supply-demand and negotiate better prices
- Meet demands by customers for more transparency, e.g., provenance, production methods, etc.
- Reduce food waste and increase production

The transactional information is recorded and shared with the other computers in the blockchain network.

Across the network, the record is combined with other transactions (eg. a fresh produce 'receipt') like a traditional computer database. Each transaction is time-stamped. When a block is complete, it also gets its own time stamp. So all information is sequential, which helps avoid duplicate entries.

The completed block is sent out across the network, where it's appended to the appropriate 'chain'.

Other participants on the network may be sending their own blocks at the same time, but time-stamps ensure that data is added in the correct sequence, and all participants have the latest version.

The key to blockchain's security is the 'hash', a piece of cryptographic math that makes the links between the blocks virtually unbreakable.

The 'hash' from one block is added to the data in the next block, so creating a traceable chain. As a result, if there is any attempt to alter a previously created block, the 'hash' that is encoded in the next block won't match', and the mismatch will continue down the chain.

Since all participants have a copy of the entire blockchain, they can detect any tampering. So when the hash matches up across the chain, the participants know they can trust their data.

Technology

Essentially the provenance data is copied across multiple distributed servers; no-one server contains the complete picture. The network is highly secure, and because of its distributed architecture, it's like having a ledger that is copied on 1000s of servers involved in the chain. Any attempt to change one element would need to be replicated to all of the distributed servers, with any mis-match being highly detectable. Thus blockchain is considered extremely secure.

The technology enables different parties in the supply chain to share details such as the date of harvest or the weather conditions at harvest time. Data can be stored as a photograph on a smartphone that is transmitted onto a dedicated platform. The system also can counter fraud and mistaken deliveries.



Conclusion

With blockchain, traceability will be much easier.

Consumers want to know more about the food they and their families are consuming. Blockchain's transparency will let them look up information on where food comes from and its path to their grocery store and home. It can keep them informed about GMOs and artificial ingredients they may not want to eat.

The technology also will help ensure that foods are ethically grown. That additional transparency also can help promote more desirable practices.

Fraud and delivery issues can be controlled, and not just on local deliveries.

Beyond Food and Fresh Produce, blockchain 'reach' is potentially extensive. It could revolutionize the way we work together; business, governments, organizations and individuals.

It provides a simple and secure way of establishing trust for virtually any kind of transaction.



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 888.725.2555

 info@velosio.com

[velosio.com/freshfood](https://www.velosio.com/freshfood)

