

Food Provenance, the question on everyone's lips: Is Blockchain the answer?

"Everywhere we go! People always ask us. Who we are? Where we come from", this may be a favourite song of many children around the world, however now more than ever, global consumers are applying the very same mentality to the provenance of the food they consume. Modern day society has become focused on what we eat, the ingredients, the source of the food and the environmental impact.

Consumers are becoming increasingly cognisant to the importance of food provenance, paying much greater attention to the food supply chain. Although 'country of origin' labelling is nothing new, it can have a significant influence on consumers' purchasing, and is why businesses such as McDonalds advertise the local source of their vegetables and meat products. Increasingly, for many consumers "locally sourced" is no longer sufficient, and they want to know how that food has gone from field-to-fork.

So what is blockchain and where can it help?

Blockchain is nothing more than a very safe database. However, unlike a "classic" centralised databases which is administered centrally by a single administrator, a blockchain database is administered by all of the participants of the database in a distributed manner. A (very) high level explanation of how a blockchain database works might be as follows. An individual sets up a file (a block) containing data. In this scenario, the first file (block) may contain data pertaining to the origin of the food. That file (block) is made available to the public (users). As data is added, i.e. the food moves from farmer to supplier, that information is shared with the other users and forms a new file (block) in the chain. The new information is then received by all those who shared the information in the first file, and must be verified by them (i.e. the new information is validated by 50% of the users). After the verification, the new file (block) is added to the chain, and secured with a hash (a unique number to that file), which connects it to the previous file (block). In event of even the slightest (unauthorised) change of the data in the file (e.g. amendment to the origin of the food), the hash changes, which causes that the corrupted file to no longer correspond to the previous file anymore. Consequently, the chain "collapses"; all of the users can see this. This creates a digital identity and record of authenticity and provenance for the food produce of ingredients.

This process is then able to continue throughout the supply chain, allowing the end consumer to simply scan a QR barcode in order to track the ownership and authenticity of the food, as they move from the manufacturer across the supply chain. Carrefour, the French retailer has done exactly that with 20 items (including chicken, eggs, raw milk, oranges, pork and cheese) specifically choosing products that consumers may consider higher risk, with a further 100 more items to follow.

The IBM Food Trust, Provenance, Origintrail, arc-net and more, are all BaaS (Blockchain-as-a-Service) solutions helping to increase food safety for all network participants, including growers, processors, senders (dispatchers), retailers, regulators and consumers. These BaaS solutions give end consumers an opportunity to learn more about their food origin and give authorised users instant access to data across the entire supply chain from farm-to-store. Accessing the complete history and current location of each individual food item is just a click away. Network data meets all global standards and is shared only with business partners as per a need-to-know basis, within a safe and confidential environment.

Not only does this use of blockchain software provide reassurance to the consumer of the provenance of the food, it has also been at the centre of recent food safety discussions. Blockchain provides a secure and very efficient means to monitor food produce and apply checks and balances. Product recalls and withdrawals from the market are accelerated through instant data access by showing the origin and status of any food product in real time. Inspection and certification documents are also network shared and provide an effective and sole source of legal and regulatory documentation.

The use of blockchain can also have tangible benefits to businesses. As mentioned above the ability to monitor food and react immediately to safety concerns not only benefits the consumer, but the supplier also. To give a couple examples, the 2013 horsemeat scandal rocked Europe following the Irish Food Safety Authority having identified horse DNA in beef burgers. The large-scale product recall that ensued across Europe cost the food industry and various supermarket chains millions. Since 2015, Chipotle's food safety issues have wiped out 46% of its market capitalisation, as its stock price fell from \$23.4 billion to \$12.6 billion. Consequently, the ability to quickly identify, intercept and remove bad produce from the supply chain has the potential to save producers and suppliers millions.

From a legal perspective, blockchain can help a business to establish 'due diligence' in the event of legal proceedings involving the nature of the product (such as whether it contains only the meat that is declared) or legal actions stemming from other provenance issues. We are already seeing Blockchain being utilised to record businesses intellectual property rights, providing a solution for verifying intellectual property rights from trade marks and designs to patents, tracking ownership and record transfers. However, the potential implications on contractual relationships between parties, where responsibilities will lie in terms of the data in the blockchain (and the privacy of that data) and potential liability for information on the blockchain, remains to be seen.

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