

Washington Report

Blockchain to the Rescue

Can the Bitcoin-related technology eliminate global food fraud?

BY TED AGRES



Several major food companies and retailers, including Tyson Foods, Nestlé, Dole, Kroger, and Walmart, are partnering with IBM to test whether blockchain technology, the tamper-proof, cryptography-based record-keeping system behind Bitcoin and other cyber-currencies, can be used to ensure the integrity of the global food safety distribution chain.

Because production and distribution records maintained by blockchain cannot be falsified without leaving an evidentiary trail, food producers and regulators could use it to quickly trace food products back to their source, allowing for fast recall and removal in case of contamination or fraud.

For example, it took FDA more than two months to identify the source of *Salmonella*-tainted Maradol papayas, which have thus far sickened more than 200 people in 23 states, resulting in 65 hospitalizations and one death. Had blockchain been used to create a digital ledger of the distribution chain, the farm in southern Mexico could have been identified within a matter of seconds.

“In the case of the global food supply chain, all participants—growers, suppliers, processors, distributors, retailers, regulators, and consumers—can gain permissioned access to known and trusted

information regarding the origin and state of food for their transactions,” IBM said in a statement announcing the food safety collaboration in August.

In addition to Tyson Foods, Nestlé, Dole, Walmart, and Kroger, other companies in the collaboration include Driscoll’s, Golden State Foods, McCormick and Co., McLane Co., and Unilever. They will work with IBM to identify new areas where the global food supply chain can benefit from blockchain.

“Unlike any technology before it, blockchain is transforming the way like-minded organizations come together and enabling a new level of trust based on a single view of the truth,” says Marie Wieck, general manager of IBM Blockchain.

This “single view of the truth” refers to the digital ledger of transactions that is available to all participating members, but which cannot be altered without leaving a record of who changed what and when. Bitcoin and other similar cryptocurrency applications use an open-source, peer-to-peer network of decentralized computers to process the complex blockchain algorithms and maintain system integrity. Corporate blockchain applications, on the other hand, including IBM’s and those of large financial institutions, are closed and use their own centralized computer systems and private networks.

New Era of Transparency

“Blockchain technology enables a new era of end-to-end transparency in the global food system—equivalent to shining a light on food ecosystem participants that will further promote responsible actions and behaviors,” says Frank Yiannas, Walmart’s vice president for food safety. “It also allows all participants to share information rapidly and with confidence across a strong trusted network. This is critical to ensuring that the global food system remains safe for all,” he adds.

This is not Walmart’s first foray into blockchain. As part of a \$25-million, five-year initiative, the company last year partnered with IBM and Tsinghua University to collaborate on ways to improve the way food is tracked, transported, and sold to consumers in China. (Walmart has more than 400 stores in Mainland China, which has become notorious for food fraud and other food-related scandals.)

China is the world’s largest producer and consumer of pork, and Walmart created a pilot blockchain project involving the distribution of pork from Chinese farms through every stage of the supply chain to retail stores. Blockchain allowed specific pork packages to be traced in seconds or minutes instead of days or weeks, Walmart announced earlier this year.

In a separate but parallel pilot project in the U.S., Walmart said it took six days, 18 hours, and 26 minutes using conventional recordkeeping to trace a package of mangoes back to the farm in the U.S. where they were grown. But using blockchain, the same trace took only a few seconds to complete.

“To put food safety to work, we need the whole industry to collaborate—from the suppliers to the distributors to the retailers,” Walmart spokesperson Rebecca Lui said of the blockchain pilot last year.

While a blockchain record may be immutable, creating it requires honest input from all participants. In other words, blockchain may be great for identifying *who* is in the system, but it does not capture the accuracy of *what* they did or did not do.

And this may be the chink in blockchain's armor.

"Blockchain is dependent on individuals in the supply chain entering accurate and current information," explains David Acheson, MD, president and CEO of The Acheson Group and a former FDA associate commissioner for foods. "What blockchain will not do is determine if a person in the supply chain caused the problem or followed proper procedures," Dr. Acheson tells Food Quality & Safety magazine.

John Spink, PhD, assistant professor and director of the food fraud initiative at Michigan State University in East Lansing, concurs. "Considering a food fraud incident such as the U.K. horse-meat, how exactly would blockchain have helped reduce food fraud? In some cases, it would seem the fraudsters are trusted with entering authentication information into the system," he tells Food Quality & Safety.

Countering Food Fraud

The need to prevent food fraud is becoming increasingly compelling, not only from the standpoint of public health but also from legal and financial concerns. Food fraud costs the global food industry about \$40 billion each year, according to Dr. Spink. In addition, poor standards of food safety, antibiotic use, and environmental mismanagement in the Asian meat, dairy, and seafood sectors could lead to "financial food poisoning" in global investments. A new report from the investor network FAIRR warns that global pension and savings funds are at financial risk due to "dangerous factory farming practices" in Asia.

The report notes that in 2014, McDonalds and Yum! Brands lost \$10.8 billion in market capitalization following reports that their restaurants in China had received and served expired meat products. "Simply put, a failure to reform the Asian meat and dairy industries in areas like food safety, could spell a nasty bout of financial food poisoning for global investors," said Jeremy Collier, founder of the FAIRR Initiative and CIO of Collier Capital. "Investors must step up to the plate."

While seafood fraud is a global issue, it is particularly worrisome in the U.S. where more than 90 percent of the consumed seafood is imported from other countries, with

an estimated value of about \$9 billion annually. In December 2016, the Obama administration announced a program to help prevent illegal fishing and seafood fraud. Effective Jan. 1, 2018, the Seafood Import Monitoring Program will require importers of record to report data from the point of harvest to the point of entry into U.S. commerce on certain fish and fish products that are vulnerable to "illegal, unreported, and unregulated" fishing practices.

A number of seafood traceability programs are being tested, including blockchain, to help comply with the regulation, which earlier this year survived a legal challenge by the National Fisheries Institute and eight seafood companies.

Other Blockchain Initiatives

IBM is far from being the only player to be experimenting in the blockchain food safety arena. A company called Ambrosus claims to have combined "high-tech sensors, blockchain protocol, and smart contracts" to build a "universally verifiable,

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community-driven ecosystem" to assure the quality and safety of food products, "from farm to fork," according to Stefan Meyer, PhD, the company's chief technology officer.

In addition, Chinese online retail giant JD.com, that country's second-largest e-commerce platform after Alibaba, has been using blockchain technology to track production and delivery of frozen beef from Inner Mongolia Kerchin Cattle Industry, a beef producer. Consumers are able to access data stored by JD.com and

Kerchin through their blockchain systems. Alibaba itself is developing a "Food Trust Framework" with AusPost, Blackmores, and PricewaterhouseCoopers (Australia) to explore the use of blockchain technology to combat food fraud.

The Chinese Ministry of Science and Technology is participating in the EU's Horizon 2020 project by helping fund a food safety initiative called the EU-China-Safe project. Its goal is to reduce food fraud and improve food safety by focusing on traceability and authenticity. A Belfast company called Arc-net will be using blockchain technology to combat food fraud in the two trading regions.

Perhaps as a sign of things to come, GS1, the global business standards organization, is urging early blockchain adopters to incorporate its track and trace standards into their systems. Blockchain "industry leaders have an opportunity to avoid divergence of internal systems and data formats and to accelerate their adoption of blockchain technologies for enterprise by leveraging the GS1 and ISO open standards EPCIS and CBV, which are global multi-sector standards that enable the exchange of traceability data and serial-level (or item-level) track-and-trace," GS1 said in a recent position paper.

Efforts to enhance the safety of food from China will likely become more pressing following the Trump administration's deal with Beijing in May to allow imports of cooked poultry from China in exchange for exports of U.S. beef and rice. The deal has been praised by U.S. farm and beef producers but criticized by consumer groups due to China's poor food safety reputation.

The move "will put U.S. consumers at risk for illnesses from potentially unsafe food imports," Food & Water Watch complained. In July, Rep. Rosa DeLauro (D-CT), a vocal food safety proponent, introduced legislation that would ban Chinese-produced or processed meat and chicken from being served in national school lunch and other federal food programs.

"Given China's demonstrably poor food safety record, it is unacceptable to take any unnecessary risks with the health of American school children—our most

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vulnerable population with respect to foodborne illnesses and sensitivity to potentially dangerous chemicals,” Rep. De-Lauro said.

“Consumers should not have to worry about whether the chicken they buy comes from China, but at least this legislation will let them know that their local public school is not feeding their children Chinese chicken in the cafeteria,” added

Thomas Gremillion, director of the Food Policy Institute at the Consumer Federation of America. ■

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Top 10 Points ...

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The Preventive Controls rule, the first of the seven FSMA provisions introduced to the food industry, should have already

changed the way retailers, manufacturers, processors, and others in the food supply chain do business. If it hasn't impacted your company yet, don't wait until the FDA forces you to make changes that at best will

be very costly and at worse could prove existential. ■

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The Facility ...

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parent company to streamline processes for ordering products and maintaining just-in-time deliveries, as well as for proactively identifying approved contractors to expedite repairs. Finally, the facility will have the potential to reduce long-term maintenance costs and reduce downtime by selecting the best repair options and products suited to each environment to

promote longevity. With coatings repair specifications from a qualified professional in hand, food and beverage facilities will be ready to address nearly any required repair that may arise during an audit. Better yet, they'll be prepared to address areas of concern prior to audits to avoid citations. In fact, the coatings professional's recommendations will include suggestions to make any necessary repairs part of the facility's ongoing maintenance

program so the repairs can be completed prior to actual FDA or other third-party audits. As a result, the audit process will be even less stressful, and the facility will have fewer compliance items to address after the auditor has completed his checklist. ■

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Hygienic Design ...

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often multiple times—so to have a machine that has been designed to be disassembled, cleaned, and ready to be sanitized by one person in a matter of a few minutes is highly desirable. Most machines require two people to tear down and it takes longer. Subsequently it takes longer to put it back together. The time saved in man

hours over the course of the machine's life alone is significant, coupled with the uptime advantages associated with those hours makes for a very attractive proposition.

Working with an expert supplier to talk through requirements and to cover all available options is the first step to take when considering the purchase of a

hygienic product inspection system. It's not all about the initial investment. There is a far bigger picture to take into consideration, and in doing so manufacturers can ensure the protection of both brand and consumer, at the same time making considerable savings. ■

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