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Food Ecosystem Transparency and Traceability

Winning Consumer Trust with Blockchain

EBook

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Farm to Plate is a BaaS (Blockchain as a Service) platform owned by

PARAMOUNT Software Solutions

Introduction

Tracking and Tracing in the Food Supply Chain in the U.S

The Consumer Perspective

It is becoming increasingly important to address food safety and food reliability for food brands than ever before. Consumer awareness on health and the impact of food in managing one's health and wellness has probably not seen this level of focus.
In 2018, in a study by the Center of Food Integrity, it was found that three areas were the most searched topics -

- **Ingredients in Food**
- **Impact of Food on Health**
- **Food Safety**

This is followed by a strong trend of trust deficit among consumers on food brands and public skepticism about what is being offered to them to consume. In the same study by the Center of Food Integrity, it was found that consumers' trust in food companies and manufacturers was the least when it came to learning about food-related issues. Only 33% of those surveyed said they were confident about the safety of the food they eat.

> 48 mn
>
> food borne illnesses annually
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> leading to 100,000 hospitalizations & 3000 deaths

State of SCM

Interestingly Supply-chain management systems were one of the first functions of businesses that witnessed considerable technical upgrades and transformation in the United States. ERP systems were able to generate data that helped developers to design and build applications. These applications were developed with the goal of

- Streamlining transactional events involving detailed planning.
- Supporting operations like a warehouse, logistics, and sourcing management
- Accessing better data to make important decisions.

Challenges and gaps in existing SCM

The American food supply is considered one of the safest, however, there are 48 million foodborne illnesses cases annually that is estimated to lead to more than 100,000 hospitalizations and 3000 deaths as per Foodsafety.gov. The US has an exhaustive track and trace system, which although available to participants like small producers, farms, and others in the supply chain, are not 100% traceable and transparent.
In a 2019 IBM global C-suite study it was found that 84% of supply chain leaders feel there is a lack of visibility across the supply chain which is one of the biggest challenges. Despite the U.S being a developed country, a large number of enterprises have only 20% visibility versus the 70%-90% required to address key issues that could pose a risk to revenues and costs.

There is a need defined by the FDA on types of data and requirement of new data but no process on implementation has been defined. Data keeping is a good starting point, but the purpose of managing food safety and quality cannot be attained simply with data storing and monitoring.

The good news is the FDA Food Safety Modernization Act (FSMA) is emphasizing this gap of addressing the need for rapid and effective tracking and tracing of foods. FSMA Section 204 Enhancing Tracking and Tracing of Food and Recordkeeping is aimed to develop additional recordkeeping requirements for certain foods, along with a focus on exploring and evaluating processes and technologies to address those needs.

Food Supply Chain Complexities & Consumer Trust

Consumer trust in food brands has reduced drastically over the years. Today's consumers are more aware of food safety, sustainability, and sourcing than a decade back. It is up to the brands to ensure consumers have a way to understand and trace the food journey, and thus providing an opportunity to build and consistently retain their trust. How can food brands provide the information the consumer is asking for?

To provide the best consumer experience and better-valued products and services, all stakeholders in the food ecosystem need to come together. Which brings us to the next question - how can stakeholders come together on a common platform?

Food and beverage supply chains are complex and big involving various stakeholders from different industries. And keeping the food and beverage safe throughout the movement of food along the supply chain becomes an imperative challenge to handle.

For example, if wine tanks designed as per ISO (International Organization for Standardization) standards are not cleaned in adherence to the standards, it could lead to oxidization or contamination of the wine. This single fact demands working with several issues and in the global food supply chain scenario where import and export of food items are engaged, the complexity of issues reaches new levels.

To ensure the authenticity and quality of products, products need to be monitored regularly and handled carefully. So the question remains how can products be monitored 24/7? As the food industry deals with perishable items, timing becomes a crucial factor for tasks like delivery, transportation, warehousing, recalls, and auditing. According to FDA reports, in a single month of March 2021, there are 21 recalls alone in Food and Beverages industry. The problem lies in the fact that there limited possibility to find who is responsible for these recalls. With the tremendous amount of recalls happening how can it be minimized?

Solutions

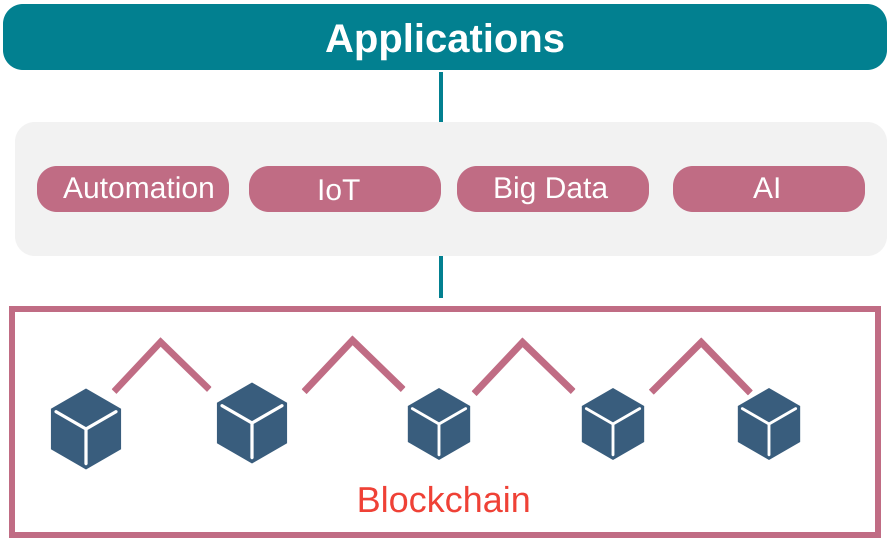
Blockchain in Tracking and Tracing

1 Common Platform

Bringing everyone whether suppliers, manufacturers, retailers, or consumers on a common platform provides an answer to the above-mentioned issues. What if each one can see in real-time “what”, “when”, “why”, “where” and “how” things are moving on the food supply chain? Blockchain fits as the best solution in the market to achieve that. Integrating blockchain with cutting-edge technologies like Robotics, IoT, AI, Automation, Nanotechnology, and others has the power to provide a full-proof solution. Blockchain works as a foundation for all the technologies as shown in the figure below. And future is very near when quantum computing is going to be used in cryptographic functions of Blockchain.

2 Common Standard - GS1

GS1 standard is an international standard for supply chain management that could be used by all the stakeholders without any conflicts. Unique identification of the product (GTIN – Global Trade Identification Number) and location (GLN – Global Location Number) helps in track and trace processes globally. Data capturing and sharing among organizations become smoother and faster when all organizations follow the same well-designed standard. Varieties of sensor information like sugar content, acidity, consistency can also be stored on blockchain following GS1 standards.

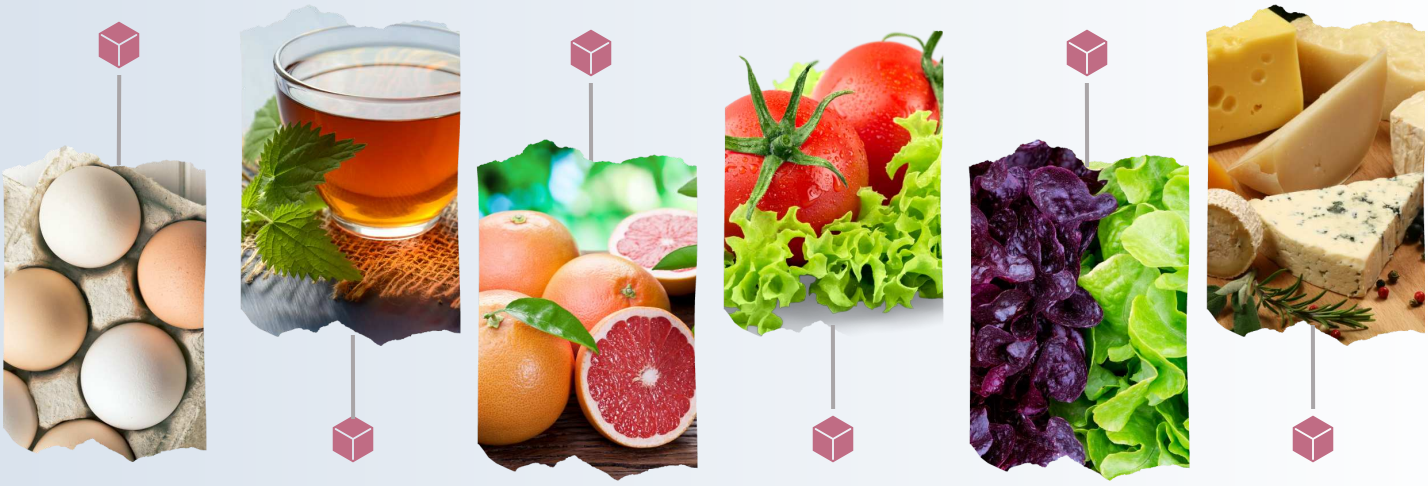


3 Privacy among Transparency

Blockchain enables end-to-end real-time visibility to all the participants which results in transparency and accuracy in the ecosystem. The immutable nature of blockchain builds trust and confidence among participants. This might sound contradictory but there is a notion of privacy among transparency. It is a choice that how much data is put on the blockchain. This measurement of data is driven by various factors like consumers' product information demands, participating organizations' business needs, and so on, but it is customizable, and data can always be accessed with proper authorizations.

4 Data Availability

Inside one organization in a blockchain network, there can be multiple nodes to hold smart contracts and ledger thereby ensuring the data availability to a greater extent even in the case of node failures. Instant access to the complete journey, locations, and environmental factors (temperature, humidity) that affect the freshness of food items are some of the key factors of a successful business.



5 QR (Quick Response) Code for Traceability

QR code provides a unique code to each product item which can be traversed on blockchain anytime. Once an item is sold, the product item status changes to "Sold" on blockchain and if a counterfeit product with the same QR code is tried to be sold, it reflects an error that this item has already been sold. Contactless scanning of QR codes can lead the consumer to a webpage providing all information related to the product. Contactless scanning became quite popular and essential during COVID-19.

6 Visibility to Meet Supply Chain Demand

Visibility of the supply chain for stakeholders greatly helps with consumer demand forecasting which further leads to minimizing overstock and understock, 35% shorter liquidity flow in the cycle, and higher profit margins. Supply chain systems on Blockchain that are powered by artificial intelligence have the capability to provide end-to-end visibility and forecasting. For example, embedding sensors to machinery and implementing digital twins can forecast a machine failure almost accurately. This single information can save the delay in the supply chain resulting in more money and more profit.

Technology - Hyperledger Fabric

Among several blockchain technologies, Hyperledger Fabric - an enterprise blockchain framework – is the best fit solution as it offers various advantages like-

Permissioned Blockchain

Only authorized entities can participate in the blockchain network. Participants are known to each other and trusted, thus supporting a network that is secured.

Need to know basis Data Accessibility

Hyperledger Fabric uses the concept of private data collection where the data can be stored privately with the concerned organizations but a hash on the data is stored on the blockchain for ensuring the authenticity of the private data. Thus data is available to only those who are stakeholders.

Modular Architecture

Hyperledger Fabric supports a plug-and-play mechanism for consensus protocols, Certificate Authorities (CA), cryptographic protocols.

Multiple Language Support

Hyperledger Fabric supports multiple languages like Go, NodeJS, Java, and Python. A network developer does not need to learn any new language like Solidity is needed for Ethereum network.

Open Source

It is open source so that it is freely available to work with. And thousands of people are working for its improvement daily.

Deterministic Consensus Algorithm

Orderer takes the responsibility of achieving consensus among participants. Once a block is validated, it is guaranteed to be added to the ledger, unlike Ethereum and Bitcoin where we need to wait for a certain amount of time.

Conclusion

As a technology, Blockchain is sensible and logical. While developers may assume that multiple organizations are ready to share their data on a distributed ledger blockchain for them to successfully implement PoC or Shadow or Parallel Production - in reality, the narrative is different. Most blockchain experts are of the opinion that in a real production building scenario, the most challenging task is to bring multiple organizations together. It is probably true to say that designing a fail-proof blockchain production network is relatively easier than finding organizations that are ready to cooperate with each other. Thus finding a common purpose for coming together is crucial - and that common purpose is **Customer Experience and Trust.**

“Customer Trust and Experience” is that intertwining and firm common purpose which can work as a glue to hold all organizations together in an ecosystem. Let's say in the scenario of a customer wanting to buy a house, where it is extremely important to ensure the house purchasing experience is smooth and hassle-free. The responsible organizations are real-estate companies, banks (for loan), home inspection companies, home insurance company and government departments of house registration. In order to bring all these organizations together on a common trustworthy platform, blockchain is a capable inter-organizational technology and helps brands achieve the trust of the consumer and bring in long-term loyalty.

If consumer trust is a priority for you and your organization is working on solving the challenges in your existing food supply chain system - Blockchain technology could help you address both. Reach out to us to know about our Blockchain platform **Farm to Plate**. Farm to Plate is a Distributed Ledger Technology-based platform focused on solving provenance and tracing, ID & Access Management, and Trade Finance challenges, in the Food Supply Chain using Blockchain.

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BUY 4
TAKE 1