



**IBM Food Trust™**

**Solution Brief 2.0**

## **An IBM Blockchain solution for the complete food system**

- ▶ *Working to make the food ecosystem safer, smarter, and more sustainable*



# What is IBM Food Trust?

Food from across the world is available to consumers today, regardless of the season, location, or environment. However, the greater options and accessibility are accompanied by increasing complexity in the food supply chain.

*With growing data and lengthening ecosystems within the industry, the importance of trust weighs heavier than ever before.*

From the farmer, processor, retailer, to the consumer, IBM Food Trust uses trust to build transparency. The blockchain solution is working to ensure that transparency enables the expanding food system.

*With capabilities to enable safer food, longer product shelf lives, reduced waste, faster traceability, and better access to shared information, IBM Food Trust empowers you to meet the new standard for transparency and trust.*

The solution provides authorized users with immediate access to actionable food supply chain data, from farm to store and ultimately the consumer. The complete history and current location of any food item along with its accompanying information (i.e. certifications, test data, temperature data) can be readily available in seconds.

**IBM Food Trust provides your organization with a set of integrated modules to address the increased complexity and build trust in the industry.**



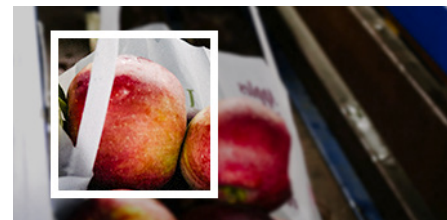
## FOOD SAFETY

Securely trace products in seconds to mitigate waste, cross-contamination, and spread of food-borne illness



## FOOD WASTE

Share and manage data across the food supply chain, helping to increase efficiency, reduce product loss, and optimize your ecosystem



## FOOD FRESHNESS

Gain unprecedented visibility into supply chain data for valuable insights and analysis, identifying inefficiencies and ensuring quality of goods sold



## FOOD CONFIDENCE

Digitize essential certificates and documents to optimize information management, certify provenance, and ensure authenticity



# IBM Food Trust with blockchain

*IBM Food Trust combines supply chain-specific modules with blockchain core functions, delivering business value to the food ecosystem from the combination of governance, standards and interoperability, and technology.*

The solution provides participants with a permission-based, shared view of food ecosystem information, allowing convenient data publishing and controlled sharing of information. To achieve this goal, the **IBM Food Trust solution enables participants to enter and control access to their encrypted blockchain data.**

In doing so, transaction partners can only access the data they are permitted to view. Permissioned data access is an integral part of the core solution. Access controls ensure that the organization that owns the data maintains full control over who can access it on the network. IBM Food Trust solution users can quickly locate items from the supply chain, in real time, by querying food product identifiers such as Global Trade Item Number (GTIN) or Universal Product Code (UPC), using the product name, and filtering on dates.

*All data is stored on blockchain ledgers, protected with the highest level of commercially-available, tamper-resistant encryption.*

POWERED BY THE

*IBM Blockchain Platform*

BUILT ON THE

*Open Standard Hyperledger Fabric*

## SOLUTION LAYER

Integrated Modules

Onboarding Services

Developer Zone

## PLATFORM LAYER

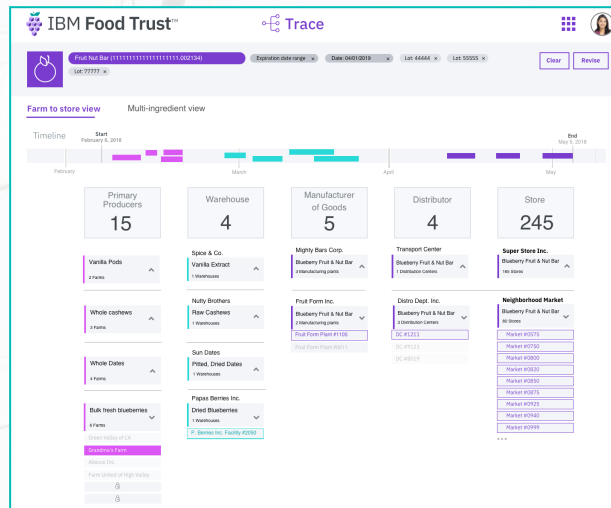
IBM Blockchain Network Platform

HYPERLEDGER FABRIC



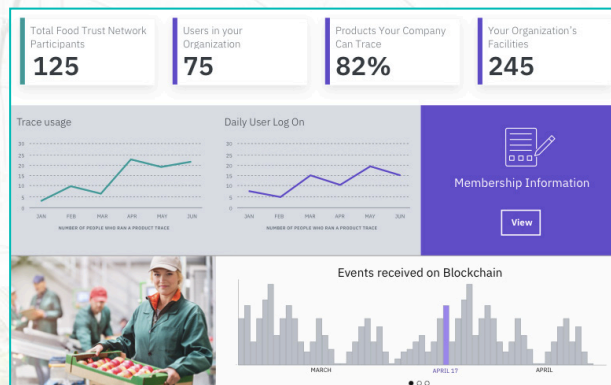
# Module-based approach

IBM Food Trust's integrated set of modules address food safety, food waste, certifications management, and more.



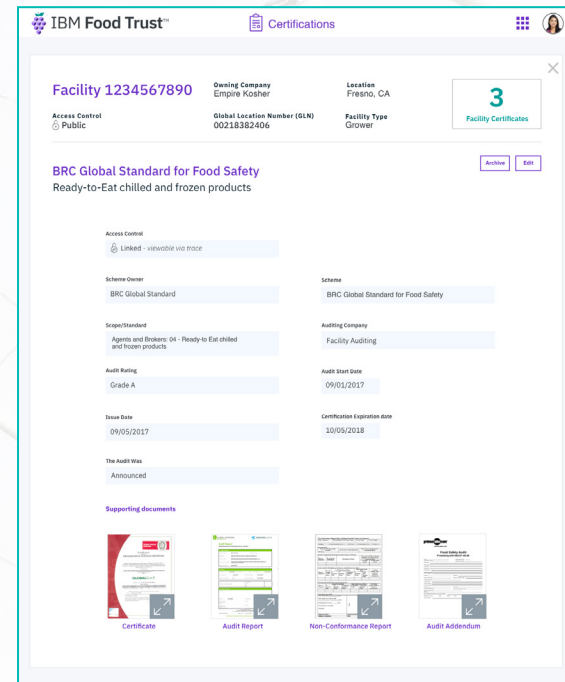
## TRACE

Product recalls are expedited through immediate access to end-to-end traceability data showing the provenance, real-time location, and status of any food product with sufficient data on the blockchain



## DATA ENTRY AND ACCESS

Leveraging solution and global standards to share data with any network participant authorized by the data owner, you can feel confident knowing your data is shared only with need-to-know business partners in a secure environment



## CERTIFICATIONS

Digitize business critical certificates and inspection documents to optimize efficiency for information management, certify provenance, and ensure authenticity

**ADDITIONAL MODULES TO BE ANNOUNCED...**

## HOW TO JOIN THE ECOSYSTEM

# Building your team

Joining the IBM Food Trust ecosystem begins with signing up online and **purchasing the most appropriate plans** for your organization. Enrollment in a solution network includes the creation of accounts for both human users and systems of engagement (SOE) users.

*Once you have access to the solution, you will onboard your organization by building and authorizing a team to register and integrate all pertinent information and data.*

The IBM Food Trust solution assigns predefined **roles** that grant users **Authorization** to execute specific network tasks on behalf of their **Organization**. Assigning roles enables **Account Administrators** to easily control the level of access provided to each individual user in their Organization.



When **onboarding** new users to the IBM Food Trust solution, an Account Administrator must assign a role to each user:

- ▶ **ACCOUNT OWNER**  
User can manage organization account settings and subscriptions
- ▶ **ACCOUNT ADMINISTRATOR**  
User can add, delete, and modify users and can modify organization settings
- ▶ **CERTIFICATIONS MANAGER**  
User can add, delete, and modify certifications and documents
- ▶ **FOOD SAFETY TEAM MEMBER**  
User(s) view data (with organization-level authorization), trace products, and view certifications
- ▶ **ONBOARDING TEAM MEMBER**  
User(s) can create product scenarios and upload data



## HOW TO JOIN THE ECOSYSTEM

# Data upload and integration

Each member organization owns its data on the blockchain network and maintains full control over who can access different data elements. All data is stored on blockchain ledgers, protected with the highest level of commercially-available, tamper-resistant encryption, and is made accessible only as data owners grant permission to share relevant records.

### Enterprises use the IBM Food Trust solution to upload or programmatically send four key data elements:

- 1 Supply chain events
- 2 Transactions
- 3 Master data
- 4 Certificate data

Solution software adapters can provide automated data import from existing data stores, such as SAP, to leverage existing business records including inventory lists, order records and supplier information. For network administrators already managing complex information environments, the IBM Food Trust Connector API is designed to automate the integration of legacy system data and network data.

Visit the [IBM Food Trust Developer Zone](#) to learn more about the data upload process and connecting to the IBM Food Trust API.

Once an enterprise has joined and on boarded the IBM Food Trust solution, its user and SOE accounts can interact with the network in several ways:

- ▶ Employ user-friendly interfaces for desktop or mobile use
- ▶ Use the Certifications module to upload regulation and inspection documents for sharing with food supply chain partners
- ▶ Use the customized interface to view and manage data that has been shared by business partners

Data connector application programming interfaces (APIs) allow enterprise IT teams to efficiently upload supply chain data from existing data stores (such as SAP) to their IBM Food Trust network for seamless integration of data from enterprise systems to an IBM Food Trust solution network. Smaller organizations can onboard data through an easy-to-use web experience. SOE users automatically upload transaction data to the solution network, based on the organization's data specifications.

Note: GS1 registration is not required to use IBM Food Trust. However, for companies who have registered with GS1, IBM Food Trust supports continued use of existing enterprise IDs.

## HOW TO USE IBM FOOD TRUST

# Trace

*When it comes to food safety, speed is paramount in controlling food-borne contamination—so is the accuracy of the information that the investigating team acts on.*

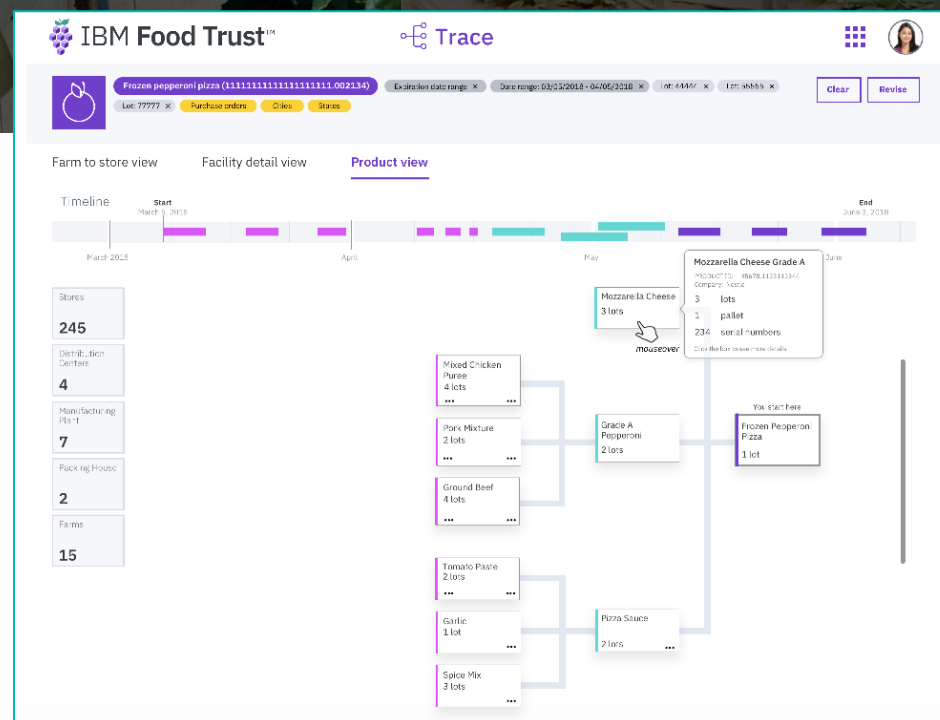
How widespread is the problem? Are there products that may have been purchased but not yet consumed? What is the source of the contamination? Was anything else contaminated? Speed and accuracy are also key to compliance with global regulations aimed at food safety and fraud, such as the US 2011 Food Safety Modernization Act (FSMA).

**To use the IBM Food Trust solution to trace food products, data on food products needs to be uploaded to the network by participants.**

Once data is uploaded, the trace module allows an authorized user to search the provenance of a food product (via GTIN, product name, or Purchase Order) and can narrow down by a specific date.

***This module enables participant organizations to quickly and accurately determine the path that a given shipment has taken.***

Authorized participants can then determine the scope of the problem, block further contamination, and narrow the scope and impact of a recall.



### Trace benefits

- ▶ Ability to quickly identify when food is contaminated and react immediately
- ▶ Ability to prove your product is safe during a foodborne outbreak
- ▶ Reduce product waste
- ▶ Increased customer satisfaction and trust
- ▶ Direct insight into inventory and supply chain inefficiencies



HOW TO USE IBM FOOD TRUST

# Certifications

IBM Food Trust™ Certifications

Find a Facility

Expiring Certificates: 5

Expired Certificates: 3

Filters: Owning Company, Facility Type, USA, California, Fresno

Number of Certificates	Owning Company	Facility Type	Facility Name	Address																				
2	Jeremy's	MANUFACTURER_OF_GOODS	Main Facility	9873 Pointout Drive, Fresno, CA US																				
1	Basilion	PROCESSING PLANT	Main Facility	76 Ridgeangle Drive, Fresno, CA US																				
3	Juniper Roof	GROWER	Main Farm	8909 Jordan Court, Fresno, CA US																				
<table border="1"> <thead> <tr> <th>Access Control</th> <th>Scheme</th> <th>Scope/Standard</th> <th>Expiration Date</th> <th>Expires In</th> </tr> </thead> <tbody> <tr> <td></td> <td>BRC Global Standard for Food Safety</td> <td>Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products</td> <td>01-16-2019</td> <td>134 Days</td> </tr> <tr> <td></td> <td>BRC Global Standard for Food Safety</td> <td>Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products</td> <td>10-05-2018</td> <td>31 Days</td> </tr> <tr> <td></td> <td>BRC Global Standard for Food Safety</td> <td>Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products</td> <td>12-07-2018</td> <td>94 Days</td> </tr> </tbody> </table>					Access Control	Scheme	Scope/Standard	Expiration Date	Expires In		BRC Global Standard for Food Safety	Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products	01-16-2019	134 Days		BRC Global Standard for Food Safety	Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products	10-05-2018	31 Days		BRC Global Standard for Food Safety	Agents and Brokers: 04 - Ready-to-Eat chilled and frozen products	12-07-2018	94 Days
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3	Hewetts	DISTRIBUTION_CNTR	DC #1025	432 Pinewood Rd, Fresno, CA, US																				
2	MicroGrowers	GROWER	Farm #750	55 Quaker Town Blvd, Fresno, CA US																				

Food safety inspection and regulatory certificates can serve as investigative starting points. Was this batch of grain shipped through a warehouse with shoddy safety practices? Has this grower been inspected recently?

Certificates and related documents can help establish that a facility is properly inspected, that livestock have been treated according to law, that a supplier is legally able to do business, and that a farm is certified as conforming to industry standards.

Certifications, however, can be issued by agencies or organizations with differing and overlapping authority, with different jurisdictions and with widely varying time windows of validity. Verifying that certificates are complete, valid and current is complicated by their abundance, complexity and variety. To simplify this task, IBM Food Trust offers a holistic approach with the Certifications module to help track and store all certificates.

*With the Certifications module, documents can be checked regularly, or as they are needed in the event of a safety investigation*

The designated Certificate Manager is authorized to upload and manage the organization's facility certificates as well as other business-enabling documents, such as authorizations, licenses and inspection results. Conflicting or outdated certificates can be easily flagged for review, which serves both suppliers who require certification to do business and buyers who want to know the certification status of a sourcing farm or factory.





IBM FOOD TRUST

# Governance model

**IBM Food Trust™**, built on blockchain, benefits all network participants with a safer, smarter, and more sustainable food ecosystem. The digitization of transactions and data provides a more efficient way of working across the supply chain, including growers, processors, shippers, retailers, regulators, and consumers.

The Governance Model includes policies in **five core areas** that enable a collaborative ecosystem and ensures all participants are held to the highest standards – while receiving value.

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## *A secure ecosystem and a trusted community.*

Every IBM Food Trust participant is vetted to confirm their identity and ensure that all operate on the ecosystem's principles. That means that your experience with fellow community members is as trustworthy as your experience with the network itself.

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## *Interoperability...and beyond.*

Because it is built on the open-standard, open-governance Linux Hyperledger Fabric, IBM Food Trust can connect to the systems and programs you have today, and can scale with you to connect to new blockchain and non-blockchain networks in the future.

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## *Data: You upload. You own. You control.*

You're in full control of the data you share on IBM Food Trust. And, as the owner of the data, you determine what you share, when you share it, and who gets to see it.

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## *Guard against collusion.*

The trust model of the IBM Food Trust solution describes the set of guarantees that reinforces the security, privacy, and integrity in a network of widely diverse participants. Our model promotes collective responsibility, while guarding against collusion – maintaining the integrity of the network.

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## *Guiding the future of the food ecosystem.*

Everyone has their unique business needs. The IBM Food Trust Advisory Council ensures that all of these needs are met—and that the solution continually evolves to provide participants with value well into the future. The end goal: to reduce friction points by creating a trusted and transparent food system.

The IBM Food Trust Governance Model is continually re-evaluated and updated based on expansion of the solution, member needs, technology innovation, and regulatory changes.



# Network and data security

*“How is security handled?” or  
“How is data handled?”*

As with any distributed network that relies on encryption and controlled access for vital record-keeping, there will be questions.

Those answers will make the difference between a system worth implementing and one that presents a danger to the enterprise.



**IBM Food Trust provides the highest level of commercially-available, tamper-resistant protection for food transaction data, employing the security benefits of the underlying *IBM Blockchain platform and Hyperledger Fabric*.**

Hyperledger Fabric requires no cryptocurrency or other processor-intensive computations to guarantee the legitimacy and permanence of network transactions, and features a thoroughly permissioned network. The owner of the data controls who can see it on a Hyperledger Fabric network.

From a network and data security point of view, your IT personnel can take the following steps to understand and prepare your environment for the IBM Food Trust solution.

- ▶ Identify relevant supply-chain processes
- ▶ Estimate and assign technical resources
- ▶ Identify users—including automated users—of the solution
- ▶ Access the security needs of each user, including external stakeholders, and initiate security clearances and other security processes



# Why IBM?

IBM is an enterprise technology company that has proven its resiliency, security, reliability, scalability, and success in new technologies like blockchain.

**IBM Food Trust is one of the first solutions in-production using blockchain technology.** Today, consumers can compose an entire meal from the products running through our network. We are continually accelerating and automating to further elevate value for all.

## Key features of the IBM Food Trust solution include:

- ▶ Participant network built on trust
- ▶ Single source of the truth
- ▶ Diverse ecosystem
- ▶ Proven business value
- ▶ Standard and interoperability
- ▶ IBM Blockchain Platform and IBM Cloud for enterprise-class performance

With blockchain technology and the power of our ecosystem, we are realizing the vision of improving trust and transparency from seed to farm to fork.

### *For more information*

To learn more about IBM Food Trust, contact your IBM representative or visit [ibm.com/food](http://ibm.com/food).

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New Orchard Road  
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Produced in the United States of America  
September 2018

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