What is Blockchain?

IBM Food Trust Overview
The challenge – visibility across the supply chain

- Producer’s records
- Wholesaler records
- Distributor records
- CPG / Supplier records
- Consumer Demand Drivers
- Retailer records
Blockchain provides the shared, replicated, permissioned ledger ... 

- Distributor records
- CPG / Supplier records
- Producer’s records
- Wholesaler records
- Consumer records
- Retailer records

... with consensus, provenance, immutability and finality
Is Blockchain the same as Bitcoin?

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Blockchain

• Blockchains for business are generally permissioned and private, and prioritize:
  – Identity over anonymity
  – Selective endorsement over proof of work
  – Assets over cryptocurrency

is an example of an unpermissioned, public ledger:

– The first blockchain application
– Defines an unregulated shadow-currency
– Resource intensive
IBM is making Blockchain real for business with diverse engagements delivered across industries

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<tr>
<th>Trade Finance</th>
<th>Pre and Post Trade</th>
<th>Complex Risk Coverage</th>
<th>Commercial Real Estate</th>
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<td>Identity/ Know your customer (KYC)</td>
<td>Unlisted Securities / Private Equity Funds</td>
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<td>FDA</td>
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<td>MAERSK</td>
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<td>Sysmex</td>
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Where are we on the IBM Food Trust journey?

2016

Pork
Traceability / safety

Mango
Traceability / global trade

2017

Additional partners joined the IBM Food Trust™ network, with growing food data transactions

2018

Onboarding agriculture, ingredient suppliers, retailers, CPGs, QSRs and others to provide bi-directional flow of information
The IBM Food Trust solution is a set of modules built for the industry.

**IBM Food Trust Solution Core**
- Permissioned Data Access & Entry
- IBM Blockchain Provenance Engine
- Secure Document Storage
- API Integration

**Trace & Recall**
- Manage Recalls
- Recall Post-Analysis
- Trace-forward & back
- Recall Simulator

**Data Entry & Access**
- Future IBM Modules
- Future 3rd Party Modules / Capabilities
- IBM Blockchain Platform
- Hyperledger Fabric

**Certificate Management**
- Version Control
- Authenticity
- Automated lifecycle management
- Real-time Sharing

**Future IBM Modules**
- Permissioned Data Access & Entry
- IBM Blockchain Provenance Engine
- Secure Document Storage
- API Integration

**Future 3rd Party Modules / Capabilities**
- Version Control
- Authenticity
- Automated lifecycle management
- Real-time Sharing
IBM Food Trust is a modular solution that will continue to grow in functionality.

- IBM Food Trust provides a blockchain platform for the food industry as well as a variety of modules targeting real business needs for all players in the ecosystem.

- We are working with 3rd party providers to further increase value by providing them the ability to build and distribute modules.

**Data Entry & Access**

- **Trace**

- **Certifications**

- **Freshness**

- **Consumer**

- **Coming soon**
Example data integration points between animal protein producer’s existing systems and IBM Food Trust
Data Elements available of IBM FOOD TRUST™

<table>
<thead>
<tr>
<th>Grower</th>
<th>Consolidator</th>
<th>Transportation to Facility</th>
<th>Product</th>
<th>Transportation / Storage External Partners</th>
<th>Customer</th>
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<tr>
<td>Feed</td>
<td>TQI Certifications</td>
<td>TQI Certifications</td>
<td>GTIN</td>
<td>Reefer Temperature</td>
<td>GTIN</td>
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<tr>
<td>Handling of Animal</td>
<td>Temperature</td>
<td>Temperature</td>
<td>Batch</td>
<td>Cold Storage Temps</td>
<td>Batch</td>
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<tr>
<td>Transportation</td>
<td>Carrier</td>
<td>Carrier</td>
<td>Location (Tracking – Geo Tagging)</td>
<td>JVL Warehouse ID</td>
<td>Expulsion Date</td>
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<tr>
<td>Diet</td>
<td>Driver</td>
<td>Driver</td>
<td>Series B Date</td>
<td>JVL Warehouse Temp</td>
<td>Suppliers</td>
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<tr>
<td>Certifications</td>
<td>Weather</td>
<td>Weather</td>
<td>Expiration Date</td>
<td>Carrier</td>
<td>Supplier Batch / Lot</td>
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<tr>
<td>Sustainability</td>
<td>Time to Transport</td>
<td>Time to Transport</td>
<td>Production Date</td>
<td>Weather</td>
<td>Supplier Batch / Lot</td>
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<tr>
<td>Animal ID</td>
<td>Consolidator Certifications</td>
<td>Carrier Certifications</td>
<td>Supplier (Spice / Raw Material)</td>
<td>Suppliers</td>
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<tr>
<td>Country of Origin</td>
<td>Animal Welfare</td>
<td>Condition of Animal</td>
<td>Time to Transport</td>
<td>Carrier</td>
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<tr>
<td>Geo Location</td>
<td>Length at Consolidator</td>
<td>Animal ID</td>
<td>Carrier Certifications</td>
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<tr>
<td>Foreign Animal Disease</td>
<td>State of Trucks</td>
<td>Foreign Animal Disease</td>
<td>State of Trucks</td>
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<td>State of Trucks</td>
<td>Animal ID</td>
<td>State of Trucks</td>
<td>Expected arrival time</td>
<td>Expected arrival time</td>
<td></td>
</tr>
<tr>
<td>Animal ID</td>
<td></td>
<td></td>
<td>Product Certifications</td>
<td>Supplier Batch / Lot</td>
<td></td>
</tr>
</tbody>
</table>

IBM Blockchain

IBM Confidential
How are our clients leveraging IFT?

**Produce**
Traceability from farm to store

**Grain Company**
Traceability for agricultural inputs

**S GROUP**
End-to-end traceability and provenance

**Nestlé**
Traceability and certificate management for multi-ingredient products
Dynamic Freshness/Expiration Management

CONVERGENCE OF TECHNOLOGIES: Blockchain + IoT + Analytics

1. Receiving
2. Issue to Production
3. Grind, Blend, & Form
4. Seal & Palletize
   - RFID label applied
   - Label encoded
   - Label scanned
5. QA Cool & Storage
   - Scan as case enters and exits QA cooler
   - Scan as case exits manufacturing facility
6. Distribution Receipt
   - Scan as case enters DC
7. Ship to Restaurant
   - Scan as case leaves DC
8. Restaurant
   - Scan as case enters walk-in cooler
9. Grill
   - Scan as case is removed from cooler

Manufacturing:

Distribution:

Restaurants (5): TBD
We will capture ERP, RFID, and IoT temperature data, map to GS1 events and formats, and send to Blockchain.

<table>
<thead>
<tr>
<th>Platform for Data Capture and Data Sharing</th>
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</thead>
</table>

**Manufacturing**
- Received
- Issued to Production
- Formed & Cased
- Palletized
- Exit QA Storage
- Loaded onto Truck
- Arrived At DC
- Enter Zone 4
- Exit Zone 4
- Shipped to Restaurant
- Arrived at Restaurant
- Consumed

**EPCIS Event**
- Commission
- Transformation
- Transformation
- Payload
- Observation
- Observation
- Observation
- Observation
- Observation
- Decommission

**Temp Type**
- Product
- Ambient
- Product
- N/A
- Ambient
- Ambient
- Ambient + product
- Ambient
- Ambient
- Ambient
- Ambient
- Ambient

**RFID Vendor**
- N/A
- Digi
- Digi
- N/A
- Digi
- JDE
- iMonnit
- iMonnit
- iBright
- Coris
- N/A

**IoT Vendor**
- N/A
- Digi
- Digi
- N/A
- Digi
- JDE
- iMonnit
- iMonnit
- iBright
- Coris
- N/A

**Temp**
- Ambient
- Ambient
- Ambient + product
- Ambient
- Ambient
- Ambient
- Ambient

**IBM Blockchain**

(Proactive) temp monitoring

Empire aliquot, N/A Digi Digi N/A Digi Digi JDE iMonnit iMonnit iBright Coris N/A