Data Science and Analytics: Blockchain and its Application in the Food Supply Chain

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Agenda

1. Introduction to Blockchain
2. Blockchain in the Food Supply Chain
3. Getting started with Blockchain
Supply Chains have had the same problems for millennia…

- Administrative costs are twice the cost of physically shipping the container
- Fraud in global trade is $600B
- US truck capacity has 51% utilization; global air cargo has 43% utilization
- 600M people fall ill every year and 420K people die from food related issues globally
- $55-93B in cost of food borne illness in U.S. alone
- One-third of all food is wasted
Problem - Monitoring asset ownership and transfers

eg. Supply Chain today

- Multiple parties in different geographies with lack of trust
- Hard to track products end to end in today’s ecosystems
- Many bi-lateral exchanges of information, require reconciliation of systems of record to sync
- Manual, paper-based processes
Solution – shared, replicated, permissioned ledger

eg. Supply Chain with Blockchain

- Brings together multiple parties on a trusted network
- Each member of the network has an up-to-date copy of the same encrypted ledger
- Members can read, write and validate transactions on the network
Blockchain for business requires trust

Append-only distributed system of record shared across business network

Shared ledger

Transactions are secure with appropriate visibility

Privacy

Business terms executed with transactions

Smart contract

Transactions are provably endorsed by relevant participants

Proof
Separating Blockchain from Cryptocurrencies

- Cryptocurrencies are one specific usage of Blockchain technology
- Blockchain can be used to solve many more real-life business challenges without the fallacies of cryptocurrency

- Exchange of digital currencies using cryptography
- First crypto currency = Bitcoin
- Fully decentralized
- Anonymous participation, Transparent activity

- Secure and Un-editable (Immutability)
- Transparent and Auditable (Provenance)
- Consensus-Based and Transactional (Consensus)
- Flexible and Orchestrated (Smart Contract)
- Distributed and Sustainable (Finality)

However, we need few key attributes for Blockchain to be business ready
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The Food Ecosystem today

Data sharing limited to ‘one up, one down’ without end-to-end transparency

Multiple data formats & sources Lack of trusted, easily auditable records

Incomplete information & inability to effectively communicate with the end consumer
IBM Food Trust solution: started with a Walmart mango pilot

How long does it take to trace a package of sliced mangoes back to the farm?

Supply Chain

Results

IBM Food Trust digital solution

2.2 seconds

Typical manual, mixed digital and paper-based method

6 days
18 hours
26 minutes

Pilot Test Case

https://www.youtube.com/watch?v=SV0KXBxSoio
IBM Food Trust solution

End to end food supply chain traceability, trusted connection for all participants. Leverages standards (eg. GS1), provides connectors for interoperability.

IBM Food Trust Solution Core

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

Data Entry & Access

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

Future IBM Modules

Future 3rd Party Modules / Capabilities

IBM Blockchain Platform

Hyperledger Fabric
IBM Food Trust: providing value to the entire food ecosystem

- **Harvesters**
  - Prove source is not a cause of event
  - Ease of connectivity to the supply chain
  - Manage chain of custody

- **Food Manufacturers / CPGs**
  - Instill trust across ecosystem
  - Validate marketing claims
  - Optimize certificate management

- **Food Service**
  - Assure customers food supplied is safe
  - Reduce wasted food

- **Food Retailers**
  - Assure customers food supplied is safe
  - Conduct targeted recalls quickly

- **Food Logistics**
  - Enhance ability to meet compliance standards
  - Reduce manual processes

- **Food Manufacturers / CPGs**
  - Conduct targeted recalls
  - Enable internal data sharing

- **Certification Bodies**
  - Reduce fraudulent certificates
  - Increase renewal speed

- **Wholesalers / Distributors**
  - Learn about recalls and increased transparency
  - Reduce risk of being victimized by food fraud

- **Certification Bodies**
  - Reduce fraudulent certificates
  - Increase renewal speed

- **Regulators**
  - Identify contamination quickly
  - Reduce unnecessary testing
IBM is now scaling the IBM Food Trust digital ecosystem beyond the early adopters

Adoption by Innovators

- Early adoption by key influencers and innovators

Value

Adoption by Ecosystem

- **Shared Value**: Value proposition/pricing resonate for all ecosystem participants
- **User Experience**: Easy to onboard and obtain value for participants at any technological maturity level
- **Enterprise Ready**: Built for business usage with security, scalability, reliability, etc.
- **Advanced Analytics**: Analytic tools dramatically raise the value of the more complete data set
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Getting Started with a Blockchain Food Supply Chain Solution

1. Identify the product and food supply chain challenges to be addressed
2. Map out the ecosystem of participants in the food supply chain
3. Identify quantitative & qualitative benefits for each key participant of adopting Blockchain for the food supply chain
4. Identify a limited set of key participant members willing to invest time/effort/money to get started
5. Develop a Minimum Viable Product (MVP) with the key participants
6. Pilot the solution with ecosystem participants
7. Go live and then scale the solution by adding other participants
Thank You!

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