



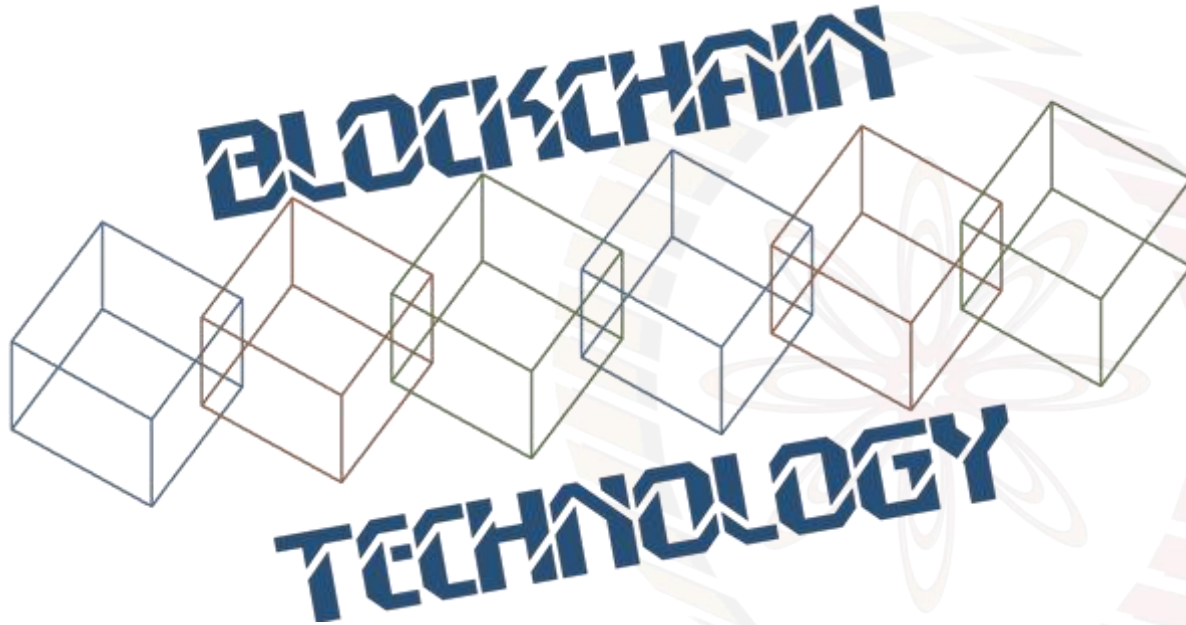
BLOCKCHAINS

ARCHITECTURE, DESIGN AND USE CASES

SANDIP CHAKRABORTY
COMPUTER SCIENCE AND ENGINEERING,
IIT KHARAGPUR

PRAVEEN JAYACHANDRAN
IBM RESEARCH,
INDIA

Image courtesy: <http://beetfusion.com/>



BLOCKCHAIN IN SUPPLY CHAIN - I

Food Safety

Walmart and IBM Are Partnering to Put Chinese Pork on a Blockchain

by Robert Hackett @rhackett OCTOBER 19, 2016, 6:00 AM EDT



Consumers scan or input the tracing code printed on the product package



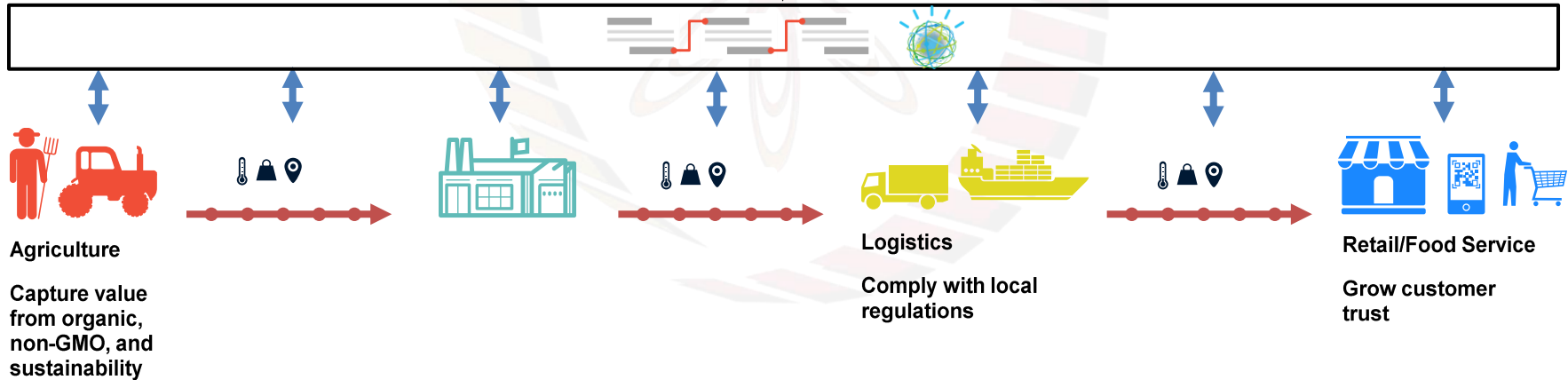
Food Traceability and Safety Enabled by Blockchain

Blockchain capabilities

- ▶ Asset identification ownership and transfer
- ▶ Asset aggregation and disaggregation
- ▶ Geo specific compliance
- ▶ Traceability, reduce food recalls

Cognitive and IoT capabilities

- ▶ Location, temperature, small computer
- ▶ Anomaly detection
- ▶ Real-time analytics & optimization



FDA Food Safety Modernization Act

- Foreign Supplier Verification Program (FSVP) – A component of FSMA, requiring importers to assess and monitor many health risk factors, including:
 - Formulation
 - Transport
 - Packaging
 - Storage
- Came into effect in the US in May 2017

Supply Chain Visibility

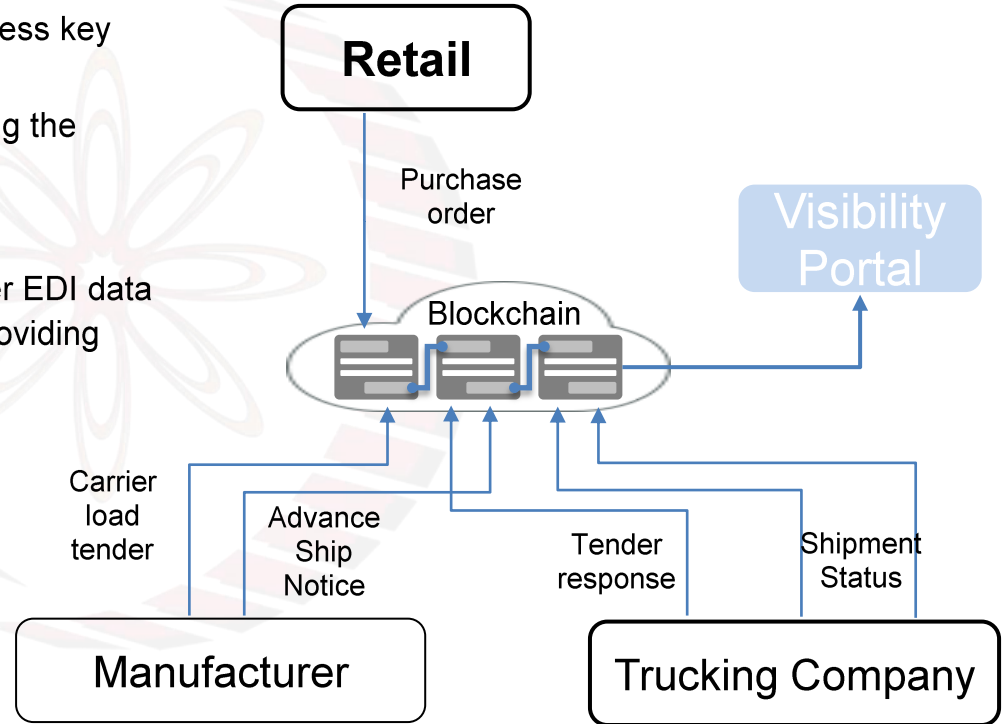
What?

Prove out the ability of Blockchain technology to address key supply chain visibility pain points

Provide a single view and source of the truth regarding the lifecycle of a Purchase Order

How?

Shadow Ledger capturing Buyer, Supplier, and Carrier EDI data to the Blockchain with a web-based User Interface providing enhanced visibility



Noteworthy Startups

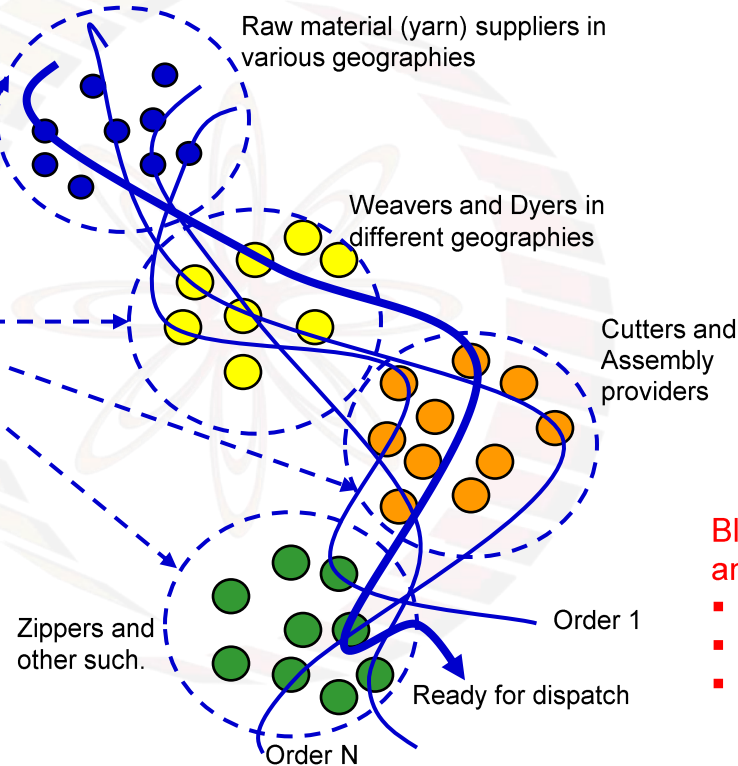
- Provenance: Tracks goods from source to retail store, encouraging producers and sellers to prove claims of quality, sustainable production providing a certified end-to-end chain of custody
- <https://www.provenance.org/whitepaper>
- Skuchain: Tracks goods and also offers supply chain financing solutions on blockchain
- <http://www.skuchain.com/>

Supply Chain Orchestration

1. A Retailer place order for large quantity of apparel

2. Possesses domain knowledge about Suppliers and local environments

3. Use knowledge to select Suppliers from different countries to perform different functions



Blockchain to handle shipment and coordination

- Cost
- Overhead
- Margin of Error in Execution

Fun Reading

- Walmart Food Safety solution (3 mins):
<https://www.youtube.com/watch?v=SV0KXBxSoio>
- Pharma Supply Chain Tracking (5 mins):
<https://www.youtube.com/watch?v=11Z4-XYoZAE>



thank you!