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# Application of ICT in food supply chain

WP Number 4

Dr. Akshit Singh

University of Liverpool, UK



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# Dr. Akshit Singh

- ❑ Lecturer in Operations Management at University of Liverpool Management School
- ❑ Former Lecturer in Management Sciences at Alliance Manchester Business School, The University of Manchester.
- ❑ PhD from University of East Anglia (UEA), Norwich
  - ❖ Topic of PhD: Waste minimisation in beef supply chain
  - ❖ TSB Project (Innovate UK): Improving efficiency and reducing waste in the beef supply chain (£2.7 million)
  - ❖ Project partners: Sainsbury's, ABP, Sealed Air, University of East Anglia, University of Bristol, Aberystwyth University and SRUC
- ❑ M.Sc. from University of Nottingham, UK
- ❑ Bachelor of Technology from National Institute of Technology, India

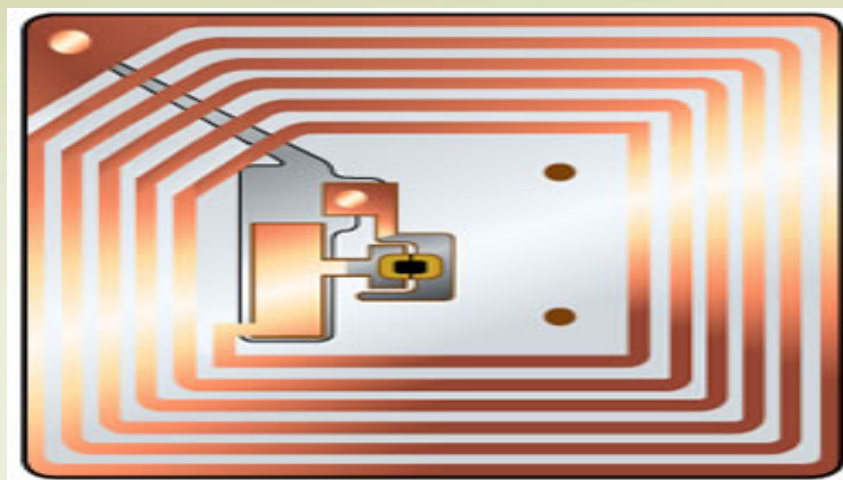


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# RFID



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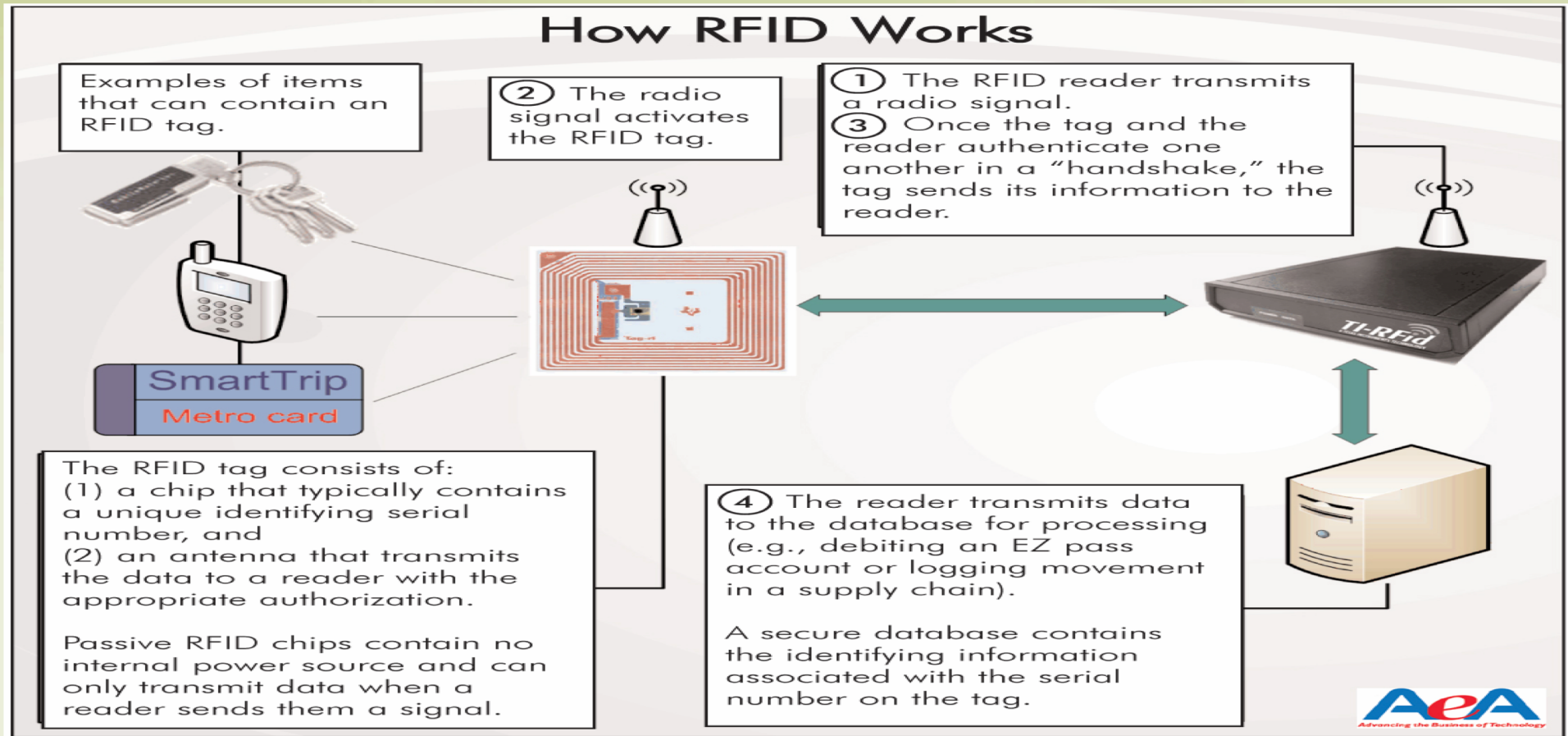


# What is so exciting about RFID?

## A Future Supermarket



# Working principle of RFID

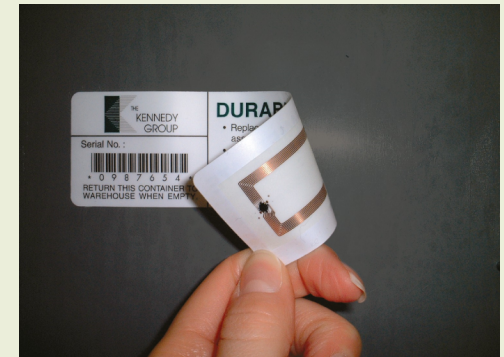
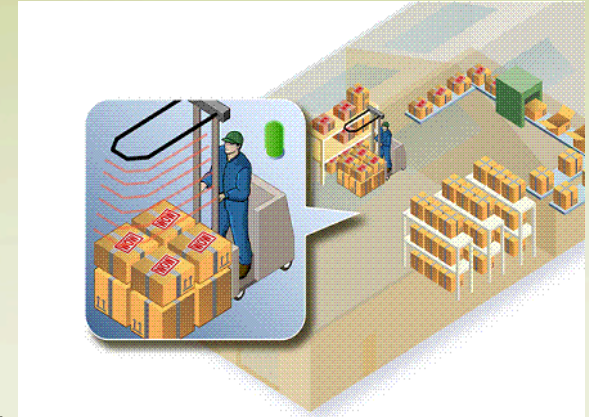


# What is RFID?



# Data encapsulated in RFID Tags

- What the product is?
- Where it has been?
- When it expires?
- When and where merchandise is manufactured, picked, packed and shipped?
- Numbers that will have to be stored, transmitted in real-time and shared with warehouse management, inventory management, financial and other enterprise systems
- RFID tags can be read automatically by electronic readers



# Other Applications

- Tracking livestock
- Marks and Spencer – Fresh Food Tracking: Reduce costs of tracking some 4 million trays of chilled foods
- pH Europe – Tracks its fleet of rental containers and pallets using active tags



# Benefits of Using RFID in Logistics

- Helps retailers provide the right product at the right place at the right time.
- Increases visibility throughout the supply chain.
- Improves efficiency, cut costs, delivers better asset utilization.
- Reduces shrinkage and counterfeiting.
- Increases sales by reducing out of stock.



R F I D

# BUSINESS APPLICATION - CASE STUDY:



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# RFID Implementation history

- April 30, 2004
  - pilot testing;
  - 8 manufacturing participants;
  - 28 volunteers;
- January 2005
  - Mandate: top 100 suppliers.



# RFID EXPANSION

- June 2005:
  - another 200 suppliers joined the effort;
- End of 2006:
  - All domestic suppliers participated;
- 2006:
  - Expected international roll out.

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Carol Sliwa (2004), "Wal-Mart Revises '05 RFID Expectations," *Computerworld*, Vol. 38, No. 21, pg. 14

**WAL★MART®**



12



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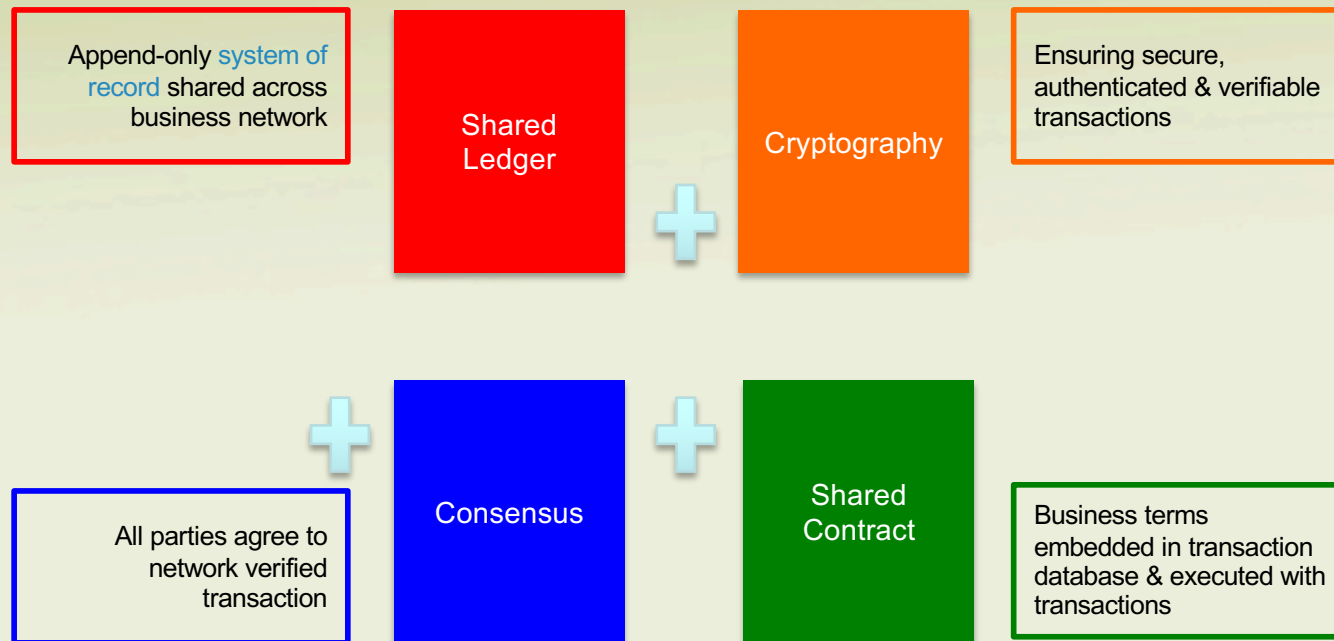
# WALMART'S ROI

- Will **not disclose** any information on how much money is being saved using RFID;
- According to an estimate published in Fortune Magazine, Wal-Mart will receive a return of **21.5% on capital** with the use of RFID.

# RESEARCH ANALYSIS

- “Analysis at the Arkansas university’s RFID Research Center indicates in test scores that an automated RFID-enabled inventory system improves accuracy by 13%;
- This finding is important because inventory inaccuracy can lead to a 10% loss of profit;
- With reports of inventory inaccuracy being as high as 65%, the 13% improvement rate demonstrates how RFID can significantly improve this problem

# Blockchain in a nutshell



Broader participation, lower cost, increased efficiency

# Why blockchain?

Blockchains are an emerging technology pattern that can radically improve banking, supply-chain and other transaction networks, giving them new opportunities for innovation and growth while reducing cost and risk.

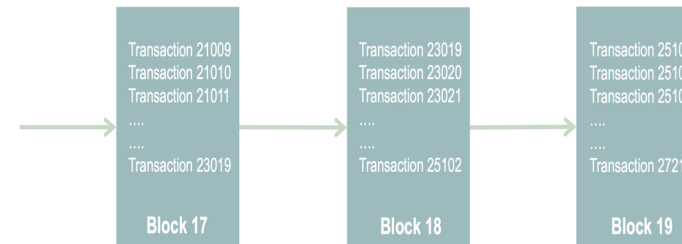
**Economic transactions on a distributed ledger can be programmed to record virtually anything of value:** your identity, a will, a deed, a title, a license, intellectual property, and also almost any type of financial instrument.

**“How seriously should we take this? I would take it as seriously as we should have taken the concept of the Internet in the 1990s.”**

—Blythe Masters, DAH <http://bit.ly/1JENgb4>

## Secure and trusted record keeping

By design, no one party can modify, delete, or even append any record to the ledger without the consensus, making the system useful for ensuring the **immutability of transactions, contracts, and other legal documents.**



## Blockchain

### Transaction

Inputs from network participants that describe changes in asset control, or insertion of contracts and/or related legal documents.

### Block

Among other things, a block contains a list of validated transactions defined around the time frame when the block was created.

### Blockchain

A **record repository** of ordered collection of blocks. It records the **history** of asset control and state changes, as well as creation of contracts and legal documents.



## Reduce costs and complexity

Blockchain technology offers a way for market participants to access dematerialized assets **directly** without always going through other participants needlessly



**Centralized Repository (today's system):** most participants are disconnected from their asset depository, settling transaction would require participants to collaborate in a flow that is **slow**, **inefficient** and **expensive**



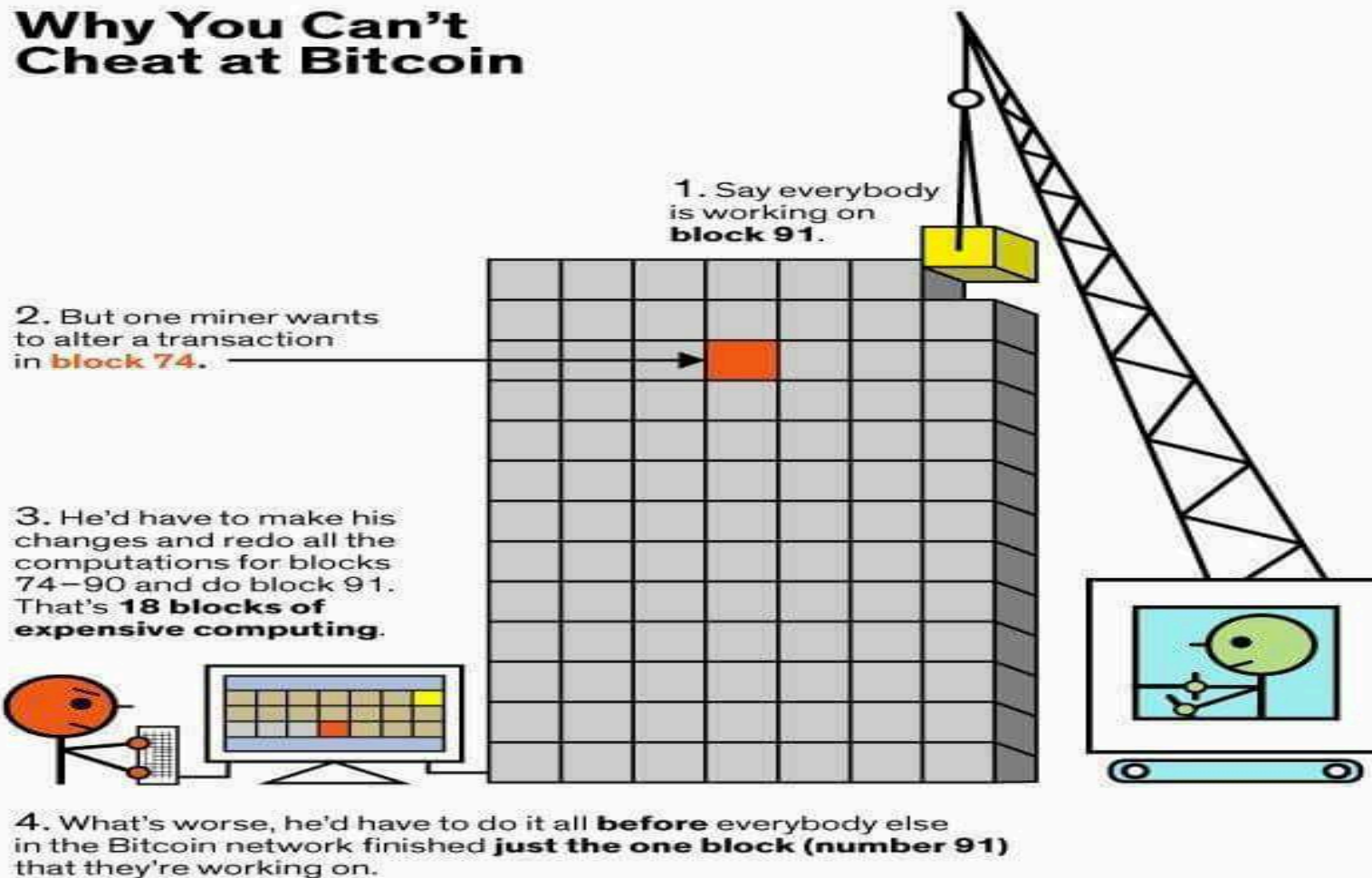
**Shared Repository:** all participants can interact with depository directly without going involving third parties, potentially making post trade operations **cheaper** and **faster**

# What is Blockchain?

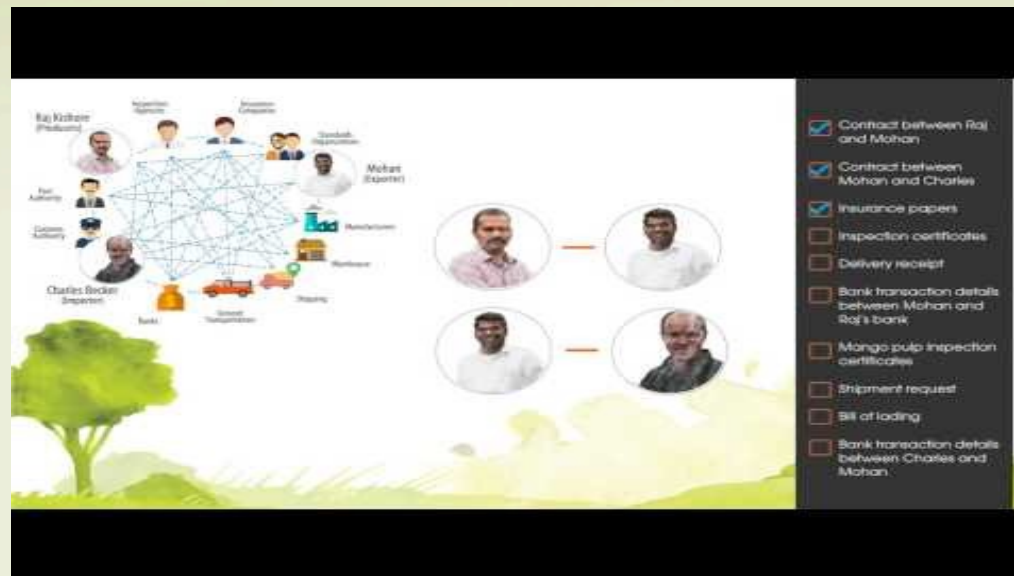


- [https://www.youtube.com/watch?v=SSo\\_ElwHSd4](https://www.youtube.com/watch?v=SSo_ElwHSd4)

# Why You Can't Cheat at Bitcoin



# Application of Blockchain in agri-food supply chain



# Cloud Computing

- ▶ **What does Cloud Computing do?**
  - Provides online **data storage**
  - Provides a variety of **software** usage
  - Enables **configuration** and **accessing** of online applications
  - Provides **computing platform** and **computing infrastructure**



# Cloud Computing

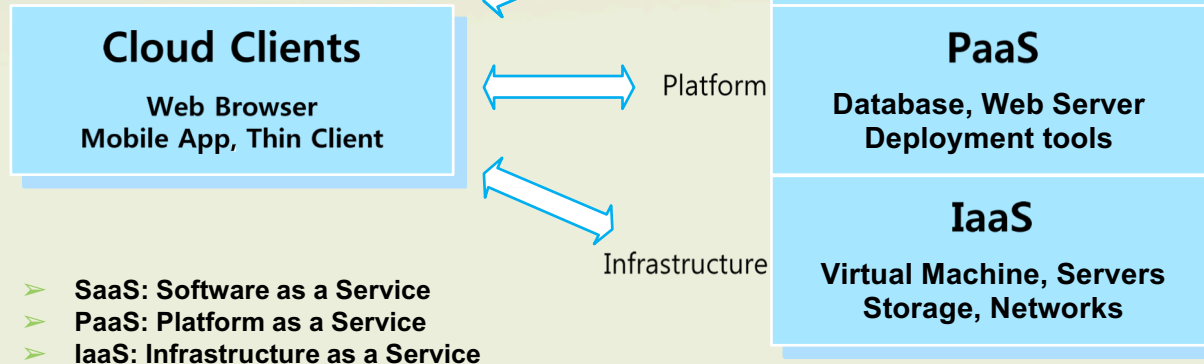
## ▶ What is a Cloud?

- **Cloud** can provide services through a **public** or **private Network** or the **Internet**, where the service hosting system is at a **remote location**
- **Cloud** can support various applications
  - **E-mail, Games, Database Management, icloud on iPhone etc.**

# Cloud Computing

## ▶ Cloud Service Models

The lower service model supports the management, computing power, security of its upper service model



# What new capabilities does cloud computing bring to supply chain management?

Volatility is the new normal

Data volumes are surging



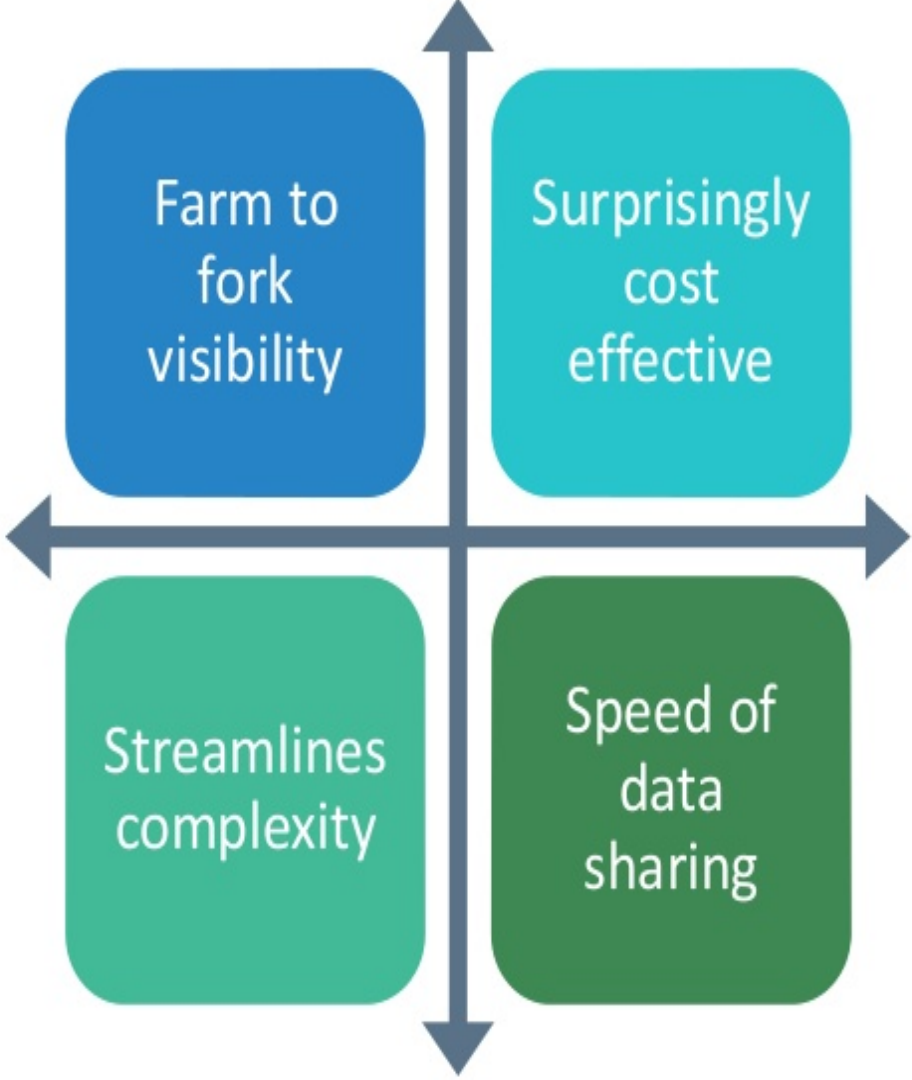
Digital technologies are industrial grade

End-to-end visibility has arrived





# Food Traceability: The potential of cloud computing



Source: Matt Ferro, Food Traceability : The potential of cloud computing, 2014

# Cloud computing in beef supply chain

