

**Should seafood traceability
systems be based on
blockchain technology?**

**MAC / NSAC / NWWAC Webinar 02/12/21:
Blockchain in the Seafood Supply Chain**

Petter Olsen, Nofima, Senior scientist

About Nofima

Nofima is a private, non-profit research institute owned by the Norwegian government with head office in Tromsø and over 390 employees in six different locations around Norway.

Nofima was founded in 2008 when four former public food research institutes merged:

- Norconserv – canned and preserved foods, Stavanger
- Matforsk – food from agriculture, Ås
- Akvaforsk – aquaculture related research, Sunndalsøra
- Fiskeriforskning – seafood and processing, Tromsø

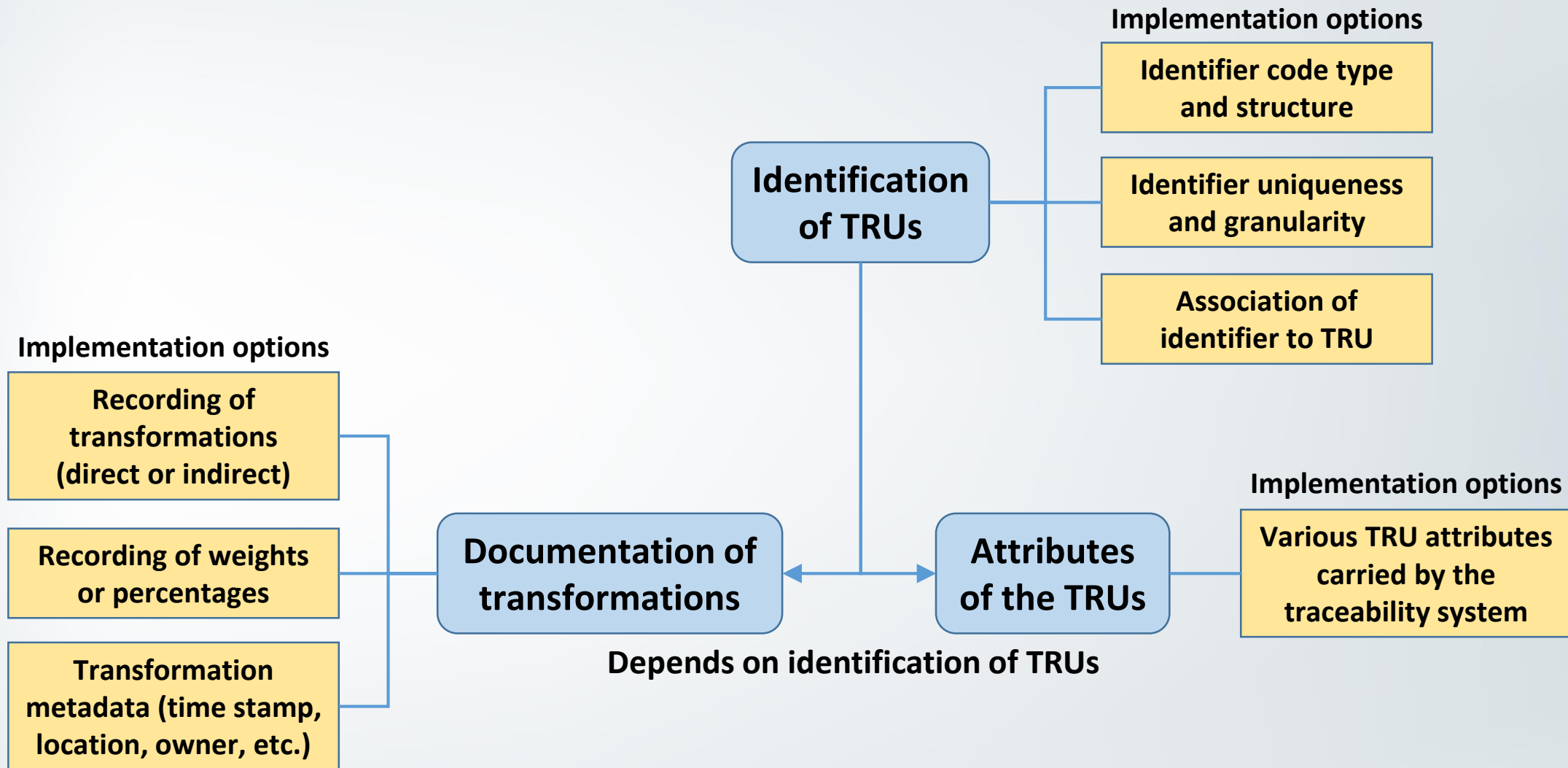
Main areas of work:

- Aquaculture and fisheries – raw materials
- Food from agriculture and aquaculture – processes and products
- Industrial economics, consumer and market research:
 - Consumer research, buying behaviour, food and context
 - Innovation and product development
 - Traceability, sustainability, environmental accounting

Turnover in 2020 was around 65 Million Euros



The components of a traceability system



Blockchain in the seafood industry

TECHNOLOGY

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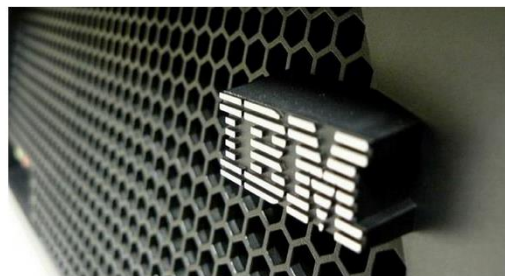
IMPORTANCE OF BLOCKCHAIN TECHNOLOGIES IN SEAFOOD INDUSTRY



May 4, 2018

Blockchain in seafood discussion at Advania in Iceland

LATEST JOBS Head of Department/Researcher



Norwegian seafood industry association partners with IBM on blockchain

The network can give Norway's seafood industry a premium edge compared to other markets.

Food and Agriculture Organization of the United Nations
FIAM/C.1207 (En)
FAO Fisheries and Aquaculture Circular
ISSN 2076-8066

BLOCKCHAIN APPLICATION IN SEAFOOD VALUE CHAINS

Norwegian Salmon Exporter Fights Food Fraud With Blockchain

Norwegian salmon producer Kvarøy Arctic has joined the IBM Food Trust to increase transparency and help prevent fraud in the seafood industry.

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NEWS

Salmon farmers urged to adopt blockchain technology

By Vince McDonagh - 7th July 2020



Kvarøy Arctic CEO Alf-Goran Knutsen

Blockchain technology has suddenly become a new tool in aquaculture in helping to ensure traceability from farm to plate and eliminating fish fraud.

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Scottish Government project explores use of blockchain and AI in fishing

Written by Liam Kirkaldy on 17 January 2020 in News
Highlands and Islands Enterprise to run scheme looking at how new tech could be used in seafood sector



Use of blockchain technologies in the seafood industry can reduce fish loss and IUU fishing

UNITED KINGDOM
Thursday, July 09, 2020, 01:00 (GMT + 9)

September 2008

October 2008



Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
 satoshi@gnux.com
 www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

1. Introduction

Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust based model.

The identity of Satoshi Nakamoto is still unknown

Blockchain news articles ...

*“It is estimated that
adulterated
tampered products
isolated, products*



*products are
[blockchain]
identified and
product recalls.”*

*“In [a Walmart]
seconds to
blockchain, the
hours and 26*

*it took 2.2
farm. Without
er six days, 18
original farm.”*

What is blockchain?

The blockchain is an incorruptible digital ledger of (economic) transactions that can be programmed to record not just financial transactions, but virtually everything (of value)

Don & Alex Tapscott, Blockchain Revolution (2016)

Sample transaction: From account: 1234, To account: 5678, Amount: 1 BTC

Blockchain is a database of transactions



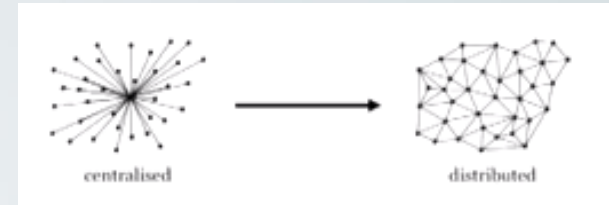
Online
(many users)



Synchronised
(every 10. minutes)



Database

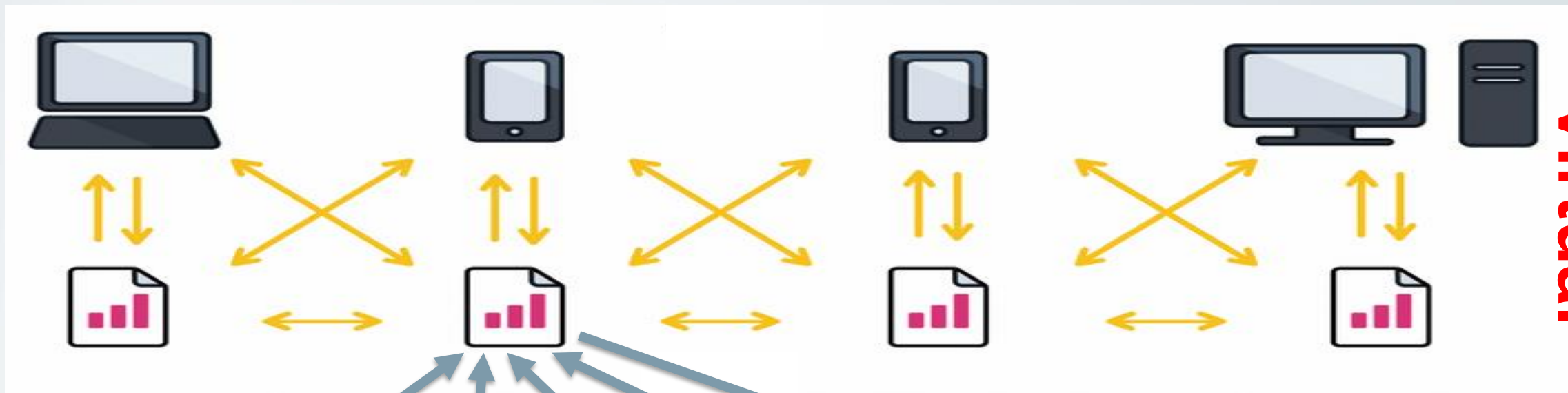


Distributed
(many copies)



**Encrypted,
Immutable**

Blockchain and supply chain



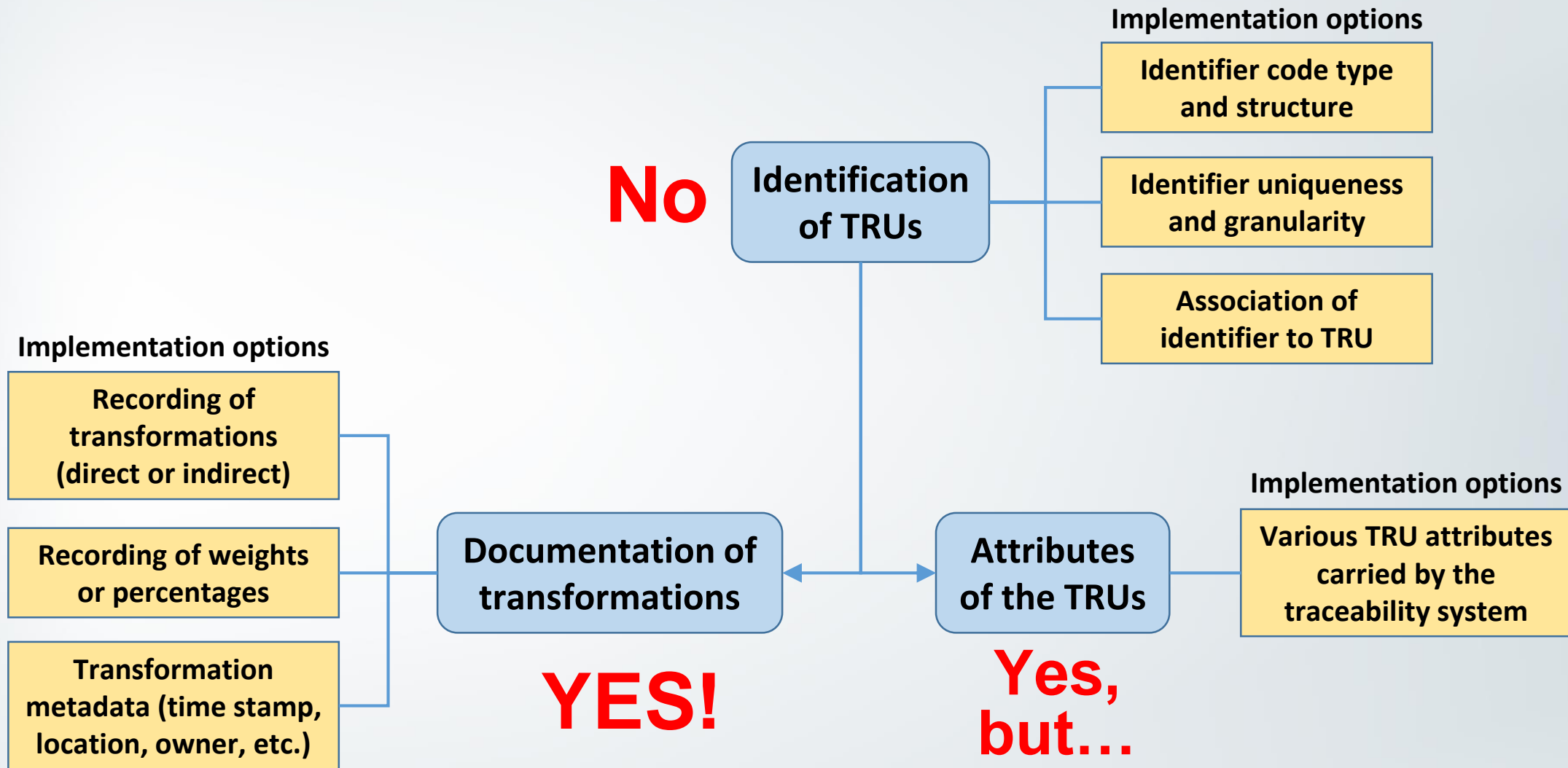
**Online
Virtual**

Getting accurate data into the blockchain is the challenge



Physical

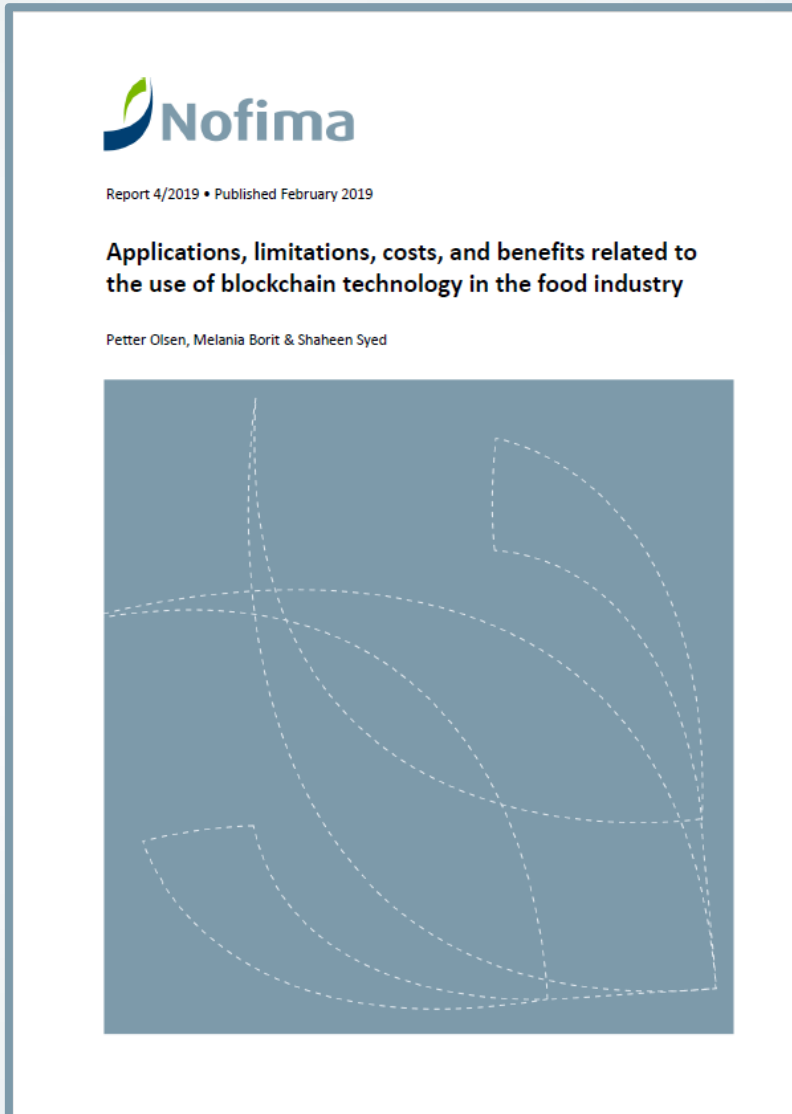
Can blockchain improve the traceability system?



Summary

- Blockchain is an exciting technology that has the potential to underlie a major technological paradigm shift
- Solution providers are currently overselling the benefits of systems based on blockchain technology
- Confidentiality and speed can be a challenge for traceability systems based on blockchain technology, but otherwise the technology is well suited for the purpose, and interoperability will be simpler
- For traceability in the supply chain, blockchain can remedy some potential problems because while claims that are recorded in the blockchain might still be wrong, it will be quite clear who made these claims, and we will know that these claims have not been tampered with

For more details...



Nofima Report 4/2019

Applications, limitations, costs, and benefits related to the use of blockchain technology in the food industry

Thanks for your attention

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