



Traceability technology for Aquaculture

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Global NTT DATA Sustainability Services



Climate & Nature

Climate Change

- Net zero strategy & carbon accounting
- Carbon markets
- Climate change adaptation strategy

Nature & Biodiversity

- Nature-based accounting and valuation
- Net Zero & Positive impact journey



Corporate Sustainability

- Sustainability strategy & transformation
- ESG reporting & disclosure



Sustainable Value Chain

- Sustainable supply chain
- Supply chain network design
- Sustainable packaging transformation
- Transportation sustainability



Sustainable IT

- Sustainable IT strategy
- Sustainable software
- Sustainable cloud
- Sustainable data center
- Technology lifecycle management



Smart in Sustainability

Energy management	Water management
Waste management	Sustainable mobility
Sustainable buildings	Smart cities & territories
Smart factory	Social impact

Applied technology :

- IoT & digital twin
- Efficient data processing
- AI for forecast & prediction
- Private 5G connectivity

ASSETS												
PARTNERS & ALLIANCES												



Context

Supply chains are becoming more and more **complex**, involving **different participants** and reaching a **global scale**.

As a consequence, a series of challenges need to be solved:

The **complete traceability** of a product **depends** on the different participants on the **supply chain**



IT systems and **heterogeneous** data models **trouble** and make more **expensive** the data integration



Harder access to get the **complete life cycle** of a product



Complexity to **integrate certificates** and **sustainability** information

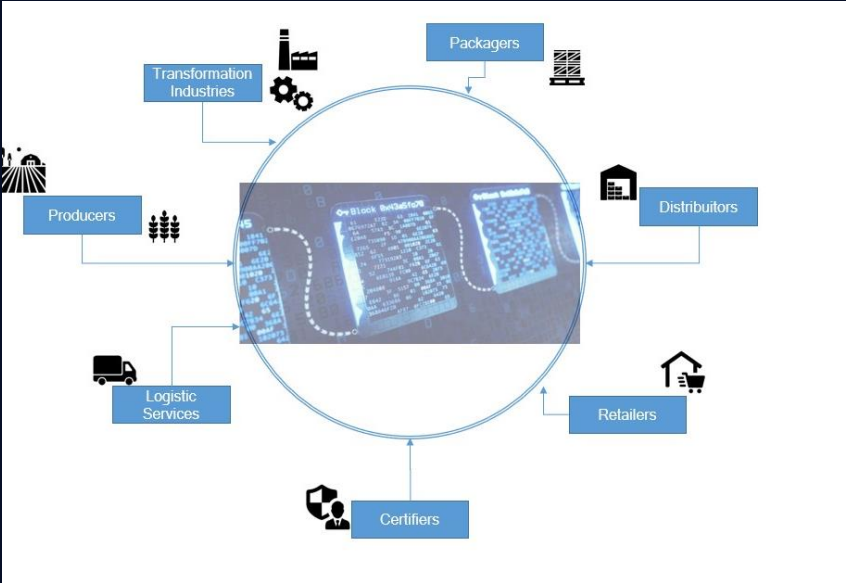


Complexity to get **Audit Trail** and manage the **digital fingerprint** of participants



NTT DATA's vision

NTT DATA's proposal to solve these challenges is based on a Blockchain (Hyperledger Fabric) Traceability Tool.



Adapted to GS1 protocol and capable of covering any traceability event, as well as allowing any combination of participants according to requirements.

Develop a **shared truth repository** where each participant can provide the associated traceability event data where they partake in.



Incorporate a **flexible data model** (based on GS1 identifiers) that adapts to each supply chain according to their information requirements.



Manage a **virtual asset that represents the physical product**, allowing the access to all its data using GS1 identifiers.



Sustainability and certification data/documentation association to the virtual asset throughout the whole product life cycle.



By default, including the digital identity of all the participants (systems or people) in each transaction registered in the system.



Tool characteristics

1

Business logic



Adapted to **GS1 (Global Standard 1) international protocol**:

- Adaptable **data model** to any sector.
- CTEs (**Critical Tracking Event**) which allow the representatioj of any real-life produc transaction.
- **Physical support** capabilities (QR, NFC, RFID, barcodes)

2

Base products



Developed in **Hyperledger Fabric**

- **Adapted to virtual asset management.**
- **Escalability**: Limited number of validations which results in increased efficiency and finalisation speed.
- **Controlled access**: Only authorized participants, private information channels.
- “Proof of Stake” consensus: Minimizing energy and operation costs
- **Consensus flexibility** according to requirements.

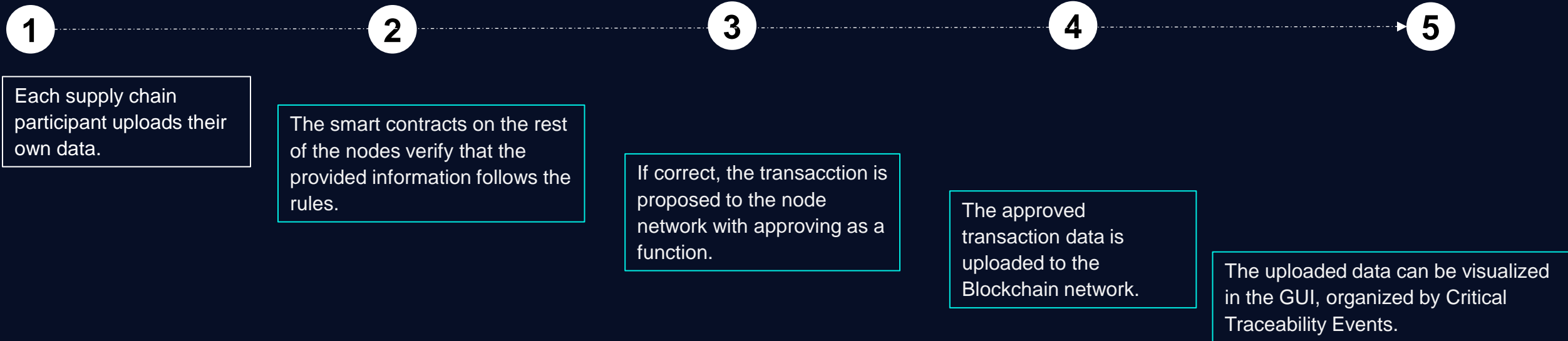
3

Cloud deployment

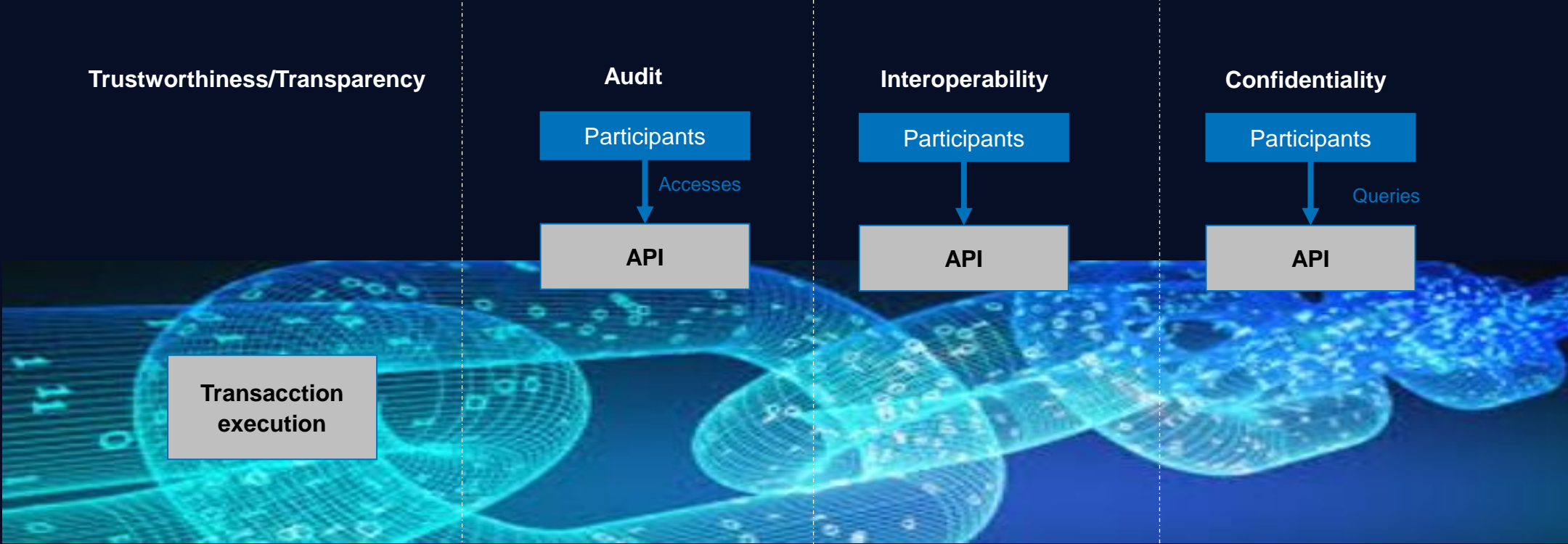
Deployed in cloud (AWS) under NTT DATA's corporate environment.

- Maximum security level:
 - Crowdstrike
 - WAF
 - SIEM
- Maximum disponibility.

How does it work?



Added value to the client



Trustworthiness/Transparency

The decision-making-capable nodes execute the Smart Contracts.

Consensus between nodes reassures the lack of execution of mistaken or malicious transactions.

Audit

Each participant accesses the tool through the API, which asks for their digital certificate.

The digital identity that executes each action is registered.

Interoperability

Each participant accesses the tool through the API, from their data origin:

- GUI
- IT Systems

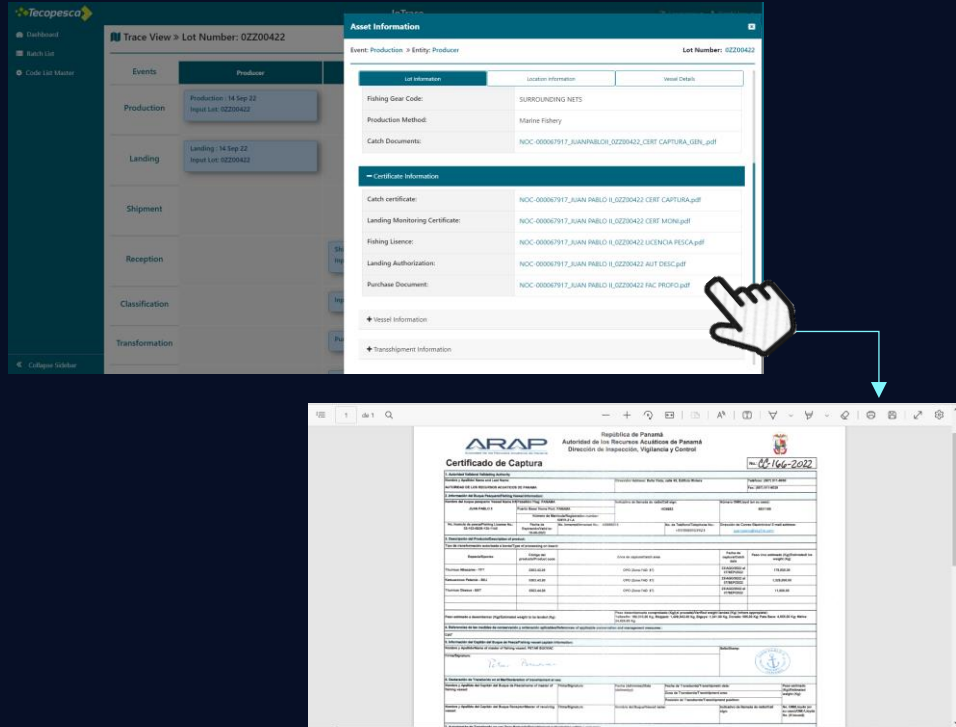
Data is sent in a homogeneous format without the need for integration.

Confidentiality

Hyperledger's digital certificates contain the digital identity of the participants and define the access datapoint for each of them.

Added value to the client (II)

Document/Certificate association

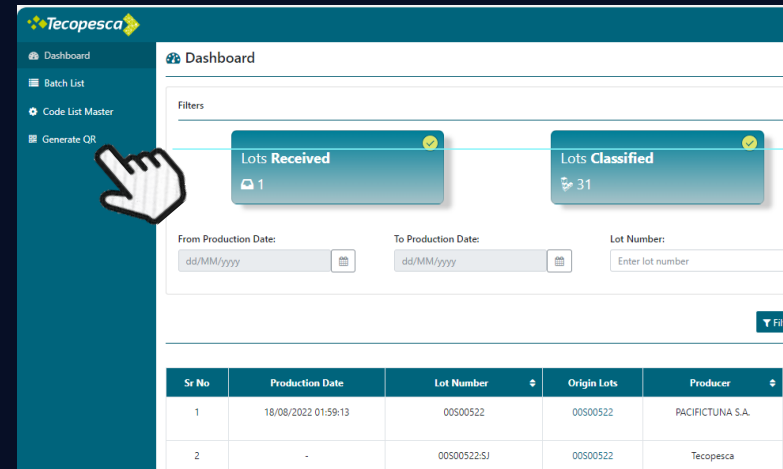


The API allows the association of documents/certificates to the product unit.

Successive registered product disgregations will keep this association throughout its life cycle.

This allows enquiring, for each final product unit, about the original certificates and documentation.

Use of physical devices



The tool allows the generation of physical labels (QR codes) in any given traceability event, which will point to the identifiers of the product unit.

Scanning these labels provides information about the product's data/documents that wish to be shown to outsiders.

THEROS case study - Digital Product Passport

An integrated toolbox for improved traceability, verification and prevention of adulterations and non-compliances in organic and GIs food supply chain

Project details

- Over 3 years
- 17 partners from 6 countries
- Includes large retailers (UNIVEREXPORT); medium and small producers; certification and regulatory bodies (BIOHELLAS, MEXILLON), and technology providers

Proposed solution

- As the technical lead, NTT DATA aims to develop a low-cost, digital and scalable solution that relies on:
- Earth observation, photonics, IoT and DNA analysis to **monitor sustainability and quality** through ML and AI.
 - Blockchain enhanced **traceability system** and **pioneering dynamic DPP** for improved traceability, security and transparency.
 - **Interfaces** to facilitate monitoring, inspections and informed decision-making by stakeholders.

Outcomes

"THEROS project is funded by the European Union, under grant agreement No 101083579. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them."

- Implementation of the **Digital Product Passport**, which would encompass user centric tools and models for improved transparency, verification, interoperability and green accountability, as well as monitoring and adulteration detection.
- Pilot demonstrations to be deployed (end 2024-end 2025):
 - Serbia:** Fertilizer use and ecologic parameters telemetry for organic product (15% of the organic produce retail market share);
 - Greece:** Organic production verification (up to 60% of organic producers for citrus and other fruits and vegetables);
 - Spain:** Galician mussels' production. 100% of the certified Galician mussels (45K tons/yr. 18% of total Galician production);
 - Czech Republic:** Organic products transportation monitoring (organic products from small, local producers)

TECOPESCA case study – Traceability and sustainability network

Business need

- One of the main transformers/exporters of tuna in LATAM.
- More than 90% of its product is exported mainly to the USA and Europe.
- Create a solution to allow end-to-end traceability, including inputs, processes, and output, and while keeping track of all the environmental data of the product.

Proposed solution

NTT DATA implemented IoTrace, a blockchain-based traceability solution, where the blockchain part generates **end-to-end traceability** of the product from production to sale (bulk or trade item products, additives, packaging materials, etc.), with the following functionalities:

- GS1 adaptation for **traceability** and **critical tracking events**.
- **Automatic integration** of data from ERP systems to IoTrace
- Data model integration in **GDST sustainability protocol**, allowing the association to the traceable object of all the information related to the sustainability of the product.

Outcomes

- Providing an **extra value** by being able to prove its **legal and sustainable origin**: complete traceability information associated to sustainability (fishing permits, catch info, various certificates, etc.).
- Enriching the product information with sustainability data by adding to the data model the information of the GDST protocol.
- Enabling the **centralisation** of the value chain information and **optimisation** of the data collection processes, due to the integration in a single repository (Blockchain ledger) of the entire life of the product.



Let's create a product's value chain!

Use these building blocks to create the value chain of one of your products.
Identify the bottlenecks you may encounter in order to get the traceability data.

Production

Shipping

Transformation

Storage

Packaging

Classification

Let's create a product's value chain!

