Web3 infrastructure fueled by UON

A blockchain network and web3 infrastructure running the UON cryptocurrency & designed for linking the stakeholders involved in supply chains.

What is UNOVA

Unova is a blockchain network with privacy-enabled data distribution clusters and cross-cluster distribution capabilities, made possible by the web3 data distribution privacy protocol and multi-layer architecture. It's the foundation of a new way of distributing data built on web3, leveraging its own blockchain, smart contracts, dapps, and powered by UON, its native cryptocurrency.
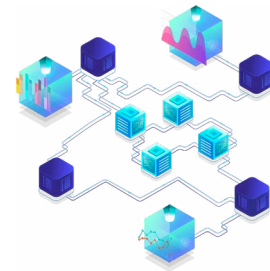
Blockchain   Smart contracts

Table of Content

Introduction

The world needs supply chain data infrastructure. Web2 failed to provide the infrastructure accommodating supply chain-wide solutions as many organizations are reluctant to trust a central gatekeeper with proprietary data. Lacking infrastructure creates gaps in supply chain monitoring, resulting in vulnerabilities causing supply chain management risks. In addition, it causes significant overhead, compliance, audit, and error costs. Other examples include numerous traceability issues and recalls causing: unnecessary excess waste, reduced consumer trust in products, and demand for increased transparency. Furthermore, fraud and counterfeiting result in people becoming ill in addition to economic losses. Other well-known issues in many supply chains include inventory management and demand prediction difficulties, resulting in excess working capital requirements.

Legacy systems are focused on optimizing a company's internal operations but fail to encompass the supply chain as a whole. Therefore, the absence of a web3 infrastructure rules out the possibility of implementing solutions that require coordination and data sharing among the many stakeholders. In addition to the current problems demanding a solution, there is a vast potential in using web3 infrastructure as a basis for future opportunities. The emergence of Blockchain, crypto, smart contracts, Dapps, and Web3 can create a vast impact in the world of production when all core requirements for mass adoption are considered. In what follows, some core requirements are described.

Unova Mainnet

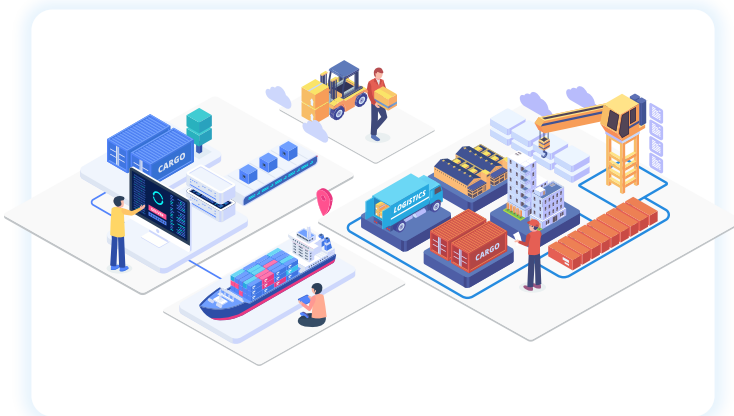Blockchain, Node Type-1, Consensus Mechanism, Transactions,...

Privacy-Enabled Distribution Protocol

Node Type-2, Smart Contracts

APIs, Storage, dApps

Supply chain Applications, Onboarding Platform, Analytics, Inventory Management, Traceability, etc,...

Web3 solution

Unova is a complete Web3 solution where users maintain control. Unova-Mainnet is an L1-L2 hybrid blockchain network configured and designed to accommodate complex business processes by leveraging smart contracts and Type-2 nodes managing off-chain data, applications, and APIs. It includes a protocol that leverages privacy-enabled data distribution, cross-cluster distribution, and a multi-layered architecture. Unova has developed its native blockchain network based on extensive feedback from companies dealing with globally connected supply chains and leveraged these learnings to create a system architecture that accommodates complex business processes. An important distinction is that blockchain is not solely used for immutability but instead as an enabler for the various smart contracts running both the current and future applications. Contrary to incumbent solutions, the applications, databases, and APIs are hosted by the users of the network who keep full control, resulting in this pure Web3 solution.

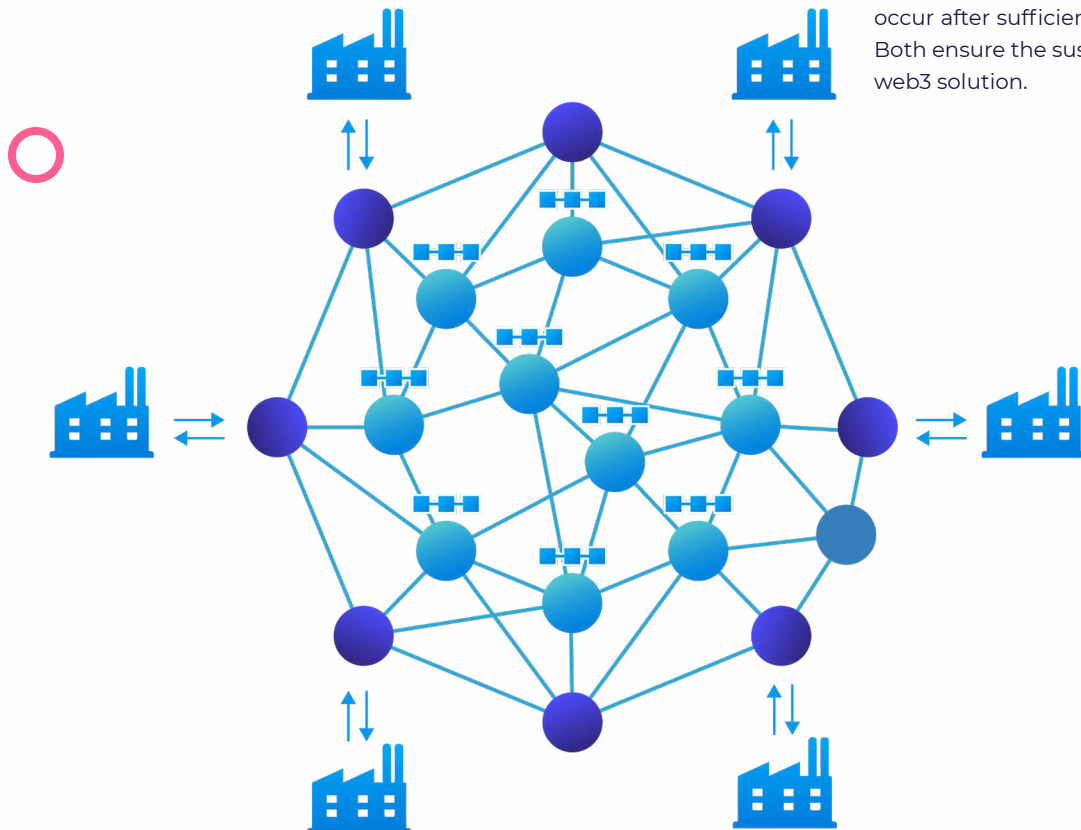## L1 & L2 hybrid blockchain network

When installing a node and becoming part of the network, the user chooses the functionality contained by the node. Each type has specific configurations and protocols to serve its function. It allows for a scalable global solution with private data distribution between stakeholders.

Single command-line installation

To enable easy onboarding, the node types can be installed using the Node Onboarding Package (NOP).

Consensus mechanism

Unova's commitment to a sustainable blockchain and environmentally positive applications has led to the choice of the blockchain consensus method. In the in the initial phase this is Proof-of-Authority (POA), open to trusted industry stakeholders. In the next phase the transition to Proof-of-Stake (POS) will occur after sufficient distribution of UON. Both ensure the sustainable nature of the web3 solution.

Mass adoption considerations

The combination of the multiple node types, Web3 architecture, and privacy-enabled distribution allows Unova to accommodate mass adoption of the technology for the supply chain use case.
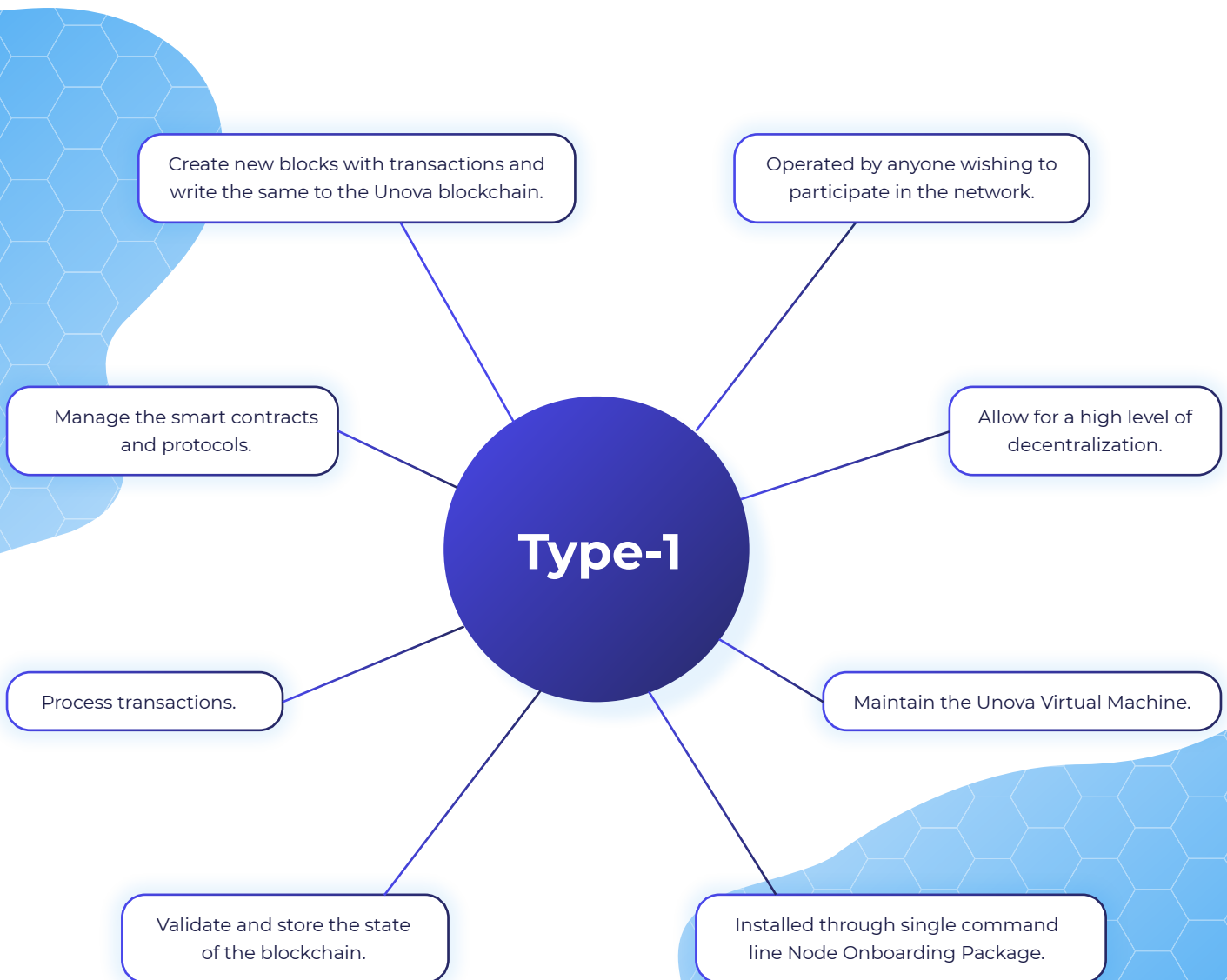
Building a community of innovators

The technologies described throughout this litepaper are designed to allow for open innovation, 3rd party business models, and the incentives corresponding to the crypto-economic model.

L1 & L2 hybrid network

When installing a node and becoming part of the network, the user chooses the functionality contained by the node. Each type has specific configurations and protocols to serve its function.
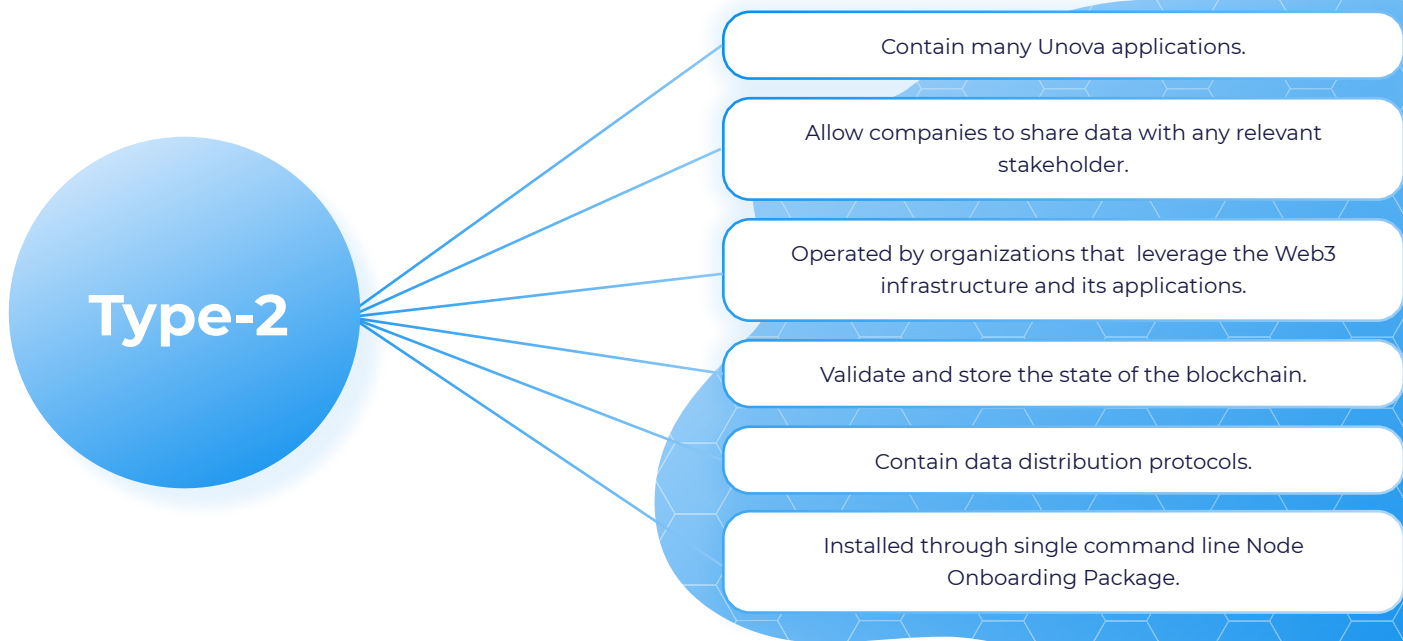
Type-1

This type of node is mainly used for increased decentralization, network security, creating blocks, hashing power, and managing the execution of smart contracts and other transactions.
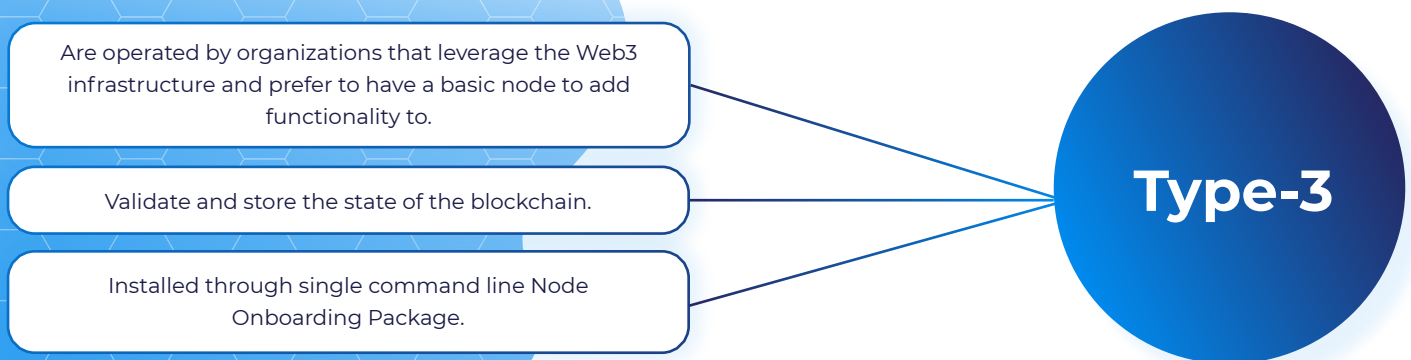
Create new blocks with transactions and write the same to the Unova blockchain.

Operated by anyone wishing to participate in the network.

Manage the smart contracts and protocols.

Allow for a high level of decentralization.

Type-1

Process transactions.

Maintain the Unova Virtual Machine.

Validate and store the state of the blockchain.

Installed through single command line Node Onboarding Package.

Type-2

This type of node is designed to be used by anyone wishing to leverage the applications and data distribution connections to be able to distribute to another Type-2 node. These are designed to accommodate and provide the data handling capabilities, Unova privacy-enabled distribution protocol, and Web3 solution where the users are at the driving seat.

Type-2

- Contain many Unova applications.
- Allow companies to share data with any relevant stakeholder.
- Operated by organizations that leverage the Web3 infrastructure and its applications.
- Validate and store the state of the blockchain.
- Contain data distribution protocols.
- Installed through single command line Node Onboarding Package.

Type-3

This type of node can be referred to as an Open Innovation Node (OIN) as it is the most basic form of a node part of the Unova network. Type-3 nodes combined with SDKs enable open innovation and allow for new business models to leverage the infrastructure and data flows.

- Are operated by organizations that leverage the Web3 infrastructure and prefer to have a basic node to add functionality to.
- Validate and store the state of the blockchain.
- Installed through single command line Node Onboarding Package.

Type-3

Blockchain explorer

Unova Blockchain Explorer is a tool for inspecting and analyzing the Unova blockchain networks. An explorer is like the Google of blockchains. It displays the blocks, miners, wallets, transactions, smart contract executions, and much more.
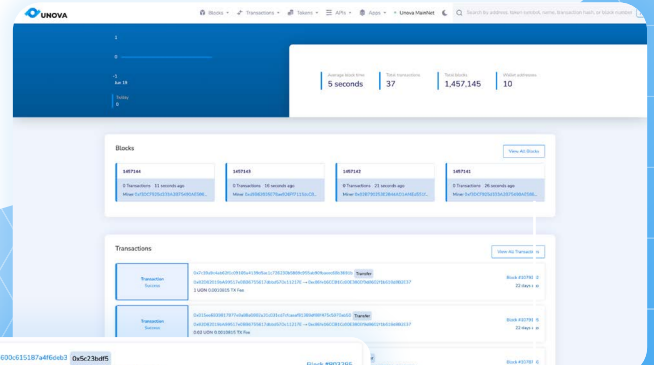
Blockchain

Transactions & smart contract executions

Block details

Transaction details

Address details

Blocks validated

Coin balance history

Privacy-enabled data distribution protocol

Global (and national) supply chains are a network of stakeholders, each involved in producing, handling, or monitoring a product. These organizations have implemented various types of internal software systems fit for their specific needs. This results in fragmentation or creation of data silos. As items are transferred between multiple actors, critical information about these items needs to be shared with business partners as well as government authorities, certification agencies, and potentially the end consumer. While most of the actors in the supply chain store a wealth of data in their legacy systems, this silo approach hinders the transfer of information leading to inefficiencies, manual overhead, traceability issues, recalls, food fraud, etc. Especially in critical situations (e.g., in case of food safety issues), an infrastructure is needed that offers all relevant actors trusted data for decision support (e.g., a swift and efficient product recall). Unova proposes a novel approach for supply chain data distribution, coordination, and innovation. The approach is based on Web3: a trustless infrastructure that takes advantage of smart contracts and blockchain technology. This allows for cutting-edge applications to be built on decentralized web software protocols. The Unova privacy-enabled data distribution protocol is specifically designed as the backbone of applications that will in turn leverage the distributed data and enable solutions to most of the currently faced supply chain problems. It leverages smart contracts, a combination of on-chain and off-chain data flows, and the L1-L2 architecture.

The main aspects of the distribution protocol are:

Bundle configuration

The configuration parameters to be set for a bundle creation are the minimum bundle size and the checking period.

Bundle creation

The Type-2 nodes are responsible for creating, distributing and sheltering the supply chain assets and events data which is done by distributing bundles.

Distribution smart contract

The distribution smart contract is executed to put the bundleId (Hash) inside a block as part of a transaction.

Data request

Once the transaction is executed, the blocks are distributed to the other nodes in the network.
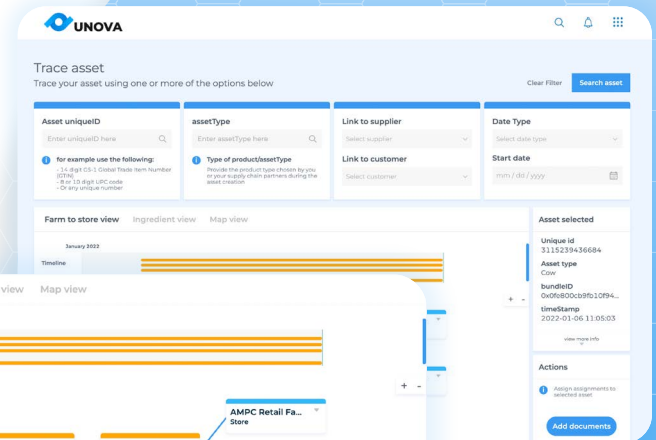
Partner confirmation

When a Type-2 node requests the data from the creator Type-2 node, the creator will validate whether it should be sending the data to this node by confirming with the partner list and the initial transaction.
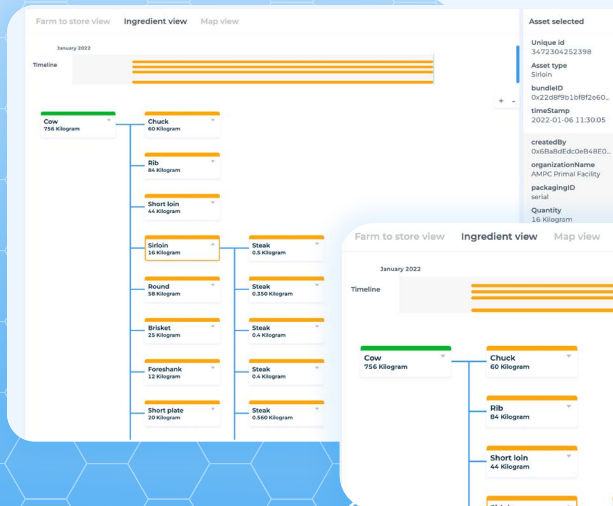
Data distribution

If the requester node is a partner and the public key is part of the transaction, only then the bundleData will be distributed to the requesting Type-2 node.

Data validation

Once the bundleData has been received a final validation happens to confirm that the data has not changed.

Main platform

UNOVA trace

In many cases, it will be important to be able to trace any product and in an intuitive user-friendly way visualize the full chain of this product. Data is only data and lacks value until it can be used and is used to make decisions. The Unova trace module serves exactly this purpose.

Farm to store view

Ingredient view

Map view

Recall system

When things go wrong, and a product is contaminated, what can you do? We purposely wrote "when" and not "if" because we all know that sometimes, things go wrong and the only thing left to do is resolve the issue. The Unova recall system is designed to do just that. Just select an asset or multiple assets that caused a problem, and the system will take care of the rest. Organizations that are involved will be notified and assets recalled before it turns into a problem.

Insights/analytics

Gain insights into every corner of your supply chain. Notice supply chain inefficiencies, spot problems, analyze in seconds how long a product is spending time at each step, average dwell time, time since harvest, and much more. Giving you more certainty and control over the quality of your product. Gain insights into consumer interactions, ratings, favorites and improve your brand.
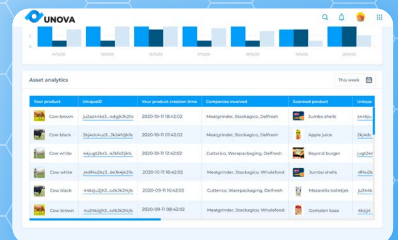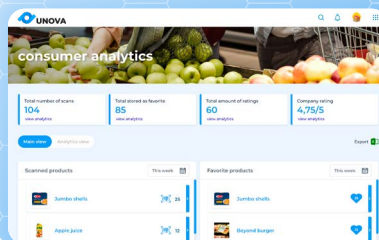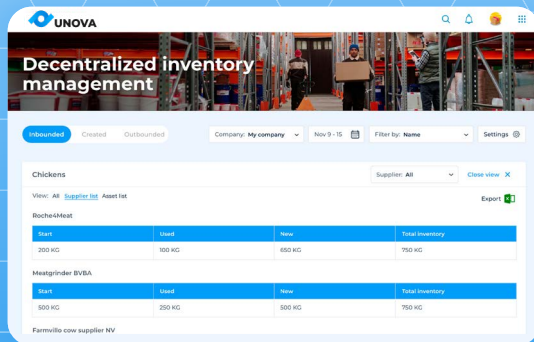
Inventory management & demand predictions

Reduce the bullwhip effect and working capital requirements which impose risks for supply chains by improving demand predictions based on customer and supplier production data and inventory status.
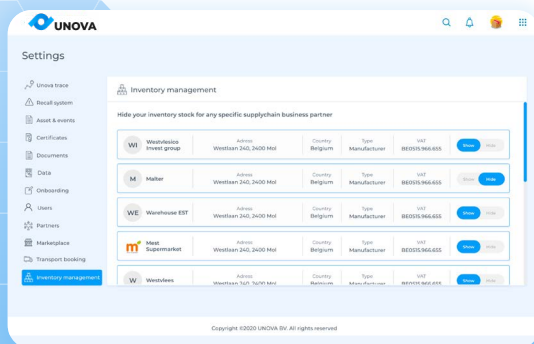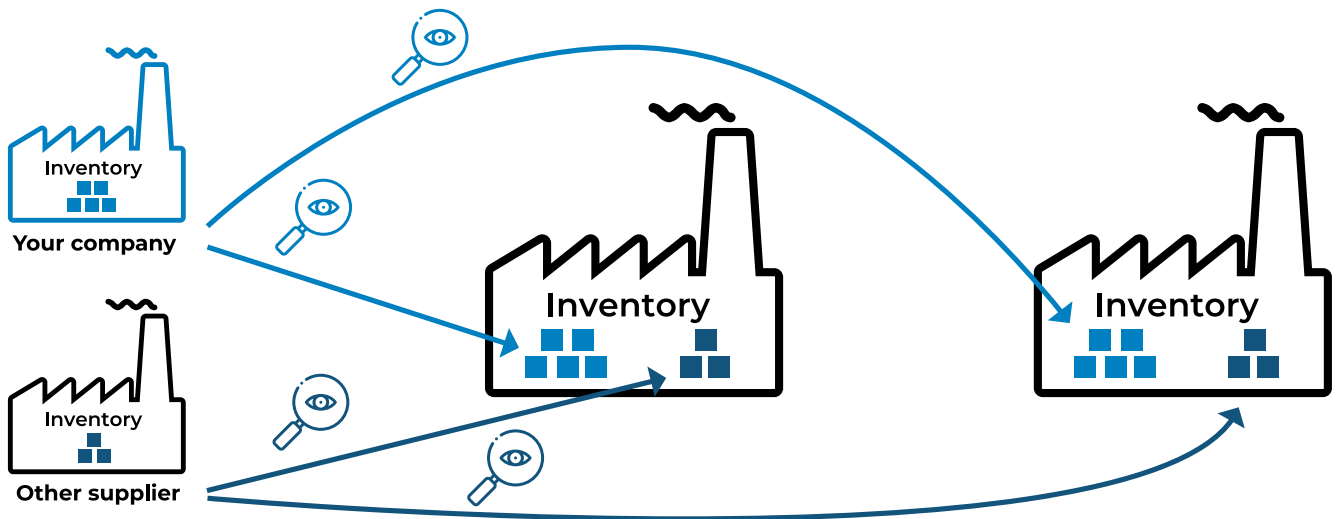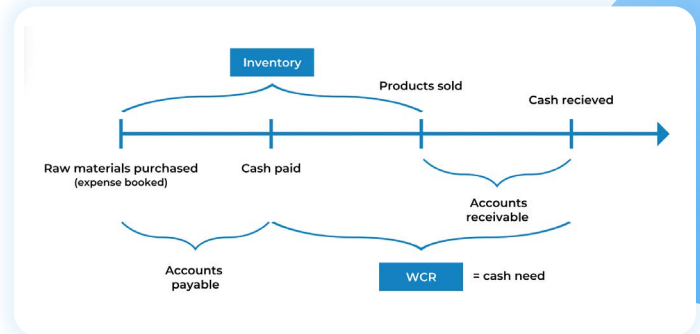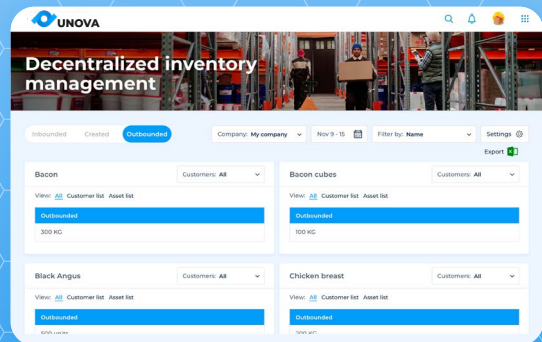

**Hide/show inventory**
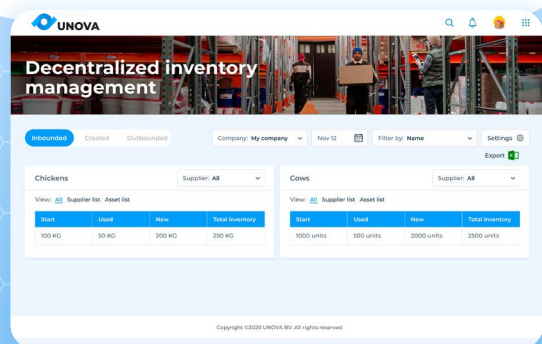
Inbounded inventory

Supplier list

Outbounded inventory

Counterfeit monitoring

Monitor your partner's supply chain data for a potential counterfeit activity or abnormal activity. Automatic flagging scripts run on the data, allowing immediate insight into possible label counterfeiting or gaps in supply chain monitoring. Rules can be added to the asset & event creations limiting the possibilities for counterfeit data creation.

Open Read APIs

Although the applications provided by Unova already give access to many insights, the read APIs allow organizations to integrate the data directly into their existing systems.

Consumer tracing

Share full supply chain transparency and proven traceability with the end consumer via a mobile-friendly web app. Unova's consumer trace dashboard allows the consumer to scan a QR-code/barcode on a physical product and get access to full traceability and transparency data. This will enable consumers to view, rate, comment, share or store products and view all members in the ecosystem. Aside from traceability and other insights, this application also notifies whenever there is a chance the product is counterfeit based on the various data points captured.
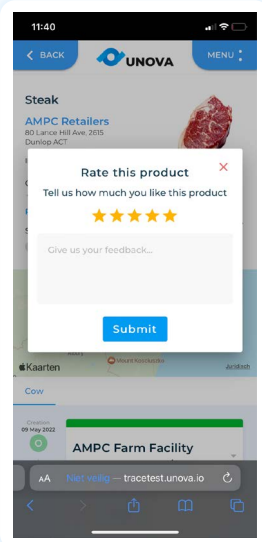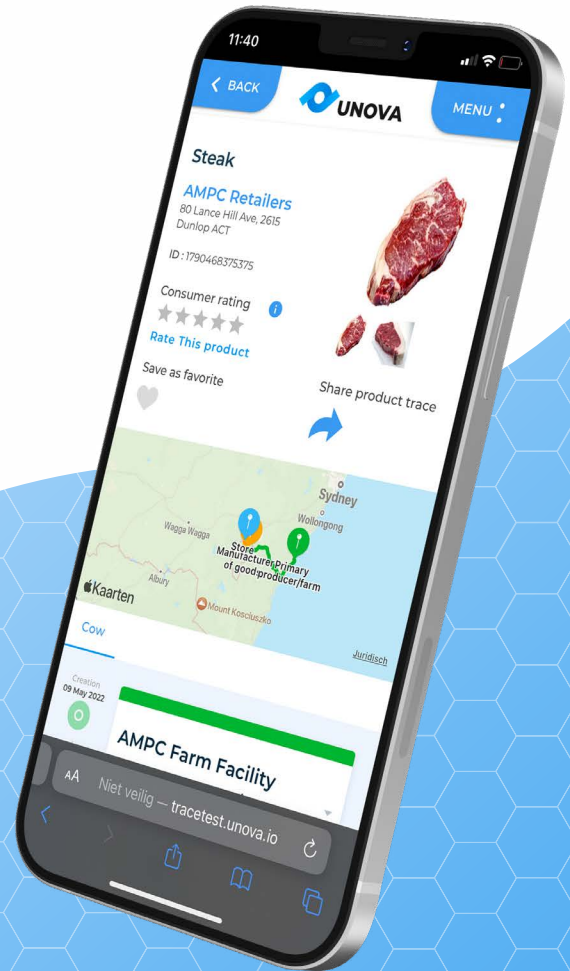
Rate products
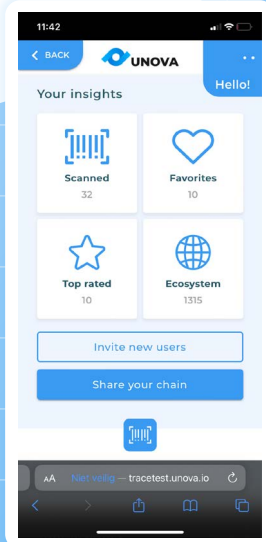
Menu
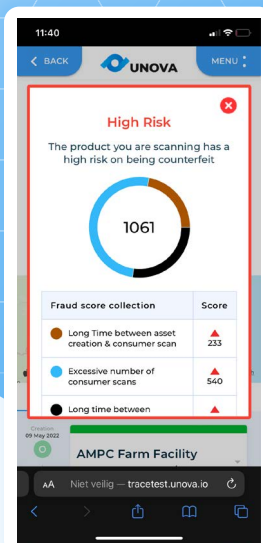
Get notified
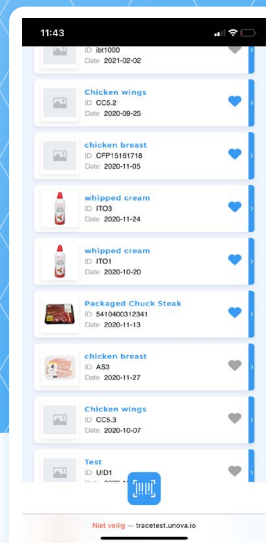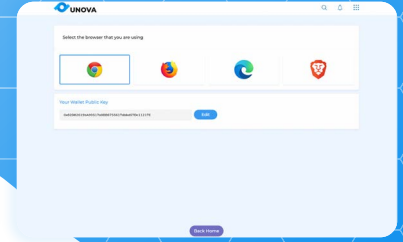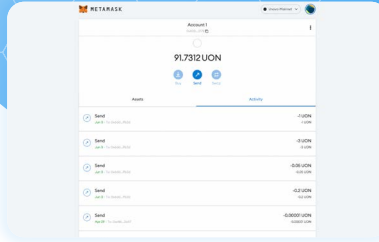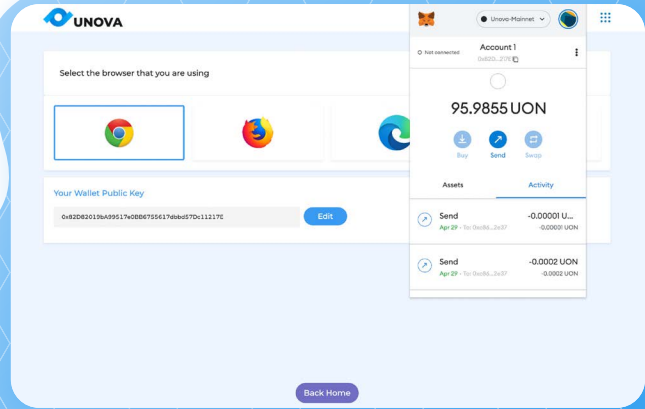
Store favourites
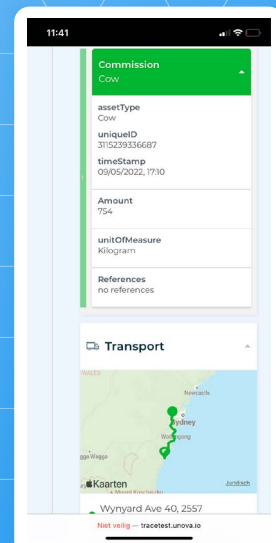
Trace product

Onboarding

Wallet creation & node onboarding

Creating a wallet allows users to read their balance, send transactions, and connect to applications. Wallets are a tool for managing Unova accounts. Users can swap wallet providers at any time. Most wallet providers allow managing several Unova accounts from one application.

Facility management

Users host their own node. The wallet keys can be created outside the Unova environment and assigned to a node. In addition, each node will be assigned private and public keys for node admin functionality. Using these keys the user will be able to add multiple facilities. Each facility will have its own private and public key assigned, which is in a lower hierarchy and linked to the node key pair.
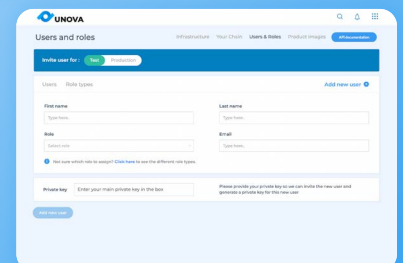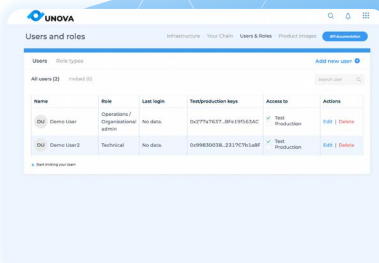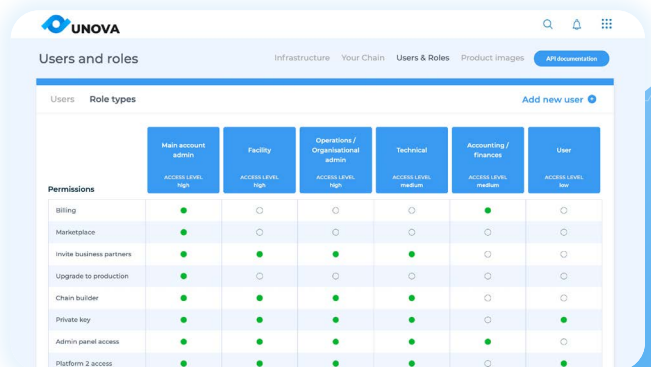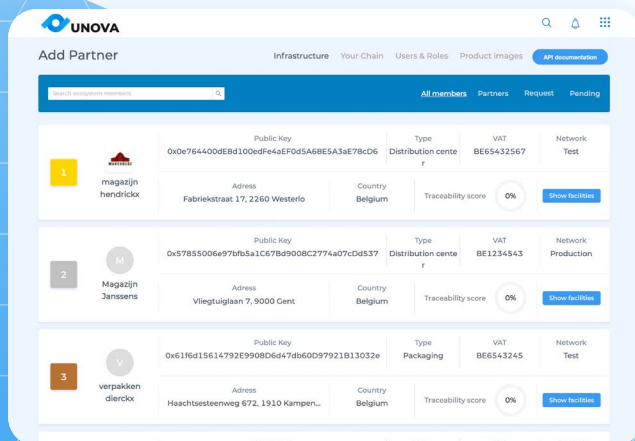
Users & Roles access management

The 'Users & Roles' module allows adding people to onboard an organization, with each their own responsibilities. Some roles will receive their own private and public key, which will be linked to the facility keys.

Ecosystem members

Unova creates more value the more suppliers and customers of a company are onboarded to the system. Unova thus encourages companies to sit together with their suppliers and customers and invite them to join the Unova ecosystem. Companies can simply invite them to join via email. If their supply chain partner is already part of the ecosystem, they can simply add them to their partner list. By having more supply chain partners onboarded, companies will notice their traceability score increase.
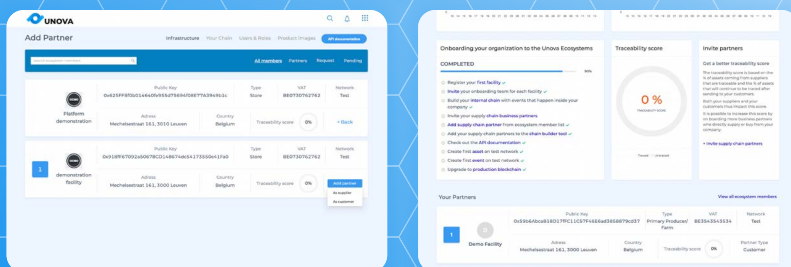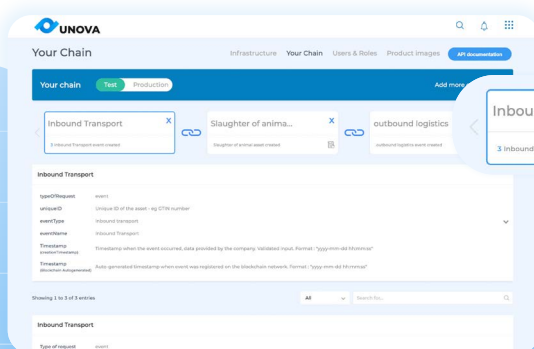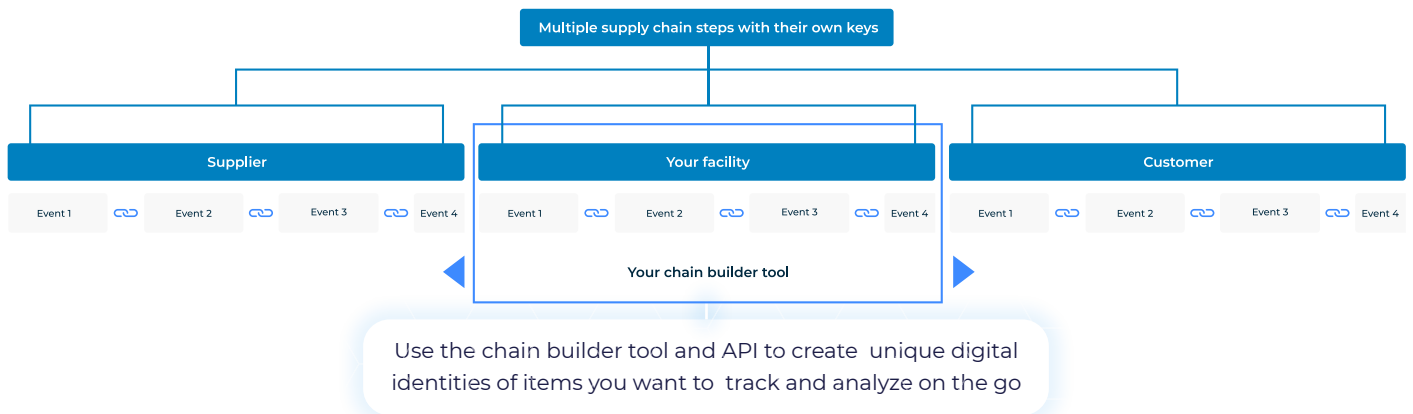
The Traceability Score

Traceability and the added benefits of obtaining this should be rewarded as it brings value to business partners as well as governments, consumers, and even the environment. This led to the creation of the traceability score. The score is based on the percentage of assets that can be traced back and the percentage of assets that can be traced forwards.
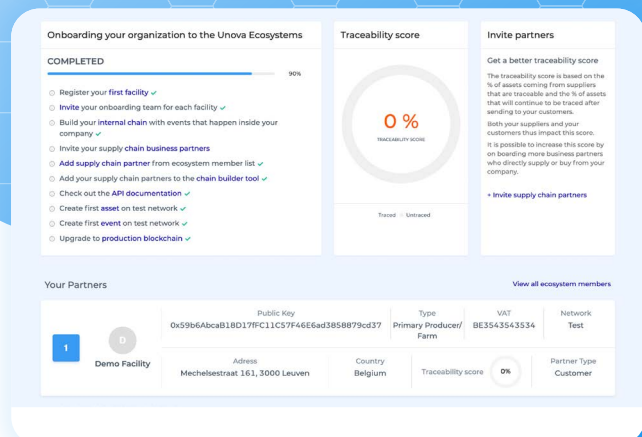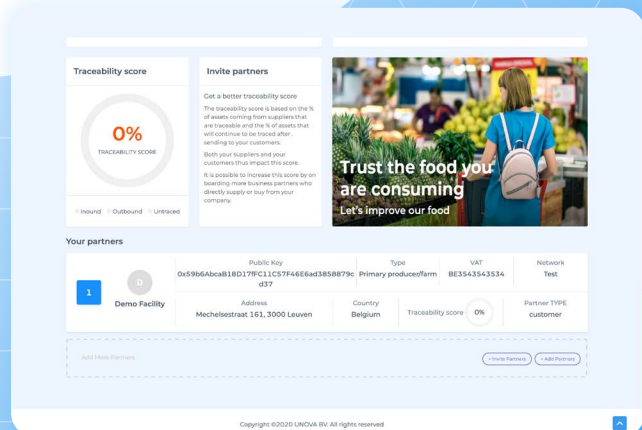
Internal process mapping

The purpose of the Unova Chain builder is to help visualize, understand, and create the events (or asset creations) that will occur inside a company. This tool can also be considered as a settings page that will be used in other aspects of the Unova platform and impact the API. It is thus important the users take care when building a company's chain and be accurate concerning the settings they select.

Use the chain builder tool and API to create unique digital identities of items you want to track and analyze on the go

Map your internal business process and determine the name and type for registering products and events
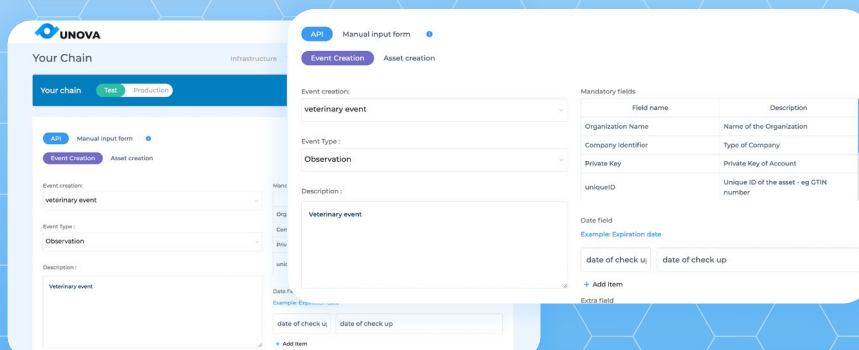
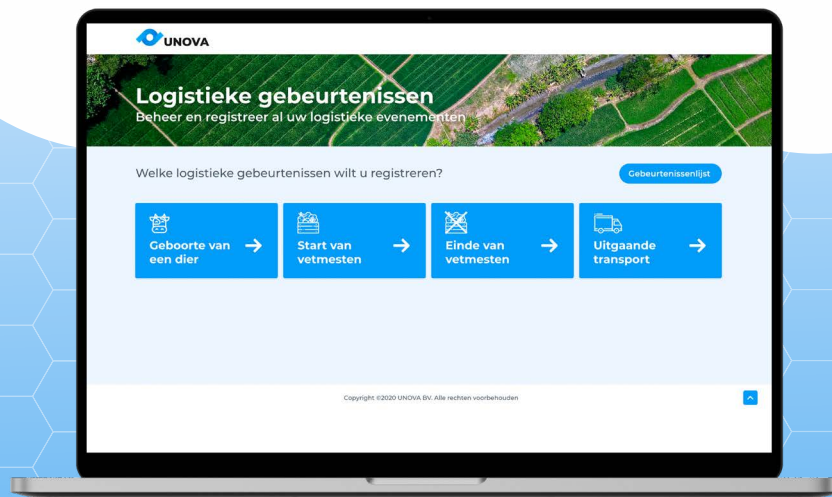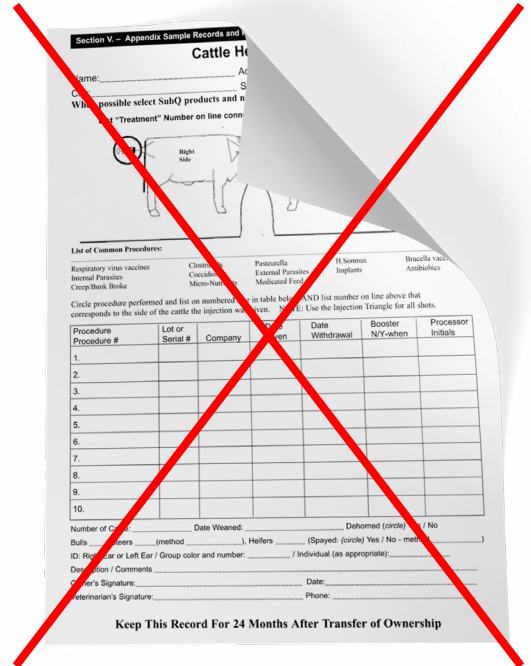Decide what additional data you want to assign to your products
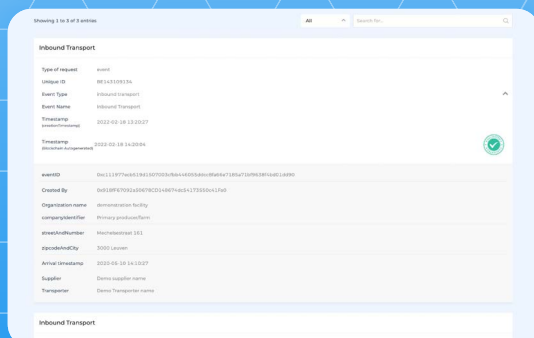
Choose between the manual form option or the connector APIs

Farmer form

The Unova Web3 solution is designed to accomodate supply chain-wide solutions across different/diverse supply chains. The implementation can happen without the need for blockchain specialists. There are solutions available for even the least tech focused stakeholders. For example, farmers can immediately fill in all the information they wish to share with both their customers and the end consumer on the basis of simple fill-in forms. Naturally, this process will take place fully automatically (APIs) in most enterprises where the information is already stored in the internal systems. In addition, the data structure has also been created in a flexible way so that it can adapt to the required situation. This leads to a fully integrated Web3 supply chain solution with a focus on adoption.

Future potential 3rd party solutions

Unova-Mainnet, its smart contracts, protocols, and data flows provide the right basis for additional services and a potential for a whole new production model. In this section, some initial ideas[14] for future developments are outlined.

DeFi solutions

The data infrastructure created by Unova paves the way for many additional financial solutions built into smart contracts. Many companies over the world do not have access to financial solutions as there is a lack of banking infrastructure, accounting standards, and data availability. The lacking (production) data that financial institutions would require and general infrastructure put a strain on the many farmers and producers that are vital to feeding the world.

Examples:

Trade financing

Insurance

Loans

Investments

Factoring and Invoice Discounting

Commodity market for all product categories

Decentralized AI automation

one might believe there will be a time when an AI solution manages the economy. This is something that would depend much less on the intelligence of the AI and much more on the availability of production data and the extent to which producers also take into account the decisions made by the AI. Even in the short term, Unova-Mainnet provides the basis for many AI optimizations and automation enabled by connections between many stakeholders and an ability to collect and leverage the available data.

Examples:

Transport booking

Purchase ordering

Inventory management

Delivery times

Non-Fungible Token (NFT) service-based production

Generally the production industry is organized in a way where companies purchase raw materials, store them as inventory, process them and sell the newly produced goods to the next step in the supply chain. Each step in this sequence pays the supplier first and then waits to get paid by the customer requiring large working capital to cover the period. In addition, companies often require additional financing to be able to purchase the raw materials in the first place and more capital to expand the operations. The performance of such a business model could significantly increase when the model is changed from a buying and selling model into a service model where the company does not purchase the raw materials but performs the service of processing instead. So why do most companies not operate in such a way?
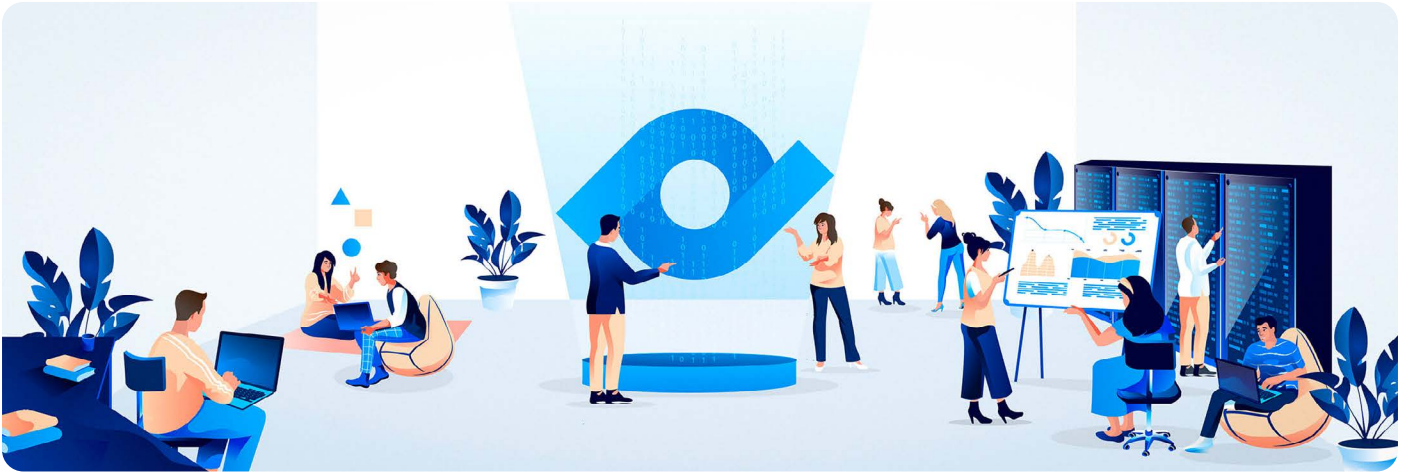
A few reasons are highlighted:

There is no marketplace for raw materials or inventory investing

There is no data availability to make smart investments

There is no infrastructure guaranteeing further processing into the final product is rewarded

Conclusion

The L1-L2 system architecture of Unova-Mainnet, the built-in contracts, the Unova data distribution protocol, and the many available applications provide the solution to most current supply chain problems. The reduced friction to join a Web3 solution as created by Unova has the potential of gaining mass adoption resulting in immense economic wealth creation. As an open solution where users keep full control by hosting their own node together with all the applications, the basis is formed for future innovation. Through its decentralized nature, the community, external developers, and innovative companies will become stakeholders/ contributors to the network. In addition, the crypto-economic model is designed to align all stakeholders in the network and leads to the democratization of the infrastructure. Furthermore, new business models can be created, supply chain financing (e.g., trade finance), and payment solutions provided in addition to any service or solution that may benefit global trade and supply chain operations.

The end goal: Unova to become the world's supply chain network.