



I-DELTA

Introducing interoperability to distributed ledger technologies

The ITEA project I-DELTA (Interoperable Distributed Ledger Technologies) focused on interoperability between distributed ledger technologies (DLTs), demonstrating this with a unique combination of use-cases in multiple domains.

Stringent regulations and complex supply chains, sometimes involving dozens of partners and hundreds of transactions, have led to inefficient and non-transparent business processes in various fields. Community-focused infrastructure assets, such as smart grids and smart cities, also face a growing number of security threats, while unique digital identities require a high overhead for definition, validation and maintenance. While DLTs can tackle these issues with real-time auditing, counterfeit prevention, end-to-end asset traceability and stronger stakeholder transparency, they currently suffer from a lack of interoperability.

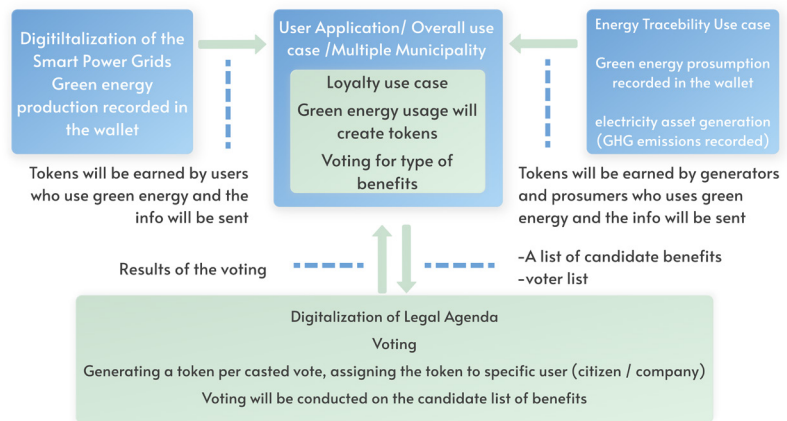
To meet this challenge, I-DELTA created an interoperable DLT-based platform for integration with existing IT systems and IoT applications. This can be used to solve problems related to energy, smart communities and supply chain optimisation by enabling shared databases and diverse stakeholder participation with blockchain. As a result, companies and municipalities can utilise an asset or data value on two or more DLT platforms simultaneously and transfer data element control from one DLT platform to another, all while retaining the necessary state and uniqueness. This also offers the capacity to audit, trace and verify data elements across their entire lifecycle and across DLT platforms while avoiding the need for structural changes to the DLT systems to be included in the integrating networks. In turn, this enables new approaches to the digitisation of businesses and public

processes.

Technology applied

I-DELTA is based on a framework of components (including for privacy, identity and real-time analytics) that enables faster build-out of DLT-based interoperability use-cases. This does not reinvent core DLT but mostly uses the existing open-source package Hyperledger to implement DLTs. This framework natively includes the

into one global demonstrator of I-DELTA's success with interoperability. In this smart city scenario, the digitalisation of smart power grids allows for the recording of green energy production in the wallet. Green energy prosumption and electricity asset generation (including greenhouse gas emissions) are also recorded in the wallet as part of energy traceability. The loyalty use-case allows tokens to be earned by users, generators and prosumers who utilise green energy; these tokens can be exchanged for benefits such as bus tickets or rented bicycles. The exact benefits can be decided via the digitalisation of legal agendas, in which tokens are generated per user (citizens or companies) to enable



^ I-DELTA Global Scenario

lightweight I-DELTA Interop Layer, which enables interoperability with Hyperledger, Ethereum, IOTA and other platforms. The national consortia have also developed new DLTs in a variety of fields, which form the project's individual use-cases on loyalty schemes, energy wallets, energy grids, the digitalisation of smart power grids and the digitalisation of legal agendas.

These use-cases have been combined

e-voting from a candidate list. This scenario ties together all of I-DELTA's developments from partners in Canada, Czechia, Spain and Turkey, creating a uniquely expansive demonstration of international collaboration within ITEA.

Making the difference

As one of the first efforts worldwide to focus on DLT interoperability, I-DELTA devoted a large amount of effort to system engineering, system integration

and building up a knowledge base through which the partners can now solve interoperability issues and demonstrate proofs-of-concept to potential clients. The project is currently in a dissemination phase, with the partners having participated in 35 events and released 11 publications so far. The first spin-offs have also been released by Argedor, which has expanded I-DELTA into gaming with solutions such as Gamewizz.io (a full-fledged wizard that offers an integrated platform for Metaverse and Web3 game development) and Dappwizz.io (a no-code wizard for companies to easily create decentralised applications).

By showing that multiple ledgers can operate together despite belonging to significantly different domains, I-DELTA promotes the increased uptake of blockchain technology and its knock-on benefits for business and society. P2P energy trading, for instance, creates a decentralised energy market that incentivises the deployment of renewable and distributed energy resources, offering greater flexibility for consumers and fewer transaction costs. The digitisation

of legal agendas, meanwhile, can be used at a municipal level to promote direct democracy and at a company level for stakeholder voting, leading to increased participation, transparency and trust in both scenarios. And in the loyalty use-case, I-DELTA offers new business opportunities via decentralised marketplaces, including supply chain track-and-trace, trade finance, reward schemes and financial asset clearing and settlement. This will allow companies to carve out a share of the global loyalty management market, expected to be worth USD 18.24 million by 2026 at a compound annual growth rate of 16.3%.

I-DELTA is the first ever ITEA project to focus on blockchain, paving the way for multiple proposals since its inception. For the partners, the experience gained in the project provides a springboard to investigate new forms of business with the technologies created. Equally valuable are the strong links created between the companies and individuals of the consortium, which will form a basis for future collaboration and impact – a major advantage of ITEA that keeps the flywheel of innovation turning.

Major project outcomes

Dissemination

- > 35 Conferences, fairs and workshops (e.g., Blockchain Futurist Conference 2022 in Toronto Aug 9-12, 2022, Internet Identity Workshop 34, April 26-28, 2022)
- > 11 publications and several social media posts

Exploitation (so far)

- > I-Benefit: a DLT-based wallet application
- > I-Scheduler: interoperable platform to manage demand / capacity gaps in pipeline
- > Smart Loyalty: interoperable multi-company loyalty networks with minimum apriori trust
- > eVote: remote and secure digital voting
- > Crounter: interoperable voting DLT-system with AI algorithm for intelligent governance
- > Energify: a DLT-based energy presumption platform

Standardisation

- > Working with W3C, W3C CCG, IETF and DIF
- > Verifiable Credentials Data Model: <https://www.w3.org/TR/vc-data-model/>
- > Decentralised Identifiers: <https://www.w3.org/TR/did-core/>
- > Verifiable Credentials API: <https://w3c-ccg.github.io/vc-api/>
- > Traceability Vocabulary: <https://w3c-ccg.github.io/traceability-vocab/>
- > Traceability Interoperability: <https://w3c-ccg.github.io/traceability-interop/>
- > DID-Method-Web: <https://w3c-ccg.github.io/did-method-web/>

Spin offs

- > Dappwizz.io; Gamewizz.io; Daoxy.io; Walletwizz.io; Supplywizz.io; ZenEnergy.io; Registo.io

ITEA is the Eureka R&D&I Cluster on software innovation, enabling a large international community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society. ITEA is part of the Eureka Clusters Programme (ECP).

<https://itea4.org>

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Partners

Canada

- > Mavenet
- > Ryerson University

Czech Republic

- > EXPECT-IT
- > Kubecka & Prokop, Advokátní Kancelář
- > Selfcon Systems

Germany

- > IOTIQ

Romania

- > BEIA Consult International

Spain

- > Sotec Consulting
- > University of Madrid Carlos III
- > VECTOR

Türkiye

- > ARGEDOR Information Technologies
- > Dakik Yazilim Teknolojileri
- > Entek Elektrik Üretimi
- > ERSTE Software
- > KoçSistem Information Communications Services
- > T2 Software
- > TMOB Bilisim

Project start

April 2020

Project end

March 2023

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<https://itea4.org/project/i-delta.html>