I-DELTA

Interoperable Distributed Ledger Technology

Deliverable 5.5

Reports generated by Report System

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Abstract:	I-DELTA is an interoperable DLT-based platform that aims to enable seamless communication and data exchange between different DLT platforms. The I-Benefit system, developed using Hyperledger Aries and Hyperledger Indy, is a DLT-based wallet application that supports various verifiable credentials. This deliverable presents reports generated by the I-Benefit reporting system that includes analytical reports, credential generation analysis, analysis of credential usage, website usage analysis, analysis for agents, and performance reports. These reports provide insights into the usage patterns, system performance, and user activities, which can help optimise the system and improve the user experience.
Keywords:	DLT, Hyperledger Aries, Hyperledger Indy, verifiable credentials, reporting system, analytical reports, credential generation analysis, credential usage analysis, website usage analysis, performance reports, user experience, interoperability, ERP, IoT, Internet of Value

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Table of Content

1. Executive Summary

I-DELTA aims to enable different Distributed Ledger Technologies (DLTs) to interoperate with one another seamlessly, without the need for structural changes. Furthermore, the solution allows for data elements to be transferable from one DLT platform to another while maintaining their uniqueness and state consistency with confidence.

To achieve this goal, the interconnected use cases within the I-DELTA scenario collaborate to promote the adoption of green energy, encourage civic participation, and foster the development of more sustainable and engaged communities. By harnessing the unique benefits of DLTs, these systems provide transparent, secure, and efficient solutions to address pressing environmental and societal challenges.

Through the implementation of I-DELTA, various DLT platforms can effectively communicate and exchange information, streamlining cross-platform processes and ensuring data integrity. This level of interoperability not only strengthens the overall performance of the individual DLT systems but also fosters collaboration and innovation across different sectors and industries. By bridging the gap between diverse DLT platforms, Idelta plays a crucial role in driving the widespread adoption and success of these cutting-edge technologies.

2. Project Description

Distributed Ledger Technologies (DLT) undoubtedly are a cutting-edge new breed of technologies with the potential to completely transform the way our society works. DLT will foster switching from the "Internet of information" era to the "Internet of Value" era, whereby decentralized and immutable contracts define business interactions and secure exchanges of information. I-DELTA aims to create an interoperable DLT-based platform enhanced by AI, integrating with existing IT systems such as ERP and IoT applications.

3. Reports Generated by Report System
3.1. I-Benefit (Türkiye - Dakik Yazılım)

I-Benefit is a DLT-based wallet application for verifiable credentials developed using Hyperledger Aries and Hyperledger Indy. It supports many features and benefit types such as authentication tokens, identity verification documents, tickets, gift cards etc. all using verifiable credentials generated for decentralized identifiers. Thanks to the Zero-Knowledge Proofs, the predicates on the information stored in these credentials can be verified without revealing the exact information.

3.1.1. Analytical Report

In I-Benefit, we have developed a reporting system that used the stored activities of the users and the response performance of the system. Thanks to this reporting system, we can easily generate usage reports, find and optimize the slow parts of the system, and keep track of set KPIs. Also, tracking users' activities shows us where we should focus in the future.

3.1.1.1.   Credential Generation Analysis

Keeping track of the Credentials allows us to prevent possible bugs and to find out where the user got an error in case of these bugs. Our reporting system stores which agent issued the credential to the user when the user accepted it, and for what purpose the credential was issued, together with the timestamps.

3.1.1.2.   Analysis of Credential Usage

Thanks to our report system, we can track the usage counts of users' credentials and their habits. In I-Benefit, we keep statistics such as how many credentials are shared with an institution, how many credentials are revoked, and how many times they are verified offline with a QR code. These statistics will help to generate usage reports and improve the user experience in the future.

3.1.1.3.   Analysis Based on the Website Usage

Thanks to the website-based analysis, we can see how many users are registered in our system and how many times they are logged in with date information. In this way, we can find the hours when the system is busy and we can work to speed up the system during these hours.

Keeping a record of users' activities can improve the experience by making the frequently used parts more noticeable and by throwing the less used parts a little further back. In this section, we can see which agent the users have connected with, how much the tax deduction feature has been used, how many credential tokens have been transferred to public chains, how many times the credential and DID details have been viewed, and how many pdf has been downloaded. For example, on the Add Connection page, we can provide a better experience for new users by putting the frequently connected agent first.

3.1.1.4.   Analysis for Agents

Tracking the activities of 3rd parties and other agents helps us to improve them with these institutions when requested. In this way, they can have an idea about the new features of the system. Furthermore, they can develop the features they have created with information such as how many times the user has encountered a proof request, how many times the users have accepted this request, and how many have rejected it.

3.1.2.   Performance Reports

With performance reporting in our system, we can see the places where users get slow responses while using the system. In this way, we can find the bottlenecks and frequently used parts we need to optimize and speed up. There are three main performance reporting modules.

DLT Performance Reporting Module: Writing something to DLT can be slow compared to the rest of the system. While any operation in the system takes a maximum of 500 ms, any write transaction applied to the DLT can take several seconds depending on its type.

Web Application Performance Reporting Module: Each transaction performed by the users in the web application is recorded along with the response time. In this way, users will be able to appear in our system when they receive an error. The time spent by users in their transactions will shed light on where we need to optimize. The transactions made by the users are completed within 300 ms on average. These times may vary depending on the user's connection speed and the availability of the server.

External Chain Performance Reporting Module: In our system, users can convert gift token credentials obtained from the Loyalty application to the IDLT token available on Ethereum, Avax, or Polygon blockchains. Since these blockchains are public chains, there is no optimization we can make for transactions on these networks. However, since we monitor the completion times of transactions, we can give feedback to users that the network is busy during peak hours. We can say that the completion time of the transactions is generally 15 seconds on average.