Gravity <> Tykn Interoperability Proof of Concept

DIGID Project, June 2021

1. Interoperability: what does it mean and why is it important?

What is interoperability?

Interoperability refers to the basic ability of different systems (for example, the two decentralized identity protocols from Gravity and Tykn) to readily connect and exchange information with one another. In terms of decentralized identity, interoperability involves a scenario where Alice, who has a decentralized identity wallet based on protocol A can share credentials with Bob, who might use a wallet based on protocol B. With full interoperability, Bob can easily decrypt, read, and verify Alice's credentials. Interoperability between different protocols is an important argument in favour of decentralized identity.

Why is interoperability important?

One of the key use cases envisioned for the use of decentralized identity in humanitarian aid is that NGO A can issue credentials to a beneficiary who can then easily share these credentials with NGO B. Interoperability allows NGOs A and B to use different decentralized identity protocols for issuance and verification, while still allowing a beneficiary to easily share credentials between the two organizations to gain access to different services.

Interoperability is important because it reduces the risk of vendor lock-in and siloed data management solutions. Using a decentralized identity protocol with a high degree of interoperability may help mitigate risks arising from being dependent on a single vendor, both for humanitarian organizations and for beneficiaries receiving assistance. For example, a Vendor A could experience a system-wide fault or suddenly cease activity. With siloed data management solutions, beneficiary data would all be lost in this scenario. However, with interoperable decentralized identity solutions, beneficiary data may still be available from Vendor B.

What has been done to achieve interoperability so far?

Currently, almost all decentralized identity solutions follow a certain data standard called VerifiableCredentials. While this is an important piece, there is still some way to go to achieve full interoperability between protocols. For instance, protocols have different ways of creating connections and exchanging messages and credentials. In addition, public keys and schemas are stored on different public ledgers and use different verification algorithms.

These issues are actively being addressed in different working groups in the World Wide Web Consortium (W3C) and the Decentralized Identity Foundation (DIF), but it will presumably take several years to achieve full interoperability.

To date, there have only been a few attempts at demonstrating interoperability within decentralized identity.[1] As such, the interoperability test conducted between Gravity and Tykn within the context of the DIGID project is one of the first of its kind that we are aware of. Our approach is novel because it is the first step towards achieving interoperability between different decentralized identity wallets based on two distinct protocols that leverage very different standards and networks.

2. How is the DIGID Project addressing interoperability?

Requirement/scope definition

It is important to ensure that any solutions that are being built for the long-term (like the DIGID Platform) are as interoperable as possible. While the DIGID project mainly leverages Gravity's identity stack built on Tezos blockchain with beneficiaries creating Gravity identity wallets during the pilot, the aim is to ensure that services that are at the intersection between the DIGID Platform and third-parties are also able to issue and read credentials from other decentralized identity protocols.

As part of this project, we tested an integration of these services on Gravity's DIGID platform with a different decentralized identity protocol, Tykn's Ana Cloud platform built on Sovrin blockchain. Ana is fully interoperable with the 121 identity platform which was also built by Tykn. Other services can be integrated as well, but this was beyond the scope of the DIGID Project.

Differences between DIGID Platform (Gravity) and Ana Cloud (Tykn)

Identifiers

Both Gravity and Tykn rely on a new type of identifiers introduced by the W3C called Decentralized IDentifiers (DIDs). However their generation differ as follows:

Gravity: hashed format of public key prefixed by `did:tz`

Tykn: encoding of Universally Unique IDentifier (UUID) prefixed by `did:sov`

Verifiable Data Registry

W3C describes Verifiable Data Registries as a public decentralized ledger that stores public metadata associated with DIDs. **Gravity** chose the **Tezos Blockchain** and **Tykn** is

[1] For example, a collaboration between two decentralized identity providers based on the Sovrin network allowed for interoperability between their respective digital identity wallets in the context of the Swiss pharmaceutical industry. Another example is an initiative to build a universal interface that allows for the verification of credentials issued using different decentralized identity protocols.

based on the Sovrin network itself based on **Hyperledger Indy**. This results in distinct DID generation mechanisms as mentioned above

Governance

The two Blockchains are themselves very different especially concerning their governance

Tezos Blockchain: public permissionless Blockchain. It is accessible via a public network so anyone can access it (public) and anyone can be a validator node of the chain (permissionless)

Hyperledger Indy: public permissioned Blockchain. It is accessible via a public network so anyone can access it (public) but permissions are required in order to become a validator node (permissioned)

Credential Issuance

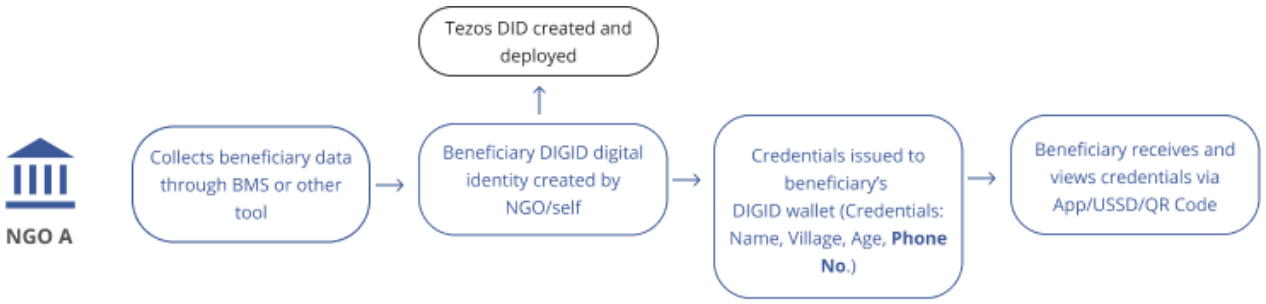
Entities issuing data, known as issuers, are able to attest information on beneficiaries. This data lands in their wallet that they (or their Guardian) control

Gravity: Issuers can directly issue data to the wallet of the beneficiary

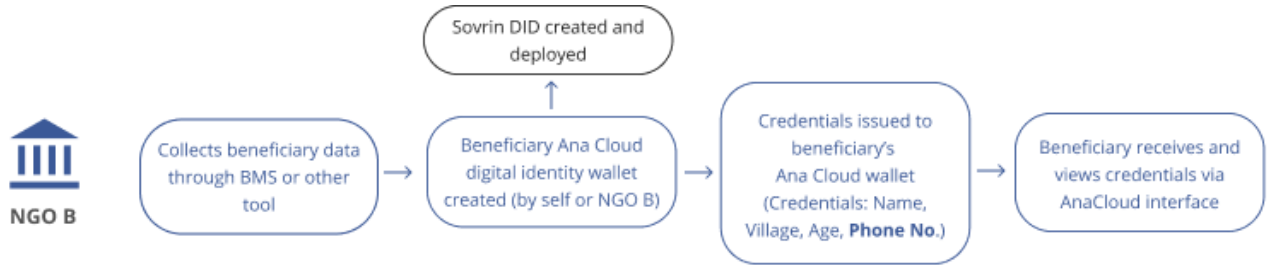
Tykn: When issuers issue data, it is the task if the beneficiary to accept or not the credential in its wallet

Sample DIGID interoperability flows

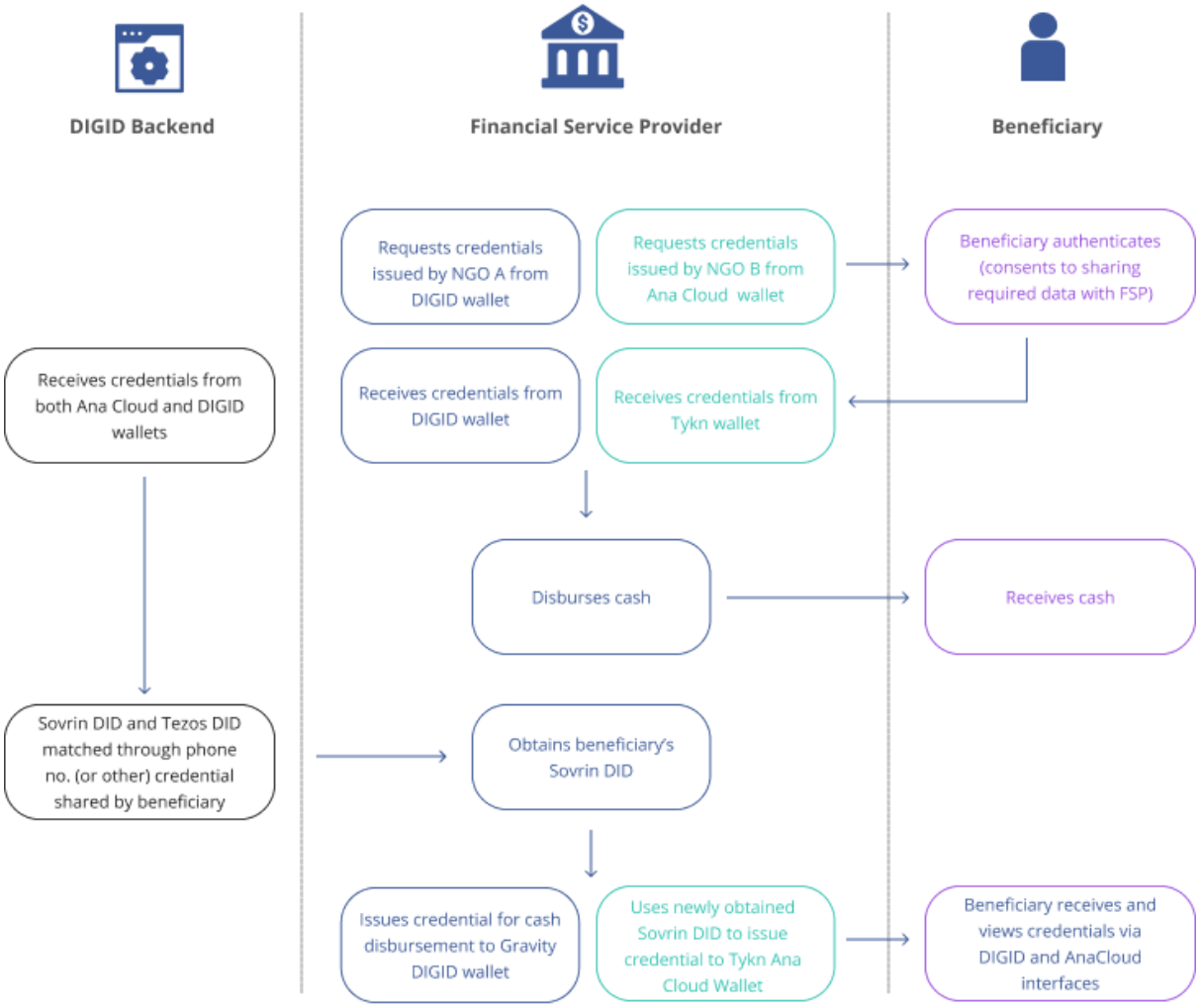
1. NGO A using the DIGID Platform developed by Gravity



2. NGO B using Ana Cloud developed by Tykn



3. Interoperability between Gravity's DIGID Platform and Tykn's Ana Cloud



3. Beyond DIGID: next steps for interoperability

Interoperability is key to ensuring the greater adoption of digital identity within the humanitarian sector. NGOs and digital identity vendors like Gravity and Tykn must continue to work together to advance interoperability so that NGOs can more easily collaborate across projects and between organizations without jeopardizing beneficiary data privacy and ownership. To optimize the interoperability of decentralized identity systems for NGOs and beneficiaries alike, there are three key areas that should be addressed moving forward.

1. Technology: Furthering interoperability through further cooperation

AnaCloud integration by NGOs

Gravity was the only identity vendor during the DIGID pilot and the Tykn stack has simply been used in a post-pilot test environment. For interoperability to be put in good use it is necessary for **NGOs to integrate the Anacloud platform** on their applications, as well as interfaces used by beneficiaries so they can benefit from Sovrin wallets and credentials. The objective is to have the DIGID ecosystem populated with NGOs using either Gravity or Tykn since it is a first step in order to avoid vendor-lock in.

Same identifiers across wallets

More than one identity solution on the DIGID ecosystem involves guarded beneficiaries may have several wallet types across the different NGOs. Because those wallets represent the same physical person, it is important they remain synchronized over time so NGOs share the same view on a given user. A solution is to have NGOs issuing the **same unique identifying data** (phone number, id number ...) **or dataset** (firstname + middlename + lastname + date of birth). Those data get eventually requested by verifiers who can intersect results in order to pair wallets with the same data unique identifying data / dataset

AnaCloud integration by FSPs

It is mandatory for Financial Service Providers to be able to **access Gravity and Tykn identity platforms**. When beneficiaries request services they simply have to share data from one type of wallet (either Gravity or Tykn) and FSPs can retrieve the counterpart with the solution given above. After cash distribution is done, disbursement **credentials are issued on both wallets** so every NGOs is aware that cash distribution has successfully come to an end

Developments reflective of real world scenarios

Tests that have been performed are the very first steps of interoperability and are not enough to really include this feature in the DIGID project. Features including basic phone flows, account recovery and data deletion have not been tested during the post-pilot phase but are mandatory to have.

2. Governance: How can humanitarian organizations improve the governance of multiple digital identity protocols to better support NGO collaboration and beneficiaries alike?

For improved digital identity management, it is important for humanitarian organizations to decide what standards they would like to set for the governance of multiple digital identity protocols.

Questions to be addressed include:

- What data should be required for all participating NGOs to collect from beneficiaries during the enrollment process and creation of digital identity wallets?
- What information do NGOs want to require and assess to verify a beneficiary's identity?

In the case described above (Sample DIGID interoperability flows), a beneficiary's phone number is the credential that helps link the Tezos and Sovrin DIDs of the same beneficiary. This credential is what links Gravity's Tezos DID to Tykn's Sovrin DID, allowing for the flow information between the two protocols. However, in many humanitarian contexts, NGOs work with beneficiaries who do not have phone numbers. Or, NGO A may collect phone numbers from beneficiaries during enrollment while NGO B does not. If this is the case, agreement among NGOs on other possible credentials to be used for linking and how to manage them is necessary for improved interoperability.

3. User Experience: How can we improve the user experience and make it easier for beneficiaries to adopt digital identities to access humanitarian aid?

Much progress has been made through his collaboration between Gravity and Tykn to help NGOs improve the efficiency of their service delivery. However, it is **also important to think about how interoperability can make the end-user experience better for beneficiaries in the humanitarian aid context.**

With the current Gravity and Tykn integration, beneficiaries will have two digital identity wallets on two different platforms (Gravity's DIGID Platform and Tykn's Ana Cloud). This requires that beneficiaries learn to use two different platforms, each with their own interfaces, authentication mechanisms and key management processes. While this is already a huge step towards interoperability, the next phase of this work would be to focus on how we can make the beneficiary experience more seamless and easy to use.