REBOOTING THE WEB OF TRUST

A WHITE PAPER FROM RWOT XII: COLOGNE

The Ecosystem Coordinator's role in SSI ecosystem management

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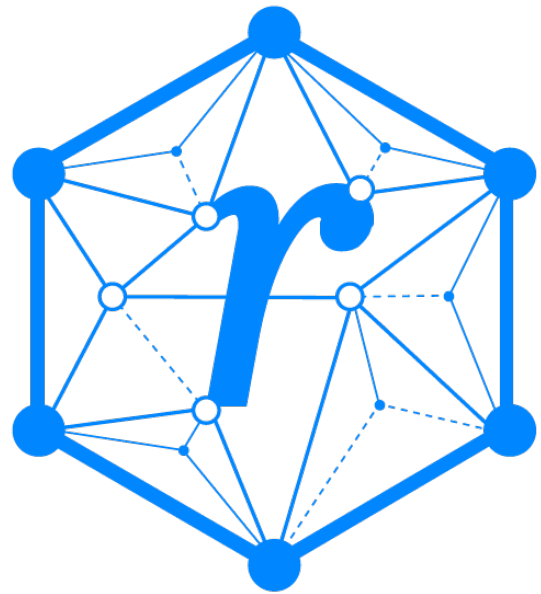
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Abstract

Taking the perspective of an identity wallet provider working to establish a financially sustainable business, this paper asks: "Why is it so hard?"

The analysis builds on a draft paper from RWOT11 that developed an Enterprise SSI stakeholder map to improve our understanding of the components in an SSI ecosystem that need to be engaged to make a technical solution work commercially. It transpired that an entity called the *Ecosystem Coordinator* plays a fundamental part in the orchestration of an SSI ecosystem. This short RWOT12 project assesses the role of the Ecosystem Coordinator in more detail based on real-world observations. What does an Ecosystem Coordinator need to be and do to make their ecosystem work?

The results point towards three significant areas that require the Ecosystem Coordinator's attention and perseverance: Standardisation to provide a common foundation and clear rules for both technology and ecosystem governance; Representation of ecosystem stakeholders within and outside of the immediate ecosystem; and Championing of the ecosystem's risk takers (usually solution providers).

Introduction

Carsten Stöcker's five critical success factors for blockchain-based solutions highlight the importance of developing a complete ecosystem to drive adoption and collaboration (Brumnik, 2023). This involves gaining the support for the business case from all relevant stakeholders. An indispensable foundation stone is the development and monitoring of a trust framework. Consequently, a key question arises: "Who takes care of all this?"

Based on work performed at RWOT11, an entity called the *Ecosystem Coordinator* (Boone & Wirrig, 2022) seems well-placed to take such a leadership role. This paper aims to deliver a brief assessment of real-world self-sovereign identity (SSI) Ecosystem Coordinators, their influence on stakeholders and, ultimately, on commercial viability.

I distinguish between *established* and *emerging* Ecosystem Coordinators. The former has existed within their ecosystem already, prior to the discovery of the specific SSI use case; whereas the SSI use case was the reason for the birth of the latter.

Established Ecosystem Coordinator

Prior research

Lacity et al. (2023) have analysed three different SSI ecosystems and concluded that starting with the issuer fast-tracks adoption. Looking at those case studies in more detail, it turns out that the issuers also appeared to be the Ecosystem Coordinators. Thanks to their central roles within their respective ecosystems, these issuing entities also concerted all efforts, such as defining the scope of the use case, pulling in more actors, educating, etc. These coordinators were also well-established bodies, namely NHS England, Bonifii and the province of British Columbia, that had a good overview of and handle on the envisaged initial ecosystem membership already at the outset of their projects. As the authors said, it made sense for those entities to lead the pilots.

NACS ecosystem - US convenience stores

The National Association of Convenience Stores (NACS) is a trade association for convenience and fuel retailing stores. There are nearly 150,000 convenience stores operating in the United States (NACS, 2022) that each perform dozens of age checks every day to sell alcohol or other age-restricted items. Assuming the role of Ecosystem Coordinator, NACS has been fundamental in driving the development of a W3C verifiable credential-based (W3, 2022) tool for the facilitation of age checks that leverages people's driver's licences and any participating point-of-sale and payment system (TruAge; Businesswire, 2021).

However, NACS itself is not the credential issuer; TruAge is. TruAge offers the issuance and verification service within this ecosystem and has been set up as a not-for-profit entity that is funded by the manufacturers of age-restricted products. Originally, system development was funded by NACS membership fees and TruAge sponsors. TruAge is well-positioned to take over as Ecosystem Coordinator, as it connects its technical integrators, manufacturers, retailers and consumers, whereas NACS focuses on retailer interests.

In principle, the reliance on open standards enables technical interoperability and, thus, allows any digital SSI wallet provider, issuer or point-of-sale vendor to enter this ecosystem.

Emerging Ecosystem Coordinator

What if the use case does not provide a tight initial ecosystem with an already existing, strong coordinator?

OCI ecosystem - US pharmaceutical supply chain

The Open Credentialing Initiative (OCI) was born out of a pilot involving a handful of key stakeholders in an ecosystem that had yet to be clearly defined. The first use case focused on a niche problem: proving so-called Authorized Trading Partner status in electronic pharmaceutical product-related enquiries between supply chain partners. The motivation behind this pilot was a new US law called the Drug Supply Chain Security Act (DSCSA).

Realising that a central entity was needed to refine and standardise the successfully piloted technological approach, to provide structure and a safe space for members to interact, and to educate the ecosystem and drive industry adoption, some of the pilot participants came together to found OCI in April 2021 (Wirrig, 2022). The consortium's network of members and supporters has grown since and developed an *Interoperability Profile*, basically a set of shared conformance standards. OCI conformance requirements allow for a degree of technological divergence between solution providers, e.g. two different DID methods (OCI, 2023), but also strive to provide sufficient prescription to keep those services compatible with each other. These architectural choices are there to prevent vendor lock-ins and enable commercial competition in other aspects of service offerings.

OCI obtains funding for its essential operations from less than a handful of sponsors, while membership is free. However, members participate as volunteers in OCI's meetings and activities. Despite the active involvement of commercial solution providers, OCI aims to remain neutral and presents itself as a hub for any interested stakeholder, including trade organisations and relevant standards setters.

IDunion ecosystem - European Schaufenster

Back in 2019/20 the German Federal Ministry for Economic Affairs and Climate Action ran a selection program to find three to four SSI "Schaufenster" projects to fund for up to three years. The ideal desired outcome was a system that enables technological interoperability between all funded projects.

IDunion was one of the grant winners. Since then IDunion has grown into arguably the biggest of the four projects based on membership, which includes various companies, associations and other national organisations. In its role as Ecosystem Coordinator, IDunion's goal from the start was to create an industry network. Eventually in July 2022, the research project spun off a separate legal entity called a *Sociedad Cooperativa Europea* (SCE), a European cooperative with limited liability (IDunion, 2022). The IDunion SCE is to survive the limited grant funding period and manage the technical operations under its umbrella.

IDunion's original funding came from the German government grant supplemented by membership fees. The ultimate goal is to sustain the organisation through revenue from provided services, e.g. infrastructure provision.

Over time IDunion has covered a variety of potential use cases inspired by its members, for example, banks were interested in KYC, while large manufacturers drove work on supplier onboarding and enterprise identity. In technological terms, IDunion has always aimed to avoid vendor lock-ins and expanded on prior work, which gave it a practical head-start ahead of

the other Schaufenster projects. However, while architectural expectations within IDunion have always been clear to Schaufenster participants and interested close parties, IDunion has never formally committed to its own shared conformance criteria in order to prevent premature self-imposed restrictions in an uncertain environment. Technological interoperability of participants is determined by their developments to work within the confines of the existing IDunion tech stack. That said, individuals from within IDunion have contributed to the creation of open standards, such as [OpenID for VC](#), SD-JWT (IETF, 2023) and Status List 2021 (W3C, 2023), and have open-sourced developments (OWF, 2023). At the moment IDunion is facing the decisive challenge of navigating future compliance with the upcoming European Digital Identity Architecture and Reference Framework (European Commission, 2022) and [eIDAS](#) 2.0.

mDL ecosystem - US driver licences

The mobile driver licence (mDL) may be seen as a controversial example in this SSI-focused assessment, as it does not follow W3C's VC Data Model (W3C, 2022). However, it has been argued that mDL's approach and SSI show a degree of overlap despite concerns around privacy, key control and vendor tie-in within mDL's design (INATBA, 2023).

The reason for its inclusion here is that it is a project leveraging novel digital identifiers that has made a lot of waves in the media, has seen big tech in the lead and has found institutional support. Thus, at least from a non-technological angle, it is more advanced than many other digital identity projects, especially those that are in pre-adoption or pre-commercial stages.

The American Association of Motor Vehicle Administrators ([AAMVA](#)) and the [Secure Technology Alliance (STA)](#) track the adoption in maps showing that several US states have accomplished or are heading for interoperable implementation; others are in earlier stages of legislative or study activity. The presented data should be considered with caution, as both maps don't seem to agree fully. To drive adoption, California's Department of Motor Vehicles (DMV), for example, has launched a public pilot to engage everyday users ([DMV CA](#)).

To arrive at a common worldwide standard, the ISO/IEC 18013 series (refer to [section 35.240.15](#)) was created to describe the various requirements that ultimately enable the implementation and interoperability of a driver licence on a mobile device. The US Department of Homeland Security has enshrined ISO/IEC 18013–5 (ISO, 2021) in a Proposed Rule (DHS, 2021). Part 5 of the standard was further expanded by separate guidance issued by AAMVA for use by US DMVs (AAMVA, 2022). [NIST](#) has launched a project looking to dive deeper into the requirements and claims of the standards ISO/IEC 18013-5 and -7 and their ecosystems.

STA appears to act in the role of an Ecosystem Coordinator (STA, 2020; STA 2021).

Conclusions

The Ecosystem Coordinator's main purpose is to provide a home for ecosystem participants and help coordinate and represent their interests. Thanks to its central position it has a unique overview of the ecosystem, is strategically placed to gather recognition from inside and outside of the immediate ecosystem and is to keep the concerted arrangements between ecosystem participants alive during and beyond the initial Sturm und Drang of ecosystem formation.

Moving beyond general abstraction, the discussed use cases provide some useful insights into tangible functions an Ecosystem Coordinator can - or even should - fulfil considering the qualities of their respective ecosystems.

Standardisation

Common technology standards help ensure service interoperability and minimum quality. Shared governance standards provide structure.

OCI has taken a grassroots approach largely driven by industry-specific service providers with backing from certain service users and industry bodies. In addition to leveraging existing accepted technology standards, OCI developed its own use case-specific conformance criteria and formalised these in a bespoke Interoperability Profile. In contrast, the mDL ecosystem has taken a much more public and institutional approach driven by big tech service providers, joined by legislators and industry bodies. They went straight for the creation of international ISO/IEC standards. An international standard bears more weight

than a niche set of conformance criteria. Arguably, it forces anyone wanting to participate in the ecosystem to fall in line with little or no room for adaptation - once set, the criteria are difficult to change. OCI's open community approach is more nimble. OCI regularly reviews feedback and permits frequent member participation. The criteria can evolve as the ecosystem matures. This flexibility is extremely useful in an ecosystem that is eager to welcome input from the community and takes a hands-on approach to incorporating the learnings. It is possible that an ecosystem outgrows this stage and looks to work with renowned standards setters to create (inter-) national standards.

I would argue that such a shift is not a function of the age of an ecosystem but of the maturity of its use case and/or the intention of the strongest players. While any type of technology standards can reduce entry barriers by providing a level playing field for everyone, they can also be used as gatekeepers to favour certain tech stacks or architectural approaches over others. This is not necessarily to be seen as anything negative if such standardisation emerges at a point in time that is beneficial for the evolution and efficiency of the ecosystem. Pre-mature forceful standardisation, on the other hand, might trap ecosystem participants on a path into inefficiency, struggle or even a dead-end.

In terms of governance, OCI has developed and published its own rules as an open-source community without cementing itself yet in a legal framework; whereas IDunion has gone to the length of founding a European cooperative. When entities with diverse interests come together, at least basic interaction rules are inevitable to introduce efficiency, avoid and manage potential frictions and provide at least a degree of transparency to stakeholders for how things are run. Formalising governance within a legal framework may impose additional requirements but also provides structure and guidance. Interestingly, it also impacts fundraising options. The more informal the governance and legal frameworks are, the more difficult it appears to be to raise funds, as the consortium may depend on voluntary contributions. On the other hand, less restrictive consortium management lowers the barrier of entry for new participants, which supports ecosystem growth. The nature and scale of an ecosystem, less its age, certainly influence its requirements for and utility derived from governance standards.

Representation

Any Ecosystem Coordinator, whether established or emerging, will have to prove its value to its community. With SSI being an ecosystem technology, this value is inexorably related to the degree to which the Ecosystem Coordinator achieves to represent the stakeholders' interests inside and outside of their sphere. Thus, the Ecosystem Coordinator should be a consistent, effective driver with either established links to relevant decision makers and influencers or the ability to forge such connections.

The prime example from the above use cases is the mDL ecosystem. While I have insufficient insights into the history of events, it would be naive to assume that strategic lobbying was not involved to get national regulators and international standards setters as well as the public media actively engaged. NACS, which also leverages driver's licences for a use case-specific type of ID check, chose a quieter, industry-focused path. NACS benefitted from its existing position in the ecosystem to facilitate the emergence of a technological solution and obtain buy-in from key industry players by representing its membership and addressing the needs of other stakeholders in the ecosystem. IDunion, on the other hand, has had to deal with a politically challenging, complex regulatory and overall uncertain environment. It may well be that this was not helped by the lack of a focused use case as a galvanising force, since resources quite likely got diluted across use cases and participants' motivations diverged over time.

Besides representing the ecosystem's existing vision, concepts, technology, needs, offers, ideas etc., it is also important for the Ecosystem Coordinator to reflect impulses from outside back into the ecosystem. This is a task that appears very palpable, for example, in the IDunion ecosystem at the moment. The Ecosystem Coordinator should be open-minded, adaptable and have sufficient resources to navigate complex environments or difficult circumstances and guide its stakeholders as unscathed as possible through any storm.

Championing

The Ecosystem Coordinator must understand the value of the SSI approach and have a primary interest in the success of the stakeholders' vision and resulting technological solutions. This does not mean clinging on to tech stacks that may be outdated or have proven unsuitable given real-world circumstances, just because these were the chosen ones at the birth of the ecosystem. It means, however, supporting those entities in the ecosystem who take the commercial risk of making upfront investments of time, money, intellectual property and other resources. If not even the Ecosystem Coordinator waves the

inventors' and service providers' flags, who will?

The extent to which the Ecosystem Coordinator can actively serve as a champion will be strongly influenced by its standing and available resources as well as the nature of the ecosystem. Championing can be as simple as maintaining a public list of those service providers involved or compliant with the ecosystem standards like OCI does. It could involve joint marketing activities like event sponsorship, public relations support or educational campaigns, if funds are available, even subsidies or grants, lobbying or anything else that enhances visibility and credibility. In the end, what the Ecosystem Coordinator needs to ask is, "What can I give back to the risk takers?", because without the risk takers, there is no SSI ecosystem.

Generally, it appears beneficial for the Ecosystem Coordinator to be commercially neutral. If the Ecosystem Coordinator itself offers services that compete with those of ecosystem members, conflict of interest and distrust may arise. Glancing at the NACS ecosystem, it will be intersting to see how TruAge's position evolves. Lacity et al. (2023) observed that the issuer is well-placed to act as the catalyst at ecosystem formation. However, if the issuer remained in its initial Ecosystem Coordinator role as the ecosystem matures, it might actively or passively discourage other issuers from entering. In highly centralised ecosystems this might be irrelevant, e.g. where the issuer is a governmental body and no other organisation has issuing authority anyway. There the value lies in the decentralisation downstream of issuance. The Ecosystem Coordinator would then, however, possibly be better placed downstream as well, to represent and champion the multitude of stakeholders.

Limitations

My goal was to complete the entire article during the RWOT12 week with a small allowance for additional conclusions and inclusion of feedback on the draft piece thereafter. Due to these time constraints, I could not dive as deeply into each case study as I had hoped. One case study demonstrating an established Ecosystem Coordinator that was brought to my attention during RWOT12 revolves around the Car Connectivity Consortium. Sadly, there was no time left to explore this further.

Through my active involvement in OCI, I have more insights in this ecosystem than any of the other ones discussed here. Thus, it is likely that I have missed to discuss details and considerations in other ecosystems that I have covered for OCI.

Contributions

I am grateful for inspiration and information gathered from fellow RWOT12 participants and all those little side conversations with various RWOT12 attendees. In particular, my understanding of the following use cases was given more colour by: - IDunion use case: Sebastian Schmittner, Sebastian Zickau, Carsten Stöcker - NACS use case: Joe Andrieu

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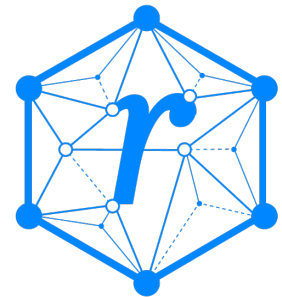
About Rebooting the Web of Trust

This paper was produced as part of the Rebooting the Web of Trust XII design workshop. On September 18th to 22nd, 2023, dozens of tech visionaries came together in Cologne, Germany to talk about the future of decentralized trust on the internet with the goal of writing 3-5 white papers and specs. This is one of them.

What's Next?

The design workshop and this paper are just starting points for Rebooting the Web of Trust. If you have any comments, thoughts, or expansions on this paper, please post them to our GitHub issues page:

https://github.com/WebOfTrustInfo/rwot12/issues

The thirteenth Rebooting the Web of Trust design workshop is planned for 2023-2024. If you'd like to be involved or would like to help sponsor the event, email: Leadership@WebOfTrust.info