Collaboration
GS1 US
GS1 Global

When trust travels with data: Verifiable Credentials and Decentralised Identifiers

GS1 standards will provide the common language that unlocks the future of trusted data sharing

Introduction

GS1 is committed to supporting the future of data sharing by developing standards to serve as a common data language and by providing industry with guidance on how to implement them.

As industries continue their journey of digital transformation, the near-constant flow of information about products across their life cycle is already resulting in a massive amount of data that is challenging for all parties to navigate.

To add even more complexity, all this data is increasingly being distributed and shared across large ecosystems of hundreds of entities.

To succeed in the future, important information about any product, entity or location will need to be portable and understandable across supply chains, cultures and geographies. We must work together to align on the basics, or we will face a global-interoperability crisis, with wide-ranging impacts to stakeholders, from regulatory bodies to consumers and patients. We will need standards for identification, data structures and data sharing.

We must robustly link physical things to their high-fidelity digital twins. We should all embrace the ambition to map data to real-world priorities that ***matter*** to consumers and patients.

Data exchange is already complex and costly. As governments and industry work globally to strengthen commitments to safe supply chains and circular economies, demand will increase for true end-to-end information sharing across ecosystems. The idea that ***trust can move with data*** will become the requirement.

BUSINESS CHALLENGE

50%+ **of Gen Z and Millennial consumers will pay more for sustainable products and will increasingly buy from companies with values that match their own. Yet when a company claims that its products are fair trade, organic, kosher or sustainably sourced, how will consumers verify these claims, especially when they want authoritative sources beyond the brand?**

Source: Forbes, Sustainable Retail: How Gen Z Is Leading The Pack

A future of trusted data sharing

Think of the barcodes on products you use in your everyday life. Those barcodes contain globally unique identifiers that ensure every product can be easily recognised by machines across the world. Barcodes are a very basic conveyor of trust across a supply chain. These packaging identifiers have been a real-world manifestation of connecting trust with identity for the last 50 years. But the challenges we face today will require solutions that go far beyond the barcode. To successfully navigate the ocean of data that is being generated, we'll need to ensure globally unique identities for locations, entities, shipments—just about everything.

For products, places and things, it is essential that we make it easy to create, register and verify globally unique, persistent identities with *authoritative sources distributed across the internet.*

For example, we should strive to simply and efficiently:

- Share data when listing products for sale on e-commerce marketplaces or building websites

- Ensure accurate, complete product data to consumers

- Confirm that traceability data about things made, moved or sold is visible to the appropriate parties

Doing so will result in a massive 'unlocking' of information. People will have easy access to these data through the search engines they use every day and, therefore, better understand the information and knowledge everyone is working so hard to share.

Technology exists today to access more varied and authoritative sources of data

With the explosion of data across a product's life cycle, the ability to verify the trusted source of data is critical to keeping and improving consumer and patient trust. Verifiable Credentials (VCs) allow for any number of digital claims to be attested about a person, place or thing across any number of data sources. Decentralised Identifiers (DIDs) offer a method of cryptographic trust in those claims by enabling proof that the data provided is attributable to the source. Combining these concepts enables data and trust to propagate with selective disclosure and anonymity as it travels through untrusted parties.

We have pilots in progress exploring how GS1 identifiers can become a powerful trust node and conduit to more sources of trusted data.
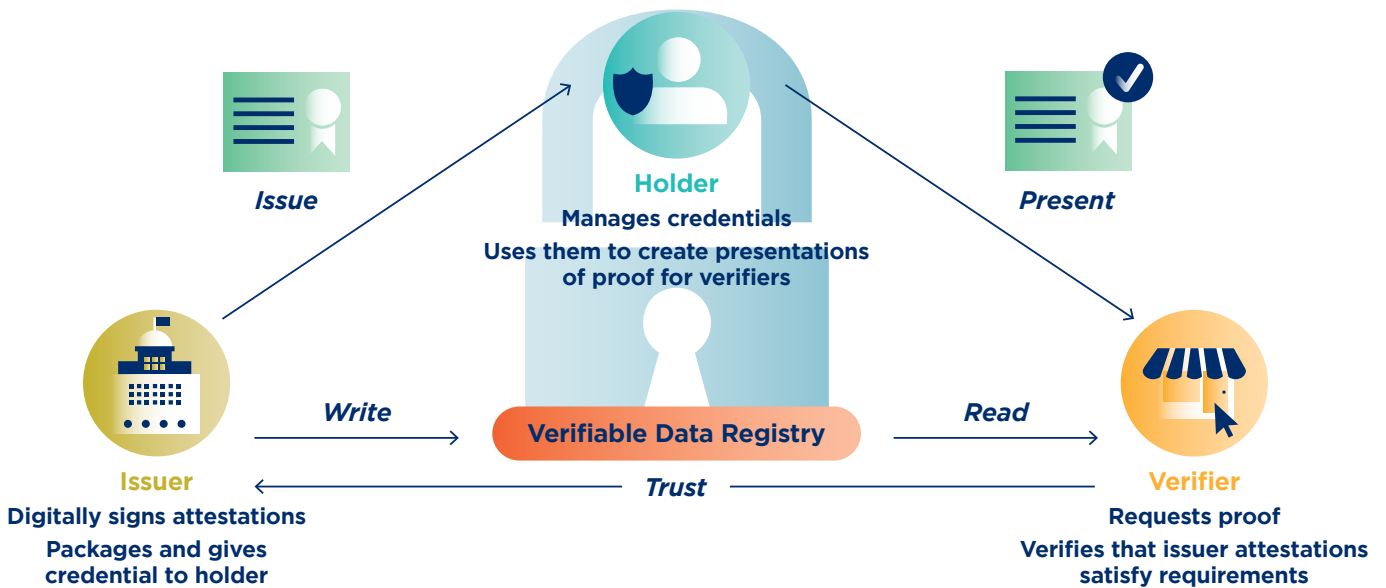
GS1 LEADS THE WAY
GS1 is developing standards, providing industry implementation guidance to web-enable barcodes and offering a common 'data language' and authoritative registry of product information. Pilots in progress are exploring how the power of Verifiable Credentials can accelerate a future where trust can move with data.

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Regardless of how data exchange methods evolve, it is clear that we must unlock a future where 'trust moves with data'... by leveraging new capabilities offered by tools such as Verifiable Credentials and Decentralised Identifiers."

— Robert Beideman
Chief product officer, GS1

Issue

Holder
Manages credentials
Uses them to create presentations
of proof for verifiers

Present

Write

Verifiable Data Registry

Read

Issuer
Digitally signs attestations
Packages and gives
credential to holder

Trust

Verifier
Requests proof
Verifies that issuer attestations
satisfy requirements

A practical example: How do Verifiable Credentials enable sharing of trusted data between new partners?

Consider a new brand of organic packaged food. To set up their business, the brand works with organisations to certify their products as organic and joins GS1 to register the company and assign unique Global Trade Item Numbers (GTINs) to their products.

Today, most organisations aren't digitally connected with one another. For the manufacturer to sell in a new marketplace, they have to follow a slow, manual process to prove they are a legitimate manufacturer, their GTINs are valid and their products are certified organic.

Now consider a world where all this information is held in verifiable, cryptographically secured credential 'containers.' When the manufacturer submits their products to a new marketplace, they also submit their digital credentials indicating the data is authorised. The marketplace can automatically verify each piece of information directly with its source: the brand, GS1 and the organic-certification body. Each of these sources becomes a 'trust anchor' for the respective data— speeding up the onboarding process and improving access to sources of trusted, verified information. The 'trust triangle' figure above illustrates this example.

Trust must move with data

We must continue to explore and solve the challenges around trust in data. We can get there together if we unlock the power of digitally verifiable identity and authoritative information about identities—Verifiable Credentials. These tools can enable an ecosystem of trust. Authorised stakeholders can attest to facts about a product to create containers of trusted data in a decentralised way. And such data can be machine verified as authentic, without the need for human interaction. That's game changing.

To move toward this future of trusted data sharing, we need three things:

- Globally interoperable identity for products, places and things
- A common data language
- Established ecosystems of trust

GS1 is working to unlock progressive value by helping industry accelerate through the challenges of data sharing across supply chains. GS1 has established a six-step framework to facilitate this journey, establishing foundational elements in steps 1 through 3 and then mobilising efforts to bring the full vision of trusted data sharing to life in steps 4 through 6. To empower industry's digital transformation and reach a future where trust moves with data, we must work together to:

1. Web-enable traditional barcodes
Using the GS1 Digital Link standard, we can build the bridge between physical and digital data.

2. Develop authoritative registries
Apps and phones don't know where to find the right information. Registries enable core information that can be accessed quickly, openly and globally. Authoritative registries of data will provide 'connective tissue' between stakeholders. Surfacing and exposing data across our value networks will help accelerate us into the future. GS1 is establishing such registries for the products, places and things identified by our worldwide GS1 system of standards.

3. Speak a common data language
Ensuring a common data language accelerates other parties' ability to understand shared data and enables machines to read, interpret and analyse data. This is critical, especially as we see commerce, healthcare and logistics networks spanning traditional borders. This data language exists as a combination of the GS1 Global Data Model, the GS1 web vocabulary and the event-data sharing standard known as Electronic Product Code Information Services (EPCIS).

4. Connect systems across stakeholders
Our ability to interoperate and drive efficiencies at scale requires collaboration and commitment from industry. Doing so will unlock the ability for every entity in a product's life cycle to attest to information about a product, place or thing, and have it understood across vast value chains.

5. Create containers of trusted data
Wrapping accurate data in cryptographically secure 'containers' known as Verifiable Credentials will lead to a new age of data portability. When combined with a common data language, this advance step changes the ways data can be shared.

6. Deploy portable ecosystems
This is the ultimate destination on our journey: Where everyone can discover and exchange data that is innately trustable. This is the tipping point that will allow massive simplification of business processes, savings and speed. This is the future where trust moves with data.

At the core of our future vision is a focus on global, unique, persistent identification and a universal model for data that enables everyone to easily access and understand the right information. There is a lot of work to do to bring this future to life, but we feel that this approach aligns strong incentives for all involved. It also serves to maximise competition, choice and value.

We believe combining emerging standards and evolving technologies related to Verifiable Credentials and Decentralised Identifiers, which share claims and attestations from multiple authoritative sources, will unlock the future of trusted data sharing. We are invested in furthering our exploration.

REACH OUT TO SEE HOW GS1 CAN HELP YOU EXPLORE DATA SHARING NOW AND INTO THE FUTURE.
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