UN Transparency Protocol

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About the UNTP

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The United Nations Transparency Protocol (UNTP) aims to support governments and industry with practical measures to counter greenwashing by implementing supply chain traceability and transparency at the scale needed to achieve meaningful impacts on global sustainability outcomes.

Presentations & Videos

- Short UNTP Presentation PDF PPT
- Longer UNTP Presentation PDF PPT
- Video presentation (15 mins) Youtube

Incentives for sustainable supply chains are increasing

Incentives for sustainable supply chains are increasing fast.

- Regulations such as the European Regulation on Deforestation (EUDR) and Carbon Border Adjustment Mechanism (CBAM) will present market access barriers or increased border tariffs for non-sustainable produce.
- These regulations impose due diligence obligations on entire supply chains, not just final products. Penalties for repeated non-compliance can be as high as 4% of global revenue.
- Financial institutions are rapidly moving to ensure that capital is preferentially focussed on ESG assets. According to Bloomberg, within a few years, around $50 Trillion or one third of all global assets under management will be ESG assets.
- Consumer sentiment is driving purchasing decisions to favour sustainable products. At the same time, consumers are increasingly mistrustful of unverifiable claims and look for third party certification based on trusted standards.

But endemic greenwashing risks devaluing the incentives

Greenwashing is a term used to describe a false, misleading, or untrue action or set of claims made by an organization about the positive impact that a company, product or service has on the environment or on social welfare. Just as the incentives described above provide a strong motivation for genuine sustainability in products, so they also provide stronger motivations for greenwashing.

The evidence from multiple research activities is that greenwashing is already endemic with around 60% of claims being proven to be false or misleading. This presents a significant threat to sustainability outcomes. But there is room for optimism because around 70% of consumers expect higher integrity behaviour and are willing to pay for it. There are two plausible pathways ahead of us.

To win the race to the top, fake claims need to be hard to make. The best way to achieve that is to make supply chains traceable and transparent so that unsustainable practices have nowhere to hide. But, to have any impact, the traceability and transparency measures must be implemented at scale.

Challenges

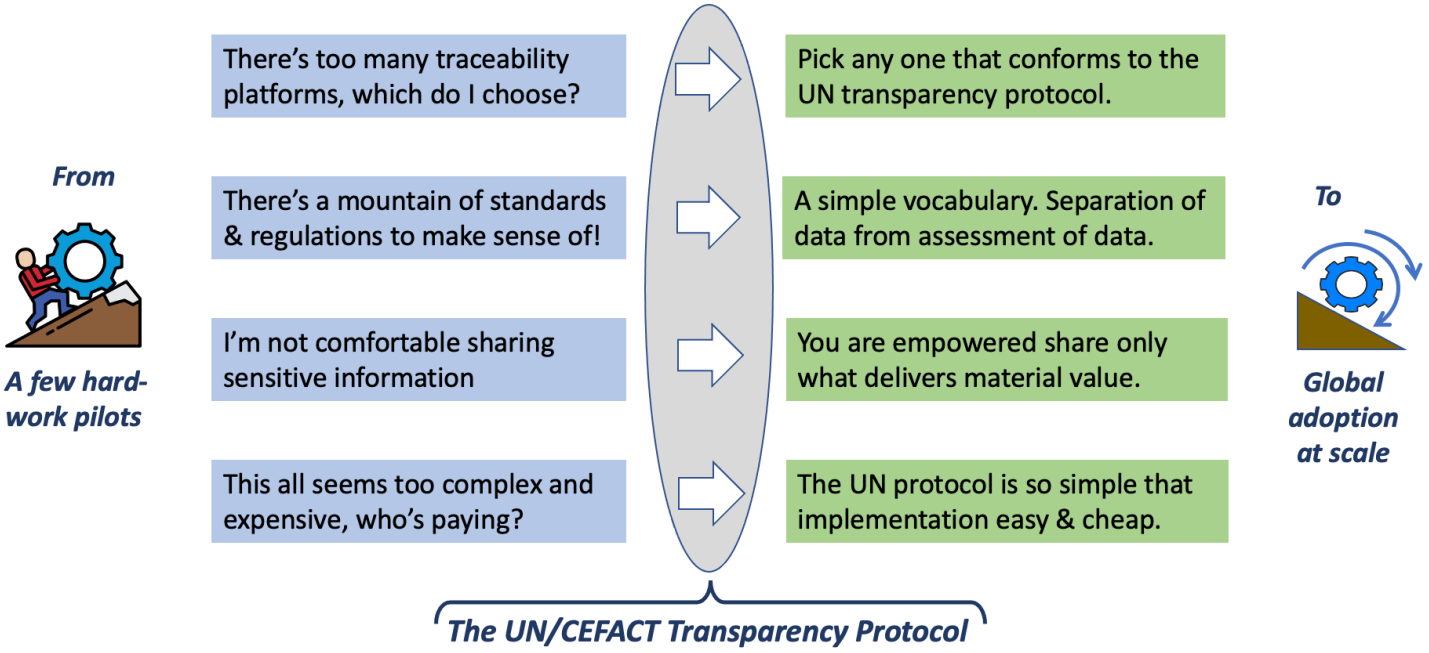
The world's supply chains must reach to the point where digital verifiable traceability and transparency information are available to meet regulatory compliance, satisfy investors, and motivate consumers for

the majority of products on the market. However, achieving transparency at that scale presents some challenges.

- **Which software to choose?** There are many traceability & transparency solutions on the marketplace. Many expect all actors in a given value chain to subscribe to the same platform in order to collect the data for end-to-end traceability. However, just as expecting your customers and suppliers to create accounts at your bank so that you can pay them is not rational or practical (that's why inter-bank payment standards exist), so the adoption of all actors in value chains to one platform is also not feasible or scalable. The UNTP is a standard protocol, not a platform, and assumes that supply chain data remains with each natural owner. So the answer to "which software to choose?" is "pick any, so long as it conforms to the UNTP".
- **Coping with a growing mountain of ESG standards and regulations.** The current count of ESG standards and regulations around the world runs into the thousands. Some are specific to particular commodities, jurisdictions, or ESG criteria and some cover multiple dimensions. There is very significant overlap between them and very little formal mutual recognition. The consequence is that it becomes very challenging for supply chain actors that sell to multiple export markets to know which criteria matter and how to demonstrate compliance. There is a risk that too much of the available ESG incentive is spent on demonstrating compliance and too little is left for implementing more sustainable practices. The UNTP does not add to the complexity by defining more ESG standards. Rather it seeks to minimise cost of compliance by making it simpler to test on-site ESG processes and data against multiple ESG criteria. Essentially this is about implementing a sustainable practice once and then re-using it to satisfy multiple overlapping criteria.
- **Protecting confidential information.** "Sunlight is the best auditor" and so verifiable transparency is the best greenwashing counter-measure. However, increased supply chain transparency for ESG purposes also risks exposure of commercially sensitive information. A viable transparency protocol must allow supply chain actors to share ESG evidence whilst protecting sensitive information. Rather than dictate what must be shared and what should not, the UNTP includes a suite of confidentiality measures that allow every supply chain actor to choose their own balance between confidentiality and transparency. The basic principle is that actors should be empowered to share only what delivers value.
- **Making a business case for implementation.** Each supply chain actor (or their software provider) will need to make a viable business case for implementation of the UNTP. The transparency incentives discussed in this section represent the benefit side of the equation. To keep the cost side as low as practical, UNTP has a strong "keep it simple" focus and offers a suite of implementation tools to further reduce cost. Some sample business case templates are provided to help actors make their case for action.

The United Nations Transparency Protocol (UNTP)

The UNTP provides a solution to the transparency challenges facing the world's supply chains. By implementing a simple protcool that can be supported by existing business systems, stakeholders will realise immediate benefits and will become visible contributors to the sustainability of global supply chains.



Audience, Benefits & Goals

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Goals

The primary goal of UNTP is to make significant reductions in the incidence of greenwashing by giving unsustainable behaviour nowhere to hide. This will also uplift the value of legitimate ESG credentials from supply chain actors that have implemented sustainable practices. UNTP will have achieved it's purpose when

Goals	Description
Most supply chain shipments are accompanied by verifiable ESG performance data.	In complex supply chains this means that at each supply chain step verifiable product and ESG information accompanies products via a Digital Product Passport.
Greenwashing is a niche activity that is easily detected and quickly penalised by markets and regulators.	Businesses that chose not to share verifible information about their products are assumed to be doing the wrong things from an ESG perspective and therefore get lower prices for their products or lose access to markets.
Products with the best sustainability characteristics enjoy the greatest market access and price uplift.	Sharing data about your products becomes a competitive advantage and your business choses to compete on the basis of high quality information.

Target Audience & Benefits

All stakeholders in the global supply chain have a role to play and benefits to realise through implementation of the UNTP. As explained in the Architecture Overview, the UNTP is a decentralised architecture where actors can be issuers, or subjects, or verifiers of digital credentials. In many cases, actors will be issuers of some credentials, subjects of others, and verifiers of others. Therefore, the

stakeholder roles and benefits described here are separated into the issuer, subject, and verifier roles as appropriate.

Regulators

Regulators define rules, issue permissions, and manage compliance. By implementing UNTP, regulators will uplift the value of the permissions they issue and improve the efficiency and integrity of compliance operations.

- The primary role of regulators as **issuers** is as a trust anchor. When identity credentials such as business registration certificates are issued as digital verifiable credentials according to UNTP then the subjects of those credentials (trading businesses) can add strong verifiable identity to their supply chain transactions. Verifiable identity can facilitate green-lane pre-clearance at import border and higher confidence lending from financial institutions. Similarly, when ESG permits and certificates that demonstrate compliance with domestic regulations are issued digitally, then traders can also attach that evidence to their transactions. In short, when regulators act as digital trust anchors, they will be uplifting their balance of trade by improving access to export markets and trade finance for their traders.
- As **verifiers** of increasingly transparent supply chain data, regulators can significantly uplift compliance activities. Rather than depend on unverifiable claims in regulatory reports that are occasionally audited at high cost, regulators can confidently automate compliance assessment on most trade transactions, leaving a much smaller volume of trade for manual compliance and enforcement activities.

Finally, as national authorities increasingly seek to uplift environmental performance through regulatory initiatives such as consumer centric product passports, we recommend that national regulators consider the UNTP as the basis for their national initiatives. By designing national initiatives as UNTP extensions, regulators will not only be able to re-use a rich and tested body of work, but will also reduce compliance costs for their domestic industry because they will be better aligned with international supply chains.

ESG Standards Organisations

Standards organisations include the national and international standards authorities as well as industry led organisations. There are a wide variety of governance arrangements in place that impact the legitimacy and value of the published standards. Unlike regulators, standards bodies do not manage compliance which can be self-assessed, or third party audited by test & certification bodies. There are

hundreds of standards organisations which collectively issue thousands of ESG standards, each with dozens of specific conformity criteria (i.e. the rules). Most of these are published as PDF documents. The key role for standards authorities under UNTP is to make their ESG rules machine readable so that they can be accurately referenced in conformity credentials.

- When ESG standards organisations publish their ESG criteria as a machine readable vocabulary then they are empowering their community of certifiers to issue digital conformity credentials that unambiguously reference the scope of the conformity claims so that the credentials can be digitally verified.
- Standards authorities will generally not be issuers, subjects, or verifiers of digital credentials unless they also act as accreditation authorities for third party certifiers that will make conformity assessments - in which case they will be issuers of accreditation credentials as described in the next paragraph.

Accreditation & Certification Organisations

There is a very well established global framework for conformity assessment of entities, processes, and products that has been in place for over 50 years. It provides assurance that products sold on the marketplace meet applicable quality, safety or ESG standards. Under the framework, independent third parties (certifiers) assess products against recognised standards and issue conformity certificates. Furthermore, a global network of mutually recognised national accreditation authorities assess the certifiers to ensure that the conformity certificates are issued by suitably qualified organisations. For example, a manufacturer may claim that their product meets a particular environmental standard. You might ask "how do I know that claim is true?" and the answer would be "because a third party tested the product and issued a certificate". You might then ask "yes, but how do I know that the third party can be trusted?" and the answer would be "because they have been accredited by the national accreditation authority". Despite all this, it's still a relatively simple process to create realistic looking but fake paper certificates. UNTP provides a standard way to digitally verify this chain of trust that is much harder to fake. UNTP does not demand that every product claim is third-party assessed, nor that every third party certifier is formally accredited, but does make that chain of trust visible where it exists. UNTP also recognises that less formal but still valuable chains of trust can exist - for example a farmer's environmental land management claims might be verified by a community organisation that is endorsed by a well-known global environmental organisation.

- When national accreditation authorities or other well-known and trusted organisations **issue** their accreditations as UNTP standard digital credentials then they are creating a digital trust anchor that empowers verifiers of ESG conformity certificates to decide whether they can be trusted. The **subject** of the accreditation is the third party conformity assessment body. Implementation of

UNTP will amplify the value of the accreditation and the brand or 'trust mark' of the accreditation authority.

- When third party conformity assessment bodies (certifiers) **issue** their product ESG certificates as UNTP standard digital credentials then they are empowering verifiers of the ESG certificates to digitally confirm that the certificates are genuine, have not been tampered, and have not been revoked. Furthermore if the digital conformity certificate contains a link to the accreditation credential then the full digital chain of trust is established. Producers, manufacturers, brands & retailers that implement UNTP will also demand digital versions of the conformity credentials that they can attach to their products. Therefore, conformity assessment bodies that can provide UNTP standard digital credentials will be preferred over those that cannot.

Primary Producers & Manufacturers

Most physical products are made of materials that either grow above the ground or are dug out from below the ground. Primary producers such as farmers and miners represent the starting point for most supply chains. Recyclers are a special case and are treated separately by UNTP because they are both the end and the (re)start of circular supply chains. Manufacturers take raw or recycled materials and produce intermediate components or final products. Primary producers and manufacturers collectively represent the upstream feedstock supply chain for the branded products sold to consumers.

- When producers and manufacturers implement UNTP by **issuing** B2B digital product passports (DPP) and linking them to every shipment of goods to their customers, then they are simplifying life for their customers by providing data at the right granularity for them to incorporate their inputs such as scope 3 CO2 emissions into their own product environmental footprint.
- When producers and manufacturers **issue** UNTP traceability events linked to product passports then they are providing provenance evidence that can inform supply chain resilience and preferential treatment decisions by their customers and export market regulators.
- When producers and manufacturers link third party issued UNTP conformity credentials then they are adding trust to the ESG claims in their DPPs that will uplift the value or market access for their products.
- When producers and manufacturers **issue** the complete collection of passports, traceability events, and conformity credentials and link them to product shipments then they will significantly uplift value to their downstream customers by empowering them to easily and verifiably meet their own ESG due-diligence obligations.
- When producers and manufacturers link their issuer identity to a strong identity credential (such as a government business registration or trademark ownership credential) and implement the UNTP

anti counterfeiting mechanism then they will add strong anti-fraud measures to their products and preserve the value of their sustainability actions.

Producers and manufacturers are themselves **verifiers** of any UNTP credentials linked to their upstream supply chain. The confidentiality measures defined by UNTP allow supply chain actors to selectively redact upstream credentials before passing them on to their downstream customers so that ESG evidence can be passed on without revealing commercially sensitive information.

Brands & Retailers

Brands and retailers consume products from their upstream producers and manufacturers and sell to the consumer. Whilst it is of course true that some brands are also manufacturers and that some retail is to business rather than consumers, the key distinction that UNTP makes is between B2B activities vs B2C activities. Sales to the consumer market is highly regulated in most economies and some are starting to develop regulations that also require product passports to support informed consumer choice and/or improved recycling processes. Brands and retailers must meet domestic regulations and face scrutiny from an increasingly greenwashing-aware consumer as well as from environmental activist organisations. The potential for reputational damage and high fines for non-compliance present brands and retailers with a strong motivation to ensure that sustainable practices are in place both for themselves and their entire supply chain.

- When brands and retailers can **verify** UNTP credentials linked to shipments from their upstream suppliers then they can confidently meet their due-diligence obligations and have the rich and verifiable information necessary to issue any consumer-centric product passports required under domestic regulations.
- UNTP should not conflict with local regulations. When international brands and retailers **issue** UNTP product passports, conformity credentials and traceability events across all markets then they are providing a consistent way for consumers to discover and verify ESG performance and are establishing a strong framework for compliance with any current or emerging domestic regulations.
- When brands and retailers request UNTP credentials from their upstream suppliers then they avoiding the challenges associated with imposing specific traceability software solutions on their supply chain. Instead, they are simply requesting conformance with a common standard, irrespective of software platform.
- When brands and retailers that have already made significant investments in GS1 identifiers and standards implement the UNTP, they can follow the GS1 binding to build upon and re-use their

existing investments. It should also be noted that UNTP does not impose GS1 solutions on organisations that have not already invested in GS1 standards.

- When brands and retailers link their issuer identity to a strong identity credential (such as a government business registration or trademark ownership credential) and implement the UNTP anti counterfeiting mechanism then they will add strong anti-fraud measures to their products and preserve the value of their sustainability actions.

Recyclers & Refurbishers

Recyclers & refurbishers play a critical role in the transition to a circular economy. Recyclers process used products into raw materials for re-use in new production processes. Refurbishers take old products and restore them for re-use. The goal of both processes is to improve sustainability outcomes by re-using natural resources rather than producing new raw materials. As regulators start to impose minimum recycled content requirements and other circularity regulations, the current linear economic model (produce, use, dispose) will require significant change to provide sufficient recycled materials to meet regulatory goals and consumer expectations. The UNTP is designed to support circular economies by including verifiable information on recycled content of products. UNTP also incentivises manufacturers to design new products to optimise recyclability and provides access to product data to better inform recycling processes.

- When manufacturers optimise their product design for recyclability and provide access to that information via **issued** UNTP passports then they are uplifting the end-of-life value of their products. Recyclers can leverage this data (especially for high value products like EV batteries) to optimise the efficiency of their recycling processes.
- When recyclers **issue** UNTP passports with their recycled material shipments, they are empowering their customers (manufacturers) to make verifiable claims about the percentage of recycled content in their products. This reduces the due diligence burden and non-compliance risk for manufacturers that face mandated minimum recycled content thresholds.
- When consumers see recycled content claims on products then they can **verify** them with confidence.

Environmental & Human Welfare Organisations

There are a large number of national and global not-for-profit organisations who's purpose is to promote environmental or human welfare causes. Some "trust marks", such as the WWF panda, have

very high global brand recognition. Although these organisations don't have the enforcement teeth of regulators, they can strongly influence product market success when their trust mark is added (or revoked).

- When influential ESG trust marks establish well-goverened accreditation frameworks and **issue** (or revoke) UNTP accreditation credentials then they are able to participate in the digital trust ecosystem as trust anchors, thereby multiplying the power of their brand to drive sustainable production practices.

Consumers

Consumer sentiment around sustainable production is strong and growing with over 70% of consumers in some economies actively choosing sustainable goods where possible. At the same time cynicism around greenwashing is increasing which acts to devalue sustainability claims. As greenwashing countermeasures such as UNTP and national regulations become widely adopted, it is reasonable to expect that consumers will become familiar with product passports and ESG verification techniques.

- When consumers can confidently **verify** the sustainability performance of products simply by scanning barcodes, QR codes or RFID tags then they will be more likely to choose products with verifiable and trustworthy ESG qualities over that that simply make unverifiable claims. When this behaviour is ubiquitous then consumers will have played a pivotal role in combatting greenwashing and winning the race to the top.
- When products are also equipped with the UNTP anti-counterfeiting measures then consumers can not only **verify** ESG performance but also confirm that the performance is associated with an authentic product and not a fake. Producers, manufacturers, brands, and retailers can be confident that their sustainability investments are not devalued by counterfeit products.

Transport & Logistics Providers

The movement of cargo by sea, air, and land accounts for around 10% of global emissions and, unless transport itself becomes more sustainable, will account for the largest fraction of global emissions by 2050. Transport (especially by road) is therefore a key part of the emissions intensity of a product on the market. In the same way that UNTP makes ESG credentials discoverable from product batch identifiers, so UNTP allows ESG credentials for transport services to be discoverable from consignment identifiers such as waybill numbers. But is it the buyer of goods or the seller fo goods that is responsible to include transportation in the ESG footprint? The UNTP answer is that it follows the INCOTERMS - essentially whoever pays for the transport has the responsibility to include the transport

in their product footprint. This ensures there are no gaps or double counting and that incentives are appropriately aligned.

- When transport & logistics providers **issue** UNTP transport credentials and link them to consignment identifiers then they are providing their customers with quantifiable and verifiable transport related ESG metrics to include in their product footprint. As producers, manufacturers, brands, and retailers seek to drive improvements in sustainability performance they will be incentivised to choose low emissions transportation services. This will uplift the value of sustainable transport services per tonne-kilometre.

Financial Institutions

Financial institutions are under increasing pressure from both regulators and the investment community to grant preferential terms for investment capital to sustainable businesses. The finance industry will increasingly verify sustainable performance via their customer annual reporting according to IFRS sustainability standards. Just as financial transactions such as bills, invoices and payments aggregate up to corporate financial statements such as profit & loss and balance sheets, so corporate level annual sustainability metrics are constructed from operational data such as UNTP digital product passports. Furthermore, at consignment level, trade finance instruments such as documentary letters of credit normally require sufficient documentation for goods clearnance to be presented prior to payment release. For cases where goods may be blocked at the border due to non-compliance with ESG regulations, then financial institutions will require ESG compliance evidence prior to releasing funds.

- When banks can use UNTP product passports and conformity credentials to digitally **verify** ESG compliance for shipments covered by letters of credit then they can more confidently release payment.
- When banks that are providing investment capital on sustainability grounds to businesses that have implemented UNTP then there is a clear line of sight from UNTP-based operational processes to IFRS-based corporate ESG performance, thereby reducing the financial risk associated with the investment.

Industry Member Associations

There are over 100,000 industry associations world-wide. Most represent a specific industry sector within a specific jurisdiction. These member associations typically provide advocacy on behalf of the community and offer best practice advice. In many cases the associations define quality standards and

branding that distinguish their member's products in the marketplace (eg genuine manuka honey). These member associations are well positioned to assist their members in navigating the complexity of domestic and international ESG standards and in assisting them to implement the UNTP. When a particular association member engages in fraudulent practices then it can quickly damage the reputation of the entire industry. Therefore, member associations are strongly incentivised to ensure that their membership adheres to quality standards and to eject non-compliant members. This includes supporting the adoption of industry-wide sustainable practices and UNTP as the digital evidence of those practices.

- Industry member associations may add value to their membership by developing develop UNTP industry profiles that provide their members with targeted implementation guidance that meets the needs of their industry and jurisdiction.
- Industry member associations may develop training and implementation services, possibly in partnership with local service providers, thereby adding both a valuable service and also a revenue stream for the member association.
- Industry member associations may act as a trusted independent quota managers to counter mass balance fraud amongst their membership. The value of this service would be increased if the industry association is accredited by either a national accreditation authority or a global environmental or human welfare organisation.

Software Developers

Software developers provide the tooling that is needed to implement UNTP because they hold the data that is needed to **issue** UNTP credentials and they will also consume the data from UNTP credentials that are discovered and **verified**. This category includes enterprise resource planning (ERP) systems, ESG management systems, and traceability platforms. By implementing UNTP, software developers are empowering their customers to participate in global transparent supply chains. For large organisations with heavily customised systems, UNTP implementation may be a customer specific project. For smaller organisations that subscribe to off-the-shelf packages, UNTP conformity is more likely to be simply a new feature in a release roadmap.

- ERP systems are the natural issuers of UNTP product passports and traceability events because they manage the finance and logistics operations around the manufacturing, sales, and shipment of products.
- ESG management systems are the source of the ESG data such as carbon intensity that will populate UNTP product passports as well as the conformity credentials referenced by the product passport.

- Traceability platforms are used to provide traceability maps of the upstream supply chain. Rather than gathering this data by direct enrolment of upstream actors, UNTP provides a means to gather the same data by following verifiable linked data trails.

The three system types described here may exist in separate software products or may be parts of a more integrated system. Some ERP systems also manage ESG data. Some ESG platforms include traceability functions. It is not unlikely that ERP systems, whether through native product features or acquisition or partnerships, will evolve to offer this integrated set of capabilities to their customers. UNTP defines a simple and implementable standard for software developers to empower their customers to connect into global transparent and sustainable supply chains.

Service Providers

The adoption of UNTP by hundreds of millions of micro (under 5 employees) and small (under 50 employees) business will most likely be driven by implementation of UNTP as out-of-the-box capability by their chosen business software systems. However, the adoption of UNTP by tens of millions of medium (under 500 employees) and large (over 500 employees) business will most likely require some business analysis and systems integration investment. To minimise cost and risk, such businesses are likely to seek UNTP implementation support from a marketplace of experienced service providers.

- When service providers such as system integrators develop skills in UNTP implementation then they will be able to offer attractive service packages to their existing customers. They may also be able to leverage UNTP implementations skills to access new customers and markets.

Success Measures

Although reduced greenwashing and improved sustainability are the ultimate goals of UNTP, the most direct measure of success is uptake. Therefore, UNTP will measure uptake by counting the number of pledges (i.e. promises to implement) and the number of successfully completed conformity tests (i.e. actual implementations). For UNTP to achieve it's goals, uptake will need to exceed the minimum thresholds shown in the uptake trajectory below.

Stakeholder type	2024 pledge	2024 implement	2026 pledge	2026 implement	2028 pledge	2028 implement	2030 pledge
Regulators	10	1	20	10	50	20	200

Stakeholder type	2024 pledge	2024 implement	2026 pledge	2026 implement	2028 pledge	2028 implement	2030 pledge
ESG Standards	10	0	20	10	50	20	200
Accreditation & certification	20	2	50	25	100	50	300
Producers & manufacturers	50	10	500	100	2,000	1,000	10,000
Brands & retailers	50	10	500	100	2,000	1,000	10,000
Recyclers & refurbishers	10	0	20	10	50	20	200
Transport & logistics	20	2	50	25	100	50	300
Financial institutions	10	0	20	10	50	20	200
Member associations	20	10	200	100	1,000	500	3,000
Software developers	20	2	50	25	100	50	300
Service providers	20	2	50	25	100	50	300

Actual progress towards these targets will be tracked via the Implementations pages.

Requirements

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UNTP Business Requirements

This page provides a summary of the high level business requirements for UNTP, grouped into 7 catgories. Each requirement is linked to the page(s) where the solution to the requirement is defined.

Governance Requirements

This set of requirements aim to ensure that UNTP is goverened in an open and transparent manner, is freely avaialable to all, and is extensible to meet specific industry and jurisdictional needs.

ID	Name	Requirement Statement	Solution Mapping
GV.01	Consensus driven process	UNTP development MUST me managed via a transparent and consensus-driven process that is open to contributions from all stakeholders - so that implementers can have confidence that the UNTP will meet their requirements.	Governance
GV.02	Freely available	The UNTP IP MUST be owned by the UN and be permanently free to access and free to use - so that implementers can have confidence that there will never be any fees for use or IP infringement claims.	Governance
GV.03	Backwards compatible	New versions of UNTP SHOULD be backwards compatible with earlier versions and each version MUST remain active and supported for a	Governance

ID	Name	Requirement Statement	Solution Mapping
		minimum of 2 years - so that implementers can have confidence in the durability of their investment.	
GV.04	Open source	UNTP implementation tools including reference implementations and test services MUST be available under open source and royalty free licensing - so that implementers can confidently use the tools to minimise their own implementation costs	Tools & Support
GV.05	Extensible	The UNTP MUST define a non-breaking extensions methodology - so that UNTP can be extended to meet specific jurisdictional or industry requirements and so that implementers of a registered extension can be confident that their implementation is interoperable with UNTP core.	Extensions
GV.06	Reusable extensions	Industry and/or jurisdictional extensions to the UNTP SHOULD also be governed via an open process and released under royalty free license terms - so that implementers of extensions can have same fees & IP confidence as with UNTP core.	Extensions
GV.07	Implementation pledge	UNTP MUST provide a mechanism for implementers to pledge their support and to register their implementations - so that implementers can choose to register both their sustainability commitment and conformant solutions for discovery by a global community of users and/or customers.	Implementations

Architectural Requirements

This set of requirements aim to ensure that UNTP is scalable enough to achieve global implementations at a volume of global trade that is sufficient ot have a material impact on greenwashing - by building on top of existing industry systems and practices and using the simplest possible framework that meets the goals.

ID	Name	Requirement Statement	Solution Mapping
AR.01	Protocol over platform	The UNTP MUST define a standard protocol that is easily implemented by any business software system - so that every supply chain actor can continue to use their preferred business software without any need for upstream or downstream actors to agree on the use of shared platforms.	Architecture
AR.02	Decentralisation	The UNTP MUST define a decentralised protocol where data is stored wherever the owner chooses - so that supply chain actors retain control of their data and are able to monetise their evidence of sustainable behaviour.	Architecture
AR.03	Natural business	The UNTP MUST accommodate the continued use of existing natural business, product, batch, and shipment identifiers - so that UNTP implementation imposes minimal disruption to existing business processes and can leverage existing business and product registers.	Identifiers
AR.04	Technical maturity	The UNTP MUST accommodate varying levels of technical maturity from (and including) paper based documents up to fully digitalised systems - so that every implementers of UNTP can confidently proceed without dependency on the capability or readiness of upstream or downstream actors.	Data Carriers

ID	Name	Requirement Statement	Solution Mapping
AR.05	Simplest possible core	The UNTP MUST prioritise simplicity by focussing on only the minimum specification that represents the common core needs across different jurisdictions and indutries - so that that implementation cost is minimised and interoperability is maximised.	Architecture
AR.06	Re-use not re-invent	The UNTP MUST re-use (rather than re-invent) existing standards (e.g. W3C Verifiable Credentials, GS1 EPCIS, UN vocabularies, etc) wherever they are fit for purpose - so that interoperability is maximised and existing investments in software components is re-used.	Architecture
TT.07	Rules as code	The UNTP MUST define a mechanism to simplify the compliance assessment of entities, products, and processes against the fast growing set of ESG standards and regulations - so that any actor's investment in sustainable practices is easily tested against multiple criteria.	ESG Rules

Traceability & Transparency Requirements

This set of requirements aim to ensure that UNTP provides the traceability and transparency data needed for each supply chain actor to confidently meet their due diligence obligations and customer epxections for verifiable evidence of sustainable practices.

ID	Name	Requirement Statement	Solution Mapping
TT.01	Data carriers	The UNTP MUST define consistent methods for the discovery of data about products from both new and existing data carriers such as ID bar codes, 2D matrix, QR codes, and RFID tags - so that any party that has	Data Carriers

ID	Name	Requirement Statement	Solution Mapping
		only a product batch ID or goods shipment ID can find ESG data about that product or shipment.	
TT.02	item/batch granularity	The UNTP MUST provide data at the granularity of the individual items or batch in a shipment so that the downstream actor can easily aggregate their material inputs (e.g. scope 3 emissions) into their own ESG performance data.	Digital Product Passport
TT.03	end-to-end traceability	Subject to privacy & confidentiality constraints, the UNTP traceability model MUST be able to trace value chains from finished product to raw materials through any number of commercial boundaries (sale of goods), or logistics boundaries (consolidation & deconsolidation), and process boundaries (manufacturing transformation of inputs to different outputs) so that the provenance and ESG footprint of goods can be verified as the sum of component parts.	Traceability Events
TT.04	Sustainability data	The UNTP MUST provide a simple and consistent way to access and verify all available sustainability metrics (eg carbon intensity, deforestation, water usage, fair work, etc) about a given product item or batch - so that product buyers can easily meet their sustainability and due diligence obligations	Digital Product Passport, Conformity Credential
TT.05	Provenance data	The UNTP MUST provide verifiable provenance information (raw material content and manufacturing origin countries) about a given product item or batch - so that product buyers can easily meet their supply chain resilience and goods origin controls.	Digital Product Passport, Guarantee of Origin
TT.06	Circularity data	The UNTP MUST provide a simple mechanism to access circularity data including both recycled content metrics as well as end-of-life recycling information - so that	Digital Product Passport,

ID	Name	Requirement Statement	Solution Mapping
		product buyers can meet their recycled content goals and recyclers can optimise their recycling processes.	Circularity Data
TT.07	ESG Vocabulary	Given the volume and diversity of ESG standards and regulations, the UNTP MUST define a simple and scalable mechanism to define both the precise meaning and general category of ESG claims - so that downstream actors can map either the specific criteria or the general category of ESG data confidently.	Vocabulary

Trust & Integrity Requirements

This set of requirements aim to ensure that UNTP provides data that can be be trusted and is resilient to several greenwashing attack vectors.

ID	Name	Requirement Statement	Solution Mapping
TI.01	Trust anchors	Trust in truth of sustainability claims can be established by third party audits, or by attestation of trusted authorities, or by long standing evidence of sustainable behaviour. The UNTP MUST provide a mechanism to link ESG claims to any or all of these "trust anchors" so that downstream actors can have confidence that claimed ESG performance is true.	Trust Anchors
TI.02	Identity integrity	Identifiers of businesses, locations, products, and shipments underpin the UNTP. Therefore, the UNTP MUST provide a mechanism to verify that ESG claims made about products or locations or entities are made by actors that are genuine owners of the identifiers or their authorised delegates - so that downstream actors	Identifiers

ID	Name	Requirement Statement	Solution Mapping
		can be sure that ESG claims are made by parties genuinely authorised to do so.	
TI.03	Accreditation	Third party audits and assessments add trust. But if the verifier does not know the auditor / certifier then there's a risk that define a mechanism to link third party certifiers to the accreditation authrority under which they perform their work so that downstream actors can trust the certificates even when they do not know the certifiers.	Conformity
TI.04	Verification of documents	The UNTP MUST define standard and interoperable mechanisms to prevent spoofing or tampering of any documents issued by upstream actors so that downstream actors can be confident that ESG credentials were genuinely issued by the claimed identity and have not been altered in any way.	Verifiable Credentials
TI.05	Verification of graphs	Evidence of ESG performance in supply chains is not concentrated in one document but rather is distributed along the entire value chain. The UNTP MUST define a mechanism to describe and verify the collection of evidence that is available from chains of linked documents so that downstream actors can verify the full ESG footprint and provenance data for any shipment.	Trust graphs
TI.06	Product substitution	As the brand value of verifiably sustainable products increases, so does the incentive to make fake products and attach them to genuinely verifiable sustainability evidence. The UNTP MUST define an anti-counterfeiting mechanism so that downstream actors can confirm that they have purchased genuine goods.	Anti-counterfeiting

ID	Name	Requirement Statement	Solution Mapping
TI.07	Mass balance fraud	Mass balance fraud occurs when a supply chain actor blends sustainable materials with cheaper non-sustainable materials as inputs to a manufacturing process and then claims that the manufactured product is 100% sustainable. The UNTP MUST define mechanisms to detect mass balance fraud so that downstream actors can be confident of the integrity of their sustainable supply chain and the value of sustainable products is maintained.	Mass balance

Security & Confidentiality Requirements

This set of requirements aim to ensure that UNTP provides mechanisms to protect the security and confidentiality of supply chain data, allowing each actor to make their own choices about the balance between trceability & transparency.

ID	Name	Requirement Statement	Solution Mapping
SC.01	Transparency vs confidentiality	The UNTP MUST allow every supply chain actor to choose their own balance between transparency and confidentiality - so that each actor can choose to share only what delivers value whilst protecting the information they deem confidential.	Confidentiality
SC.02	Multi-layered security	Information about products have a range of commercial sensitivity from public data to highly confidential data. The UNTP MUST provide a range of data protection mechanisms that can be applied appropriately so that supply chain actors can choose the right protection level for specific data sets.	Confidentiality

ID	Name	Requirement Statement	Solution Mapping
SC.03	Selective redaction	ESG data and credentials from sellers may contain data that buyers do not want to pass on to their own customers. The UNTP MUST define a selective redaction method that allows any supply chain actor to redact information (without affecting the cryptographic integrity) from credentials received from upstream suppliers before passing it on to their downstream customers - so that verifiable ESG data can be passed on without leaking commercially sensitive data.	Confidentiality
SC.04	Revocation	The UNTP MUST provide a mechanism to revoke previously issued conformity certificates when an actor is found to be non-compliant so that downstream actors can be confident of the currency of the ESG assessments they receive.	Verifiable Credentials
SC.05	Availability	UNTP MUST define a mechanism for high availability and long term durability of ESG evidence - so that data can be accessed by verifiers even when source systems are down, and so that data for long-lifetime products such as batteries or building materials can be accessed long after source systems are retired.	Verifiable Credentials
SC.06	Cryptography	The UNTP MUST support flexibility in cryptographic methods so that new algorithms can be supported as they emerge to meet new challenges such as quantum computing.	Verifiable Credentials
SC.07	Key management	The UNTP MUST provide mechanisms for the discovery of public keys, the protection of private keys, and the rotation of key pairs so that keys remain secure and can be easily chained if compromised.	Verifiable Credentials

Compatibility & Interoperability Requirements

This set of requirements aim to ensure that UNTP is compatible with existing standards for technology, ESG criteria, and supply chain practices so that implementers can maximise the leverage of existing investments.

ID	Name	Requirement Statement	Solution Mapping
CI.01	National regulations compatibility	UNTP conformant data SHOULD be straightforward to map to national ESG regulations so that it can usefully provide the upstream B2B ESG evidence to support national B2C product conformance.	Vocabulary, Extensions
CI.02	Entity ESG reporting compatibility	UNTP conformant ESG data about products & shipments MUST be straightforward to map to entity level ESG reporting obligations so that UNTP transaction level ESG data can be easily aggregated to inform annual ESG reporting that conforms to standards like IFRS sustainability.	Vocabulary
CI.03	ESG standards compatibility	The UNTP MUST be able to support ESG claims against criteria from any ESG standard and MUST provide a mechanism to map those claims to a common vocabulary - so that implementers can align with standards of their choice and verifiers can make sense of the claims even when they are unfamiliar with specific standard criteria	Vocabulary, ESG Rules
CI.04	Credential interoperability (VCs)	The UNTP MUST provide the flexibility to support multiple credential standards such as W3C Verifiable Credentials and Hyperledger Airies Anoncreds - so that ESG data along a value chain can be verified even when different credential standards are adopted by different actors along the value chain.	

ID	Name	Requirement Statement	Solution Mapping
CI.05	Blockchain	Whilst some implementers MAY choose blockchain technologoes to underpin their solutions, the UNTP MUST NOT require the use of blockchain for conformant implementations - so that implementers that wish to avoid the costs and complexity of blockahin technologies are free to do so.	
CI.06	GS1 compatibility	GS1 identifiers and standards are ubiquitous at the downstream consumer goods end of most supply chains. The UNTP MUST be compatible with GS1 standards but MUST NOT require the use of GS1 standards - so that supply chain actors that are already invested in GS1 identifiers and standards can maintain and build upon that investment	
CI.07	Other registry compatibility	The UNTP MUST define a mechanism to support existing identity registers so that implementers can continue to leverage existing business identifiers such as tax registration numbers, cadastral lot numbers, shipping container numbers, and so on under UNTP	Identifiers, Extensions

Implementation Requirements

This set of requirements aim to ensure that UNTP is implementable at the lowest possible cost, and that early implementers gain a marketing advantage, and that the impact of implementations can be tracked.

ID	Name	Requirement Statement	Solution Mapping
IM.01	Making a business case	Every UNTP implementer will need confidence that the benefots of their implementation	Business Case

ID	Name	Requirement Statement	Solution Mapping
		outweighs the cost. UNTP SHOULD provide a set of business case templates so that each stakholder type can fast-track their decision to proceed	
IM.02	Open source tools	The UNTP MUST include an open source reference implementation that any supply chain actor can embed into their solutions to help fast-track their implementation.	Tools
IM.03	Conformity testing	the UNTP MUST include a conformance test suite and test service so that each implementer can self-assess their conformance and be confidenet that their implementations will be interoperable.	Test service
IM.04	Implementation Support	UNTP MUST provide mechanisms for implementers to get either community support or professional support so that they can minimise their implementation risk.	Support
IM.05	Tracking implementations	UNTP MUST provide a mechanism to track implementations so that uptake and impact can be measured and so that early implementers can publicise their solutions.	Implementations
IM.06	Tracking extensions	UNTP MUST provide a mechansim to track and publish industry & jurisdictional extensions so that new extensions can find and re-use relevant work.	Extensions
IM.07	Greenwashing KPIs	Although uptake is a simple and concrete success measure, the real purpose of UNTP is to lift the value of sustainable practices by countering greenwashing. Therefore, UNTP	Greenwashing KPIs

ID	Name	Requirement Statement	Solution Mapping
		MUST develop a set of greenwashing KPIs that can be tracked to assess whether UNTP is having a material impact.	

Governance

> **INFO**
>
> Please note that this content is under development and is not ready for implementation. This status message will be updated as content development progresses.

Management process

The UNTP development follows the same **standard governance rules** as any UN/CEFACT project.

- Free to use,
- Open source licensed,
- Maintained via an open process
- Version controlled
- Lifecycle managed

Releases

As per docusaurus version management practices, the latest stable version of UNTP will always be shown be default at /docs (this site). In-progress future version will be hosted at /docs/next and previous versions at /versioned-docs/version-x.y. The version history includes major versions (breaking) and minor versions (non-breaking but with functional change) but not patch versions (bug fixes and typos) which overwrite the relevant minor version.

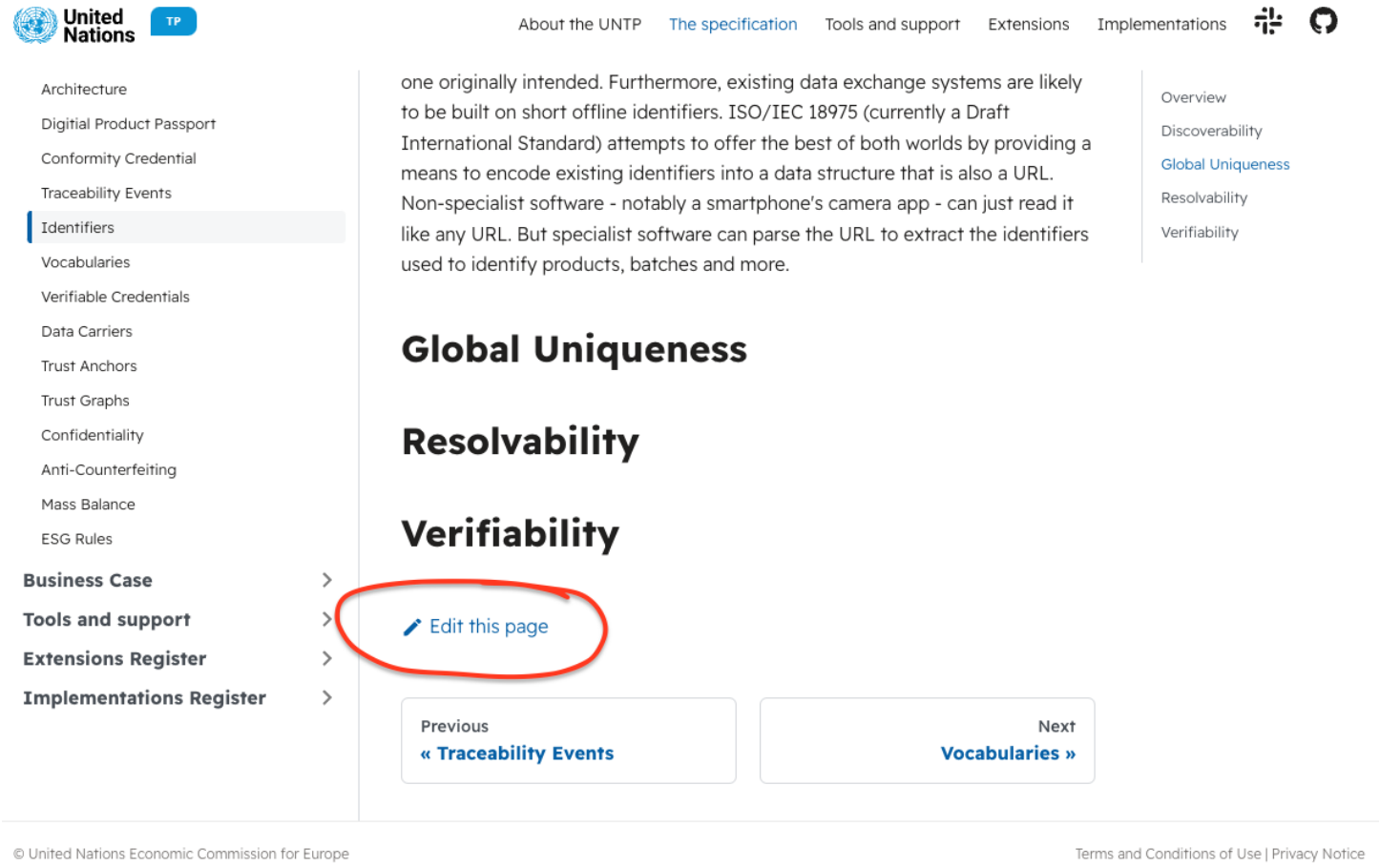
The UNTP includes a number of distinct and separately versioned components such as passport schema, traceability event schema and so on. To simplify implementaiton management, all seaprate component versions are grouped together and listed under each aggregated UNTP version.

UNTP Version	Status	Date	Componenets	Comment
0.0.0	Raw	2024-01-01	TBA	Empty framework

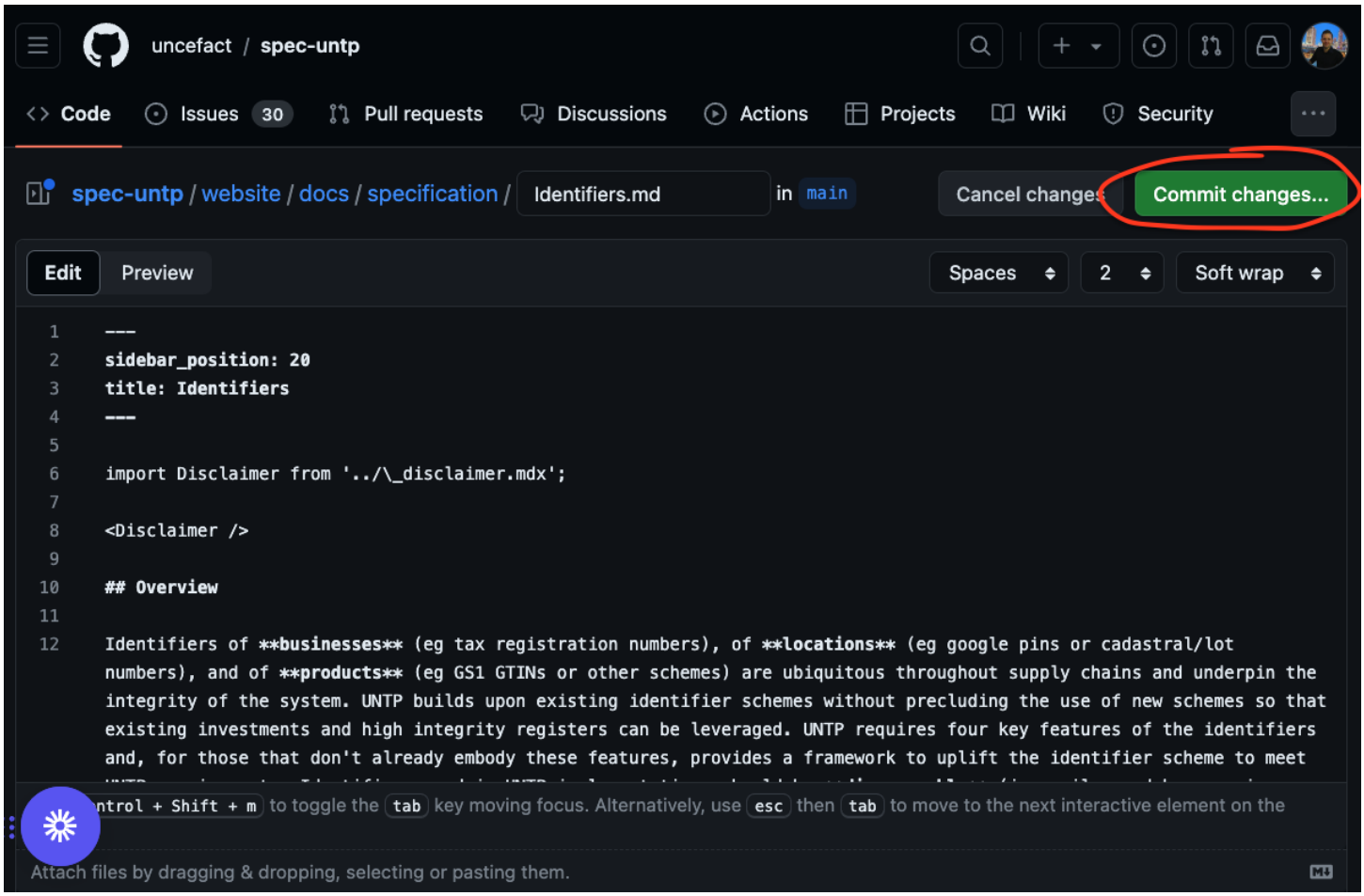
Contribution Process

In general we follow the standard GIT Pull Request process.

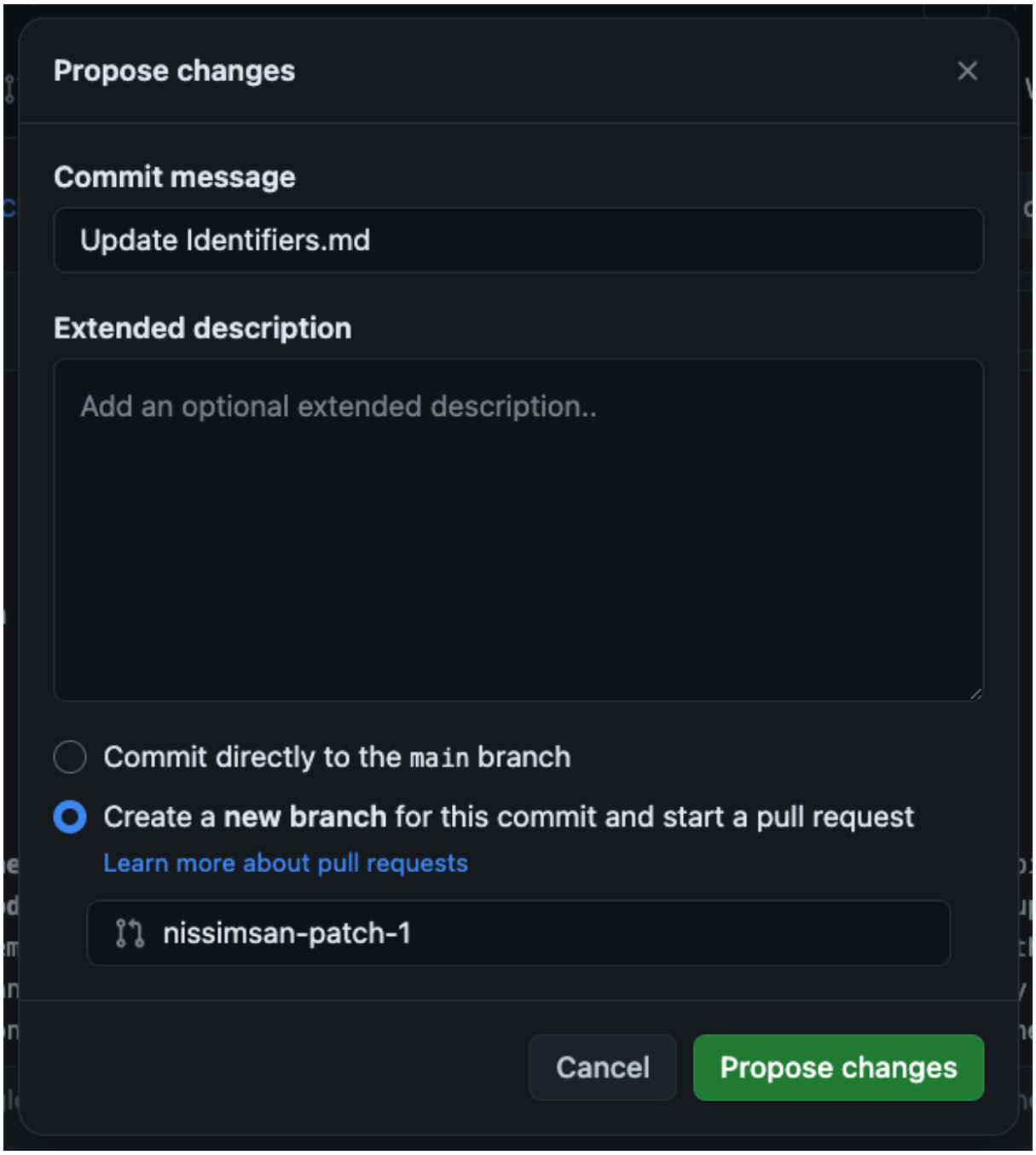
1. By far the easiest way is to start from the Edit feature, here:



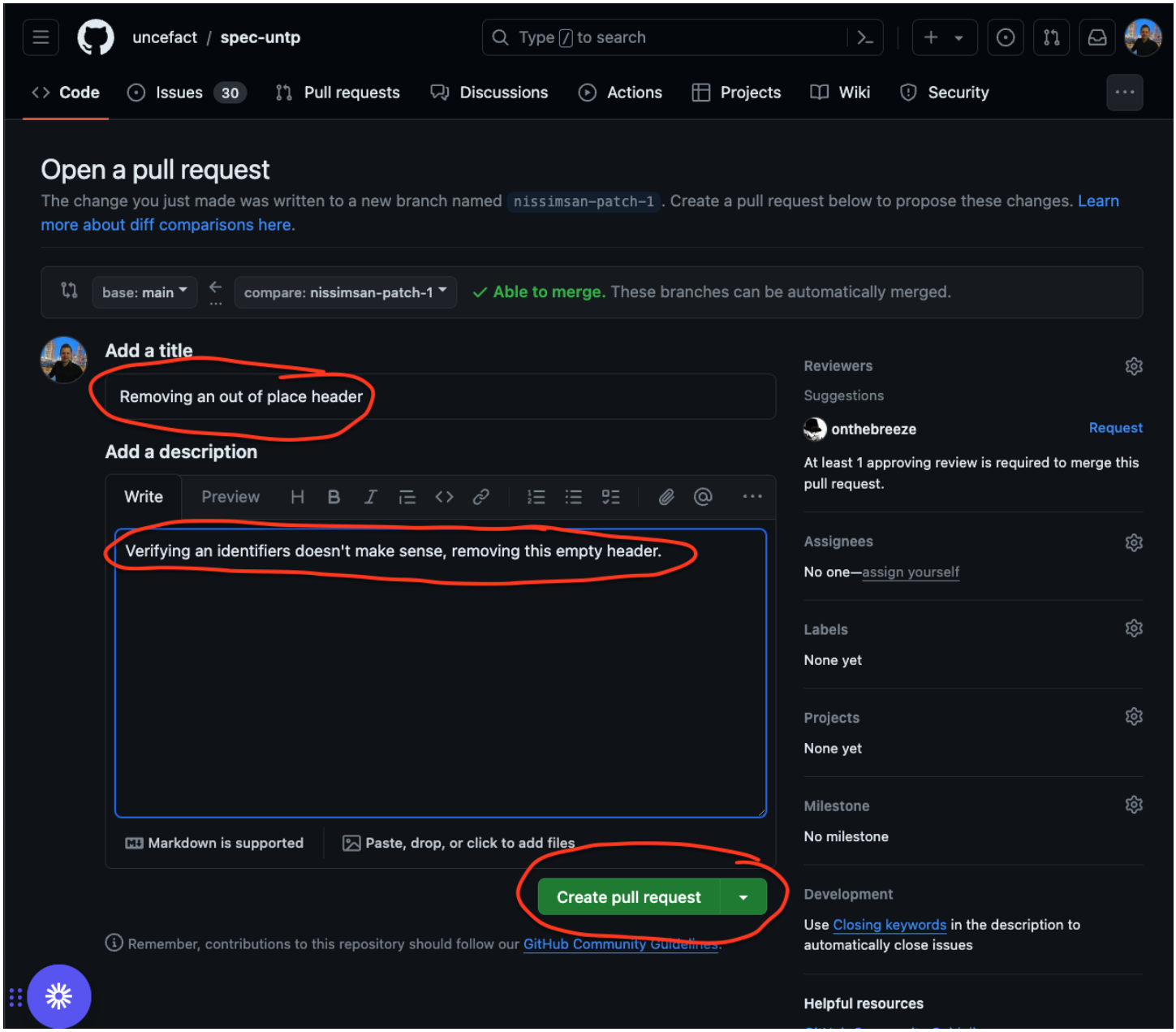
2. Make your changes in the markdown file, then commit:



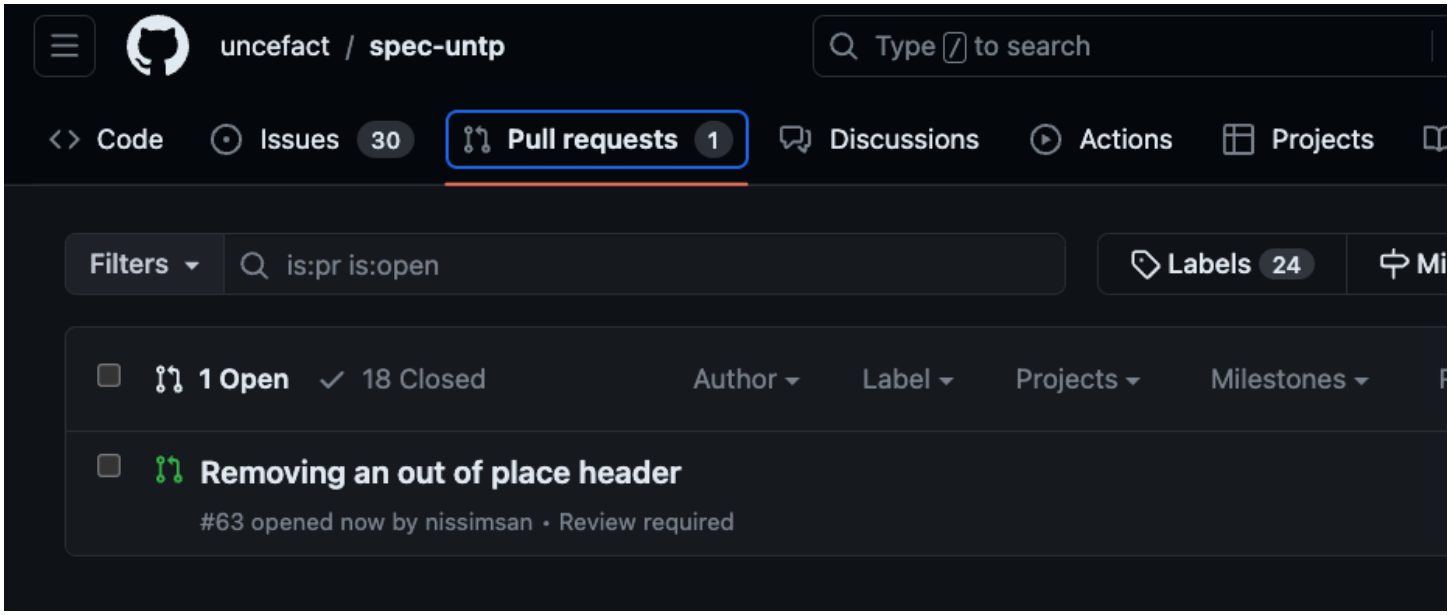
3. Just click okay on this (we don't have a commit message policy):



4. Then create a pull request for your change request. Here we do prefer a suitable title and a brief description of the change you are suggesting:



5. We will process your PR in the next meeting. Note that you will not see your change on the website before that happens, and we have agreed to merge your PR.


uncefact / spec-untp
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Code
Issues 30
Pull requests 1
Discussions
Actions
Projects
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1 Open
18 Closed
Author
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#63 opened now by nissimsan • Review required

Meetings

> **INFO**
>
> Please note that this content is under development and is not ready for implementation. This status message will be updated as content development progresses.

Meetings

UNTP development team meetings are held weekly at alternating times to accomodate participants from different timezones.

Each meeting will generally work through open issues and pull requests.

Previous meeting dates, recordings, transcripts, and minutes are summarised below with the most recent meeting at the top.

Next Meeting

The next meeting is 8am UTC 13th June 2024. Join here

Previous Meetings

Meeting	Summary	Recording	Transcription
2024-06-05	The meeting focused on improving meeting participation, managing transcription and summary processes, handling JSON schema and JSON-LD context differences, addressing challenges with semantic interoperability, and establishing principles for managing context files.	video	transcript
2024-05-30	The meeting focused on addressing pull requests, aligning with EU right-to-repair regulations, and discussing the challenges and strategies for	video	transcript

Meeting	Summary	Recording	Transcription
	maintaining and verifying digital product passports within the supply chain.		
2024-05-23	The Working Group discussed updates to the digital product passport sample file, terminology adjustments, and the adoption of a "transparency graph" to better align with the VC data model and enhance data validation and provenance.	video	transcript
2024-05-16	In the meeting, the team discussed updates to project examples and data models, alignment with international standards, and strategies for maintaining interoperability and accurate mappings in linked data while preparing for upcoming pilot implementations.	video	transcript
2024-05-09	The meeting focused on aligning digital product passport models with the VC data model, removing scoring elements to simplify the structure, and discussing the implementation of trust graphs and multilingual support using governed overlays.	video	transcript
2024-04-25	The meeting focused on reviewing and processing pull requests, assigning stale issues, and emphasizing broader collaboration within the group, with key discussions on traceability event schema updates and the verification of identifiers.	video	transcript
2024-04-18	The April 18, 2024, meeting focused on streamlining specification sections, reviewing and merging several pull requests, and discussing key issues related to verification and trust graphs, with commitments to create examples and improve meeting efficiency.	video	transcript
2024-04-11	The meeting focused on discussing industry use cases for the Digital Product Passport, trust and credential verification methods, and agreeing on future tasks and	video	transcript

Meeting	Summary	Recording	Transcription
	pilot projects, with an emphasis on more active use of Slack for ongoing discussions.)		
2024-04-04	The meeting focused on refining digital product passports and verifiable credentials, emphasizing interoperability, traceability, and the development of clear business requirements to guide technical decisions.	video	transcript
2024-03-28	The meeting focused on discussing and refining the digital product passport (DPP) structure, addressing the challenges of integrating claims and evidence at different levels, and planning further updates and reviews to ensure its practical implementation.	video	transcript
2024-03-14	The team discussed the successful submission of the policy document, agreed on weekly meetings, reviewed technical specifications and PRs, and demonstrated GitHub contribution processes.	video	transcript
2024-02-29	The team discussed updates from Europe, aligned on the structure of recommendations and challenges in their document, and set a plan for finalizing the document for submission by the end of the week.	video	transcript
2024-02-15	The meeting focused on refining the policy document draft by incorporating feedback, simplifying technical language, and aligning with global frameworks to prepare for final review and public release.	video	transcript
2024-01-18	TBD	video	TBD
2024-01-11	TBD	video	TBD

2024-06-05 Meeting Summary

Attendees:

- Steve (Speaker 1)
- Virginia (Speaker 3)
- Jason (Speaker 5)
- Patrick (Speaker 2)
- Marcus (Speaker 4)
- Other unidentified speakers

Key Points Discussed:

1. **Meeting Organization and Participation:**
    - Steve acknowledged the need to increase participation in meetings through better marketing.
    - Reminded attendees that this is a UN meeting and contributions are considered UN IP.
    - Steve mentioned that meetings are recorded and transcriptions are published.
2. **Meeting Transcription and Summary Process:**
    - Steve shared updates on how meeting transcriptions and summaries are managed.
    - Introduced a table format for meeting summaries with video transcripts, text transcripts, GPT summaries, and one-sentence summaries for quick reference.
3. **Pull Requests and JSON Schema vs. JSON-LD Context:**
    - Discussion on handling pull requests and differences between JSON schema (structure) and JSON-LD context (meaning).
    - Steve shared a detailed explanation and a diagram to clarify these differences, using examples like a verifiable credential describing a traceability event for a bale of cotton.
4. **Challenges with JSON-LD Context and Semantic Interoperability:**
    - Steve highlighted the challenges in mapping complex, abstracted data models to meaningful terms in a consistent way.
    - Illustrated the difficulty with an example involving transport means and IMO numbers, emphasizing the problem with abstract structures in JSON-LD context files.
5. **Discussion on Governance and Granularity:**

- Patrick and Marcus contributed to the discussion on how to manage the complexity and granularity of context files.
- Marcus suggested using catalog entries to manage multiple schemas and context files, which could help in maintaining semantic integrity and version control.
- The need for proper governance to ensure correct mappings and avoid wrong semantic interpretations was emphasized.

6. **Principles for Managing Context Files:**

   - Agreement on keeping context files small, semantically correct, and aligned with specific use cases.
   - Steve proposed focusing on manageable granularity for context files, suggesting one context file per credential schema to simplify governance and changes.

7. **Future Steps:**

   - Plan to open an issue for further discussion on mapping complexity and balance.
   - Aim to document guiding principles for UNTP governance and implementers.
   - Acknowledgment that more discussion and iteration are needed to refine the approach.

Action Items:

- Steve to draft guiding principles for context file management.
- Open an issue for further discussion on mapping complexity and balance.
- Follow-up discussions to refine the approach based on feedback and further exploration.

Meeting Conclusion:

- Steve thanked everyone for their participation and contributions.
- The meeting ended with an acknowledgment of the need for ongoing collaboration to address the challenges discussed.

2024-05-30 Meeting Summary

Attendees:

- Zachary
- Stefano

- Michael
- Joe
- Bill
- Peter
- Various team members

Key Points Discussed:

1. **Pull Requests:**
    - Zachary presented his closed pull request related to test architecture. He acknowledged the need to update it based on Steve's feedback and plans to do so by next week.
    - Discussion on merging half-baked pull requests to ensure progress and avoid stagnation.
2. **Issues:**
    - The team has 50 open issues, with a tendency to create more than they resolve.
    - **Selective Disclosure Use Cases and Requirements:** This issue is on hold, with a potential demo for the UN forum being considered.
    - **PDF Generator Issue:** Assigned to three people, none of whom were present. It was suggested to put a note for easy conversion of GitHub sites to PDF documents and possibly mark the issue as pending close.
    - **Right to Repair Regulations:** Stefano highlighted the importance of aligning with EU regulations on this matter to enhance document alignment. He volunteered to draft relevant verbiage.
    - **Depth of Product Information:** The team discussed the necessity of tracking both upstream and downstream information, debating the practical limits and methods for maintaining depth without overcomplicating the process.
    - **Discovery Mechanism:** Discussion on the challenge of linking product information if the physical identifier is lost. No immediate solution was found, and the issue might be closed without action or tagged for future consideration.
3. **Technical Discussions:**
    - The challenge of maintaining a dynamic and evolving digital product passport was discussed, with considerations on how to append information without altering the original document.
    - There was a consensus on the importance of linked product passports, with each tier in the supply chain responsible for creating and maintaining their own passports and linking them

appropriately.
    - Verification and validation processes for credentials were discussed, with the need to detail steps for verifying issuers, data, schema, and status.
    - Discussion on certificates of conformity and the need for a practical way to refer to specific sections within a comprehensive conformity document.

4. **Future Actions:**
    - Explore solutions for appending information to digital product passports without compromising the original data.
    - Open new tickets to address specific downstream right-to-repair solutions.
    - Investigate the potential need for a central registry or blockchain solution to ensure the longevity and accessibility of digital product passports.
    - Ensure alignment with existing standards and leverage the work done by related bodies.

Conclusion: The meeting covered a range of issues from pull requests to regulatory alignment and the technical challenges of digital product passports. The team agreed on the need for continued exploration and development in these areas, with specific action items identified for follow-up. The meeting ended with the decision to be more aggressive in closing unresolved issues to maintain a manageable list.

2024-05-23 Meeting Summary

Participants: Virginia, Steve, Patrick, Zach, Gerhard, Marcus, John, Virginia, Joe, Phil, Harley, Juliet, and others.

Key Points Discussed:

1. **Attendance and Meeting Logistics:**
    - Various participants joined from different locations, including Steve on a yacht in Corfu.
    - Technical difficulties were experienced by some participants with the meeting link.

2. **Meeting Overview:**
    - The meeting was recorded and contributions are governed by a UN project.
    - The agenda focused on pull requests, updates to tickets, and related discussions.

3. **Pull Requests and Sample File Updates:**

- A pull request discussed was about updating a sample file for the digital product passport.
- The sample file was initially populated with real data from a participant's wife's company, which was then genericized.
- Agreement to merge the pull request after making it align better with the VC data model.

4. **Discussion on Naming and Structuring Digital Product Passports:**

   - Debate on the appropriate terminology for types of credentials and subjects within the digital product passport.
   - Suggestions included keeping terms like "product passport" consistent and aligned with the data model.
   - The group discussed the implications of using terms like "digital" in various contexts.

5. **Alignment with the VC Data Model:**

   - Agreement that the digital product passport should not compete with but rather use the VC data model.
   - Proposed changes include aligning the example data and the data model, and updating the website accordingly.

6. **Trust Graph vs. Transparency Graph:**

   - Extensive discussion on the terminology to describe the assessment of linked data within digital product passports.
   - Alternatives considered included "trust graph," "provenance graph," "evidence graph," and "transparency graph."
   - Consensus leaned towards using "transparency graph" to avoid confusion and to better align with the project's goals.

7. **Reference to W3C Provenance Model:**

   - Marcus suggested using the W3C Provo ontology as a framework for describing the evidence or transparency graph.
   - This approach would help in structuring and querying the data to provide a clear lineage and validation of the information.

8. **Action Items:**

   - Steve to make the discussed changes to the pull request and update the data model and website.

- Participants to review the W3C Provenance Model and consider its integration into the project specifications.
- Further refinement and alignment of terminology and models in future discussions.

Next Steps:

- Follow-up on the discussed changes and updates.
- Continued refinement of terminology and alignment with established data models.
- Ongoing review and merging of pull requests as per the consensus reached.

Closing:

- The meeting concluded with an acknowledgment of the productive discussion and the clarity gained on several topics. Participants were thanked for their contributions.

For more detailed information, the full meeting recording and notes are available for review.

2024-05-16 Meeting Summary

Date: May 16, 2024

Participants: Various speakers including Steve, Phil Archer, Nis, Suzanne, and others.

Key Points Discussed:

1. **Introduction and IP Reminder:**
   - Contributions to the project are under the UNIP framework.
   - Agenda includes discussing outstanding pull requests, ongoing tickets, and the relationship between schema, context files, and vocabularies.
2. **Pull Requests Review:**
   - **Minor Typo Fix:** A simple typo correction was merged without objections.
   - **Example Update:** An update to the example in the passport and conformity credential sections was discussed. Concerns about using a real company's product (buyacre.com) were raised, suggesting a switch to imaginary examples to avoid IP issues.
3. **Test Architecture Proposal:**

- Introduction of a three-tier conformance testing model: technical interoperability, schema testing, and business workflow testing.
- Emphasis on ensuring must/should requirements are testable.
- Discussion on using existing W3C test suites for core elements and defining additional tests for extensions.

4. **Linked Data and JSON-LD Context Files:**

   - Importance of linked data for ensuring consistent meaning across multiple instances.
   - Strategy to keep JSON-LD context files light and map only necessary elements to avoid complexity and incorrect mappings.
   - Agreement to develop the data model first and then map to established vocabularies.

5. **Issues and Tickets:**

   - Several issues tagged as pending closure after aligning models with VCDM.
   - Ongoing discussions on specific issues, with updates and resolutions expected in future meetings.

6. **External Collaborations and Standards:**

   - Steve presented at the Surpass kickoff, discussing alignment with the European Commission's efforts on product passports.
   - Suzanne highlighted the need to align with JTC 24 standards, focusing on product passport issuance and upstream supply chain data integration.
   - Proposal to establish a formal liaison with JTC 24 through the UN.

Actions and Next Steps:

1. **Steve:**

   - Work with Nis to update example models with non-proprietary products.
   - Align data models with VCDM and prepare for pilot implementations.
   - Follow up on establishing a formal liaison with JTC 24 through the UN.

2. **Phil Archer:**

   - Review any references to secure QR codes and update the test suite as needed.
   - Monitor and update the alignment with JTC 24 standards.

3. **Suzanne:**
    - Provide guidance on establishing a liaison with JTC 24.
    - Monitor JTC 24 activities and report back on potential divergences or necessary alignments.
4. **All Participants:**
    - Review the updated data models and provide feedback in the next meeting.
    - Engage in discussions on trust graphs and interoperability in upcoming calls.

Closing Remarks:

- Meeting ended 15 minutes early, with participants appreciating the extra time. The next meeting will focus on updates to the data models and further discussions on trust graphs.

2024-05-09 Meeting Summary

Attendees:

- Speaker 1 (Steve)
- Speaker 2 (Patrick)
- Speaker 3 (Virginia)
- Speaker 4 (John)
- Speaker 5 (Marcus)
- Speaker 6 (Unidentified)
- Speaker 7 (Unidentified)

Agenda:

1. Review of Outstanding PRs
2. Discussion on Key Tickets
3. Assignment Updates

Key Points:

1. **General Updates:**
    - Steve is currently anchored in Hvar, Croatia.
    - Meeting participants are from various time zones, with some joining late at night.

2. **Recording and Contributions:**

   - Meeting is recorded and contributions are for UNIP.
   - Participants are reminded that if they do not wish to contribute to UNIP, they should refrain from sharing ideas.

3. **Review of PRs:**

   - Only one pull request was discussed, which focused on enriching the content for conformity credentials.
   - The PR aims to align with existing business requirement specifications and the logical model of digital product conformity certificates.
   - Discussion about aligning fields with the VC (Verifiable Credentials) data model, particularly the "issuer" field.

4. **Feedback on PRs:**

   - Nis provided feedback on the PR, suggesting alignment with the VC data model.
   - Discussion on avoiding duplication of information and using complex objects in the VC issuer field.
   - Decision to merge the current PR and address alignment in subsequent revisions.

5. **Trust Graphs:**

   - Discussion led by John on the concept of trust graphs and the complexity of defining absolute measures of trustworthiness.
   - Agreement that trust decisions should be subjective and context-dependent, rather than protocol-defined scores.

6. **Rendering Methods:**

   - Patrick discussed the use of OCA (Overlays Capture Architecture) for rendering credentials, supporting multiple languages and additional metadata.
   - Emphasis on separating rendering logic from the data integrity of credentials.

7. **Multilingual Support:**

   - Debate on whether multilingual support should be embedded within the credential or handled through external overlays.

- Consensus on using governed presentation layers for multilingual support to keep credentials simple and maintainable.

8. **Action Items:**
    - Align digital product passport models with the VC data model.
    - Remove the scoring elements from the digital product passport to avoid complications and ensure clarity.
    - Write a ticket to formally propose the removal of scoring from the digital product passport (John).
9. **Other Discussions:**
    - Mention of the Australian Agriculture Traceability Protocol as a model for implementing similar initiatives.
    - Steve highlighted a new publication from the Australian Government on agricultural traceability, noting the influence of UNTP.
10. **Closing Remarks:**
    - Steve thanked participants and emphasized the importance of aligning with the VC data model.
    - Next steps include continuing work on assigned tickets and discussing progress in the next meeting.

Next Meeting:

- Participants will continue with their assigned tasks and discuss further progress in the following week.

This summary captures the main points and action items from the meeting, ensuring clarity on the next steps and ongoing discussions.

2024-04-25 Meeting Summary

Meeting Start and Introductions:

- The meeting was initiated by Speaker 1, who took over the role of Master of Ceremony due to Steve being on a flight.

- Attendance included a significant Australian contingent despite it being a public holiday in Australia.
- Steve is traveling to China to coordinate supply chain pilot projects in the battery and critical mineral manufacturing process.

Agenda and Objectives:

- Review and process of open pull requests.
- Assignment and movement of stale issues.
- Emphasis on facilitating broader collaboration within the group.
- Encouragement for discussions to be taken offline or into Slack channels unless mission-critical.

Key Points Discussed:

1. **Pull Requests:**
    - Three pull requests were reviewed.
    - Major update to the traceability event schema by Steve was discussed, aligning more closely with the GS1 EPCIS standard.
    - Gerhard suggested creating an issue to compare the current model with the existing data models used in other sectors like animal track and trace and textiles.
    - Another pull request involved adding a governance section to describe the collaboration process.
    - A minor but potentially controversial pull request to remove an "out of place header" was discussed. The group decided to create a ticket to further explore the verifiability of identifiers before merging the pull request.
2. **Issues:**
    - Several issues were discussed, including the addition of page listing referenced standards, digital product passport sample files, and UNTP extensions methodology.
    - Gerhard highlighted the importance of maintaining interoperability by having a concise data model applicable across different industries.
    - Marcus and Virginia emphasized the need for clear guidance on how extensions fit within the core data structures and the governance process for managing these extensions.

Action Items:

- Creation of issues for comparing data models and verifying identifiers.

- Assignment of tasks to specific individuals, including Zach taking on the task of providing a digital product passport sample file.
- Further discussion on trust graph validation and the relationship between extensions and the core UNTP specifications.

Closing Remarks:

- The meeting concluded with thanks to Zach for leading the session in Steve's absence.
- A reminder for continuous collaboration and the importance of adhering to the process for pull requests and issue discussions.

This summary captures the main points and action items from the meeting, providing a concise overview for those who were unable to attend.

2024-04-18 Meeting Summary

Participants:

- Speaker 1
- Nis (Master of Ceremonies)
- Phil
- Susanne
- Steve
- Zach
- Michael
- Gerhard

Key Points Discussed:

1. **Reminder on Contributions:**
    - Contributions made to the GitHub repository are contributions to United Nations Intellectual Property (UN IP).
    - External specifications like GS1 and W3C can be referred to, but unique content belongs to UN IP.
2. **Streamlining Specification Sections:**

- Discussion on the need to streamline the specification sections due to too many headings.
- Proposal to handle this later in the normal order of pull requests and issues.

3. **Pull Requests:**

   - **Pull Request 57 by Phil:**
     - Focused on identifying discoverability and the pervasiveness of scanners and software.
     - Positive feedback and agreement to build incrementally on the contributions.
   - **Pull Request 59 by Zach:**
     - Simplified goals based on previous discussions, addressing issue 53.
     - Merged with no objections.
   - **Pull Request by Steve:**
     - Added verifiable credentials section, discussing business requirements and existing technical specifications.
     - Emphasis on conservative issuance and flexible verification.
     - Merged with no objections.

4. **Issues Discussion:**

   - **Issue 9 (Verification and Trust Graphs):**
     - Proposal to use business-friendly examples and diagrams to explain trust graphs.
     - Three common patterns identified:
       a. Same identity across different credentials.
       b. Conformity credential linked to claim.
       c. Certifier accredited by a trusted third party.
     - Commitment to create a PR with these examples for further discussion.

5. **General Agreement:**

   - Need for more use cases to test the scenarios and specification.
   - Encouragement for more participants to lean in and help move forward with the tasks.
   - Importance of balancing detailed discussions with progress on issues.

Actions and Assignments:

- **Steve and Suzanne:** Collaborate on creating examples and diagrams for the trust graph patterns.
- **Phil:** To work on aligning terminologies (must, should, may) with IETF standards.
- **All participants:** Add comments on issues directly in GitHub for better tracking and follow-up.

Next Steps:

- Assign issues before discussions in the next meeting.
- Ensure more focused discussions to cover more issues efficiently.

Closing Remarks:

- Commitment to improving the pace of progress while bringing everyone along on the journey.
- Meeting adjourned with a plan to implement better structure in future meetings.

This summary captures the essence of the meeting, the key decisions made, and the next steps agreed upon. If you need any specific details from the transcript, please let me know!

2024-04-11 Meeting Summary

Attendees:

- Steve
- Patrick
- Susanna
- Virginia
- Susan
- Becky
- Nancy
- Zach
- Carolyn
- Joe
- Stephen
- Other Participants

Main Discussion Points:

1. **Introduction and Setup:**
    - Initial greetings and setting up systems.
    - Discussion on the global timing of the meeting to accommodate different time zones, primarily focusing on American and Canadian colleagues.

2. **Podcast Mention:**
    - Mention of a podcast with Darrell O'Donnell and the suggestion to share the link in the Slack channel.
3. **Meeting Formalities:**
    - Reminder that contributions are for U.N. IP and that the meeting is recorded.
    - Standard procedure involves reviewing open pull requests and discussing issues.
4. **Digital Product Passport (DPP) Development:**
    - Emphasis on the need to start looking at industry use cases.
    - Discussion on the GBA digital product battery passport and ISO standard for digital product circularity.
    - Agreement to merge changes related to the product passport data model.
5. **Use Cases and Industry Pilots:**
    - Discussion on industry-specific pilots for testing the feasibility and value of the DPP.
    - Mention of upcoming pilots in agriculture and critical raw materials.
    - Carolyn shared a slide explaining the value chain and the application of the UNTP framework.
6. **Trust and Credential Verification:**
    - Discussion on trust registries and methods for verifying the trustworthiness of credential issuers.
    - Different approaches were considered, including the use of DID (Decentralized Identifiers) and linked credentials.
    - Example of the Australian Business Register and how it could issue credentials to businesses.
7. **Verifiable Credentials and Exchange Models:**
    - Debate on the best practices for exchanging verifiable credentials, whether wallet-to-wallet or through a publish and discover model.
    - Reference to a project that involved publicly discoverable credentials and lessons that could be relevant for UNTP.
8. **Technical Infrastructure and DID Methods:**
    - Concerns about the infrastructure for DID web and potential lock-in with service providers.

    - Suggestion to develop recommendations for DID methods suitable for different use cases, such as small businesses and product identifiers.

9. **Upcoming Tasks and Assignments:**
    - Agreement to work on a prototype for linked credentials and identity verification.
    - Decision to use Slack more actively for offline discussions to expedite progress.

Action Items:

- Patrick to write a summary of lessons from the discussed project and how they might impact UNTP.
- Stephen Curran to work on a prototype for verifying linked credentials.
- Create a ticket for recommending DID methods for different use cases.
- More active use of Slack for ongoing discussions and resolving tickets.

Next Meeting:

- The next meeting will be held at a time more convenient for European participants.

Additional Notes:

- Suzanne from the World Economic Forum and the Global Battery Alliance participated for the first time.
- Stephen Curran introduced a new DID method called Trusted Web, which could be relevant for the project's needs.

This summary captures the key points and discussions from the meeting on April 10, 2024.

2024-04-04 Meeting Summary

Attendees:

- Steve (Speaker 1)
- Nisht (Speaker 2)
- SAC Representative (Speaker 8)
- Michael Shea (Speaker 9)
- Virginia (Speaker 5)
- Brett (Speaker 7)

- Gerhard (Speaker 3)
- Joe (Speaker 4)
- Ashley (Speaker 6)

Key Points Discussed:

1. **Recording and IP Contribution:**
    - **Steve** reminded everyone that contributions are voluntary, and IP is contributed to the UN.
    - A recording will be posted for those who couldn't attend.
2. **Digital Product Passport (DPP):**
    - **Steve** requested additional discussion time on DPP updates.
    - Issues with pull requests (PR) were discussed, particularly around supply chain depth clarification.
    - Agreement to merge a PR and address depth in a subsequent PR.
3. **Pull Requests and Issues:**
    - A PR from **SAC Representative** was discussed. It was agreed to merge it with follow-up clarifications.
    - Discussion on identifiers for entities and products, emphasizing the need for multiple identifiers (e.g., GLN, ABN, DID) and the ability to verify them.
    - Importance of having robust claims for product categories and items, considering changes over time.
4. **Granularity in Product Claims:**
    - **Virginia** and **Gerhard** led a detailed discussion on handling product claims at different levels (e.g., product class vs. individual items).
    - Emphasized the necessity of batch numbers and serialized identifiers for traceability and integrity.
5. **Verifiable Credentials and Technical Specifications:**
    - Debate on the approach for verifiable credentials and the need for implementation guidelines.
    - Discussion on interoperability, technical recommendations, and the balance between specificity and flexibility.
    - Agreement to draft business requirements to guide technical recommendations.

6. **Rendering Templates for Verifiable Credentials:**
    - **Ashley** presented on using rendering templates within credentials.
    - Discussion on embedding templates vs. linking to external sources, considering privacy, performance, and integrity.
7. **Next Steps and Actions:**
    - **Steve** to draft business requirements for verifiable credentials.
    - **Nis** and others to provide feedback and draft a pull request based on these requirements.
    - Further discussion on specific technical choices and their rationale.

Action Items:

- **Steve** to draft and post business requirements for verifiable credentials.
- **All relevant parties** to prepare and review pull requests related to DPP updates and verifiable credentials.
- Continue discussions on granularity of product claims and implementation guidelines.

Conclusion: The meeting focused on refining the process for handling digital product passports and verifiable credentials, ensuring robust and interoperable solutions. The importance of clear business requirements to guide technical decisions was emphasized, and specific actions were assigned to move forward with these discussions.

2024-03-28 Meeting Summary

Attendees:

- **Stephen (Speaker 1)**
- **Kevin (Speaker 13)**
- **Nancy Norris (Speaker 5)**
- **Stephen Curran (Speaker 14)**
- **Jason (Speaker 7)**
- **Phil (Speaker 2)**
- **Virginia (Speaker 3)**
- **Christophe (Speaker 12)**
- **Michael (Speaker 10)**

- **Zach (Speaker 12)**
- **John (Speaker 9)**
- **Peter (Speaker 8)**

Key Points Discussed:

1. **Meeting Timing Adjustments:**
    - Adjusted to accommodate participants from different time zones, especially from Canada and the U.S.
    - Noted appreciation for the flexibility, despite it being late for some European participants.
2. **Welcome and Introductions:**
    - Introduction of new participants from North America.
    - Brief introductions by Nancy Norris and Stephen Curran highlighting their roles and work on verifiable credentials.
3. **Recording and Standards Development:**
    - Meeting is being recorded.
    - Emphasis on the focus on standards development rather than commercial products.
    - Contributions to the meeting are considered as contributions to the United Nations Intellectual Property Library.
4. **Digital Product Passport (DPP):**
    - Discussion on the importance of focusing on the DPP due to upcoming pilots in Australia and the EU.
    - Emphasis on business attention needed for the DPP structure.
5. **Claims and Evidence:**
    - Discussion on how to handle claims at the SKU, batch, and facility levels.
    - Recognition of the need to differentiate between product-level and batch-level claims.
    - Debate on the inclusion of benchmark values and references in the claims.
        - Some participants argued for the inclusion to provide context and comparability.
        - Others suggested it could be out of scope and should be handled by third-party verifiers.
6. **Granularity of Claims and Evidence:**

- Addressed the challenge of reconciling claims at the shipment level with evidence at the facility level.
- Discussed the potential for greenwashing if facility-level evidence is used to support product-level claims without proper verification.

7. **Product vs. Batch Passports:**
   - Consideration of whether to maintain separate passports for products and batches.
   - Discussed the possibility of inheriting claims from product to batch levels.
   - Agreed on the need for optional structures to support different use cases.
8. **Vocabulary and Ontology:**
   - Suggested a need for rigorous definition and management of the taxonomy and ontology of claims.
   - Potential overlap between the data model and the vocabulary of sustainability claims.
9. **Next Steps:**
   - Stephen to update the ticket with the consensus from the discussion.
   - Further review and testing of the data model with real use cases to ensure its implementability.

Action Items:

- Stephen to update the data model and ticket based on the discussion.
- Participants to review the updated model and provide feedback.
- Plan to test the model with sample certificates and real-world scenarios.

Closing:

- Meeting concluded with a reminder to stick to time limits for the benefit of all participants.

Please let me know if there are any specific details or additional information you would like to include in the summary.

2024-03-15 Meeting Summary

Participants:

- Steve
- Phil
- Nis
- Other unnamed speakers

Key Points Discussed:

1. **Policy Document Submission:**
    - The policy document was successfully submitted to the Secretariat and forwarded to the Bureau.
    - Approval from Bureau members is in progress, with public release anticipated soon.
2. **Meeting Frequency:**
    - Discussion on whether to hold meetings weekly or fortnightly.
    - Consensus leaned towards weekly half-hour meetings to ensure consistent progress and accountability.
3. **Tech Specifications and PRs:**
    - Focus to shift to tech specifications following the policy document submission.
    - Nis discussed several pull requests (PRs) for practice and refinement.
    - Agreed on a structured approach to reviewing and merging PRs.
4. **GS1 Standards and UNTP:**
    - Debate on the inclusion of GS1 standards and the relationship with UNTP.
    - Decision to potentially host information on GS1's own page and link it from the UNTP site.
5. **Editing and Contributing via GitHub:**
    - Demonstration on how to edit pages, create issues, and make pull requests on GitHub.
    - Emphasis on using the "Edit this page" feature for ease of contribution.
6. **Action Items:**
    - Participants to self-assign tickets on GitHub and contribute to issues and pull requests.
    - Continuous monitoring and support via Slack for any technical issues.
7. **Miscellaneous:**

- Acknowledgment of contributions to the policy document.
- Future meetings to follow a structured process focusing on PRs and issues.

Next Steps:

- Weekly meetings to continue with a focus on technical specifications.
- Participants to actively engage in GitHub for issue tracking and pull requests.
- Continued collaboration and support to ensure progress on project goals.

2024-02-29 Meeting Summary

Date: February 29, 2024

Participants:

- Speaker 1 (Steve)
- Speaker 2 (Virginia)
- Speaker 3 (Christophe)
- Speaker 4 (Nes)
- Speaker 5 (Brett)
- Speaker 6 (Jerry)
- Speaker 7 (Rakesh)
- Speaker 8 (Peter)
- Speaker 9 (Unnamed participants)

Key Points Discussed:

1. **Introduction and Updates:**
    - Steve (Speaker 1) is still in Europe and provided an update on his encounters in Europe, including attending the GS1 Global Forum and OECD Textile and Leather Due Diligence Forum. He emphasized the alignment of GS1's initiatives with the group's goals and the opportunities for collaboration.
2. **European Meetings:**

- GS1 Global Forum: Discussed their customers' challenges and the potential for cooperation in the use of resolvable identifiers and digital product passports.
- OECD Forum: Major brands like Adidas are struggling with due diligence requirements and need a standard to push through their supply chain.
- Surpass Program: EU's initiative for pilot projects in various sectors, which is seen as complementary to UNDP.
- DG Grow: European Commission's interest in complementary end-to-end pilots.

3. **Feedback on Europe Meetings:**
   - The feedback received from meetings in Europe was generally positive, indicating a good alignment with the group's objectives and a strong appetite for collaboration on digital product passports and related initiatives.
4. **Discussion on UNDP and EU DPP:**
   - Virginia highlighted the need to base the cross-border environmental passport on UNDP and mentioned that UNEP is interested in cooperating but prefers to base their work on UNDP.
5. **Recommendations Structure:**
   - The group discussed the structure of the recommendations in their document, deciding on having recommendations after the challenges section, aligning with standard UN document structures.
   - Emphasized the importance of making digital product passports resolvable and verifiable and the role of identifier schemes.
6. **Challenges Section:**
   - Agreement to shorten the challenges section to make the document more readable and concise, aiming for about two pages.
7. **Next Steps:**
   - Steve will rework Section 1 based on the feedback, shorten the challenges, and send out the updated version by Monday for final review before submission to the Secretariat by the end of the week.

Action Items:

- Steve to revise Section 1 and shorten the challenges section.

- Send the revised document to the team by Monday.
- Team to review and provide feedback before the next meeting on Thursday.
- Finalize the document for submission by Friday.

Meeting Adjourned:

- Meeting concluded with a plan to reconvene on Thursday for final review.

This summary captures the key points and actions from the meeting, ensuring that all participants are aligned on the next steps and responsibilities.

2024-02-15 Meeting Summary

Participants:

- Speaker 1 (Chair)
- Speaker 2 (Virginia)
- Speaker 3 (Gerhard)
- Speaker 4 (Rakesh)
- Speaker 5 (Stefano)
- Speaker 6
- Speaker 7 (Joe)
- Speaker 8
- Speaker 9
- Speaker 10

Agenda:

1. Review and focus on the policy document draft.
2. Discuss feedback and make necessary adjustments.
3. Prepare for final iteration of sections before the public review.

Key Points Discussed:

1. **Policy Document Review:**
    - The meeting primarily focused on the policy document draft instead of GitHub issues.

- The urgency to finalize REC 49 for the UN plenary in July was emphasized. The document needs to complete a two-month public review starting early March.

2. **Feedback and Structural Changes:**

   - Feedback from UN Secretariat suggested separating recommendations to member states (Section 1) from those to industry actors (Section 2).
   - Virginia's recent edits include:
     - An introduction explaining the purpose of Recommendation 49.
     - A section detailing the UNTP and its challenges in a table format.
     - Clarification on roles and opportunities in Section 2.

3. **Content Adjustments:**

   - Speaker 2 pointed out the need for an explanatory section on UNTP.
   - Speaker 1 shared insights from discussions with WTO member state delegates, highlighting the importance of simplifying the document's language and message.
   - Stakeholder mapping and visual aids were suggested to clarify the focus on different audiences.

4. **Technical and Terminological Clarifications:**

   - Debate on the term "protocol" concluded with keeping the term but clarifying its meaning in the context of the document.
   - Replace "ESG" with "sustainability" to avoid political connotations and ensure clarity.

5. **Strategic Alignment:**

   - Rakesh emphasized aligning the document with existing multilateral frameworks (G20, OECD) and strategic objectives of countries.
   - Highlighting benefits such as harmonization and reduction of industry burden to appeal to policymakers.

6. **Final Edits and Testing:**

   - The need for another draft incorporating feedback was agreed upon.
   - Testing the revised document on external policymakers for readability and impact before the final iteration.

Action Items:

- **Virginia** to integrate feedback and refine the document.
- **Rakesh** to draft paragraphs on aligning with global initiatives and specifying relevant government departments.
- **Joe and Gerhard** to provide additional input on technical simplifications and stakeholder visual aids.
- **Speaker 1** to circulate an updated draft by Monday for final review and feedback.

Closing Remarks:

- Appreciation for the hard work and contributions from all team members.
- Next steps include refining the document based on today's discussions and preparing for final testing with policymakers.

Next Meeting:

- Date to be determined, expected early next week to review the updated document.

2024-01-18 Meeting Summary

2024-01-11 Meeting Summary

Pledge

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Sustainability Pledge

FAQ

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Frequently Asked Questions

Specification

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The specification is the heart of UNTP. It defines the detailed specifications for interoperable implementations. This page provides an outline of the purpose and scope of each component of the specification.

Architecture

The architecture is the blueprint for all the components of the specification and how they work together. It defines the **design principles** which underpin the UNTP and shows the components working together from the perspective of a **single actor** and across the **entire value-chain**. The UNTP is a fundamentally **decentralised architecture** with no central store of data.

Digital Product Passport

The digital product passport (DPP) is issued by the shipper of goods and is the carrier of **product and sustainability information** for every serialised product item (or product batch) that is shipped between actors in the value chain. It is deliberately **simple and lightweight** and is designed to carry the minimum necessary data at the **granularity** needed by the receiver of goods - such as the scope 3 emissions in a product shipment. The passport contains links to **conformity credentials** which add trust to the ESG claims in the passport. The passport also contains links to **traceability events** which provide the "glue" to follow the linked-data trail (subject to confidentiality constraints) from finished product back to raw materials. The UNTP DPP does not conflict with national regulations such as the EU DPP. In fact, it can usefully be conceptualised as the **upstream B2B feedstock** that provides the data and evidence needed for the issuing of high quality national level product passports.

Conformity Credential

Conformity credentials are usually issued by independent third parties and provide a **trusted assessment** of product ESG performance against credible **standards or regulations**. As such the credential provides trusted verification of the ESG claims in the passport. Since the passport may make several independent claims (eg emissions intensity, deforestation free, fair work, etc) there may be many linked conformity credentials referenced by one passport. As an additional trust layer, the conformity credential may reference an **accreditation** credential that attests to the authority of the third party to perform the specific ESG assessments. The conformity credential data model has been developed by a separate UN/CEFACT project on digital conformity that has expert membership from accreditation authorities and conformity assessment bodies.

Traceability Events

Traceability events are very lightweights collections of identifiers that specify the “what, when, where, why and how” of the products and facilities that constitute a value chain. The UNTP is based on the GS1 EPCIS standard for this purpose because it is an existing and proven mechanism for supply chain traceability. Note that UNTP supports but does not require the use of GS1 identifiers. The basic idea behind the traceability event structure is that any supply chain of any complexity can always be accurately modelled using a combination of four basic event types. An **object** event describes an action on specific product(s) such as an inspection. A **transaction** event describes the exchange of product(s) between two actors such as sale of goods between seller and buyer. An **aggregation** event describes that consolidation or de-consolidation of products such as stacking bales of cotton on a pallet for transportation. Finally, a **transformation** event describes a manufacturing process that consumes input product(s) to create new output product(s). The UNTP uses these events in a decentralised architecture as the means to traverse the linked-data "graph" that represents the entire value-chain.

Identifiers

Identifiers of **businesses** (eg tax registration numbers), of **locations** (eg google pins, cadastral/lot numbers, GS1 GLNs), and of **products** (eg GS1 GTINs or other schemes) are ubiquitous throughout supply chains and underpin the integrity of the system. UNTP builds upon existing identifier schemes without precluding the use of new schemes so that existing investments and high integrity registers can be leveraged. UNTP requires four key features of the identifiers and, for those that don't already embody these features, provides a framework to uplift the identifier scheme to meet UNTP requirements. Identifiers used in UNTP implementations should be **discoverable** (ie easily read by scanning a barcode, QR code, or RFID), **globally unique** (ie by adding a domain prefix to local schemes), **resolvable** (ie given an identifier, there is a standard way to find more data about the

identified thing), and **verifiable** (ie ownership of the identifier can be verified so that actors cannot make claims about identifiers they don't own).

Vocabularies

Web **vocabularies** are a means to bring consistent understanding of **meaning** to ESG claims and assessments throughout transparent value chains based on UNTP. There are hundreds of ESG standards and regulations around the world, each with dozens or hundreds of specific conformity **criteria**. Any given value chain from raw materials to finished product is likely to include dozens of passports and conformity credentials issued against any of thousands of ESG criteria. Without a consistent means to make sense of this data, UNTP would provide a means to discover a lot of data but no easy way to make sense of it. The UNTP defines a standard and extensible topic map (taxonomy) of ESG criteria and provides a mechanism for any standards authority, or national regulator, or industry association to map their specific terminology to the UNTP vocabulary.

Verifiable Credentials

The World-Wide-Web Consortium (W3C) has defined a standard called Verifiable Credentials (VCs). A VC is a portable digital version of everyday credentials like education certificates, permits, licenses, registrations, and so on. VCs are digitally signed by the issuing party and are tamper proof, privacy preserving, revokable, and digitally verifiable. The UN has previously assessed this standard and has recommended it's use for a variety of cross border trade use cases in a recent white paper. VCs are inherently decentralised and so are an excellent fit for UNTP which recommends that passports, credentials, and traceability events are all issued as W3C VCs. A related W3C standard called Decentralised Identifiers (DIDs) provides a mechanism to manage the cryptographic keys used by verifiable credentials and also to link multiple credentials into verifiable trust graphs. DIDs are not the same as the business / product / location identifiers maintained by authoritative agencies - but can be linked to them.

Data Carriers

Digital data needs to be linked to the physical product it describes and should be discoverable through the identifiers printed on that product serial or batch number. For high volume goods and easy / reliable discovery, these identifiers are already typically represented as barcodes, matrix codes, QR codes, or RFID encoded data. UNTP supports the use of these existing data carriers. A basic UNTP principle is that if you have a product then you should be able to find ESG data about that product

even when the identifier is not a web link. Therefore, the UNTP defines a generalised protocol (based on GS1 Digital Link) to allow any identifier scheme (GS1 or otherwise) to be consistently resolvable so that product passports and other data can always be accessed from the identifier of the product. The UNTP also defines a specific QR based data carrier format for use on paper/PDF versions of conformity credentials or other trade documents that provides secure access to credentials in a way that is both human and machine readable. This provides a simple but powerful mechanism to facilitate uptake of digital solutions alongside existing paper/PDF based frameworks.

Architecture

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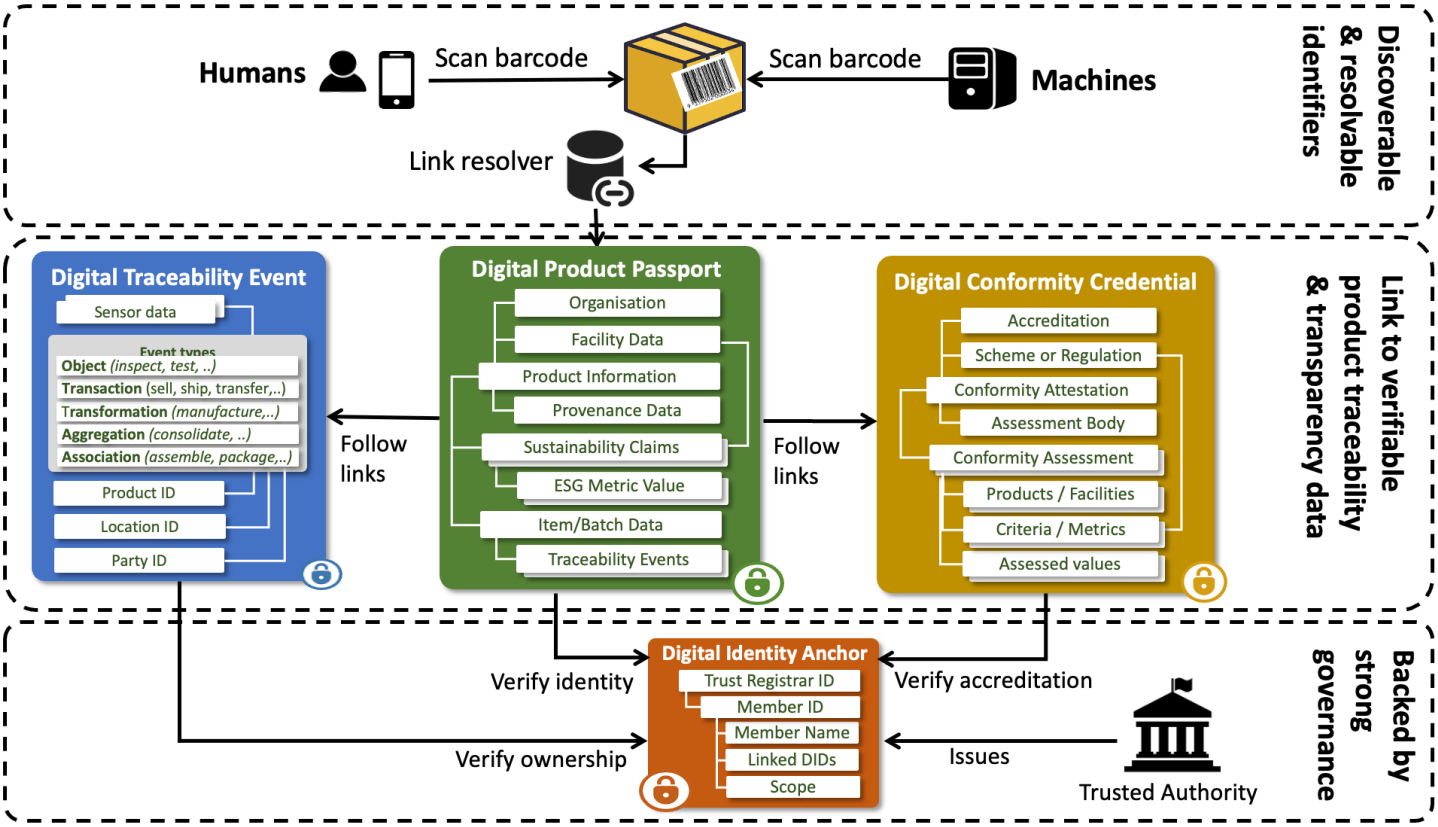
Overview

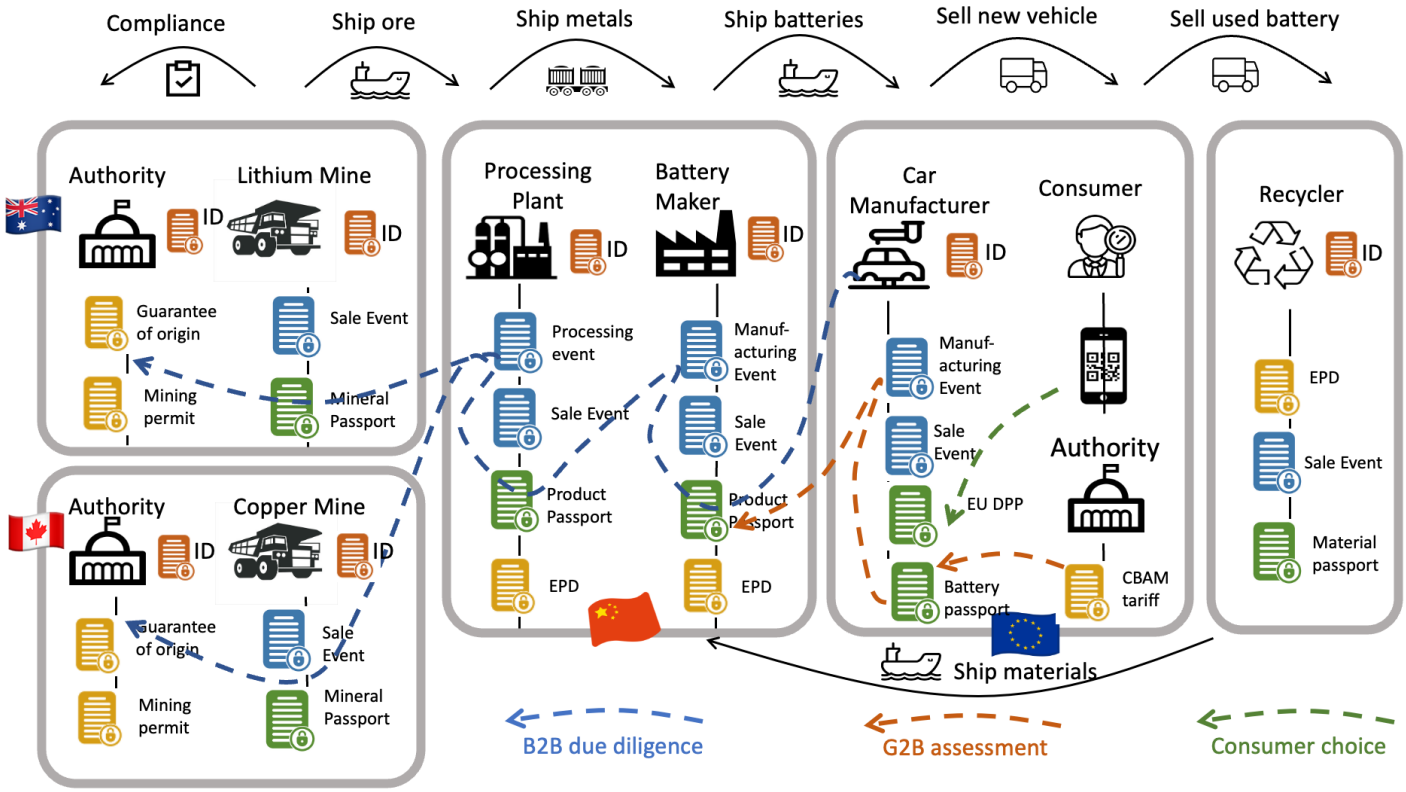
The architecture is the blueprint for all the components of the specification and how they work together. It defines the **design principles** which underpin the UNTP and shows the components working together from the perspective of a **single actor** and across the **entire value-chain**. The UNTP is a fundamentally **decentralised architecture** with no central store of data.

Principles

Each Actor



Entire Value Chain



Digitial Product Passport

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Versions

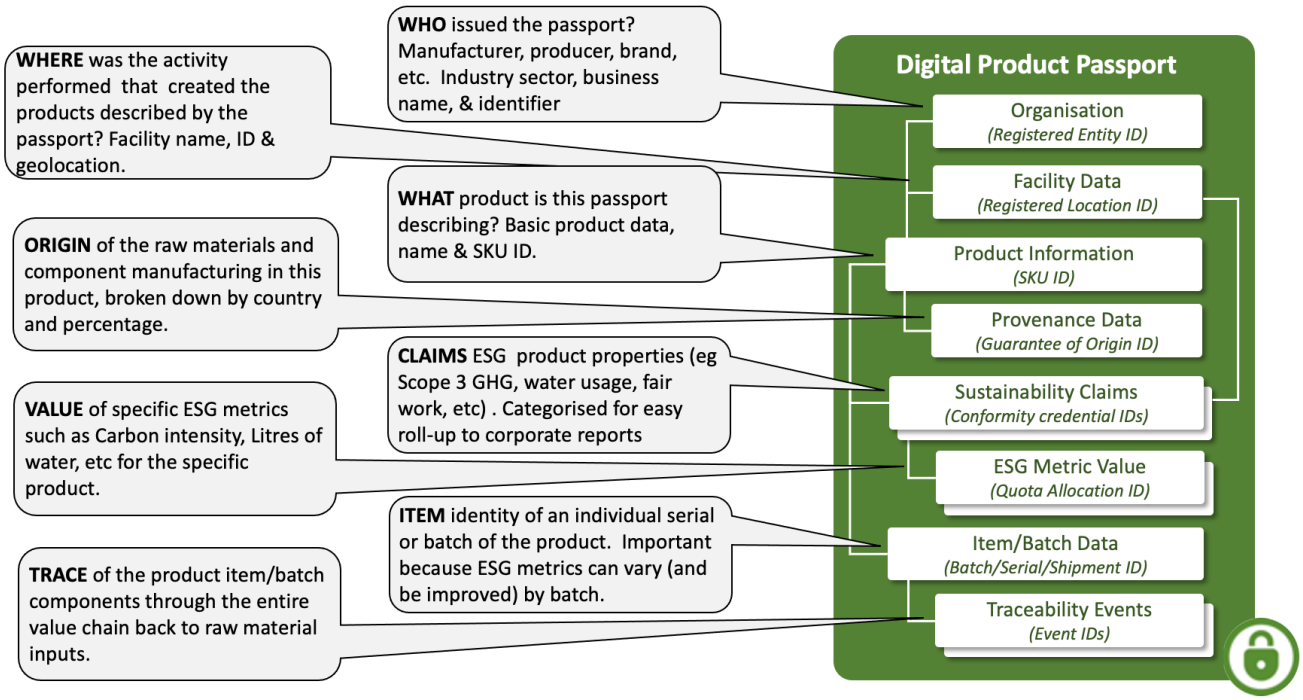
DPP Version	Date	status	JSON-LD Context	JSON Schema
0.3.0	25-03-2024	Raw (not for implementation)	DPP context	DPP schema
0.4.0	08-04-2024	Raw (for review)	DPP context	DPP schema

The current version of this specification is v0.4.0

Overview

The digital product passport (DPP) is issued by the shipper of goods and is the carrier of **product and sustainability information** for every serialised product item (or product batch) that is shipped between actors in the value chain. It is deliberately **simple and lightweight** and is designed to carry the minimum necessary data at the **granularity** needed by the receiver of goods - such as the scope 3 emissions in a product shipment. The passport contains links to **conformity credentials** which add trust to the ESG claims in the passport. The passport also contains links to **traceability events** which provide the "glue" to follow the linked-data trail (subject to confidentiality constraints) from finished product back to raw materials. The UNTP DPP does not conflict with national regulations such as the EU DPP. In fact, it can usefully be conceptualised as the **upstream B2B feedstock** that provides the data and evidence needed for the issuing of high quality national level product passports.

Conceptual Model



Requirements

The digital product passport is designed to meet the following detailed requirements as well as the more general [UNTP Requirements(https://uncefact.github.io/spec-untp/docs/about/Requirements)]

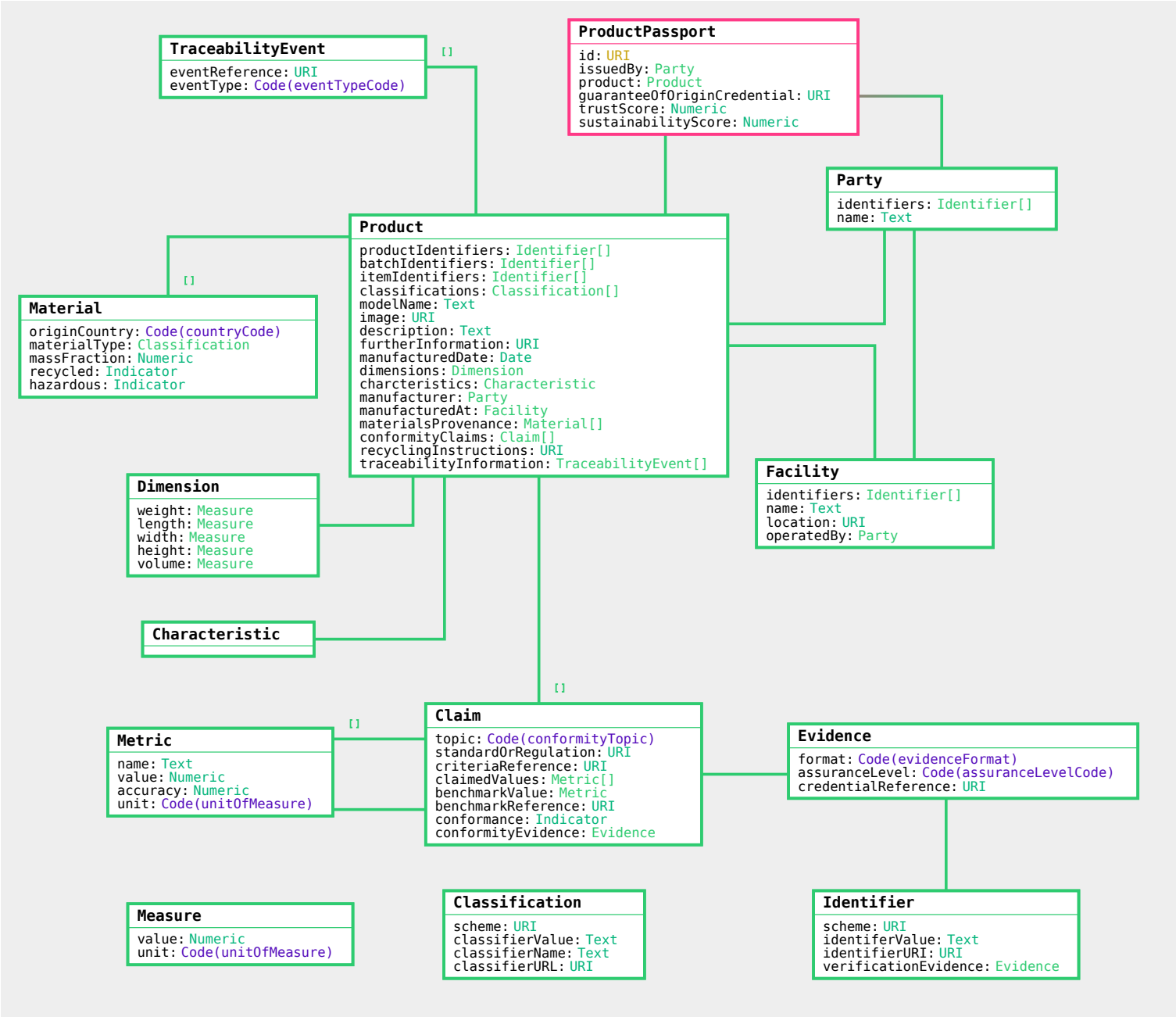
ID	Name	Requirement Statement	Solution Mapping
DPP-01	product, batch, item	The DPP should support use at either product level or at batch level or at individual serialised item level.	Claims are made at the passport level, which MUST have a related product and MAY have a related batch and item
DPP-02	Classification	The DPP should support any number of product classifications using codes from a defined classificaton scheme (eg UN-CPC)	The classifications property

ID	Name	Requirement Statement	Solution Mapping
DPP-03	Materials provenance	The DPP should provide a simple structure to allow issuers to breakdown the material composition of their products by mass fraction and origin country so that raw material provenance requirements are easily assessed and met.	The DPP "materialsProvenance" structure is designed to meet this need.
DPP-04	Manufactured at	The DPP should provide a simple structure to describe the manufacturing facility at which the product was made. The facility identifier SHOULD be resolvable and verifiable and SHOULD link to cadastral boundary information.	The "Facility" structure incliding the locationEvidence credential property is designed to meet this need
DPP-05	Dimensions	The DPP must support the definision of key product dimensions such as length, width, height, weight, volume so that conformity claims made at the unit level (eg Co2 intensity in Kg/Kg) can be used to calculate actual values for the shipped product	Dimensions class
DPP-06	Traceability	The DPP should provide a means to follow links to further DPPs and conformity credentials of constituent products so that (subject to confidentiality constraints), prevenance claims can be verified to any arbitrary depth upt o primary production	The links to EPCIS traceability event credentials from the productBatch class is designed to meet this need
DPP-07	characteristics	The DPP should allow issuer to provide descriptive information about the product (image, description, etc) that is extensible to meet industry specific needs.	Characteristics property as an industry extnesion point

ID	Name	Requirement Statement	Solution Mapping
DPP-08	Verifiable Party	The DPP should provide DPP issuer, product manufacturer, and facility operator identification inclding a name, a resolvable and verifiable identifier, and proof of ownership of the identifier	The Party structure inclding the "verification Evidence" property of the identifier class link meets this need
DPP-09	Claims	The DPP MUST provide a means to include any number of conformity claims within one DPP so that it can provide simple single point to aggregate all claims about the product in one place	The "conformityClaims" array is designed to meet this need
DPP-10	Conformity Topic	The DPP MUST provide a simple mechanism to express the sustainability/circularity/conformity topic for each claim so that similar claims can be grouped and the high level scope easily understood.	The ConformityTopic code list is designed to meet this need
DPP-11	Metrics	The DPP MUST provide a simple mechanism to quantify a conformity claims (eg carbin intensity, water consumption, etc) and to express any accuracy range and also to compare the claimed value to a relevant benchmark such as a standard/regulation requirement or an industry average	The "Metric" class is designed to meet this need
DPP-12	Criteria	The DPP MUST provide a means to reference a standard or regulation as well as the specific criteria within that standard or regulation - so that claims can be understood inter terms of the criteria against which they are made.	The standardorRegulation property points to the standard document and the "criteria" property points to the specific rule or clause within that standard or regulation.

ID	Name	Requirement Statement	Solution Mapping
DPP-13	Evidence	The DPP MUST provide a means to reference independent conformity assessments that support and verify the claims being made. The related evidence SHOULD be digitally verifiable but MAY be a simple document or web page. The confidenc elevel attached ot the evidence should be clear.	The "Evidence" class is designed to meet this need, together with the evidence type and assirance lvel code lists.

Logical Model



Data Definitions

ProductPassport

> The ProductPassport is a comprehensive data structure that encapsulates various details pertaining to a product, including its identification details, who issued it, batch information, and different scores relating to sustainability and trustworthiness.

Property	Definition	Type
id	A unique identifier (URI) assigned to the product passport.	URI
issuedBy	The Party that issued the product passport.	Party
product	Detailed information about the product encapsulated in a ProductInformation object.	Product
guaranteeOfOriginCredential	A conformity credential issued by a trusted authority that confirms some or all of the claims made in this product passport	URI
trustScore	An aggregate numeric metric that represents the level of trustworthiness associated with the product. This score is derived based on the credibility and reliability of the issuing bodies that substantiate the claims being made about the product. The calculation rules are defined in the UNTP trust graph specification.	Numeric
sustainabilityScore	An aggregate numeric metric calculated based on the various sustainability claims vs benchmarks associated with the product. It amalgamates scores assigned to individual sustainability claims, which are validated by various issuing bodies. The score provides a comprehensive view of the product's overall sustainability performance, giving users a quantifiable measure of the product's environmental and social impacts.	Numeric

Party

> The Party class represents an entity such as an organization, or a company that manufactured the product.

Property	Definition	Type
identifiers	A unique identifier (URI) assigned to the organization or company. (Link Resolver - GS1 company prefix?)	Identifier
name	The name of the organization or company, represented as a text string.	Text

Facility

> The Facility class embodies information about a specific facility, which manufactured the product.

Property	Definition	Type
identifiers	A unique identifier (URI) assigned to the facility. (Link Resolver - GS1 GLN?)	Identifier
name	The name of the facility, represented as a text string.	Text
location		URI
operatedBy	The Party entity responsible for operating the facility.	Party

Product

> The ProductInformation class encapsulates detailed information regarding a specific product, including its identification details, manufacturer, and other pertinent details.

Property	Definition	Type
productIdentifiers	An array of unique identifiers assigned to the product or model.	Identifier
batchIdentifiers	Information regarding the specific production batch of the product.	Identifier
itemIdentifiers	An array of identifiers representing a specific	Identifier

Property	Definition	Type
	serialised item of the product.	
classifications	A code representing the product's class, typically using the UN CPC (United Nations Central Product Classification) https://unstats.un.org/unsd/classifications/Econ/cpc	Classification
modelName	The model name or number of the product, represented as text.	Text
image	A unique identifier (URI) pointing to an image of the product.	URI
description	A textual description providing details about the product.	Text
furtherInformation	A URL pointing to further human readable information about the product.	URI
manufacturedDate	The ISO 8601 date on which the product batch was manufactured.	Date
dimensions	The physical dimensions of the product. Not every dimension is relevant to every products. For example bulk materials may have wieght and volume but not length, with, or height.	Dimension
charcteristics		Characteristic
manufacturer	The Party entity that manufactured the product.	Party
manufacturedAt	The Facility where the product batch was manufactured.	Facility
materialsProvenance	An array of Provenance objects providing details on the origin and mass fraction of components or	Material

Property	Definition	Type
	ingredients of the product batch.	
conformityClaims	An array of claim objects representing various product conformity claims about the product / batch. These can be sustainability claims, circularity claims, or any other claim type within the conformity topic list.	Claim
recyclingInstructions	A URI pointing to information regarding the recycling aspects of the product.	URI
traceabilityInformation	An array of TraceabilityEvent objects detailing EPCIS events related to the traceability of the product batch.	TraceabilityEvent

Claim

> The SustainabilityClaim class represents specific claims regarding the sustainability of a product, providing details about the metrics, thresholds, and evidences supporting the claim.

Property	Definition	Type
topic	A code representing the topic of the sustainability claim. E.g. environment.deforestation, environment.ghg-emission-intensity, etc.. Drawn from a standard code list.	Code (conformityTopic)
standardOrRegulation	The standard or regulation against which this conformity claim is made. Expressed as a URI and should match a value in the UN catalogue of reference vocabularies.	URI
criteriaReference	A URI pointing to the specific criteria within the standard or regulation against which this claim is made.	URI

Property	Definition	Type
claimedValues	One or more actual measures supporting the claim. For example for GHG emissions there may be a metric for total emissions intensity and also a metric for amount of offsets included.	Metric
benchmarkValue	A benchmark value against which the claimed value can be assessed. THis could be a value specified by a standard or regulation or could be an industry benchmark.	Metric
benchmarkReference	A refernce to evidence to support the benchmark value.	URI
conformance	and indicator (boolean) that expresses whether or not this product has achieved compliance against the criteria. for example, if the topic is environment.deforstation and the criteria is EU.2023.1115 then the product is conformant if it has not touched any facility throughout it's lifecycle that is not deforestation free since dec 2020.	Indicator
conformityEvidence	A URI pointing to the evidence supporting the claim. Most likely in the form of a verifiable credential.	Evidence

Metric

> A specific measure of performance against the criteria that governs the claim. Expressed as an array of metric (ie unit of emasure) / value (ie the actual numeric value) pairs.

Property	Definition	Type
name	A human readable name for this metric	Text

Property	Definition	Type
value	A numeric value representing the measurement or evaluation outcome for the claim.	Numeric
accuracy	A percentage represented as a numeric between 0 and 1 indicating the rage of accuracy of the claimed value (eg 0.05 means that the actual value is within 5% of the claimed value.)	Numeric
unit	The unit of measure. for example, emissions intensity in Kg Co2e per kWh produced. Or Kg Co2e per Kg of livestock gross weight.	Code (unitOfMeasure)

TraceabilityEvent

> The TraceabilityEvent class represents a specific EPCIS event in the traceability chain of a product, including details about the event type and reference.

Property	Definition	Type
eventReference	A URI pointing to the detailed information about the EPCIS event. Most likely in the form of a verifiable credential.	URI
eventType	A code representing the type of EPCIS event. ObjectEvent, AggregationEvent, TransactionEvent, TransformationEvent, ObjectEvent.	Code (eventTypeCode)

Material

> The material class encapsulates details about the origin or source of raw materials in a product, including the country of origin and the mass fraction.

Property	Definition	Type
originCountry	A ISO 3166-1 code representing the country of origin of the component or ingredient.	Code (countryCode)

Property	Definition	Type
materialType	The type of this material - as a value drawn from a controlled vocabulary eg textileexchange.org/materials/rm01014 - representing organic cotton.	Classification
massFraction	A numeric value representing the mass fraction of the product represented by this material. The sum of all mass fraction values for a given passport should be 100.	Numeric
recycled	Indicator is true if this material input is from a recycled source.	Indicator
hazardous	Indicates whether this material is hazardous. If true then	Indicator

Evidence

> Evidence to support a conformity or identity claim.

Property	Definition	Type
format	Format of the evidence (verifiable credential, document, website, etc)	Code (evidenceFormat)
assuranceLevel	The assurance level of the evidence (self declaration, 2nd party, 3rd party, accredited auditor)	Code (assuranceLevelCode)
credentialReference	The URL of the evidence credential. Should be a hashlink to avoid post-issue tampering.	URI

Dimension

> Overall (length, width, height) dimensions and weight/volume of an item.

Property	Definition	Type
weight	the weight of the product	Measure
length	The length of the product or packaging	Measure
width	The width of the product or packaging	Measure
height	The height of the product or packaging	Measure
volume	The displacement volume of the product.	Measure

Classification

> A classification scheme and code / name representing a category value for a product, entity, or facility.

Property	Definition	Type
scheme	Classification scheme - eg https://unstats.un.org/unsd/classifications/Econ/cpc	URI
classifierValue	classifier value within the scheme - eg "01211" in UN CPC	Text
classifierName	Name of the classifier - eg "Asparagus" for code "01211" in UNCPC	Text
classifierURL	Linked data URL to a web vocabulary entery for this classificaiton code. When this property is provided, the scheme, value, and name properties of the classifer are not required. eg https://vocabulary.uncefact.org/unlocode?country=au#AUBNE represensign the port of Brisbane in the UN/LOCODE classification scheme.	URI

Identifier

> An identifier of a party, product, or facility that is defined by an identifier scheme and idenfier value and, optinally, verification evidence

Property	Definition	Type
scheme	the identifier scheme as defined by the registrar that manages the identifier registry. If the identifier scheme is registered with UNTP then this URI can use used to dicsover the resolution method (to get more data) and the verification method (to prove ownership).	URI
identiferValue	The value of the identifier within the scheme	Text
identifierURI	The fully qualified URI representing the globally unique record for this identifier.	URI
verificationEvidence	Link to evidence that attests to the validity and ownership of the identifer.	Evidence

Measure

> The measure class defines a numeric measured value (eg 10) and a coded unit of measure (eg KG).

Property	Definition	Type
value	The numeric value of the measure	Numeric
unit	Unit of measure drawn from the UNECE rec20 measure code list.	Code (unitOfMeasure)

Characteristic

> Product specific characteristics. This class is an extension point for industry specific product characteristics or performance information such as clothing size or battery capacity.

Code Tables

conformityTopic

Name	Description
environment.energy	claims supporting clean energy transition
environment.emissions	claims supporting GHG emissions reduction
environment.water	claims supporting minimising water usage impact
environment.waste	claims supporting waste processing and reduction
environment.deforestation	claims supporting native forest restoration
environment.biodiversity	claims supporting improved biodiversity outcomes
circularity.content	claims supporting the use of recycled content in products
circularity.design	claims supporting product design for circularity outcomes
social.labour	claims supporting labour rights including fair wages
social.rights	claims supporting human rights and anti-discrimination
social.community	claims supporting local community development
social.safety	claims supporting process and product safety
governance.ethics	claims supporting ethical conduct and corporate governance
governance.compliance	claims supporting regulatory compliance including taxation and community protection
governance.transparency	claims supporting transparency and traceability

unitOfMeasure

```
Code values for this table can be found here:
https://vocabulary.uncefact.org/UnitMeasureCode
```

eventTypeCode

Name	Description
aggregation	event describing the grouping of products such as placing bales of cotton on a pallet
transformation	event describing the consumption of input products to create output products in a manufacturing process such as spinning thread from cotton bales.
object	event describing an action on a single product such as an inspection or test
transaction	event describing commercial transactions such as the sale of a collection of products from seller to buyer
association	event describing the creation of relationships between products such as a bill of material of components in an assembly

countryCode

```
Code values for this table can be found here:
https://vocabulary.uncefact.org/CountryId
```

evidenceFormat

Name	Description
w3c_vc	A W3C Verifiable Credential
iso_mdl	an ISO 108013 identity credential
document	a binary document for human consumption such as a PDF

Name	Description
website	a reference to an entry on a public website.
other	some other representation

assuranceLevelCode

Name	Description
Self	self-assessment
Commercial	conformity assessment by related body or under commercial contract
Buyer	conformity assessment by potential purchaser
Membership	conformity assessment by industry representative body or membership body
Unspecified	conformity assessment by party with unspecified relationship
3rdParty	3rd party (independent) conformity assessment

Sample

Note - this sample describes the digital product passport payload only - ie the subject of the verifiable credetial without the envelope. Needs some more realistic data.


```
{
  "@context": [
    "https://www.w3.org/ns/credentials/v2",
    "https://uncefact.org/untp/v1"
  ],
  "type": [
    "VerifiableCredential",
    "UNTPDigitalProductPassportCredential"
  ],
  "id": "urn:untp:e5adbeg6-2n1s-4669-bd54-321d903re998",
  "issuer": {
```

```
    "type": "Organization",
    "id": "did:web:zerowave.example.com",
    "name": "Zero Wave Riding Co.",
    "url": "https://zerowave.example.com"
  },
  "validFrom": "2023-06-22T10:00:00.000Z",
  "credentialSubject": {
    "type": "UNTPDigitalProductPassport",
    "product": {
      "type": "Product",
      "id": "https://shop.zerowave.example.com/cruizer",
      "batchIdentifiers": [
        "http://zerowave.example.com/01/09520123456788/10/ABC123"
      ],
      "itemIdentifiers": [
        "http://zerowave.example.com/01/09520123456788/21/12345",
        "http://zerowave.example.com/01/09520123456788/21/12346"
      ],
      "modelName": "Cruizer",
      "image": "https://shop.zerowave.example.com/media/cruizer.jpg",
      "description": "12kW, 3.6 kWh self-propulsion surfboard",
      "classifications": "eSurf",
      "furtherInformation": "https://shop.zerowave.example.com/cruizer",
      "manufacturedDate": "2024-05-08",
      "dimensions": {
        "type": "Dimensions",
        "weight": {
          "value": 15.90,
          "unit": "kg"
        },
        "length": {
          "value": 169,
          "unit": "cm"
        },
        "width": {
          "value": 65.5,
          "unit": "cm"
        }
      },
      "manufacturer": {
        "type": "Organization",
        "id": "did:web:hitech-assembly.example.com",
        "name": "Hitech Assembly, Inc.",
        "location": "Manufacturered in the EU"
      },
      "materialsProvenance": [
        {
          "type": "MaterialProvenance",
```

```
          "originCountry": "EU",
          "materialType": "EPP",
          "massFraction": 0.6,
          "recycled": true,
          "hazardous": false
        }
      ],
      "conformityClaims": [
        {
          "type": "LinkRole",
          "target": "https://supplier.example.com/material/reuse-certificate",
          "linkRelationship": "untpConformity"
        },
        {
          "type": "LinkRole",
          "target": "https://supplier.example.com/manufacturing/carbon-emissions-
certificate",
          "linkRelationship": "untpConformity"
        }
      ],
      "recyclingInstructions": "http://brand-owner.example.com/nordic-
pioneer/recycling",
      "traceabilityInformation": [
        {
          "type": "UNTPAggregationEvent",
          "id": "http://manufacturer.example.com/293847293847"
        }
      ]
    },
    "guaranteeOfOriginCredential":
"https://supplier.example.com/manufacturing/certificate-of-origin"
  }
}
```


Examples from pilot projects

Project	DPP Version	Description	Credential	Rendered View
AATP	0.1.0	Packaged Meat DPP	sample DPP VC	DPP VC Viewer

Conformity Credential

> **INFO**
>
> Please note that this content is under development and is not ready for implementation. This status message will be updated as content development progresses.

Versions

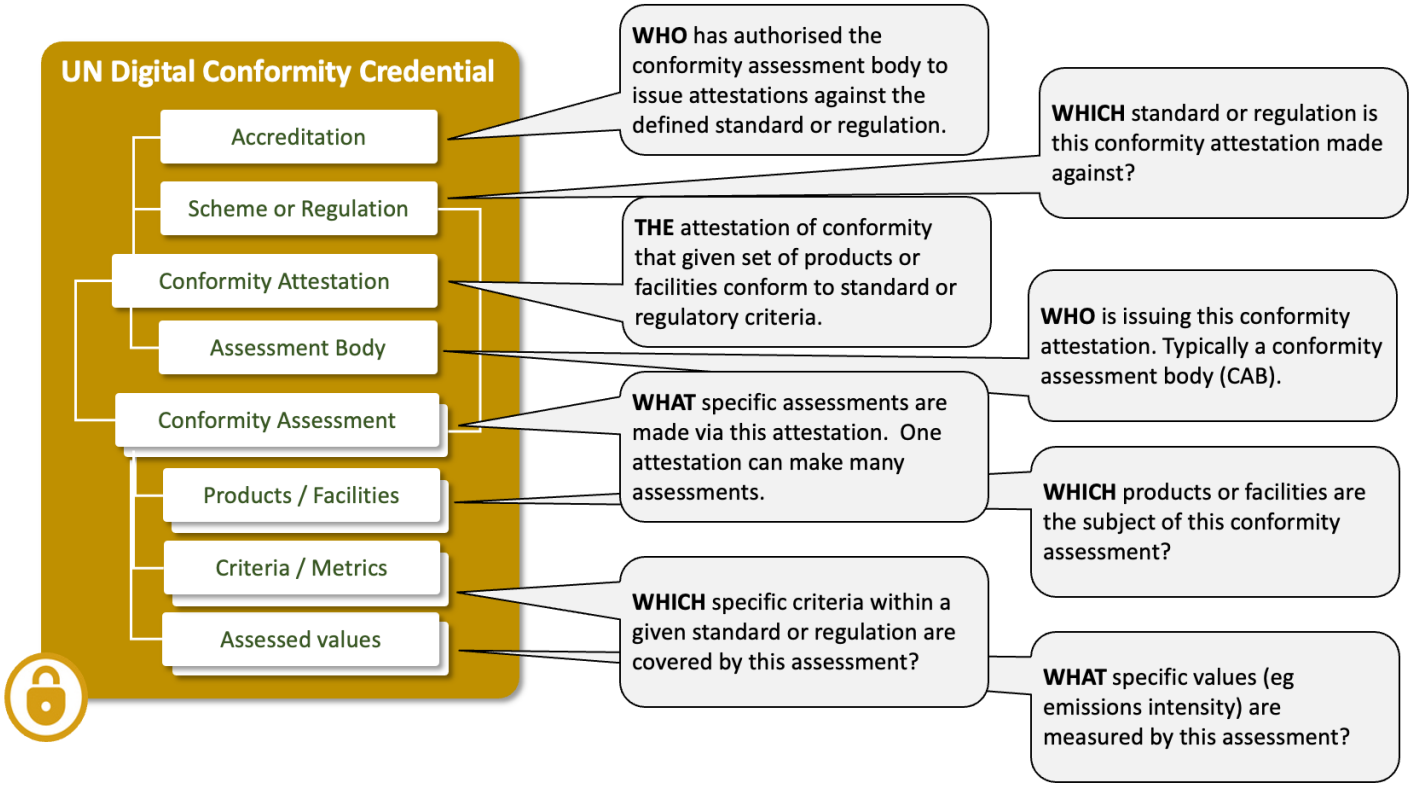
DPCC Version	Date	status	JSON-LD Context
0.2.0	06-04-2024	Raw (not for implementation)	DPP context - TBA

The current version of this specification is v0.2.0

Overview

Conformity credentials are usually issued by independent third parties and provide a **trusted assessment** of product ESG performance against credible **standards or regulations**. As such the credential provides trusted verification of the ESG claims in the passport. Since the passport may make several independent claims (eg emissions intensity, deforestation free, fair work, etc) there may be many linked conformity credentials referenced by one passport. As an additional trust layer, the conformity credential may reference an **accreditation** credential that attests to the authority of the third party to perform the specific ESG assessments. The conformity credential data model has been developed by a separate UN/CEFACT project on digital conformity that has expert membership from accreditation authorities and conformity assessment bodies.

Conceptual Model



Requirements

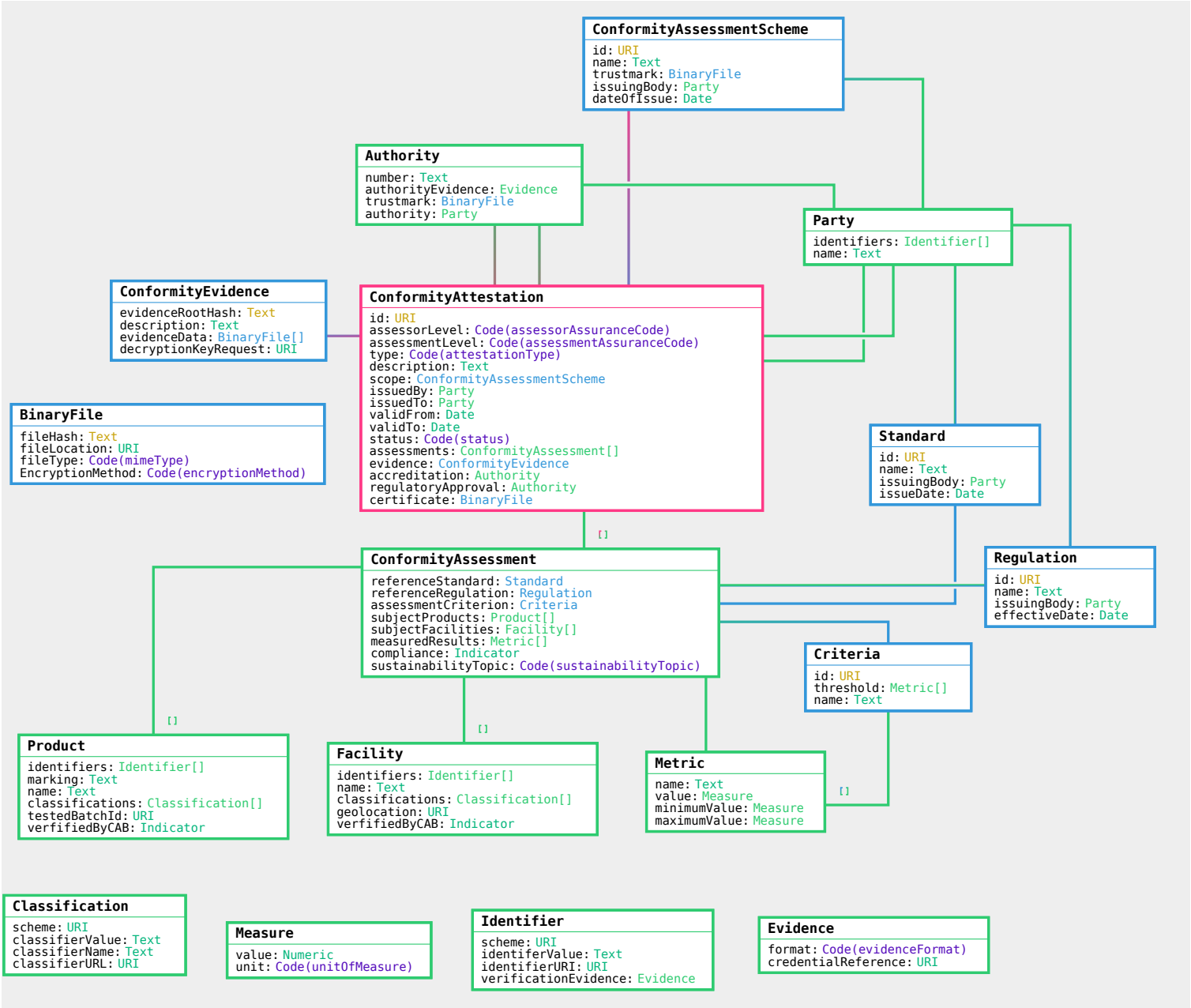
The digital product conformity credential (DPCC) is designed to meet the following detailed requirements as well as the more general [UNTP Requirements(https://uncefact.github.io/spec-untp/docs/about/Requirements)]

ID	Name	Requirement Statement	Solution Mapping
DPCC-01	Authorised source	The DPCC MUST be verifiable as issued by an authorised source, typically a conformity assessment body (CAB)	DPCC MUST be issued as a digital verifiable credential signed by the CAB
DPCC-01	Assurance level	The DPCC MUST the identify the nature of any authority or support for attestation, such as formal recognition by a Governmental authority or an Accreditation Body	Authority

ID	Name	Requirement Statement	Solution Mapping
DPCC-03	Subject of conformity	The DPCC MUST unambiguously identify the subject of the conformity assessment, whether a product or facility.	Product, Facility
DPCCE-04	Reference standard or regulation	The DPCC MUST identify the reference standard(s) and/or regulation(s) that specify the criteria against which the conformity assessment is made. If appropriate this must include specific measurable trhesholds (eg minimum tensile strength)	Standard, Regulation, Metric
DPCC-05	Conformity Attestation	The DPCCE MUST unambiguosly state whether or not the subject of the assessment is conformat to the reference standard or regulation criteria	Assessment
DPCC-06	Measured metrics	The DPCCE SHOULD include actual measured values (eg emissions intensity, tensile strength, etc) with the conformity assessment	metric
DPCC-07	Evidence	The DPCCE MAY include references to auditable evidence (eg instrument recordings, satellite images, etc) to support the assessment. If so then the hash of the evidence fileset SHOULD be included (so that an auditor can be sure that the evidence data has not changed). The evidence data MAY be encrypted with decryption keys provided on request	Conformity Evidence

|

Logical Model



Data Definitions

ConformityAttestation

> A conformity attestation issued by a competent body that defines one or more assessments (eg carbon intensity) about a product (eg batttery) against a specification (eg LCA method) defined in a standard or regulation.

Property	Definition	Type
id	The unique identifier of this conformity attestation	URI
assessorLevel	Assurance code pertaining to assessor (relation to the object under assessment)	Code (assessorAssuranceCode)
assessmentLevel	Assurance pertaining to assessment (any authority or support for the assessment process)	Code (assessmentAssuranceCode)
type	The type of criterion (optional or mandatory).	Code (attestationType)
description	A textual description of the scope or purpose of this confomrity attestation	Text
scope	A list of relevant standards and/or regulations against which apply to this attestation (eg AS1163:2016).	ConformityAssessmentScheme
issuedBy	The party that issued the conformity attestation.	Party
issuedTo	The party to whom the conformity attestation was issued.	Party
validFrom	The date from which the conformity attestation is valid.	Date
validTo	The date until which the conformity attestation is valid.	Date
status	The status of this conformity attestation (eg pending, valid, expired, revoked)	Code (status)

Property	Definition	Type
assessments	The list of specific assessments made within this conformity attestation.	ConformityAssessment
evidence	Evidence supporting the assessment	ConformityEvidence
accreditation	The accreditation from a competent authority (ag NATA) that confirms the issuers authorised scope of assessments.	Authority
regulatoryApproval	The regulatory approval under which this conformity attestation is issued.	Authority
certificate	A reference to the human / printable version of this conformity attestation - typically represented as a PDF document. The document may have more details than are represented in the digital attestation.	BinaryFile

ConformityAssessmentScheme

> A formal governance scheme under which this attestation is issued (eg ACRS structural steel certification)

Property	Definition	Type
id	THe unique identifier of the formal scheme (eg steelcertification.com/product-certification)	URI
name	The name of the conformity scheme (eg ACRS structural steel certification)	Text
trustmark	The trust mark that represents the conformity assessment scheme.	BinaryFile
issuingBody	The issuing body of the conformity scheme.	Party

Property	Definition	Type
dateOfIssue	The date of issue of the scheme.	Date

Facility

> The physical site (eg farm or factory) where the product or materials was produced.

Property	Definition	Type
identifiers	A unique, resolvable, and verifiable identifier for the facility (eg https://maps.app.goo.gl/ULJFeVuA75M8cuQc8)	Identifier
name	The name of this facility	Text
classifications	The UN CPC service calssificaiton for the activities undertaken at this facility.	Classification
geolocation	The geolocated point or area that can be used to place the location on a map. Should be a PlusCode - eg https://plus.codes/4RQGGVGP+	URI
verfifiedByCAB	Indicates whether the conformity assessment body has verified the identity of the subject of the assement (a facility or product / batch).	Indicator

Product

> The facility (fatctory, farm, etc) or product or produciton batch that this conformity attestation is about.

Property	Definition	Type
identifiers	A unique, resolvable, and verifiable identifier for the product (eg id.gs1.org/gtin/5000127163096)	Identifier

Property	Definition	Type
marking	Markings or codes on the product that can be used to match the physical product to this confomity assessment. if not provided then the productID MUST be marked on the product.	Text
name	the name of this product as defined by the manuracturer or retailer.	Text
classifications	The UN CPC product classification code.	Classification
testedBatchId	A unique, resolvable, and verifiable identifier for the product serial number or batch (eg id.gs1.org/gtin/614141123452/lot/ABC1/ser/12345?exp=180426)	URI
verfifiedByCAB	Indicates whether the conformity assessment body has verified the identity of the subject of the assement (a facility or product / batch).	Indicator

ConformityAssessment

> A specific assessment about the product or facility against a specific specification. Eg the carbon intensity of a given product or batch.

Property	Definition	Type
referenceStandard	The reference to the standard that defines the specification / criteria	Standard
referenceRegulation	The reference to the regulation that defines the assessment criteria	Regulation
assessmentCriterion	The specification against which the assessment is made.	Criteria

Property	Definition	Type
subjectProducts	The list of products that are the subject of this conformity assessment	Product
subjectFacilities	The list of facilities that are the subject of this conformity assessment.	Facility
measuredResults	The list of specific values measured as part of this assessment (eg tensile strength)	Metric
compliance	An indicator of whether or not the assessment meets the specification.	Indicator
sustainabilityTopic	The UN ESG topic category for this assessment (eg vocabulary.uncefact.org/sustainability/emissions)	Code (sustainabilityTopic)

Metric

> A numric value of the conformity claim - eg this product scope 1 emissions intensity is 5 KgCo2e/Kg

Property	Definition	Type
name	A short name for the metric - eg emissions intensity	Text
value	The measured value.	Measure
minimumValue	maximum measured or allowed value	Measure
maximumValue	minimum measured or allowed value	Measure

ConformityEvidence

> The specific collection of evidence that was used to inform the conformity claim. Eg satellite images and supporting declarations in support of a deforestation claim.

Property	Definition	Type
evidenceRootHash	An MD5 hash representing the root of the evidence.	Text
description	A textual description of the evidence.	Text
evidenceData	Files that constitute the evidence.	BinaryFile
decryptionKeyRequest	A URI to request the decryption key for the evidence.	URI

BinaryFile

> A file representing a data snapshot that is used to infomr the conformity assessment.

Property	Definition	Type
fileHash	The MD5 hash of the file.	Text
fileLocation	The location of the evidence file.	URI
fileType	The type of file, represented as a MIME type.	Code (mimeType)
EncryptionMethod	A code indicating the encryption method applied to the file.	Code (encryptionMethod)

Authority

> The authority under which a conformity claim is issued. For example a national accrediation authority may accredit a test lab to issue test certificates about a product against a standard.

Property	Definition	Type
number	The reference number for the accreditation - issued by the accreditation body (AB) to the confomrity assessment body (CAB)	Text

Property	Definition	Type
authorityEvidence	The evidence that supports the authroty under which the attestation is issued - eg an accreditation certificate.	Evidence
trustmark	The trust mark image awarded by the AB to the CAB to indicate accrediation.	BinaryFile
authority	The competent authority that issued the accreditation.	Party

Standard

> A standard (eg ISO 14000) that specifies the criteria for conformance.

Property	Definition	Type
id	A unique identifier for the standard (eg https://www.iso.org/standard/60857.html).	URI
name	The name of the standard (eg ISO 14001 Environmental management system)	Text
issuingBody	The party that issued the standard	Party
issueDate	The date when the standard was issued.	Date

Regulation

> A regulation regulation (eg EU deforestation regulation) that defines the criteria for assessment.

Property	Definition	Type
id	The identifier of the regulation - eg https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1115)	URI
name	The name of the regulation - eg EU deforestation regulation.	Text

Property	Definition	Type
issuingBody	the issuing body of the regulation.	Party
effectiveDate	the date at which the regulation came into effect.	Date

Criteria

> A specific rule or criterion within a standard or regulation. eg a carbon intensity calculation rule within an emissions standard.

Property	Definition	Type
id	A unique identifier for the criterion - managed by the standards wuthority or regulator.	URI
threshold	A conformity threshold defined by the specification (eg minimum compressive strength)	Metric
name	A name that describes this criteria (eg tensile strength)	Text

Party

> A party in the conformity domain such as the manufacturer, assessment body, standards authority, accreditation authority, etc

Property	Definition	Type
identifiers	A unique, resovable and verifiableidentifier for the party (eg abr.business.gov.au/ABN/90664869327)	Identifier
name	The name of the party - should match the name in the corresponding formal register.	Text

Evidence

> Evidence to support a conformity or identity claim.

Property	Definition	Type
format	Format of the evidence (verifiable credential, document, website, etc)	Code (evidenceFormat)
credentialReference	The URL of the evidence credential. Should be a hashlink to avoid post-issue tampering.	URI

Classification

> A classification scheme and code / name representing a category value for a product, entity, or facility.

Property	Definition	Type
scheme	Classification scheme - eg https://unstats.un.org/unsd/classifications/Econ/cpc	URI
classifierValue	classifier value within the scheme - eg "01211" in UN CPC	Text
classifierName	Name of the classifier - eg "Asparagus" for code "01211" in UNCPC	Text
classifierURL	Linked data URL to a web vocabulary entery for this classificaiton code. When this property is provided, the scheme, value, and name properties of the classifer are not required. eg https://vocabulary.uncefact.org/unlocode#AUBNE represensign the port of Brisbane in the UN/LOCODE classification scheme.	URI

Identifier

> An identifier of a party, product, or facility that is defined by an identifier scheme and idenfier value and, optinally, verification evidence

Property	Definition	Type
scheme	the identifier scheme as defined by the registrar that manages the identifier registry. If the identifier scheme is registered with UNTP then this URI can use used to dicsover the resolution method (to get more data) and the verification method (to prove ownership).	URI
identiferValue	The value of the identifier within the scheme	Text
identifierURI	The fully qualified URI representing the globally unique record for this identifier.	URI
verificationEvidence	Link to evidence that attests to the validity and ownership of the identifer.	Evidence

Measure

> The measure class defines a numeric measured value (eg 10) and a coded unit of measure (eg KG).

Property	Definition	Type
value	The numeric value of the measure	Numeric
unit	Unit of measure drawn from the UNECE rec20 measure code list.	Code (unitOfMeasure)

Code Tables

assessorAssuranceCode

Code that describes the assurance level of the conformity assessment

Name	Description
Self	self-assessment
Commercial	conformity assessment by related body or under commercial contract
Buyer	conformity assessment by potential purchaser
Membership	conformity assessment by industry representative body or membership body
Unspecified	conformity assessment by party with unspecified relationship
3rdParty	3rd party (independent) conformity assessment

assessmentAssuranceCode

Name	Description
GovtApproval	conformity assessment delivered under authority granted by national government
GlobalMLA	conformity assessment delivered under authority granted by IAF/ILAC signatory body
Accredited	conformity assessment delivered under an independent accreditation
Verified	conformity assessment externally verified
Validated	conformity assessment externally validated
Unspecified	conformity assessment claiming no external authority or else unspecified

attestationType

A code for the type of the attestation credential

Code	Description
certification	A formal third party certification of conformity
declaration	A self assessed declaration of conformity
inspection	An Inspection report
testing	A test report
verification	A verification report
validation	A validation report
calibration	An equipment calibration report

status

```
Code values for this table are derrived from the state lifecycle chart: null
```

value

sustainabilityTopic

Name	Description
environment.energy	claims supporting clean energy transition
environment.emissions	claims supporting GHG emissions reduction
environment.water	claims supporting minimising water usage impact
environment.waste	claims supporting waste processing and reduction
environment.deforestation	claims supporting native forest restoration

Name	Description
environment.biodiversity	claims supporting improved biodiversity outcomes
circularity.content	claims supporting the use of recycled content in products
circularity.design	claims supporting product design for circularity outcomes
social.labour	claims supporting labour rights including fair wages
social.rights	claims supporting human rights and anti-discrimination
social.community	claims supporting local community development
social.safety	claims supporting process and product safety
governance.ethics	claims supporting ethical conduct and corporate governance
governance.compliance	claims supporting regulatory compliance including taxation and community protection
governance.transparency	claims supporting transparency and traceability

mimeType

```
Code values for this table can be found here:
https://mimetype.io/all-types
```

encryptionMethod

Name	Value	Description
none		no encryption
AES		AES standard

evidenceFormat

A code describing the format of the conformity evidence

Name	Description
w3c_vc	A W3C Verifiable Credential
iso_mdl	an ISO 108013 identity credential
document	a binary document for human consumption such as a PDF
website	a reference to an entry on a public website.
other	some other representation

unitOfMeasure

UNECE Recommendation 20 Unit of Measure codelist

```
Code values for this table can be found here:
https://vocabulary.uncefact.org/UnitMeasureCode
```

Sample


```
{
  "id": "http://example.com",
  "assessorLevel": "Self",
  "assessmentLevel": "GovtApproval",
  "type": "certification",
  "description": "string",
  "scope": {
    "id": "http://example.com",
    "name": "string",
    "trustmark": {
      "fileHash": "string",
      "fileLocation": "http://example.com",
      "fileType": "string",
      "EncryptionMethod": "none"
```

```
    },
    "issuingBody": {
      "identifiers": [
        {
          "scheme": "http://example.com",
          "identiferValue": "string",
          "identifierURI": "http://example.com",
          "verificationEvidence": {
            "format": "w3c_vc",
            "credentialReference": "http://example.com"
          }
        }
      ],
      "name": "string"
    },
    "dateOfIssue": "2019-08-24"
  },
  "issuedBy": {
    "identifiers": [
      {
        "scheme": "http://example.com",
        "identiferValue": "string",
        "identifierURI": "http://example.com",
        "verificationEvidence": {
          "format": "w3c_vc",
          "credentialReference": "http://example.com"
        }
      }
    ],
    "name": "string"
  },
  "issuedTo": {
    "identifiers": [
      {
        "scheme": "http://example.com",
        "identiferValue": "string",
        "identifierURI": "http://example.com",
        "verificationEvidence": {
          "format": "w3c_vc",
          "credentialReference": "http://example.com"
        }
      }
    ],
    "name": "string"
  },
  "validFrom": "2019-08-24",
  "validTo": "2019-08-24",
  "status": "string",
```

```
  "assessments": [
    {
      "referenceStandard": {
        "id": "http://example.com",
        "name": "string",
        "issuingBody": {
          "identifiers": [
            {
              "scheme": "http://example.com",
              "identiferValue": "string",
              "identifierURI": "http://example.com",
              "verificationEvidence": {
                "format": "w3c_vc",
                "credentialReference": "http://example.com"
              }
            }
          ],
          "name": "string"
        },
        "issueDate": "2019-08-24"
      },
      "referenceRegulation": {
        "id": "http://example.com",
        "name": "string",
        "issuingBody": {
          "identifiers": [
            {
              "scheme": "http://example.com",
              "identiferValue": "string",
              "identifierURI": "http://example.com",
              "verificationEvidence": {
                "format": "w3c_vc",
                "credentialReference": "http://example.com"
              }
            }
          ],
          "name": "string"
        },
        "effectiveDate": "2019-08-24"
      },
      "assessmentCriterion": {
        "id": "http://example.com",
        "threshold": [
          {
            "name": "string",
            "value": {
              "value": 0,
              "unit": "string"
```

```
        },
        "minimumValue": {
          "value": 0,
          "unit": "string"
        },
        "maximumValue": {
          "value": 0,
          "unit": "string"
        }
      }
    ],
    "name": "string"
  },
  "subjectProducts": [
    {
      "identifiers": [
        {
          "scheme": "http://example.com",
          "identiferValue": "string",
          "identifierURI": "http://example.com",
          "verificationEvidence": {
            "format": "w3c_vc",
            "credentialReference": "http://example.com"
          }
        }
      ],
      "marking": "string",
      "name": "string",
      "classifications": [
        {
          "scheme": "http://example.com",
          "classifierValue": "string",
          "classifierName": "string",
          "classifierURL": "http://example.com"
        }
      ],
      "testedBatchId": "http://example.com",
      "verfifiedByCAB": true
    }
  ],
  "subjectFacilities": [
    {
      "identifiers": [
        {
          "scheme": "http://example.com",
          "identiferValue": "string",
          "identifierURI": "http://example.com",
          "verificationEvidence": {
```

```
              "format": "w3c_vc",
              "credentialReference": "http://example.com"
            }
          }
        ],
        "name": "string",
        "classifications": [
          {
            "scheme": "http://example.com",
            "classifierValue": "string",
            "classifierName": "string",
            "classifierURL": "http://example.com"
          }
        ],
        "geolocation": "http://example.com",
        "verfifiedByCAB": true
      }
    ],
    "measuredResults": [
      {
        "name": "string",
        "value": {
          "value": 0,
          "unit": "string"
        },
        "minimumValue": {
          "value": 0,
          "unit": "string"
        },
        "maximumValue": {
          "value": 0,
          "unit": "string"
        }
      }
    ],
    "compliance": true,
    "sustainabilityTopic": "environment.energy"
  }
],
"evidence": {
  "evidenceRootHash": "string",
  "description": "string",
  "evidenceData": [
    {
      "fileHash": "string",
      "fileLocation": "http://example.com",
      "fileType": "string",
      "EncryptionMethod": "none"
```

```
      }
    ],
    "decryptionKeyRequest": "http://example.com"
  },
  "accreditation": {
    "number": "string",
    "authorityEvidence": {
      "format": "w3c_vc",
      "credentialReference": "http://example.com"
    },
    "trustmark": {
      "fileHash": "string",
      "fileLocation": "http://example.com",
      "fileType": "string",
      "EncryptionMethod": "none"
    },
    "authority": {
      "identifiers": [
        {
          "scheme": "http://example.com",
          "identiferValue": "string",
          "identifierURI": "http://example.com",
          "verificationEvidence": {
            "format": "w3c_vc",
            "credentialReference": "http://example.com"
          }
        }
      ],
      "name": "string"
    }
  },
  "regulatoryApproval": {
    "number": "string",
    "authorityEvidence": {
      "format": "w3c_vc",
      "credentialReference": "http://example.com"
    },
    "trustmark": {
      "fileHash": "string",
      "fileLocation": "http://example.com",
      "fileType": "string",
      "EncryptionMethod": "none"
    },
    "authority": {
      "identifiers": [
        {
          "scheme": "http://example.com",
          "identiferValue": "string",
```

```
          "identifierURI": "http://example.com",
          "verificationEvidence": {
            "format": "w3c_vc",
            "credentialReference": "http://example.com"
          }
        }
      ],
      "name": "string"
    }
  },
  "certificate": {
    "fileHash": "string",
    "fileLocation": "http://example.com",
    "fileType": "string",
    "EncryptionMethod": "none"
  }
}
```

Traceability Events

> **INFO**
>
> Please note that this content is under development and is not ready for implementation. This status message will be updated as content development progresses.

Versions

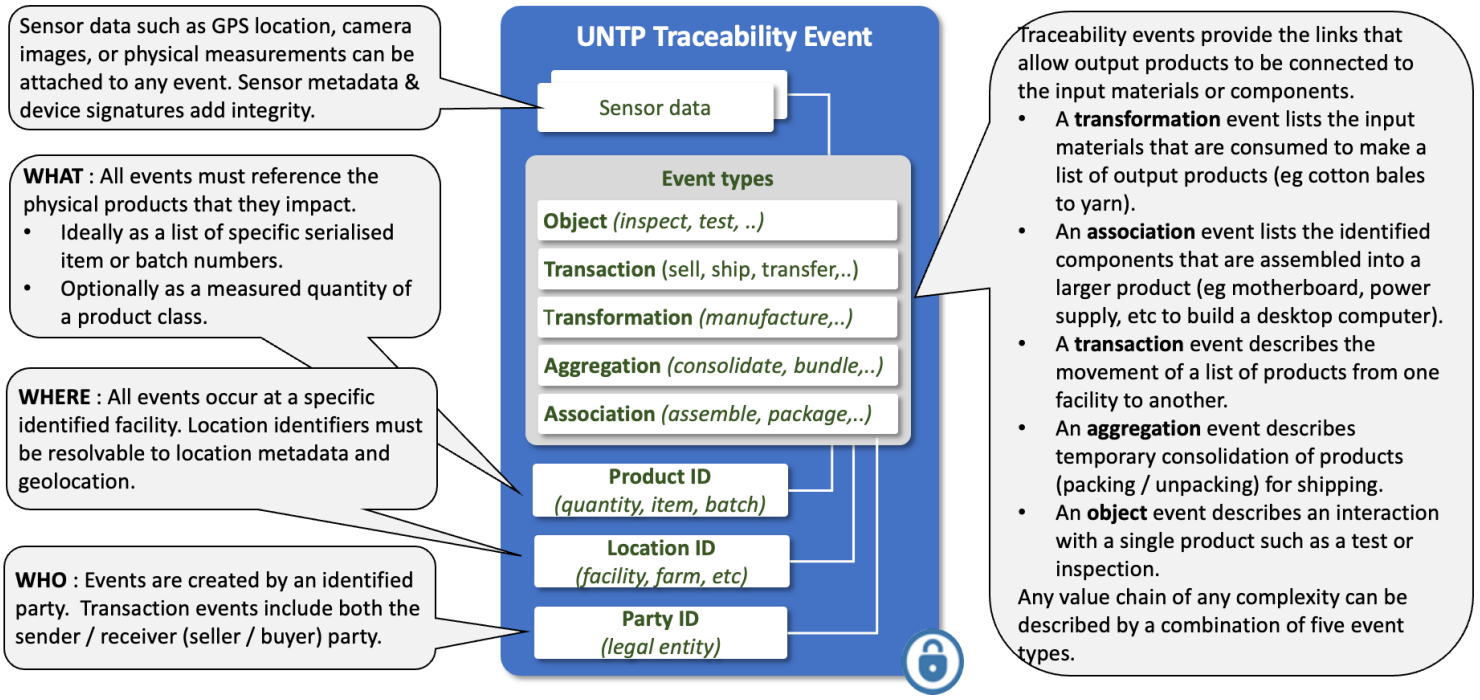
traceability Version	Date	status	JSON-LD Context
0.3.0	20-04-2024	Raw (for review)	Coming soon - fixing a bug

The current version of this specification is v0.3.0

Overview

Traceability events are very lightweights collections of identifiers that specify the “what, when, where, why and how” of the products and facilities that constitute a value chain. The UNTP is based on the GS1 EPCIS standard for this purpose because it is an existing and proven mechanism for supply chain traceability. Note that UNTP supports but does not require the use of GS1 identifiers. The basic idea behind the traceability event structure is that any supply chain of any complexity can always be accurately modeled using a combination of four basic event types. An **object** event describes an action on specific product(s) such as an inspection. A **transaction** event describes the exchange of product(s) between two actors such as sale of goods between seller and buyer. An **aggregation** event describes the consolidation or de-consolidation of products such as stacking bales of cotton on a pallet for transportation. An **association** event describes the assembly of sub-components to make a composite product. Finally, a **transformation** event describes a manufacturing process that consumes input product(s) to create new output product(s). The UNTP uses these events in a decentralised architecture as the means to traverse the linked-data "graph" that represents the entire value-chain.

Conceptual Model



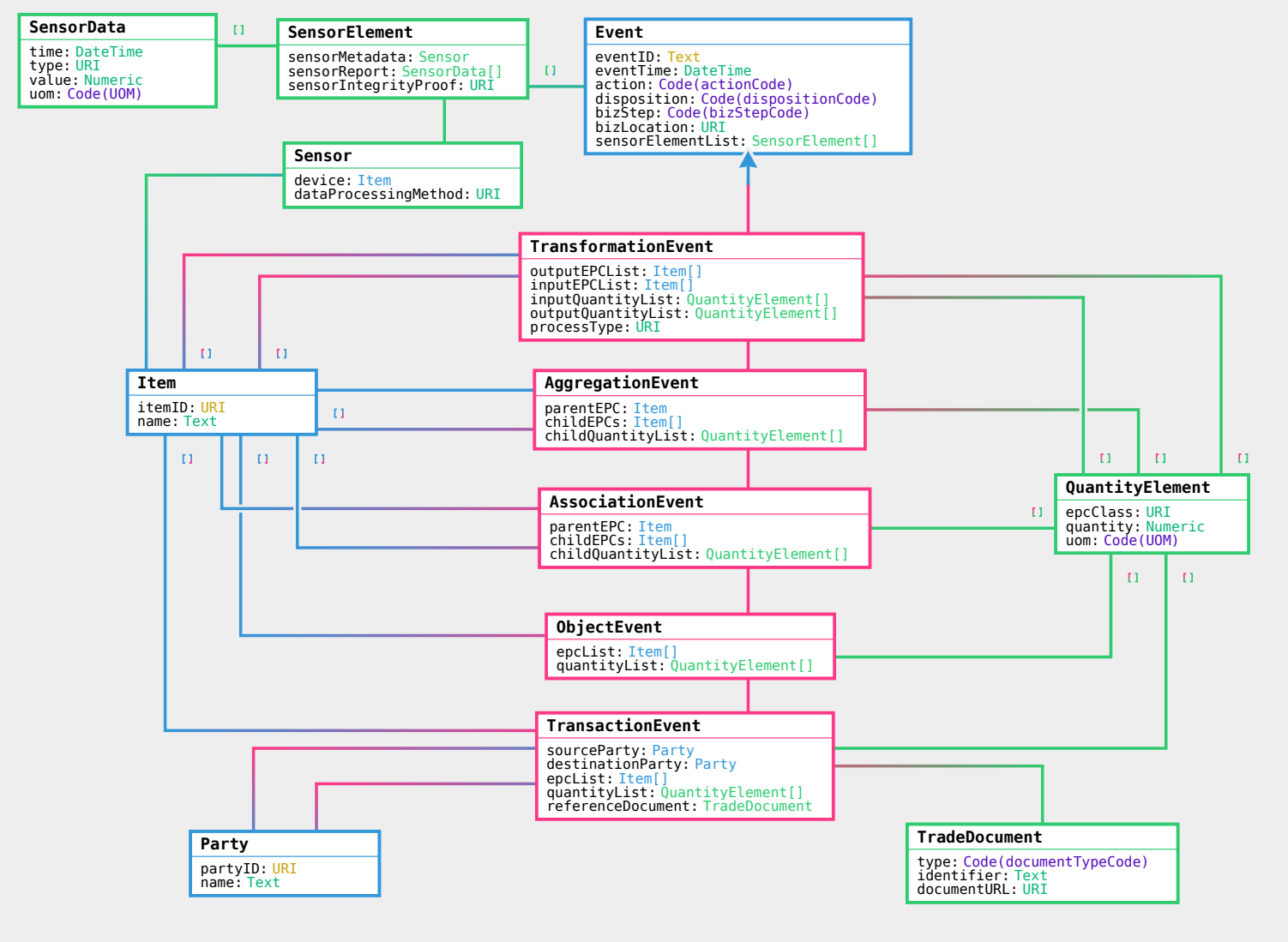
Requirements

The traceability event is designed to meet the following detailed requirements as well as the more general [UNTP Requirements(https://uncefact.github.io/spec-untp/docs/about/Requirements)]

ID	Name	Requirement Statement	Solution Mapping
TEV-01	Sub-components	The traceability event MUST provide a mechanism to trace from a DPP representing a product assembly to the individual DPPs of each sub-assembly component part	Association Event
TEV-02	Consumed materials	The traceability event MUST provide a mechanism to trace a manufactured product DPP back to the DPPs representing batches of input materials that are consumed in manufacturing one or more output products.	Transformation Event](#transformationevent)
TEV-03	Aggregated bundles	When a DPP represents an aggregated bundle of similar items (eg a pallet of	Aggregation Event

ID	Name	Requirement Statement	Solution Mapping
		cotton bales) then the traceability event MUST provide a means to allocate the aggregate measures to each individual item (ie each bale)	
TEV-04	Transportation	when a product (or consolidated consignment) is shipped from one physical location to another, the traceability event MUST provide a means to record the movement and associate sustainability measures such as transport emissions to the shipped bundle	Transaction event
TEV-05	items or quantities	Traceability events MUST work equally well whether the input or output items are individually serialised items or measured quantities (mass or volume) of a product class.	Items Quantity
TEV-06	IoT Sensor data	Traceability events will often be generated by or associated with physical sensor readings. In such cases, the traceability event SHOULD support the association of sensor data with the event	Sensor element
TEV-07	Time & Location	Traceability events MUST always record the timestamp and physical location of the event so that multiple events can be be connected in time and space	Event

Logical Model



Data Definitions

Event

> This abstract event structure provides a common language to describe supply chain events such as shipments, inspections, manufacturing processes, etc. There are four types of event but this is an abstract class representing all common properties of an event.

Property	Definition	Type
eventID	The unique identifier of this event - SHOULD be a UUID	Text
eventTime	The ISO-8601 date time when the event occurred.	DateTime

Property	Definition	Type
action	Code describing how an event relates to the life-cycle of the entity being described.	Code (actionCode)
disposition	Disposition code describing the state of the item after the event.	Code (dispositionCode)
bizStep	A business step code drawn from a controlled vocabulary.	Code (bizStepCode)
bizLocation	A Business Location is a uniquely identified and discretely recorded geospatial location that is meant to designate the specific place where an object is assumed to be following an EPCIS event until it is reported to be at a different Business Location by a subsequent EPCIS event. The bizLocation must be a resolvable URI that links to facility information and geolocation data.	URI
sensorElementList	An array (one for each sensor) of sensor device data sets associated with the event.	SensorElement

Object Event

> Object represents an event that happened to one or more physical or digital objects - such as an inspection or certification of a product or shipment. The physical objects may be identified either as specific items (eg a unique consignment number) or as a quantified amount of a product class (eg 100Kg of cotton yarn)

Note that object event includes all the properties of Event as well as the additional properties described below.

Property	Definition	Type
epcList	A list of uniquely identified items (eg specific items serial numbers or tagged shipments / packages) that are the focus of	Item

Property	Definition	Type
	this object event.	
quantityList	A quantified list of product classes (eg GS1 GTINs) that are the focus of this object event	QuantityElement

Aggregation Event

> Aggregation represents an event that happened to one or more objects that are physically aggregated together (physically constrained to be in the same place at the same time, as when cases are aggregated to a pallet). This event is also used to represent de-aggregation (eg unpacking) when businessStepCode is unpacking.

Note that aggregation event includes all the properties of Event as well as the additional properties described below.

Property	Definition	Type
parentEPC	The unique item identifier that is the result of this aggregation. Typically a packaging ID used in shipments that represents a box/ pallet / container of contained items.	Item
childEPCs	The list of child items that have been aggregated into the parent (or dis-aggregated from the parent). Maybe a list of package references (eg boxes on a pallet) or may be individual items (eg products in a box).	Item
childQuantityList	List of quantified product classes that have been aggregated into the parent. Used when the child items do not have unique identifiers (eg 100 Kg of cotton bales)	QuantityElement

Transaction Event

> Transaction represents an event in which one or more objects become associated or disassociated with one or more identified business transactions - such as the purchase /

> shipment of goods between buyer and seller.

Note that transaction event includes all the properties of Event as well as the additional properties described below.

Property	Definition	Type
sourceParty	The source party for this supply chain transaction - typically the seller party	Party
destinationParty	The destination party for this supply chain transaction - typically the buyer party.	Party
epcList	The list of uniquely identified trade items included in this supply chain transaction.	Item
quantityList	List of quantified product classes that are included in this transaction. Used when the trade items do not have unique identifiers (eg 100 reels of yarn)	QuantityElement
referenceDocument	The supply chain document reference for this transaction event - eg the invoice, order, or dispatch advice	TradeDocument

Transformation Event

> Transformation represents an event in which input objects are fully or partially consumed and output objects are produced, such that any of the input objects may have contributed to all of the output objects - for example consuming bales of cotton to produce yarn.

Note that transformation event includes all the properties of Event as well as the additional properties described below.

Property	Definition	Type
outputEPCList	The list of uniquely identified items that are the output of this transformation event - for example a list of	Item

Property	Definition	Type
	individually identified bolts of cloth that are the output of a weaving process.	
inputEPCList	The list of uniquely identified items that are the input of this transformation event - for example a list of individually identified bobbins of yarn that are the input of a weaving process.	Item
inputQuantityList	The quantified list of product classes that are the input of this transformation event - used when each item does not have a unique identity. for example the weight of raw cotton that is the input to a ginning process.	QuantityElement
outputQuantityList	The quantified list of product classes that are the output of this transformation event - used when each item does not have a unique identity. for example a count of the bales of cleaned cotton that are the output of a ginning process.	QuantityElement
processType	An industry specific process type code.	URI

AssociationEvent

> The association event represents the assembly of child sub-components to create a parent assembled item. For example a desktop computer assembled from power supply, hard drive, and motherboard. The association event is very similar in structure to the aggregation event but is used for physical assembly. An association event may represent a bill of materials used to assemble a product whilst an aggregation event may represent a packing list or items for transport.

Note that association event includes all the properties of Event as well as the additional properties described below.

Property	Definition	Type
parentEPC	The unique item identifier that is the parent of this association. Typically an assembled product ID such as a desktop computer that is built from the associated child components.	Item
childEPCs	The list of child items that have been assembled to create the parent - for example the power supply or hard drive components of a desktop computer.	Item
childQuantityList	List of quantified product classes that have been assembled into the parent. Used when the child items do not have unique identifiers (eg brackets and screws used in the assembly of a desktop computer)	QuantityElement

QuantityElement

> The quantity element is used to define the quantities (eg 100), units of measure (eg Kg) and product class (eg GTIN or other class identifier) of products that are inputs or outputs or the subject of supply chain events.

Property	Definition	Type
epcClass	THe identifier of a product class (as opposed to a product instance) such as a GTIN code for a manufactured product.	URI
quantity	The numeric quantity of the product class (eg 100 kg of cotton)	Numeric
uom	The unit of measure for the quantity value (eg Kg or meters etc) using the UNECE Rec 20 unit of measure codelist.	Code (UOM)

TradeDocument

> A trade transaction between two parties such as an invoice, purchase order, or shipping notification.

Property	Definition	Type
type	The document type representing the trade transaction drawn from the business transaction type vocabulary.	Code (documentTypeCode)
identifier	The identifier of the trade transaction document - eg an invoice number or bill of lading number. Must be unique for a given source party	Text
documentURL	The URL of the referenced trade document. For integrity reasons, it is recommended (but not required) that the documentURL is a hash-link (https://w3c-ccg.github.io/hashlink/) so that if the document the URL is changed then the hash verification will fail.	

Item

> A specific trade item /product code which could be either a product serial number or a consignment identifier

Property	Definition	Type
itemID	The globally unique identifier (eg GS1 GTIN or digital link) of the product item.	URI
name	The name of the product class to which the product item belongs.	Text

Party

> A trade party

Property	Definition	Type
partyID	The globally unique identifier of the party. This must be expressed as a URI that is (preferably) resolvable to an entity register such as a national business register - eg https://abr.business.gov.au/ABN/View?abn=41161080146	URI

Property	Definition	Type
name	The entity name of the identified party - usually the business name from the corresponding national registry -eg ACME LTD	Text

SensorElement

> A SensorElement is used to carry data related to an event that is captured one sensor such as an IoT device. Include one sensor property and an array of sensor data values.

Property	Definition	Type
sensorMetadata	Data that describes the physical sensor that recorded the sensor data set.	Sensor
sensorReport	A list of sensor readings from the given sensor relevant to the traceability event context.	SensorData
sensorIntegrityProof	An optional reference to a verifiable credential signed by the sensor device or device manufacturer that contains the digitally signed raw data associated with this sensor report.	URI

Sensor

> A physical sensor that records a sensor data set.

Property	Definition	Type
device	The device Identifier for the sensor as a URI (typically an EPC)	Item
dataProcessingMethod	The data processing method used by the sensor - should reference a documented standard criteria as a URI	URI

SensorData

> A data point read by a sensor.

Property	Definition	Type
time	the timestamp at which the sensor reading was made.	DateTime
type	the measurement type of the sensor reading, as a URI reference to a measurement method specification.	URI
value	the sensor reading	Numeric
uom	the unit of measure for the sensor reading	Code (UOM)

Code Tables

actionCode

The Action type says how an event relates to the lifecycle of the entity being described. For example, AggregationEvent is used to capture events related to aggregations of objects, such as cases aggregated to a pallet. Throughout its life, the pallet load participates in many business process steps, each of which may generate an EPCIS event. The action field of each event says how the aggregation itself has changed during the event: have objects been added to the aggregation, have objects been removed from the aggregation, or has the aggregation simply been observed without change to its membership? The action is independent of the bizStep (of type BusinessStepID) which identifies the specific business process step in which the action took place.

Name	Description
observe	The entity in question has not been changed.
add	The entity in question has been created or added to.
delete	The entity in question has been removed from or destroyed altogether.

dispositionCode

Disposition code is a vocabulary whose elements denote a business state of an object. An example is a code that denotes “recalled”. The disposition field of an event specifies the business condition of the event’s objects, subsequent to the event. The disposition is assumed to hold true until another event indicates a change of disposition. Intervening events that do not specify a disposition field have no effect on the presumed disposition of the object.

```
Code values for this table can be found here:
https://ref.gs1.org/cbv/Disp
```

bizStepCode

BusinessStep is a vocabulary whose elements denote steps in business processes. An example is an identifier that denotes “shipping.” The business step field of an event specifies the business context of an event: what business process step was taking place that caused the event to be captured?

```
Code values for this table can be found here:
https://ref.gs1.org/cbv/BizStep
```

UOM

UNECE Recommendation 20 Unit of Measure code list.

```
Code values for this table can be found here:
https://vocabulary.uncefact.org/UnitMeasureCode
```

documentTypeCode

Document type codes for trade and logistics documents supporting the event such as purchase order, invoice, shipping notification, bill of lading, etc.

```
Code values for this table can be found here:
https://ref.gs1.org/cbv/BTT
```

Samples

Object Event


```
{
  "epcList": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "quantityList": [
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
  "eventTime": "2019-08-24T14:15:22Z",
  "action": "observe",
  "disposition": "string",
  "bizStep": "string",
  "bizLocation": "http://example.com",
  "sensorElementList": [
    {
      "sensorMetadata": {
        "device": {
          "itemID": "http://example.com",
          "name": "string"
        },
        "dataProcessingMethod": "http://example.com"
      },
      "sensorReport": [
        {
          "time": "2019-08-24T14:15:22Z",
          "type": "http://example.com",
          "value": 0,
          "uom": "string"
        }
      ],
      "sensorIntegrityProof": "http://example.com"
    }
  ]
}
```


Transaction Event

Note that the sensorElementList property exists in the transaction event but is not expanded in the sample below for brevity purposes.


```
{
  "sourceParty": {
    "partyID": "http://example.com",
    "name": "string"
  },
  "destinationParty": {
    "partyID": "http://example.com",
    "name": "string"
  },
  "epcList": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "quantityList": [
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
  "referenceDocument": {
    "type": "string",
    "identifier": "string",
    "documentURL": "http://example.com"
  },
  "eventTime": "2019-08-24T14:15:22Z",
  "action": "observe",
  "disposition": "string",
  "bizStep": "string",
  "bizLocation": "http://example.com",
  "sensorElementList": [..]
}
```


Aggregation Event

Note that the sensorElementList property exists in the transaction event but is not expanded in the sample below for brevity purposes.

```
{
  "parentEPC": {
    "itemID": "http://example.com",
    "name": "string"
  },
  "childEPCs": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "childQuantityList": [
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
  "eventTime": "2019-08-24T14:15:22Z",
  "action": "observe",
  "disposition": "string",
  "bizStep": "string",
  "bizLocation": "http://example.com",
  "sensorElementList": [..]
}
```

Transformation Event

Note that the sensorElementList property exists in the transaction event but is not expanded in the sample below for brevity purposes.

```
{
  "outputEPCList": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "inputEPCList": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "inputQuantityList": [
```

```
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
  "outputQuantityList": [
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
  "processType": "http://example.com",
  "eventTime": "2019-08-24T14:15:22Z",
  "action": "observe",
  "disposition": "string",
  "bizStep": "string",
  "bizLocation": "http://example.com",
  "sensorElementList": [..]
}
```

Association Event

Note that the sensorElementList property exists in the transaction event but is not expanded in the sample below for brevity purposes.

```
{
  "parentEPC": {
    "itemID": "http://example.com",
    "name": "string"
  },
  "childEPCs": [
    {
      "itemID": "http://example.com",
      "name": "string"
    }
  ],
  "childQuantityList": [
    {
      "epcClass": "http://example.com",
      "quantity": 0,
      "uom": "string"
    }
  ],
```

```
  "eventTime": "2019-08-24T14:15:22Z",
  "action": "observe",
  "disposition": "string",
  "bizStep": "string",
  "bizLocation": "http://example.com",
  "sensorElementList": [..]
}
```

Working Examples

TBC

Identifiers

> **INFO**
>
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Overview

Identifiers of **businesses** (eg tax registration numbers), of **locations** (eg google pins or cadastral/lot numbers), and of **products** (eg GS1 GTINs or other schemes) are ubiquitous throughout supply chains and underpin the integrity of the system. UNTP builds upon existing identifier schemes without precluding the use of new schemes so that existing investments and high integrity registers can be leveraged. UNTP requires four key features of the identifiers and, for those that don't already embody these features, provides a framework to uplift the identifier scheme to meet UNTP requirements. Identifiers used in UNTP implementations should be **discoverable** (ie easily read by scanning a barcode, QR code, or RFID), **globally unique** (ie by adding a domain prefix to local schemes), **resolvable** (ie given an identifier, there is a standard way to find more data about the identified thing), and **verifiable** (ie ownership of the identifier can be verified so that actors cannot make claims about identifiers they don't own).

Discoverability

The term 'data carrier' applies to all 1- and 2-dimensional barcode symbols and radio frequency tags. A very large number of data carriers are in use, including proprietary ones tied to specific apps. For UNTP, the important data carriers are those defined by ISO/IEC Joint Technical Committee 1, Steering Committee 31. These include different types of linear symbol most people think of as 'a barcode', as well as Data Matrix, QR Code and RFID tags. The standards for those data carriers do not define the type of identifier(s) that can be encoded so that, for practical purposes, it's necessary to also consider the origin and management of the identifiers to be encoded, the syntax to be used for that encoding, the devices and software necessary to print and read the data. It is this multi-layered complexity that makes "Automatic Identification and Data Capture" (AIDC) a professional activity in its own right.

Given this background, 'discoverability' itself has several aspects. It is reasonable to assume that someone inspecting goods in the course of their work will be equipped with a specialist device. This is

always necessary for RFID tags, the principal advantage of which is that hundreds, if not thousands, of tags can be scanned within a given volume, even without line of sight. But be aware that the device needs to be running software that can interpret the data it receives. Handheld optical scanners are also in common use and these will typically be able to read a very wide variety of optical symbols. But again, the key question is whether or not the software can interpret the data read from the carrier.

It hardly needs saying that the more standardized the identifiers and the encoding used, the more widely used the data carrier, and the more ubiquitous the software used to interpret the data read from the carrier, the more interoperable and therefore the more discoverable the identifiers will be. It is this kind of consideration that often leads industry to choose established identifier and data exchange systems such as that offered by GS1. That said, modern smartphones can read any almost any optical barcode and NFC tag *if* the user first opens an app that can interpret the data. This is true for proprietary data carriers and identifiers as well as standardized ones. Installing an app can readily turn a general-purpose smartphone into a specialist device. This opens up the option of using less-established identifier schemes and syntaxes including Decentralized Identifiers (DIDs). Then it's a question of whether the identifiers are equally disoverable at different points along the supply chain.

One case deserves special mention: a URL encoded in a QR Code. Almost all smartphone users can scan a QR Code just using the native camera app and, if the QR Code contains a URL, the Web browser will open the relevant Web page. This kind of identifier is therefore the most disoverable of all. That is, if a URL in the QR code is treated as the identifier then disoverability is a given. However, using a URL itself as the identifier brings some issues of its own. For example, over the medium to long term, many URLs suffer 'link rot' - that is, the URL no longer functions. Or if it does, it may lead to a Web page very different from the one originally intended. Furthermore, existing data exchange systems are likely to be built on short offline identifiers. ISO/IEC 18975 (currently a Draft International Standard) attempts to offer the best of both worlds by providing a means to encode existing identifiers into a data structure that is also a URL. Non-specialist software - notably a smartphone's camera app - can just read it like any URL. But specialist software can parse the URL to extract the identifiers used to identify products, batches and more.

Global Uniqueness

Resolvability

Vocabularies

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>
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Overview

Web **vocabularies** are a means to bring consistent understanding of **meaning** to ESG claims and assessments throughout transparent value chains based on UNTP. There are hundreds of ESG standards and regulations around the world, each with dozens or hundreds of specific conformity **criteria**. Any given value chain from raw materials to finished product is likely to include dozens of passports and conformity credentials issued against any of thousands of ESG criteria. Without a consistent means to make sense of this data, UNTP would provide a means to discover a lot of data but no easy way to make sense of it. The UNTP defines a standard and extensible topic map (taxonomy) of ESG criteria and provides a mechanism for any standards authority, or national regulator, or industry association to map their specific terminology to the UNTP vocabulary.

UN ESG Topic Map

ESG Standards Criteria

Verifiable Credentials

> **INFO**
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Overview

The World-Wide-Web Consortium (W3C) has defined a standard called Verifiable Credentials (VCs). A VC is a portable digital version of everyday credentials like education certificates, permits, licenses, registrations, and so on. VCs are digitally signed by the issuing party and are tamper proof, privacy preserving, revocable, and digitally verifiable. The UN has previously assessed this standard and has recommended it's use for a variety of cross border trade use cases in a recent white paper. VCs are inherently decentralized and so are an excellent fit for UNTP which recommends that passports, credentials, and traceability events are all issued as W3C VCs. A related W3C standard called Decentralized Identifiers (DIDs) provides a mechanism to manage the cryptographic keys used by verifiable credentials and also to link multiple credentials into verifiable trust graphs. DIDs are not the same as the business / product / location identifiers maintained by authoritative agencies - but can be linked to them.

Business requirements for UNTP application of VCs

Verifiable Credentials technology is one of the key tools in the UNTP anti-green-washing toolbox. But there are many different technical implementation options which presents an interoperability risk - namely that credentials issued by one party will not be understandable or verifiable by another party. UNTP will not design new technical standards as that is the role of technology standards bodies such as W3C or IETF. However, be recommending the use of the narrowest practical set of technical options for a given business requirement, the UNTP can enhance interoperability.

A key design principle that is applicable to decentralized ecosystems such as UNTP recommends is Postel's robustness principle which, for UNTP, means that **an implementation should be conservative in its sending (issuing) behavior, and liberal in its receiving (verifying) behavior.** That is because the sustainability evidence that is discovered in any given value chain may be presented as many different versions of W3C VCs, or ISO mDL credentials, or Hyperledger Anoncreds,

or as human readable PDF documents. Being as open as possible in what is received and verified will allow sustainability assessments to be made over a wide set of evidence. Conversely, choosing a narrow set of ubiquitous technology options when issuing UNTP credentials such as digital product passports will simplify the task of verifiers and minimise costs for the entire ecosystem.

ID	Name	Requirement Statement	Solution Mapping
VC-01	Integrity	VC technology recommendations must support tamper detection, issuer identity verification, and credential revocation so that verifiers can be confident of the integrity of UNTP credentials.	All VC options support this requirement
VC-02	Compatibility	VC technology recommendations for issuing UNTP credentials should be as narrow as practical and should align with the most ubiquitous global technology choices so that technical interoperability is achieved with minimal cost	Basic profile
VC-03	Human readable	VC technology recommendations must support both human readable and machine readable credentials so that uptake in the supply chain is not blocked by actors with lower technical maturity.	Render method
VC-04	Discovery	VC technology recommendations must support the discovery and verification of credentials from product identifiers so that verifiers need not have any a-priori knowledge of or relationship to either the issuers or the subjects of credentials.	Presentations
VC-05	Semantics	VC technology recommendations must support the use of standard web vocabularies so that data from multiple independent credentials can be meaningfully aggregated.	Vocabularies
VC-06	Performance	VC technology recommendations should value performance so that graphs containing hundreds of	Basic profile

ID	Name	Requirement Statement	Solution Mapping
		credentials of any size can be traversed and verified efficiently.	
VC-07	Compliance	VC technology recommendations must meet any technology based regulatory requirements that apply in the countries in which credentials are issued or verified.	Basic profile
VC-08	Openness	VC DID method recommendations must not drive users towards closed ecosystems or proprietary ledgers so that there is no network effect coercion towards proprietary ledgers.	DID methods
VC-09	Portability	VC DID method recommendations must allow users (issuers) to move their DID documents between different service providers so that long duration credentials can remain verifiable even when issuers change service providers.	DID methods
VC-10	Evolution	VC technology is evolving and UNTP recommendations must evolve as newer tools and versions become ubiquitous	Roadmap

VC basic profile

The VC basic profile is designed to be as simple, lightweight, and interoperable as possible. A conformant implementation

- MUST implement the W3C VC Data Model v1.1 using the JSON-LD Compacted Document Form
- SHOULD implement the W3C VC Data Model v2.0 using the JSON-LD Compacted Document Form
- MUST implement W3C VC Bitstring Status List for credential status checks including revocation checks
- MUST implement W3C-DID-CORE using DID methods defined in DID methods
- MUST implement the enveloping proof mechanism defined in W3C VC JOSE / COSE with JOSE (Section 3.1.1)

- SHOULD implement the embedded proof mechanism defined in W3 Data Integrity proof

DID methods

There are a large number of did methods listed in the W3C did register. It is reasonable to expect that this proliferation of did methods will consolidate to a much smaller number of did methods, each designed to meet a specific business need. In future the UNTP may provide a did method decision tree with different methods for different use cases (eg legal entities vs products). In the meantime, a conformant implementation

- MUST implement the did:web method as an Organizational Identifiers
- SHOULD implement the did:web method using the web domain of the issuer to avoid portability challenges.

> Note that there is activity within the VC technical community to define new did methods that achieve the ubiquity of did:web whilst still maintaining portability across web domains. This work may impact UNTP did method recommendations.

Render Method

To support uptake across supply supply chain actors with varying levels of technical maturity, human rendering of digital credentials is essential. A conformant implementation

- MUST implement the VC HTML Rendering Method using a hash-linked external rendering template.
- MAY implement other rendering methods (eg SVG or PDF)

> Note that there is a pending update to the rendering specification to support HTMl rendering and hash-links.

Presentations

Verifiable Presentations (VP) are widely used in the verifiable credentials ecosystem to support holders to combine one or more credentials in a digital wallet and then present them for in-person or online verification purposes. The VP is signed by the holder did and so provides a holder binding mechanism. In UNTP supply chain implementations, the subject of most claims is an inanimate object (eg bar-coded goods) and digital credentials about the goods are discovered by any party that has access to the goods. The box of goods does not create verifiable presentations on demand and the binding is to the identity of the goods. A conformant UNTP implementation

- MUST issue and publish product passports, product conformity credentials, and traceability events as verifiable credentials and MUST include the identifier of the goods within the VC subject.
- MAY exchange these and any other credentials as verifiable presentations in wallet-to-wallet transfers or any other method.

Vocabularies

A shared understanding of the meaning of claims made in verifiable credentials is essential to interoperability. To this end, conformant UNTP implementations

- MUST use the JSON-LD syntax for the representation of data in all issued credentials.
- MUST implement the UN/CEFACT web vocabulary](https://vocabulary.uncefact.org/) JSON-LD @context and schema for Digital Product Passports, Conformity Credentials, traceability events, and identity credentials.
- SHOULD implement widely used industry vocabularies such as schema.org or GS1 web vocabulary as a first choice for UNTP extensions requiring terms not in the UN vocabulary.
- MAY use any other published JSON-LD vocabulary for any other industry or country specific extensions.

Roadmap

Future versions of this specification will

- Provide richer guidance on did methods via a decision tree that helps to select the right method for the right purpose
- Provide guidance on selective redaction methods to better support confidentiality goals.
- Provide timelines for transition between versions of technical specifications (eg when VCDM 2.0 will change from SHOULD support to MUST support)

Data Carriers

> **INFO**
>
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Overview

Digital data needs to be linked to the physical product it describes and should be discoverable through the identifiers printed on that product, including serial or batch number as appropriate. For high volume goods and easy / reliable discovery, these identifiers are already typically represented as barcodes, matrix codes, QR codes, or RFID encoded data. UNTP supports the use of these existing data carriers. A basic UNTP principle is that if you have a product then you should be able to find ESG data about that product even when the identifier is not a web link. Therefore, the UNTP defines a generalised protocol (based on ISO/IEC DIS 18975) to allow any identifier scheme (GS1 or otherwise) to be consistently resolvable so that product passports and other data can always be accessed from the identifier of the product. The UNTP also defines a specific QR based data carrier format for use on paper/PDF versions of conformity credentials or other trade documents that provides secure access to credentials in a way that is both human and machine readable. This provides a simple but powerful mechanism to facilitate uptake of digital solutions alongside existing paper/PDF based frameworks.

Resolvers

A *resolver* is a service that connects an identifier to one or more sources of information about the identified thing. An internet domain name *resolves* to one or more actual servers (identified by their IP addresses). Digital Object Identifiers (DOIs), commonly used to identify research papers, *resolve* to the paper itself (wherever it may be). In the UNTP context, identifiers for products, locations and supply chain operators must resolve to information about those entities. This can include the DPP, ESG certificates and more, some of which may be access-controlled. That is, knowing the location of information is not the same as automatically having access to it.

ISO/IEC DIS 18975 specifies two different approaches for encoding identifiers in HTTP URIs (web addresses). Either can be used to point to a resolver that associates an identifier with a set of links to one more sources of relevant information following the IETF's Linkset standard RFC9264. A

conformant resolver can respond to queries for a particular type of information about the identified entity by providing the appropriate link from the linkset. GS1 Digital Link is conformant to this model. The URI syntax follows the *structured path* approach set out in ISO/IEC DIS 18975 and the GS1-Conformant resolver standard defines the related service. An example will make this clearer:

Imagine a white t-shirt that has a GTIN of 9506000164908. This can be encoded in a GS1 Digital Link URI as https://id.gs1.org/01/09506000164908, which can, in turn, be encoded in a QR Code. Following that link, without any specialist software, will take you to a landing page for the white t-shirt from which there are links to specific types of information. One of those links is to sustainability information. Using an app, it's possible to ask the resolver directly for that sustainability information by appending the GS1 Digital Link URI with an instruction thus: https://id.gs1.org/01/09506000164908?linkType=gs1:sustainabilityInfo. The resolver recognises the `linkType` parameter and redirects immediately to that page. Alternatively, software can request the full linkset and either present it to the user or process it as it sees fit. See the next section for more on link types.

Link Vocabulary

With very few exceptions, all websites include hyperlinks to different pages within those websites. Users understand that clicking a 'menu' option will take them to that kind of information. Online newspapers provide a good example. There will typically be a home news section, foreign news, economics, sport, arts, lifestyle, weather, TV guide and so on. Applying this to UNTP, when looking for information about a product the user will want the DPP, certificates covering ESG issues and conformance, perhaps manufacturer's details. These can all be provided using the same infrastructure and methods as used for consumer information such as the sustainabilty page in the white t-shirt example above.

The IETF's RFC9264 defines how sets of links can be made machine-discoverable and machine-interpretable. The key feature being that each link is annotated with the type of thing it points to. There is no limit on those link types but interoperability is lost if everyone uses their own. Therefore it is preferable to choose link types from a defined list that is under formal change management. GS1 provides one such list as part of its Web Vocabulary.

1D Barcodes

2d Matrix Codes

QR Codes

RFID Codes

Best Practices

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Design patterns are non-normative but provide best practice guidance for UNTP implementers.

Trust Anchors

UNTP credentials will include identifiers of products, locations or businesses. UNTP credentials will also include ESG performance claims like emissions intensity values. But how can a verifier of these identifiers or ESG claims be confident that the claims are true and that they are made by the genuine party at a verifiable location? Trust anchors are national or international authorities that typically run existing business or product registration, certification, accreditation, or other high integrity processes. Examples of trust anchors include national regulators that govern things like land ownership or business registrations. Another example are the national accreditation bodies that audit and accredit certifiers to issue third party assessments. UNTP depends on trust anchors to add digital integrity to ESG claims and identities by linking them to the authority under which they are made. In essence, UNTP defines a protocol for existing trust anchors to continue doing what they have always done, but in a digitally verifiable way.

Trust Graphs

The ESG footprint of a finished product is the aggregation of it's components and processes through the value chain. Verification of ESG claims therefore involves assessing a bundle of linked credentials (aka a "trust graph") drawn from all or part of a value chain. Whilst each credential may be valid in it's own right, one challenge is verifying the context of related credentials. For example, a conformity assessment body that is accredited to test strength of structured steel might not be accredited to issue emissions intensity certificates. A technically valid emissions certificate linked to a technically valid accreditation certificate that has a different scope would be fraudulent. To address this problem, the UNTP defines a simple method to verify the contextual scope of linked credentials. Essentially this provides a mechanism to verify a linked graph of data at a layer above individual credential verification.

Confidentiality

There is a balance between the demands of transparency (more supply chain visibility means it's harder to hide greenwshing) and confidentiality (share too much data and you risk expososing commercial secrets). A key UNTP principle is that every supply chain actor should be able to choose their own balance between transparency and confidentiality. To achieve this, UNTP defines six data confidentiality patterns with different degrees of data protection so that they can be appropriately combined to meet the confidentiality goals of each party. This includes the ability to selectively redact data from credentials received from upstream suppliers before passing them on to downstream buyers - without affecting the cryptographic integrity of the data.

Counterfeiting

As the value of genuinely sustainable goods increases, so do the incentives to sell fake goods as the real thing. UNTP defines a simple and decentralised anti-counterfeiting protocol that can be implemented by any producer at very low cost. It builds upon the W3C DID standard by issuing a unique DID (and corresponding keypair) for every serialised (individual or batch) product. The DID (and therefore the public key) is discoverable from the product serial number using the standard link resolver protocol. The item/batch level DID is cryptographically linked to the product class level DID The private key is discoverable from a QR code hidden inside the product packaging. Scanning the QR provides the necessary key to update the individual serialised product public status to indicate consumption. Attackers that copy genuine serial numbers will find that their products are quickly identifiable as fakes. Attackers that try to create new serial numbers will not be able to create valid links to the genuine product class. The UNTP anti-counterfeiting protocol provides additional value/incentive for UNTP uptake beyond ESG integrity.

Mass Balance

Mass balance fraud is a particularly challenging greenwashing vector. It happens when a fraudulent actor buys a small quantity of high ESG integrity inputs (eg genuine carbon neutral, organic, deforestation free cotton) and mixes that input with lower quality alternatives and then sells the full volume of manufactures product (eg woven cotton fabric) as sustainable product, re-using the valid credentials from the niche supply. The UNTP solution to this problem involves trusted third parties (certifiers or industry associations) to act as quota managers that issue "guarantee of origin" credentials (a type of conformity credential). In this model, the guarantee of origin certificate for 10 Tons of cotton fabric (for example) can only be issued when the third party has evidence of the

purchase of at least 10 Tons sustainable input materials. The third party will also mark the input batch as consumed (in a similar way to the anti-counterfeiting protocol) so that the valid sustainble input cannot be re-presented to a different third party.

ESG Rules

Yet another greenwashing attack vector is to deliberately apply incorrect rules to the determination of criteria such as emissions intensity. The verification question in this case is "yes, but how do I know you calculated it right?". The UNTP proposes an independent calculator service offered either by the standards body or regulator that defined the rules or by an accredited service provider. The Supply chain actor presents raw data to the calculator which returns with a signed credential confirming that the rules were correctly applied. This protocol has an additional benefit for legitimate actors if widely adopted by rules authorities - which is to significantly simplify the assessment of compliance against multiple different rules. By separating observed facts from the assessment of those facts against specific rules then it becomes relatively simple to test compliance against multiple standards and regulations.

GS1 Binding

The UNTP is agnostic of any technology or any identifier system. Nevertheless, GS1 is by far the most widely used scheme for product identification, particularly at the downstream / consumer end of the value chain. Billions of unique product/shipment identifiers have been issued and over 5 billion product barcode scans happen around the world every day. UNTP does not require any actor to adopt GS1 standards and identifiers, but it certainly must facilitate existing GS1 users to adopt the UNTP. To this end, the UNTP defines a specific binding that shows how existing GS1 users can leverage their existing investments when implementing the UNTP.

Trust Anchors

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Overview

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VC Representation

Public Web Representation

Identity Credentials

Accreditation Credentials

Trust Graphs

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Overview

The ESG footprint of a finished product is the aggregation of it's components and processes through the value chain. Verification of ESG claims therefore involves assessing a bundle of linked credentials (aka a "trust graph") drawn from all or part of a value chain. Whilst each credential may be valid in it's own right, one challenge is verifying the context of related credentials. For example, a conformity assessment body that is accredited to test strength of structured steel might not be accredited to issue emissions intensity certificates. A technically valid emissions certificate linked to a technically valid accreditation certificate that has a different scope would be fraudulent. To address this problem, the UNTP defines a simple method to verify the contextual scope of linked credentials. Essentially this provides a mechanism to verify a linked graph of data at a layer above individual credential verification.

Trust Graphs

JSON-LD Representation

SCHACL Graph verification

Confidentiality

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Overview

There is a balance between the demands of transparency (more supply chain visibility means it's harder to hide greenwshing) and confidentiality (share too much data and you risk expososing commercial secrets). A key UNTP principle is that every supply chain actor should be able to choose their own balance between transparency and confidentiality. To achieve this, UNTP defines six data confidentiality patterns with different degrees of data protection so that they can be appropriately combined to meet the confidentiality goals of each party. This includes the ability to selectively redact data from credentials received from upstream suppliers before passing them on to downstream buyers - without affecting the cryptographic integrity of the data.

Discoverable Public Data

Public Data with GUID key

Encrypted Data with Shared Key

Encrypted Data with Requestable Key

Selective Redaction

Private Data

Usage Patterns

Anti-Counterfeiting

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Overview

As the value of genuinely sustainable goods increases, so do the incentives to sell fake goods as the real thing. UNTP defines a simple and decentralised anti-counterfeiting protocol that can be implemented by any producer at very low cost. It builds upon the W3C DID standard by issuing a unique DID (and corresponding keypair) for every serialised (individual or batch) product. The DID (and therefore the public key) is discoverable from the product serial number using the standard link resolver protocol. The item/batch level DID is cryptographically linked to the product class level DID The private key is discoverable from a QR code hidden inside the product packaging. Scanning the QR provides the necessary key to update the individual serialised product public status to indicate consumption. Attackers that copy genuine serial numbers will find that their products are quickly identifiable as fakes. Attackers that try to create new serial numbers will not be able to create valid links to the genuine product class. The UNTP anti-counterfeiting protocol provides additional value/incentive for UNTP uptake beyond ESG integrity.

Product Serial DID

Product Serial VC

Brand Trust Root

Public Verification

Private Acquittal

Mass Balance

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Overview

Mass balance fraud is a particularly challenging greenwashing vector. It happens when a fraudulent actor buys a small quantity of high ESG integrity inputs (eg genuine carbon neutral, organic, deforestation free cotton) and mixes that input with lower quality alternatives and then sells the full volume of manufactures product (eg woven cotton fabric) as sustainable product, re-using the valid credentials from the niche supply. The UNTP solution to this problem involves trusted third parties (certifiers or industry associations) to act as quota managers that issue "guarantee of origin" credentials (a type of conformity credential). In this model, the guarantee of origin certificate for 10 Tons of cotton fabric (for example) can only be issued when the third party has evidence of the purchase of at least 10 Tons sustainable input materials. The third party will also mark the input batch as consumed (in a similar way to the anti-counterfeiting protocol) so that the valid sustainble input cannot be re-presented to a different third party.

ESG Rules

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Overview

Yet another greenwashing attack vector is to deliberately apply incorrect rules to the determination of criteria such as emissions intensity. The verification question in this case is "yes, but how do I know you calculated it right?". The UNTP proposes an independent calculator service offered either by the standards body or regulator that defined the rules or by an accredited service provider. The Supply chain actor presents raw data to the calculator which returns with a signed credential confirming that the rules were correctly applied. This protocol has an additional benefit for legitimate actors if widely adopted by rules authorities - which is to significantly simplify the assessment of compliance against multiple different rules. By separating observed facts from the assessment of those facts against specific rules then it becomes relatively simple to test compliance against multiple standards and regulations.

Business Case

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Business Case

For Industry

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For Industry

For Certifiers

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For Certifiers

For Industry Associations

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For Industry Associations

For Regulators

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For Regulators

For Software Vendors

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For Software Vendors

Implementation Guidance

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Implementation Guidance

For Industry

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For Industry

For Certifiers

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For Certifiers

For Industry Associations

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For Industry Associations

For Regulators

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For Regulators

For Software Vendors

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For Software Vendors

Test Services

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Test Service

Support

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Implementation Support

Reference Implementation

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Reference Implementation

Extensions Register

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Extensions Register

Extensions Methodology

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Overview

UNTP is designed as a common core that is usable by any industry sector or in any regulatory jurisdiction. This extensions methodology describes how to extend UNTP to meet the specific needs of any industry sector or regulated market in such a way that the extension maintains core interoperability with any other extension. This cross-industry and cross-border interoperability is a core value of UNTP because almost every value chain will cross industry and/or national borders.

In some cases, UNTP extensions are themselves UN projects - such as the extnesions defined by the UN critical raw materials traceability and transparency project. In most cases however, industry sectors and/or national projects will govern their own extensions.

To be registered as UNTP conformant, an extension MUST remain interoperable with UNTP. This is achieved by limiting extensions to the extension points described below and be completing interoperability testing.

Extension Points

Schema Extensions

Vocabulary Extensions

Identifier Extensions

Choreography Extensions

Testing Extensions

Extensions Register

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Extensions Register

Implementations Register

Implementation Conformity

Implementations Register