

UN/CEFACT Project Proposal

Project Name:	Linked Data Vocabulary & Shapes Project		
Date submitted:	03-Jan-2024	Proposed by:	Dr. Hanane BECHA
Relevant SDG targets :	This proposed underlying capability (methodology) will support the future sustainability of all UN/CEFACT business domain project deliverables. Consequently, all SDGs that are relevant for UN/CEFACT projects are also relevant for this specification.		

All SDGs impacted by UN/CEFACT business deliverables.

1. Project purpose

Required

The UN/CEFACT Core Component Library (UN/CCL) serves as a foundational element within the UN/CEFACT's suite of standards and specifications, contributing to the facilitation of international trade and electronic business. The UN/CCL supports the harmonization of business processes by providing a common vocabulary for expressing business data elements. This harmonization is essential for promoting efficiency, reducing redundancy, and improving the overall interoperability of systems and processes involved in cross-border trade. The UN/CCL includes the identification, definition, and management of standardized data components, such as data types, business entities, and data structures. These components are designed to be reusable across different domains and industries, promoting consistency and reducing the need for custom data definitions.

UN/EDIFACT, the first generation of globally standardized electronic data interchange paved the way for digital document-based communication within strongly constrained environments (slow communication, poor computing capabilities, costly storage systems). Second generation UN/CEFACT XML Schemas were introduced as a step further towards digitized data exchange but XML itself lacks the ability to be deployed in more complex situations without dramatically increasing complexity where applications are combining multiple sources of different information due to the lack of global XML naming and design rules and the fact that typically XML schemas are designed as document replacements rather than process driven snippets. The third generation of data interchange standards developed and published by UN/CEFACT are the UN/CCL-based process-driven global supply chain Reference Data Model exchange standards deployable through any exchange syntax. The UN/CEFACT fourth generation resource driven JSON-LD Web Vocabulary now offers additional Restful API data exchange possibilities.

Links between these generational standards are critical to support the facilitation of digitised global supply chains as no single technical exchange syntax solution can be a single-source solution. Whilst the UN/CCL and RDM standards provide the semantic foundation, the latest LD Web Vocabulary must be kept up to date with the semantic foundation developments which result from our UN/CEFACT Forum domain business project work.

The primary objective of this project proposal is to establish and implement a process that ensures the timely publication of a new version of the UN/CEFACT LD Web Vocabulary whenever the UN/CEFACT Library is updated. This initiative aims to support the interoperability of trade and electronic business by providing an accurate and up-to-date linked data representation of the UN/CEFACT Buy-Ship-Pay Reference Data Model.

The UN/CEFACT LD Web Vocabulary project focuses on creating and maintaining a dynamic and responsive web vocabulary that captures the evolving terminologies and semantics within the UN/CCL-based UN/CEFACT Buy-Ship-Pay Reference Data Model). This effort is crucial for enhancing the interoperability of trade-related systems and facilitating seamless communication across the global supply chain. UN/CEFACT aims to solidify its position as a leader in trade facilitation and electronic business standards by providing this valuable additional resource for the global trade community through its interoperable LD Web Vocabulary. It is essential for UN/CEFACT to provide up-to-date outputs that are relevant for modern web developers.

The aim of this project is to develop an automated mechanism to monitor changes and updates in the UN/CEFACT semantic framework (UN/CCL plus the Buy Ship Pay Reference Data models) to enable them to be reflected in the UN/CEFACT LD Web Vocabulary. It is necessary to ensure that whenever a new version of the semantic framework standards are delivered, the delivery automatically triggers the generation of a new version of the LD Web Vocabulary. JSON schema is another syntactic format that can be used for publishing the UN/CEFACT Business Standard deliverables. It is a lightweight and easily readable data interchange format and its simplicity makes it suitable for deployment in various software environments. This project proposes a target RDF vocabulary to allow UN/CEFACT JSON or XML Schema conforming data to be exposed as Linked Data.

A more recent approach adopted by many organizations (GS1, OGC, IATA, ETSI, HL7, ...) is to produce communication specifications, based on W3c RDF recommendations for Linked Data (LD) [3] : This allows information to be distributed in a more convenient and atomic manner: for instance, message parts could be cited and its content processed automatically as described in dereferencing [4], allowing automation on up-to-date information with more lightweight systems. This would allow SMEs to enter into the ecosystem, and small or large companies to benefit from evolving knowledge graphs (see: lod-Cloud [6]). This approach has already been initiated at UN/CEFACT with the publication of the “UN/CEFACT Web Vocabularies” [7] . The complexity arising from the chosen method (see a synthesis of the process [8]) has multiple consequences:

- The Web vocabulary (JSONLD context & vocabulary) can be hard to keep synchronized with UN/CEFACT semantic framework updates;
- API implementations will be difficult unless there is a machine readable description of messages structures & constraints (cardinalities...). Those are provided by JSON Schema or XML Schema, but not by JSONLD @context;
- The resulting vocabulary is difficult to combine or align with other vocabularies

Note: JSON-LD [9] is a JSON based format to serialize Linked. LD vocabularies or ontology descriptions rely on several vocabularies (c.f. RDF Primer [10] , RDF Schema [11] , OWL [12] , ShEx [13], SHACL [14], SKOS [15]..). They may be serialized as JSON-LD

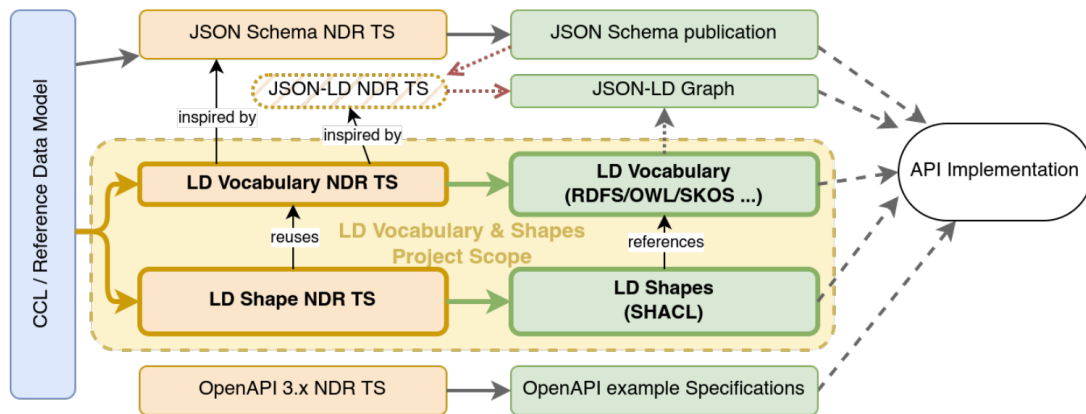
2. Project scope

Required

This project will

- To push forward the objectives of “JSONLD Web Vocabulary” project [16];
- To improve the LD Web Vocabulary publication by producing it directly from the UN/CCL-based Reference Data Models;

- To facilitate LD API implementations by providing reusable “Shapes” with structural and constraints descriptions (expressed with SHACL [14]) directly from the UN/CCL-based Reference Data Models as Application Profiles of the vocabulary.
- To allow alignment of other semantic vocabularies with UN/CEFACT [17]



A proof of concept is already in progress, for the JSONLD Graph to be produced from the UN/CCL-based Reference Data Models. The project will deliver the following :

- Linked Data Web Vocabulary update methodology technical specification

3. Project deliverables and 4. Exit Criteria

Required (check all that apply)

Please note that the Bureau may reassess and change a deliverable after its completion at its discretion.

	Project deliverables	Exit Criteria
<input type="checkbox"/>	Policy Recommendation	Public Review logs demonstrating all comments have been satisfactorily resolved; Final document ready for publication.
<input type="checkbox"/>	Business Requirement Specification	
<input checked="" type="checkbox"/>	Technical Specification	
<input type="checkbox"/>	White Paper	Final document ready for publication.
<input type="checkbox"/>	Green Paper	
<input checked="" type="checkbox"/>	Requirement Specification Mapping	
<input type="checkbox"/>	Core Component Business Document Assembly	
<input type="checkbox"/>	Guidelines	
<input type="checkbox"/>	Executive Guide	
<input type="checkbox"/>	Brochure	Final deliverable ready for publication.
<input type="checkbox"/>	Entries/alignment to the Core Component Library	
<input type="checkbox"/>	XML Schema	Final document ready for Bureau approval.
<input type="checkbox"/>	UN/EDIFACT message	
<input type="checkbox"/>	Internal UN/CEFACT Document	
<input type="checkbox"/>	Other (specify)	

5. Impact analysis

Please indicate how these project deliverables will affect trade facilitation policies and regulations. Please highlight any anticipated / tangible results achieved. Indicate how the results and impact can be evaluated after the project is completed.

UN/CEFACT electronic standards for trade facilitation evolves covering aspects such as sustainability and products circularity. We need to make sure that all the data elements in the UN/CCL-based Reference Data Models will be accessible using the modern technologies. Therefore, this project

delivers wide-scale across-the-board value to uplift the relevance and uptake of the UN/CEFACT semantic standards across all relevant data exchange syntaxes and methodologies.

6. Project Team membership and required functional expertise

Membership is open to UN/CEFACT experts with broad knowledge in the area of: CCL/RDM Business Semantics
JSON-LD technology

In addition, Heads of Delegations may invite technical experts from their constituency to participate in the work.

Experts are expected to contribute to the work based solely on their expertise and to comply with the UN/CEFACT Code of Conduct and Ethics and the policy on Intellectual Property Rights.

<https://unece.org/trade/documents/2010/12/session-documents/intellectual-property-rights-policy>

7. HoD support

Required for Technical Standards, Business Standards and UNECE Recommendations. And at the request of the UN/CEFACT Bureau. A request for HoD support will be circulated to all HoDs in these cases. If you have verbal confirmation from specific delegations of their support, please list these here. Projects that require HoD support must obtain this within 6 months of Bureau provisional approval.

Proposed :

- Japan
- Australia
- UK
- France

8. Geographical focus

The geographical focus of the project is global

9. Beneficiaries

Highlight relevance for sustainable and digital trade facilitation in developing and transition economies, and benefits to vulnerable groups (e.g. MSMEs and women-led businesses)

Most SMEs use commercial small-business software for managing their business. Modern API specifications from UN/CEFACT will contribute to facilitating the implementation of data interchange capabilities that bring them to a common level with larger enterprises, thereby levelling the playing field for SMEs.

10. Initial contributions

The following are the used references and the initial contributions for this project:

List any initial contributions:

References and initial contributions:

1. UN/CEFACT JSON Schema Naming and Design Rules Technical Specification
2. UN/CEFACT OpenAPI Naming and Design Rules
3. How JSON Schema NDR and OpenAPI can enhance the interoperability and accessibility of UN/CEFACT standards. [How JSON Schema NDR and OpenAPI \(unece.org\)](https://unece.org/trade/documents/2010/12/session-documents/intellectual-property-rights-policy)
4. JSONLD Web Vocabulary. UN/CEFACT Collaboration Environment.
<https://uncefact.unece.org/display/uncefactpublic/JSONLD+Web+Vocabulary>

5. Reuse of UN/CEFACT standards. [PowerPoint Presentation \(unece.org\)](#)
6. [Introducing UN/EDIFACT | UNECE](#)
7. [XML Schemas | UNECE](#)
8. [LinkedData - W3C Wiki](#)
9. [DereferenceURI - W3C Wiki](#)
10. [The Digital Economy and Society Index \(DESI\) | Shaping Europe's digital future \(europa.eu\)](#)
11. [The Linked Open Data Cloud \(lod-cloud.net\)](#)
12. JSONLD 1.1. <https://www.w3.org/TR/jsonld/>
13. RDF 1.1 Primer. RDF 1.1 Primer. <https://www.w3.org/TR/rdf11primer/>
14. RDF 1.2 Schema. [RDF 1.2 Schema \(w3.org\)](#)
15. OWL 2 Web Ontology Language Document Overview (Second Edition). <https://www.w3.org/TR/owl2 overview/>
16. Shape Expressions (ShEx) 2.1 Primer. <https://shex.io/shexprimer/index.html>
17. Shapes Constraint Language (SHACL) <https://www.w3.org/TR/shacl/>
18. SKOS Simple Knowledge Organization System Primer. <https://www.w3.org/TR/2009/NOTE-skosprimer20090818/>

11. Resource requirements

Participants in the project shall provide resources for their own participation. The existence and functioning of the project shall not require any additional resources from the UNECE secretariat.

Any additional request:	None
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11. Proposed project leadership

(subject to Bureau approval)

Proposed project lead:	Damien Truffaut	E-mail:	d.truffaut@lainpharma.com
Proposed Vice Chair:	Steven Capell	E-mail:	Steve.capell@gmail.com
Proposed domain	Specification		

11. Milestones (repeat for each deliverable, if different)

The following are draft milestones of the project.

	ODP Stage	Expected Completion Date	
Yes	Project Inception	1 month	
Yes / No	Requirements gathering	<input checked="" type="checkbox"/>	1 month
Yes	Draft development	<input type="checkbox"/>	3 months (Very quick)
		<input checked="" type="checkbox"/>	6 months (Quick)
		<input type="checkbox"/>	12 months (Normal)
		<input type="checkbox"/>	18 months (Normal)
		<input type="checkbox"/>	24 months (Long)
Yes / No	Public Draft Review	<input checked="" type="checkbox"/>	2 months
Yes	Project Exit	1 month	