CATENA-X

STANDARD

CX - 0020 Aspect Model Single Level BoM As Built v.2.0.0

Contact: standardisierung@catena-x.net

Table of Contents

ABOUT THIS DOCUMENT & MOTIVATION

Catena-X is the first open and collaborative data ecosystem. The goal is to provide an environment for the creation, operation, and joint use of end-to-end data chains along the entire automotive value chain. All partners are on an equal ground, have sovereign control over their data and no lock-in effects occur. This situation provides a sustainable solution for the digitalization of supply chains, especially for medium-sized and small companies, and supports the cooperation and collaboration of market participants and competitors.

The ever-growing Catena-X ecosystem will enable enormous amounts of data to be integrated and collaboratively harnessed. To ensure that these complex data volumes can be sent, received, and processed smoothly across all stages of the value chain, one language for all players: common standards. The standards of the Catena-X data ecosystem define how the exchange of data and information in our network works. They are the basis for ensuring that the technologies, components, and processes used are developed and operated according to uniform rules.

Common standards create added value for all partners: Within our network, data flows more smoothly through interfaces. In addition, we avoid cumbersome individual IT solutions for sharing data with other partners. In the field of international standardization, Catena-X follows the proven international standardization institutions: ISO/IEC/ITU and CEN-CENELC/ETSI.

For users and data providers, implementation of standards will reduce the costs that would arise from adapting different systems. In addition, no important data is lost. On the contrary, it even becomes easier to collect data across companies. For operators and developers, standards will create a framework that provides reliable orientation and planning security.

The following document describes one of the standards used in the Catena-X ecosystem and the requirements needed to implement it. Here, it serves as main resource to illustrate the following data model. It contains information starting from the format of the model, up to the conceptual and physical model. The standardisation of the data model will enable faster information sharing and homogeneity throughout the entire Catena-X ecosystem.

DISCLAIMER & LIABILITY

The present document and its contents are provided "AS-IS" with no warranties whatsoever.

The information contained in this document is believed to be accurate and complete as of the date of publication, but may contain errors, mistakes or omissions.

The Catena-X Automotive Network e.V. ("Catena-X") makes no express or implied warranty with respect to the present document and its contents, including any warranty of title, ownership, merchantability, or fitness for a particular purpose or use. In particular, Catena-X does not make any representation or warranty, and does not assume any liability, that the contents of the document or their use (i) are technically accurate or sufficient, (ii) conform to any law, regulation and/or regulatory requirement, or (iii) do not infringe third-party intellectual property or other rights.

No investigation regarding the essentiality of any patents or other intellectual property rights has been carried out by Catena-X or its members, and Catena-X does not make any representation or warranty, and does not assume any liability, as to the non-infringement of any intellectual property rights which are, or may be, or may become, essential to the use of the present document or its contents.

Catena-X and its members are subject to the IP Regulations of the Association Catena-X Automotive Network e.V. which govern the handling of intellectual property rights in relation to the creation, exploitation and publication of technical documentation, specifications, and standards by Catena-X.

Neither Catena-X nor any of its members will be liable for any errors or omissions in this document, or for any damages resulting from use of the document or its contents, or reliance on its accuracy or completeness. In no event shall Catena-X or any of its members be held liable for any indirect, incidental or consequential damages, including loss of profits. Any liability of Catena-X or any of its members, including liability for any intellectual property rights or for non-compliance with laws or regulations, relating to the use of the document or its contents, is expressly disclaimed.

REVISIONS & UPDATE

The present document may be subject to revision or change of status. Catena-X reserves the right to adopt any changes or updates to the present document as it deems necessary or appropriate.

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be copied or modified without the prior written authorization of Catena-X. In case of any existing or perceived difference in contents between any versions and/or in print, the prevailing version of the present document is the one made publicly available by Catena-X in PDF format.

If you find any errors in the present document, please send your comments to: standardisierung@catena-x.net

COPYRIGHT & TRADEMARKS

ABSTRACT

Traceability aims to built up product genealogy information throughout the supply chain. Therefore it is required to link a produced part with its predecessor items. SingleLevelBoMAsBuilt is the submodel for a digital twin for such a linkage. It contains the unique identifiers of the predecessor items of a produced or assembled part and therefore allows navigation through the supply chain by Catena-X identifiers.

1. Introduction

The aspect SingleLevelBoMAsBuilt provides information on the child items (one structural level down) from which the given object is assembled. It describes the relationship of serialized items.

Note: The presented aspect model is in version 1.0.0

1.1 Audience & Scope

> *This section is non-normative*

This standard applies to the roles:

- Data Provider / Consumer
- Business Application Provider

The semantic model or submodel template specified in this document MUST be, when used, made available by Traceability applications, as well as all data providers in the traceability use-case.

1.2 Context

> *This section is non-normative*

This submodel template or aspect model is required to identify child Items for a given part in terms of product genealogy.

It links the Catena-X IDs of the parent part with the Catena-X IDs of its ingredients or components.

Therefore this aspect allows navigation throughout the supply chain.

1.3 Architecture Overview

> *This section is non-normative*

1.4 Conformance

As well as sections marked as non-normative, all authoring guidelines, diagrams, examples, and notes in this specification are non-normative. Everything else in this specification is normative.

The key words MAY, MUST, MUST NOT, OPTIONAL, RECOMMENDED, REQUIRED, SHOULD and SHOULD NOT in this document are to be interpreted as described in BCP14, RFC2119, RFC8174 when, and only when, they appear in all capitals.

1.5 Proof of conformity

> *This section is non-normative*

All participants* and their solutions MUST prove they conform with the Catena-X standards. To validate that the standards are applied correctly, Catena-X employs Conformity Assessment Bodies (CABs).

A model validator MUST be created, to prove the correctness of the data model. A generic test set created for the model MUST prove the expected results.

**Disclaimer: The operating model released by the Catena-X association will define the roadmap, content and scope for the certification process. This will include the roles, certification and further assessment procedures as well as the rollout phases.*

1.6 Examples


```
{
  "catenaXId": "urn:uuid:580d3adf-1981-44a0-a214-13d6ceed9379",
  "childItems": [
    {
      "quantity": {
        "quantityNumber": 1.0,
        "measurementUnit": "unit:piece"
      },
      "createdOn": "2022-02-03T14:48:54.709Z",
      "lastModifiedOn": "2022-02-03T14:48:54.709Z",
      "catenaXId": "urn:uuid:d60b99b0-f269-42f5-94d0-64fe0946ed04",
      "businessPartner": "BPNL50096894aNXY"
    }
  ]
}
```


Example JSON payload: Submodel "SingleLevelBomAsBuilt" for a Batch


```
{
  "catenaXId": "urn:uuid:580d3adf-1981-44a0-a214-13d6ceed9379",
  "childItems": [
    {
```

```
      "quantity": {
        "quantityNumber": 25.0,
        "measurementUnit": "unit:kilogram"
      },
      "createdOn": "2022-02-03T14:48:54.709Z",
      "lastModifiedOn": "2022-02-03T14:48:54.709Z",
      "catenaXId": "urn:uuid:d60b99b0-f269-42f5-94d0-64fe0946ed04",
      "businessPartner": "BPNL50096894aNXY"
    }
  ]
}
```


1.7 Terminology

> *This section is non-normative*

The following terms are especially relevant for the understanding of the standard:

Business Partner Number (BPN)

A BPN is the unique identifier of a partner within Catena-x.

Business Partner Number Legal Entity (BPNL)

A BPNL is the unique identifier of a manufacturer within Catena-x.

Aspect Model

A formal, machine-readable semantic description (expressed with RDF/turtle) of data accessible from an Aspect.

```
Note 1 to entry: An Aspect Model must adhere to the Semantic Aspect Meta
Model (SAMM), i.e., it utilizes elements and relations defined in the
Semantic Aspect Meta Model and is compliant to the validity rules
defined by the Semantic Aspect Meta Model.

Note 2 to entry: Aspect model are logical data models which can be used
to detail a conceptual model in order to describe the semantics of
runtime data related to a concept. Further, elements of an Aspect model
can/should refer to terms of a standardized Business Glossary (if
existing).
```

[Source: Catena-X, SEM-002, note 3 removed]

Additional terminology used in this standard can be looked up in the glossary on the association homepage.

2. Aspect Model SingleLevelBoMAsBuilt

> *This section is normative*

2.1 Introduction

The aspect SingleLevelBoMAsBuilt provides information on the child items (one structural level down) from which the given object is assembled. It describes the relationship of serialized items.

If a data provider decides to provide data for the SingleLevelBomAsBuilt Aspect Model they **MUST** provide the data conformant to the semantic model specified in this document.

The unique identifier of the semantic model specified in this document MUST be used by the data provider to define the semantics of the data being transferred.

Every certified business application relying on SingleLevelBoMAsBuilt data MUST be able to consume data conformant to the semantic model specified in this document.

This semantic model MUST be made available in the central Semantic Hub.

Data consumers and data provider MUST comply with the license of the semantic model.

In the Catena-X data space SingleLevelBoMAsBuilt data MUST be requested and exchanged via Eclipse Dataspace Connector (EDC) conformant to CX-0018 and CX-0002 .

Data providers of the SingleLevelBomAsBuilt Aspect Model MUST provide the data as part of a digital twin of the asset for serialized items conformant to CX-0002.

The JSON Payload of data providers MUST be conformant to the JSON Schema as specified in this document.

2.2 Specification Artifacts

The modeling of the semantic model specified in this document was done in accordance to the "semantic driven workflow" to create a submodel template specification [SMT].

This aspect model is written in BAMM 2.0.0 as a modeling language conformant to CX-0003 as input for the semantic derived workflow.

Like all Catena-X data models, this model is available in a machine-readable format on GitHub[^3] c conformant to CX-0003 .

2.3 License

This Catena-X data model is an outcome of Catena-X use case group Traceability. This Catena-X data model is made available under the terms of the Creative Commons Attribution 4.0 International (CC-BY-4.0) license, which is available at Creative Commons[^4].

The license information is available in github.

In case of doubt the license, copyright and authors information in github overwrites the information in this specification document.

2.4 Identifer of Semantic Model

The semantic model has the unique identifier

urn:bamm:io.catenax.single_level_bom_as_built:1.0.0#SingleLevelBoMAsBuilt

2.5 Formats of Semantic Model

2.5.1 RDF Turtle

The rdf turtle file, an instance of the Semantic Aspect Meta Model, is the master for generating additional file formats and serializations.

https://github.com/eclipse-tractusx/sldt-semantic-models/blob/main/io.catenax.single_level_bom_as_built/1.0.0/SingleLevelBomAsBuilt.ttl

The open source command line tool of the Eclipse Semantic Modeling Framework[^5] is used for generation of other file formats like for example a JSON Schema, aasx for Asset Administration Shell Submodel Template or a HTML documentation.

2.5.2 JSON Schema

A JSON Schema can be generated from the RDF Turtle file. The JSON Schema defines the Value-Only payload of the Asset Administration Shell for the API operation "GetSubmodel".

2.5.3 aasx

A AASX file can be generated from the RDF Turtle file. The AASX file defines one of the requested artifacts for a Submodel Template Specification conformant to [SMT].

3. References

3.1 Normative References

CX-0002 DIGITAL TWINS IN CATENA-X
CX-0003 BAMM ASPECT META MODEL
CX-0004 GOVERNANCE PROCESS FOR SEMANTIC MODELS
CX-0018 ECLIPSE DATA SPACE CONNECTOR (EDC)
CX-0001 EDC DISCOVERY API

3.2 Non-Normative References

[SMT] How to create a submodel template specification. Guideline. Download from: https://industrialdigitaltwin.org/wp-content/uploads/2022/12/I40-IDTA-WS-Process-How-to-write-a-SMT-FINAL-.pdf