CATENA-X
STANDARD

CX-0095-DataModelTransmissionPass v.1.0.0

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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.

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ABSTRACT

The data model "TransmissionPass" in the version 1.0.0 corresponds to the digital product passport information required by the proposed Ecodesign Regulation (ESPR-2022) and describes the data that is collected and available during the lifespan of a transmission. The vision of the project "Digital Product Pass" is to achieve 100% material circularity, a trusted, transparent, traceable, standardized, and automatic digital supply chain to holistically enable material circularity. The project "Digital Product Pass" by partners from industry and research is designing content and technical standards for a transmission pass based on collected requirements. The consumers can see at a glance the relevant data about the transmissions which ARE installed in the vehicle. The data set includes manufacturing, safety and sustainability information.This standard defines the format for the circularity data, so that the exchange of the data between different partners is possible.

1. INTRODUCTION

This document describes a semantic model used in the Catena-X network.

1.1 AUDIENCE & SCOPE

This section is non-normative

The purpose of this document is the description of the Asset Administration Shell submodel Transmission Pass. It defines the transmission identity and all relevant attributes. The presented data model is described and illustrated in the following with the entities and properties and their interrelationships.

This standard is relevant for following roles:

Data Provider / Consumer
Business Application Provider

1.2 CONTEXT

This section is non-normative

The Transmission Passport is a further instrument to develop a sustainable and circular transmission value chain delivering on ten principles by monitoring the sustainability performance based on data. They are Understandable, Standardized, Accurate, Differentiating, Auditable, Comprehensive and providing the insights to trigger improvement action. The Transmission Passport is the supplementary for the Digital Product Passport.

The Passport itself is defined by the usage of Catena-X shared services, a standardized data model and an application which will enable stakeholders to access the relevant data. The first version of the transmission passport model consists out of the following information:

The circularity parameters will contribute to a more transparent and circular economy within the European Union. The detailed description is given in the Ecodesign for Sustainable Products Regulation Proposal (ESPR). From these regulations, content clusters for circularity were identified, and concrete circularity parameters for the transmission passport derived. The data sets also contain information, which are relevant for closed and open loop business models. It is important to note that the data model contains information / data fields, which are optional and mandatory for regulation fulfilment. It is also worth mentioning that sharing information within the network is based on decentralised technologies and is always based on the individual decision by each provider. This data model is based on the new proposed Ecodesign Regulation (ESPR-2022) and is continuously adapted to the basic conditions over time.

1.3 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 document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

1.4 PROOF OF CONFORMITY

This section is non-normative

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

1.5 EXAMPLE

The following json code gives an overview of the data model.

```json
{
  "productSpecificParameters" : {
    "torqueConverter" : [ "RYtGKbgicZaHCBRQDSx" ],
    "driveType" : "combustion engine",
    "oilType" : "ZF Lifeguard Hybrid 2",
    "spreading" : 6.79,
    "torque" : 500.0,
    "power" : 300.0,
    "standardGearRatio" : {
      "gear" : "1",
      "ratio" : 4.1567
    },
    "oilCapacity" : 8.9,
    "electricPerformance" : [ "VLhpfQGTMDYpsBZxvfBoeygjb" ],
    "speedResistance" : {
      "speed" : 7800,
      "gear" : "1"
    }
```

```json
    },
    "instructions" : {
      "packagingInstructions" : [ {
        "documentTitle" : "Title A",
        "documentLink" : "https://www.xxx.pdf"
      } ],
      "transportationInstructions" : [ {
        "documentTitle" : "Title A",
        "documentLink" : "https://www.xxx.pdf"
      } ],
      "dismantlingProcedure" : [ {
        "documentTitle" : "Title A",
        "documentLink" : "https://www.xxx.pdf"
      } ],
      "safetyMeasures" : [ {
        "documentTitle" : "Title A",
        "documentLink" : "https://www.xxx.pdf"
      } ],
      "vehicleDismantlingProcedure" : [ {
        "documentTitle" : "Title A",
        "documentLink" : "https://www.xxx.pdf"
      } ]
    },
    "identification" : {
      "manufacturerId" : "BPNL1234567890ZZ",
      "localIdentifiers" : [ {
        "value" : "SN12345678",
        "key" : "PartInstanceID"
      } ],
      "dataMatrixCode" : "UMaAIKKIkknjWEXJUfPxxQHeWKEJ"
    },
    "sparePartSupplier" : [ {
      "supplierContact" : {
        "faxNumber" : "+49 89 0987654321",
        "website" : "https://www.samsung.com",
        "phoneNumber" : "+49 89 1234567890",
        "email" : "test.mail@example.com"
      },
      "supplierId" : "BPNL1234567890ZZ",
      "sparePartName" : "torque converter"
    } ],
    "stateOfHealth" : {
      "serviceHistory" : [ "2023-05-22T13:16:47.239+02:00" ],
      "expectedLifespan" : 500000,
      "remanufacturing" : {
        "remanufacturingDate" : "2023-05-22T13:16:47.239+02:00",
        "productStatusValue" : "first life"
      }
    },
    "generalInformation" : {
      "additionalInformation" : "JxkyvRnL",
      "physicalDimensionsProperty" : {
```

```json
      "width" : 1000.0,
      "length" : 20000.1,
      "weight" : 100.7,
      "diameter" : 0.03,
      "height" : 0.1
    },
    "warrantyPeriod" : 60.0,
    "productDescription" : "manual transmission",
    "productType" : "8HP60MH"
  },
  "sustainability" : {
    "substancesOfConcern" : [ "yedUsFwdkelQbxeTeQOvaScfqIOOmaa" ],
    "responsibleSourcingDocument" : [ {
      "documentTitle" : "Title A",
      "documentLink" : "https://www.xxx.pdf"
    } ],
    "recyclateContent" : {
      "nickel" : -1.7976931348623157E+308,
      "lithium" : -1.7976931348623157E+308,
      "cobalt" : -1.7976931348623157E+308,
      "otherSubstance" : [ {
        "substancePercentage" : 8.0,
        "substanceName" : "Lead"
      } ]
    },
    "criticalRawMaterials" : [ "eOMtThyhVNLWUZNRcBaQKxI" ],
    "carbonFootprint" : {
      "crossSectoralStandardsUsed" : [ {
        "crossSectoralStandard" : "GHG Protocol Product standard"
      } ],
      "co2FootprintTotal" : -1.7976931348623157E+308,
      "productOrSectorSpecificRules" : [ {
        "operator" : "PEF",
        "ruleNames" : "ABC 2021",
        "otherOperatorName" : "NSF"
      } ]
    }
  }
}
```

1.6 TERMINOLOGY

This section is non-normative

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

Ecodesign for Sustainable Products regulation (ESPR) : The proposal establishes a framework to set ecodesign requirements for specific product groups to significantly improve their circularity, energy performance and other environmental sustainability aspects.

Business Partner Number (BPN) : A BPN is the unique identifier of a partner within Catena-x

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

2 ASPECT MODEL ""TRANSMISSIONPASS""

2.1 INTRODUCTION

The purpose of this document is the description of the Asset Administration Shell submodel Transmission Pass. It defines the transmission identity and all relevant attributes. The presented data model is described and illustrated in the following with the entities and properties and their interrelationships.

2.2 SPECIFICATION ARTIFACTS

The modelling 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 deriven workflow.

Like all Catena-X data models, this model is available in a machine-readable format on GitHub2F2F conformant to CX-0003.

2.3 LICENSE

This Catena-X data model is an outcome of Catena-X use case group Digital Product Pass (DPP). 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 Commons4F4F.

2.4 IDENTIFER OF SEMANTIC MODEL

The semantic model has the unique identifier:

```
urn:bamm:io.catenax.transmission.transmission_pass:1.0.0
```

2.5 FORMATS OF SEMANTIC MODEL

All different formats of the semantic model can be found in the github repository.

```
https://github.com/eclipse-tractusx/sldt-semantic-
models/tree/main/io.catenax.transmission.transmission_pass/1.0.0
```

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. It can be accessed via github:

```
https://github.com/eclipse-tractusx/sldt-semantic-
models/blob/main/io.catenax.transmission.transmission_pass/1.0.0/TransmissionPass.ttl
```

The open source command line tool of the Eclipse Semantic Modeling Framework 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. These other formats are saved in the "gen" folder in github:

```
https://github.com/eclipse-tractusx/sldt-semantic-
models/tree/main/io.catenax.transmission.transmission_pass/1.0.0/gen
```

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".

```
https://github.com/eclipse-tractusx/sldt-semantic-
models/blob/main/io.catenax.transmission.transmission_pass/1.0.0/gen/TransmissionPass-
schema.json
```

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].

Note: As soon as the specification V3.0 of the Asset Administration Shell specification is available and update will be provided.

3.1 NORMATIVE REFERENCES

3.2 NON-NORMATIVE REFERENCES

SMT- How to create submodel template specification

ANNEXES

FIGURES