

CATENA-X

STANDARD



## CX - 0041 Semantic Model: Manufactured Parts Quality Information

BUSINESS DOMAIN: PLM & QUALITY

USE CASE: LIVE QUALITY LOOPS

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## **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 reference implementations 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. Defining the data model as a reference implementation enables faster information exchange and homogeneity across the Catena-X ecosystem.

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<sup>1</sup><https://catena-x.net/de/standardisierung/catena-x-einfuehren-umsetzen/standardisierung/standard-library>

## MANAGEMENT SUMMARY

The Catena-X use case Live Quality Loops (QAX) provides the ability to detect quality issues the earliest possible to start root cause analyses and/or to enable an early warning feature for new quality topics. In subsequent steps counter measures can also be defined earlier and monitored. In sum, this reduces the number of vehicles affected by quality issues and increases the availability of the vehicle and built-in components. Catena-X use case Live Quality Loops is powered by Catena-X standard core components to share data from OEM and suppliers based on data sharing agreements and usage policies.

The Catena-X use case Live Quality Loops (QAX) uses multiple data models to exchange data between automotive manufacturer (OEM) and component supplier (TIER1). Each of these data models can be supplied independently.

The data model ManufacturedPartsQualityInformation is a set of manufacturing-related properties of a produced part/component that could be relevant to solve a quality task.

## 1 INTRODUCTION

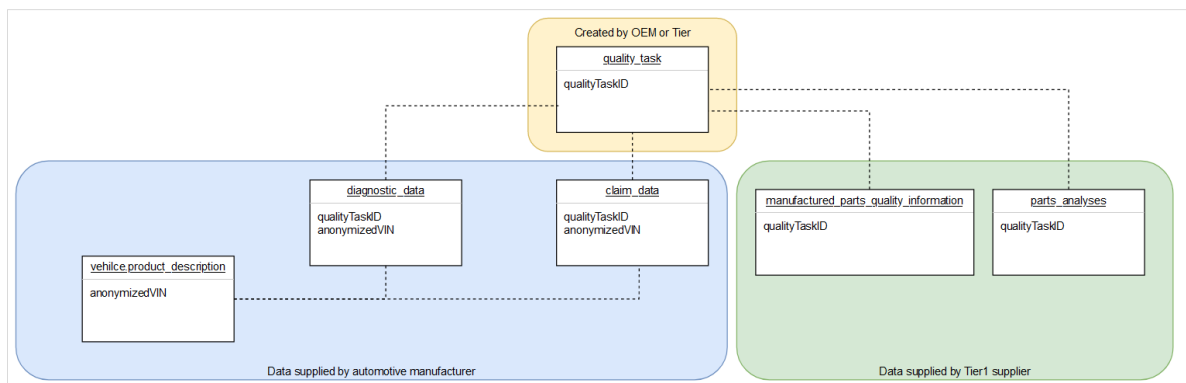
A quality topic has different natures: Proactive quality and reactive quality work.

Example for proactive quality work: A component supplier (TIER1) releases a new component for a vehicle. The TIER1 delivers this component to an automotive manufacturer (OEM). The OEM launches a new vehicle model with this component.

For both companies, the end-user experience of this component/of the new vehicle is key. Therefore, they align in a Catena-X QualityTask to exchange anonymized component performance data from the real vehicle to closely track the behavior of this component. They use Catena-X core infrastructure to exchange relevant data and start the collaborative quality monitoring.

Example for reactive quality work: More and more end-customers are complaining about a potentially faulty component in a specific vehicle model. The component supplier (TIER1) and the automotive manufacturer (OEM) are defining a Catena-X QualityTask to eliminate this quality topic.

They use the Catena-X core infrastructure to exchange relevant data and start the collaborative quality work to define countermeasures for the root cause(s).



*Figure 1: Hierarchy of Catena-X Live Quality Loops data models*

Data models in QAX and their content:

- QualityTask is the root element and describes why companies are working together on a quality topic and what they want to do. All involved companies and their contact people are named. In addition, a flag tells what should be done with exchanged data after a QualityTask is closed.
- Vehicle.ProductDescription: This data model is a representation of one vehicle affected by this QualityTask. The model represents the vehicle when it was sold to the end-customers from an end-customers point of view: Which standard equipment was installed in the vehicle and which extra equipment was installed in the vehicle.



- Fleet.DiagnosticData: Diagnostic data coming from multiple vehicles that are affected by this QualityTask + Diagnostic data from similar vehicles that are not affected by this QualityTask.
- Fleet.ClaimData: Customer complaints that are linked to this QualityTask + Data about the exchange of potentially faulty parts
- ManufacturedPartsQualityInformation: A selection of manufacturing-related parameters that help to solve the QualityTask
- PartsAnalyses: Analyses results of replaced, potentially faulty parts, that are linked to this QualityTask

The data model ManufacturedPartsQualityInformation includes a list of manufactured parts. These parts have a reference to a quality task and identifiers that allow the identification of the part at the manufacturer (supplier) and customer (OEM)

Besides that, there is the entity “Manufacturing” that groups manufacturing-related properties, like date and country of the manufacturing site, plant ID, plant description and batch ID. There are several optional properties like production line or the hasBeenReworked flag that can be supplied additionally. There is an additional information key:value list, that can be used to exchange non-standardized information.

## **2 PURPOSE OF THE DOCUMENT**

The purpose of this document is to make the reader familiar with the Catena-X use case Live Quality Loops (QAX) and the Catena-X data models that were defined by QAX. The ManufacturedPartsQualityInformation data model is enhancing another data model “SerialPartTypization” that was released by Catena-X’s use case “Traceability”. The reader of this document should be able to understand the core principles of this Catena-X data model.

The ManufacturedPartsQualityInformation consists of a list of manufactured parts. Each manufactured part has a reference to a quality task and identifiers that allow to identify the part at the manufacturers (supplier) and at customers (OEM) side.

### 3 SCOPE OF THE IMPLEMENTATION

This chapter serves to situate the given reference implementation, to outline its prerequisites and to point out its limitations.

#### 3.1 PRECONDITIONS AND DEPENDENCIES

Like all Catena-X data models, this model will be available in a machine-readable format on GitHub<sup>1</sup>.

This aspect model is written in BAMM 2.0 as a modeling language, which is a separate industry standard from the open manufacturing platform, see Open Manufacturing<sup>2</sup>.

The data contained in this Catena-X data model is requested and exchanged via Catena-X using an Eclipse Dataspace Connector (EDC), which is a separate Catena-X standard and an implementation of the IDSA standard.

The recommendation is to use Apache parquet<sup>4</sup> file format together with EDC S3 data plane for file data exchange.

#### 3.2 CONSTRAINTS AND LIMITATIONS

There are no constraints and limitations to this reference implementation document.

#### 3.3 LICENSE

This Catena-X data model is an outcome of the Catena-X use case group Live Quality Loops (QAX). 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<sup>3</sup>.

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<sup>1</sup> <https://github.com/eclipse-tractusx/sldt-semantic-models>.

<sup>2</sup> <https://openmanufacturingplatform.github.io/>

<sup>3</sup> <https://creativecommons.org/licenses/by/4.0/legalcode>

<sup>4</sup> <https://parquet.apache.org/>

## 4 DATA MODEL

The data model is described in BAMB and is available in the semantic hub from which the following description originates.

### 4.1 OVERVIEW

The data model can be described in different formats. The graphical representation of this data model can be found in the annex.

Manufactured_Parts_Quality_Information	
<b>Description</b>	This aspect model is used to exchange manufacturing-oriented information of several parts, e.g. for quality tasks
<b>Name</b>	Quality information for parts

### 4.2 PROPERTIES

A property of a BAMB Aspect Meta Model represents a named value and the following are the properties that refer to the aspect of the model.

Manufactured parts	
<b>Description</b>	A list of manufactured parts and their properties
<b>Name</b>	listOfManufacturedParts
<b>Characteristic</b>	List Has a certain order Duplicates allowed Type urn:bamm:io.catenax.manufactured_parts_quality_information:1.0.0#ManufacturedPart
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	listOfManufacturedParts

### 4.3 ENTITIES

An entity is a logical encapsulation of multiple values. It has a number of properties, which are described in the following, starting with the entity, followed by its properties.

### 4.3.1 Properties of Entity Additional information

Additional information	
<b>Description</b>	One key:value information pair
<b>Name</b>	Additional information

Key id	
<b>Description</b>	Key identifier for this additional information
<b>Name</b>	key
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	Steel quality
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	key

value	
<b>Description</b>	Value for this additional information
<b>Name</b>	value
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	Stainless steel
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	value

### 4.3.2 Properties of Entity Manufactured Part

Manufactured part	
<b>Description</b>	Manufacturing information for one part. Important properties are standardized. Besides that, there is a key:value list to exchange further non-standardized properties for this part
<b>Name</b>	Manufactured part

Catena-X ID	
<b>Description</b>	The fully anonymous Catena-X ID of the manufactured part - only available after digital twin registry is fully operational

<b>Name</b>	catenaXId	
<b>Characteristic</b>	Trait Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>	
<b>Example</b>	urn:uuid:580d3adf-1981-44a0-a214-13d6ceed9001	
<b>Optional</b>	Yes	
<b>In Payload</b>	Yes	
<b>Payload Key</b>	catenaXId	
<b>Constraints</b>	Catena-X Id Regular Expression	
	Description	The provided regular expression ensures that the UUID is composed of five groups of characters separated by hyphens, in the form 8-4-4-4-12 for a total of 36 characters (32 hexadecimal characters and 4 hyphens), optionally prefixed by "urn:uuid:" to make it an IRI.
	Reference	<a href="https://datatracker.ietf.org/doc/html/rfc4122">https://datatracker.ietf.org/doc/html/rfc4122</a>
	Regular expression	(^[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{12}\$) (^urn:uuid:[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{12}\$)

Quality Task ID	
<b>Description</b>	A unique quality task identifier where this manufacturing information belongs to. Optional to ensure that there is also data exchange without having a quality task.
<b>Name</b>	qualityTaskId
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	BPN-811_2022_000001
<b>Optional</b>	Yes
<b>In Payload</b>	Yes
<b>Payload Key</b>	qualityTaskId

Manufacturer ID	
<b>Description</b>	Identifier assigned by the manufacturer for this specific part. In case of common parts: This identifier is not unique.

<b>Name</b>	manufacturerId
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	123-0.740-3434-A
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	manufacturerId

#### Manufacturer serial part number

<b>Description</b>	Serial part number given by the manufacturer. Not available for common parts.
<b>Name</b>	manufacturerSerialPartNumber
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	436347347.4343884384.FTG.538348
<b>Optional</b>	Yes
<b>In Payload</b>	Yes
<b>Payload Key</b>	manufacturerSerialPartNumber

#### Manufacturer part name

<b>Description</b>	Name of the manufactured part as given by the manufacturer
<b>Name</b>	nameAtManufacturer
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	Steering assembly
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	nameAtManufacturer

#### Manufacturing information

<b>Description</b>	Collection of defined manufacturing-related properties for this part
<b>Name</b>	manufacturingInformation
<b>Characteristic</b>	SingleEntity Type <a href="urn:bamm:io.catenax.manufactured_parts_quality_information:1.0.0#Manufacturing">urn:bamm:io.catenax.manufactured_parts_quality_information:1.0.0#Manufacturing</a>
<b>Optional</b>	No

<b>In Payload</b>	Yes
<b>Payload Key</b>	manufacturingInformation

### 4.3.3 Properties of Entity Manufacturing

Manufacturing	
<b>Description</b>	Collection of defined manufacturing-related properties for this part
<b>Name</b>	Manufacturing

Production Date	
<b>Description</b>	Date of manufacturing
<b>Name</b>	date
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#dateTime">http://www.w3.org/2001/XMLSchema#dateTime</a>
<b>Example</b>	2022-02-04T14:48:54
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	date

Country code		
<b>Description</b>	Country code where the part was manufactured	
<b>Name</b>	country	
<b>Characteristic</b>	Trait Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>	
<b>Example</b>	DEU	
<b>Optional</b>	No	
<b>In Payload</b>	Yes	
<b>Payload Key</b>	Country	
<b>Constraints</b>	Country Code Regular Expression	
	Description	Regular Expression that ensures a three-letter code
	Regular expression	<code>^[A-Z][A-Z][A-Z]\$</code>

**Plant id**

<b>Description</b>	Manufacturer-specific identifier of the production plant of this part
<b>Name</b>	plantId
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	00001
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	plantId

#### Plant description

<b>Description</b>	Manufacturer-specific description of the production plant of this part
<b>Name</b>	plantDescription
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	Feuerbach Plant
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	PlantDescription

#### Batch number

<b>Description</b>	Manufacturer-specific batch identifier: In which batch was this part manufactured
<b>Name</b>	batchId
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	20220204_466
<b>Optional</b>	No
<b>In Payload</b>	Yes
<b>Payload Key</b>	batchId

#### Production line

<b>Description</b>	On which production line was this part produced
<b>Name</b>	productionLine
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#string">http://www.w3.org/2001/XMLSchema#string</a>
<b>Example</b>	Line_1



<b>Optional</b>	Yes
<b>In Payload</b>	Yes
<b>Payload Key</b>	productionLine

<b>Reworked</b>	
<b>Description</b>	Indicator whether this part was reworked during manufacturing
<b>Name</b>	hasBeenReworked
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#boolean">http://www.w3.org/2001/XMLSchema#boolean</a>
<b>Example</b>	false
<b>Optional</b>	Yes
<b>In Payload</b>	Yes
<b>Payload Key</b>	hasBeenReworked

<b>Conducted EOL test</b>	
<b>Description</b>	Number how often this part went through the EOL test
<b>Name</b>	numberOfConductedEOLTests
<b>Characteristic</b>	Type <a href="http://www.w3.org/2001/XMLSchema#positiveInteger">http://www.w3.org/2001/XMLSchema#positiveInteger</a>
<b>Example</b>	1
<b>Optional</b>	Yes
<b>In Payload</b>	Yes
<b>Payload Key</b>	numberOfConductedEOLTests

<b>Additional information</b>	
<b>Description</b>	This key:value list can be used for additional properties that were not defined in this aspect model.
<b>Name</b>	additionallInformation
<b>Characteristic</b>	List Has a certain order Duplicates allowed Type <a href="urn:bamm:io.catenax.manufactured_parts_quality_information:1.0.0#AdditionallInformation">urn:bamm:io.catenax.manufactured_parts_quality_information:1.0.0#AdditionallInformation</a>
<b>Optional</b>	Yes

<b>In Payload</b>	Yes
<b>Payload Key</b>	additionallInformation

## 5 NORMATIVE REFERENCES

The following references refer to related Catena-X reference implementation and external standards. This is intended to place the present reference implementation in the context of existing references.

### 5.1 CATENA-X REFERENCE IMPLEMENTATIONS

Catena-X Reference Implementations <sup>2</sup>	
<b>CX - 0003</b>	BAMM Aspect Meta Model
<b>CX - 0004</b>	Governance Process
<b>CX - 0010</b>	Business Partner Number
<b>CX - 0018</b>	Eclipse Data Space Connector (EDC)

### 5.2 COMMON STANDARDS

Common Standards	
<b>IDSA</b>	International Data Spaces Association <sup>1</sup>

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<sup>1</sup> <https://internationaldataspaces.org/we/the-association/>

<sup>2</sup> <https://catena-x.net/de/standard-library>

## GLOSSARY

### ABBREVIATIONS

Abbreviations	Description
BAMM	BAMM Aspect Meta Model
IDSA	International Data Spaces Association

**ADDENDUM FOR CONFORMITY ASSESSMENT**

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**The following pages are not part of the standard documentation.**

**CATENA-X**

ADDENDUM FOR  
CONFORMITY  
ASSESSMENT



## **CX – 0041 SEMANTIC MODEL: MANUFACTURED PARTS QUALITY INFORMATION**

BUSINESS DOMAIN: PLM & QUALITY

USE CASE: LIVE QUALITY LOOPS

**Contact:** [standardisierung@catena-x.net](mailto:standardisierung@catena-x.net)

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## ABOUT THIS DOCUMENT & MOTIVATION

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.

The addendum for conformity assessment clarifies the requirements and scope for each standard. It contains conformity assessment criteria (CAC) that specify how a participant can receive a certificate for the correct application of the standard.



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<sup>1</sup> <https://catena-x.net/de/standard-library>

# 1 INTRODUCTION

This document describes the semantic model “Manufactured Parts Quality Information” used in the Catena-X network.

## 1.1 AUDIENCE & SCOPE

*This section is non-normative*

The described semantic model is relevant for :

- Data Provider / Consumer
- Business Application Provider

## 1.2 CONTEXT

*This section is non-normative*

The Catena-X use case Live Quality Loops (QAX) uses multiple data models to exchange data between automotive manufacturer (OEM) and component supplier (TIER1). Each of these data models can be supplied independently.

The data model ManufacturedPartsQualityInformation is a set of manufacturing-related properties of a produced part/component that could be relevant to solve a quality task.

## 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 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 will need to prove they conform with the Catena-X standards. To validate that the standards are applied correctly, Catena-X employs Conformity Assessment Bodies (CABs).

For Data Provider: To prove conformity you have to fulfill all MUST criteria mentioned in chapter [Normative criteria for Data Provider](#).

There is no proof of conformity necessary for Data Consumer.

For Business Application Provider: To prove conformity you have to fulfill all MUST criteria mentioned in chapter [Normative criteria for Business Application Provider](#).

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

## 1.5 EXAMPLES

Example payload in JSON format:

```
{
  "listOfManufacturedParts" : [ {
    "manufacturerId" : "123-0.740-3434-A",
    "manufacturingInformation" : {
      "date" : "2022-02-04T14:48:54",
      "hasBeenReworked" : false,
      "country" : "DEU",
      "productionLine" : "Line_1",
      "plantDescription" : "Feuerbach Plant",
      "plantId" : "00001",
      "batchId" : "20220204_466",
      "additionalInformation" : [ {
        "value" : "Stainless steel",
        "key" : "Steel quality"
      } ],
      "numberOfConductedEOLTests" : 1
    },
    "catenaXId" : "urn:uuid:580d3adf-1981-44a0-a214-13d6ceed9001",
    "qualityTaskId" : "BPN-811_2022_000001",
    "nameAtManufacturer" : "Steering assembly",
    "manufacturerSerialPartNumber" : "436347347.4343884384.FTG.538348"
  } ]
}
```

## 1.6 TERMINOLOGY

*This section is non-normative*

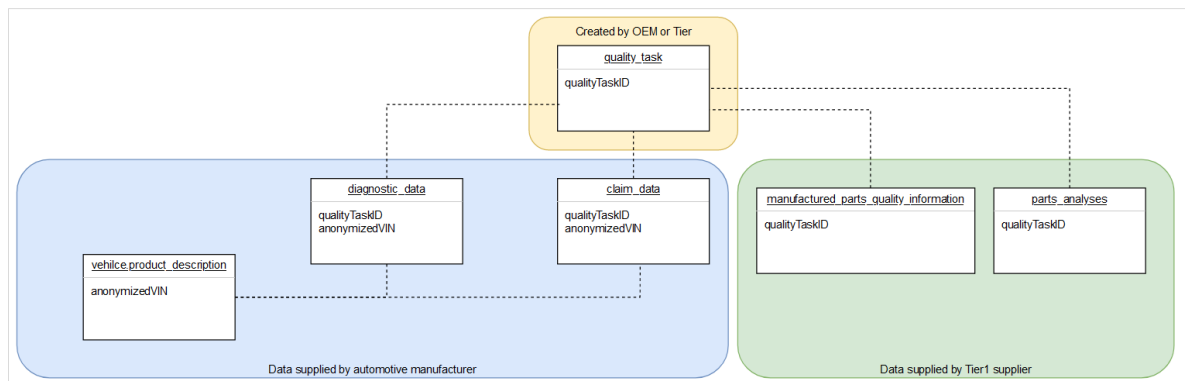
**Business Partner Number (BPN)**

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

## 2 ASPECT MODEL MANUFACTURED PARTS QUALITY INFORMATION

### 2.1 INTRODUCTION

Catena-X use case “Live Quality Loops” (QAX) uses several Catena-X standardized data models to exchange data:



*Figure 1: Hierarchy of Catena-X data models used in QAX*

Data models in QAX and their content:

- QualityTask is the root element and describes why companies are working together on a quality topic and what they want to do. All involved companies and their contact people are named. In addition, a flag tells what should be done with exchanged data after a QualityTask is closed.
- Vehicle.ProductDescription: This data model is a representation of one vehicle affected by this QualityTask. The model represents the vehicle when it was sold to the end-customers from an end-customers point of view: Which standard equipment was installed in the vehicle and which extra equipment was installed in the vehicle.
- Fleet.DiagnosticData: Diagnostic data coming from multiple vehicles that are affected by this QualityTask + Diagnostic data from similar vehicles that are not affected by this QualityTask.
- Fleet.ClaimData: Customer complaints that are linked to this QualityTask + Data about the exchange of potentially faulty parts
- ManufacturedPartsQualityInformation: A selection of manufacturing-related parameters that help to solve the QualityTask
- PartsAnalyses: Analyses results of replaced and potentially faulty parts that are linked to this QualityTask

## 2.2 NORMATIVE CRITERIA

The usage of the described semantic model “Manufactured Parts Quality Information” is a MUST for Data Provider and Data Consumer that want to work together on a quality topic over Catena-X automotive network.

### 2.2.1 Normative criteria for Data Provider

Every data provider of “Manufactured Parts Quality Information” MUST provide the data conformant to the semantic model specified in CX-0041.

If available a data provider of “Manufactured Parts Quality Information” MUST provide manufacturerSerialPartNumber for serial parts.

It is a MUST for data providers of “Manufactured Parts Quality Information ” to provide the property qualityTaskId. qualityTaskId MUST match with qualityTaskId property of “Quality Task” data as defined in CX – 0036.

If available batchId of the produced parts SHOULD be provided by the data provider.

If available catenaXId of the produced parts SHOULD be provided by the data provider.

In the Catena-X data space “Manufactured Parts Quality Information” MUST be exchanged via Eclipse Dataspace Connector (EDC) conformant to CX-0018 and CX-0002..

It is RECOMMEND to use Apache parquet<sup>1</sup> file format together with EDC S3 data plane for file data exchange for “Manufactured Parts Quality Information”.

### 2.2.2 Normative criteria for Business Application Provider

It is a MUST for Business Application Provider to support at least 2 standardized Catena-X QAX aspect models from Catena-X release 3.0 to get the label “Catena-X Certified Solution” for their quality application.

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<sup>1</sup> <https://parquet.apache.org/>

It is RECOMMEND for Business Application Provider to be able to read the semantic model “Manufactured Parts Quality Information”.

## 2.3 LICENSE

This Catena-X data model is an outcome of Catena-X use case group Live Quality Loops (QAX). 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<sup>1</sup>.

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

This semantic model has the unique identifier  
urn:bamm:io.catenax.manufactured\_parts\_quality\_information:1.0.0

## 2.5 FORMATS OF SEMANTIC MODEL

### 2.5.1 RDF Turtle

The rdf turtle file, adhering to the Semantic Aspect Meta Model, is the master for generating additional file formats and serializations. It is provided here:

[https://github.com/eclipse-tractusx/sldt-semantic-models/tree/main/io.catenax.manufactured\\_parts\\_quality\\_information/1.0.0](https://github.com/eclipse-tractusx/sldt-semantic-models/tree/main/io.catenax.manufactured_parts_quality_information/1.0.0)

The open source command line tool of the Eclipse Semantic Modeling Framework<sup>2</sup>(ESMF) 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 using the Eclipse ESMF tooling. The JSON Schema defines the Value-Only payload of the Asset Administration Shell for the API operation "GetSubmodel".

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<sup>1</sup> <https://creativecommons.org/licenses/by/4.0/legalcode>

<sup>2</sup> <https://github.com/eclipse-esmf/esmf-sdk>



If present, example JSON-payloads MUST validate against the generated JSON schema.

## 3 REFERENCES

### 3.1 NORMATIVE REFERENCES

- CX-0003 SEMANTIC ASPECT META MODEL
- CX-0004 GOVERNANCE PROCESS FOR SEMANTIC MODELS
- CX-0018 ECLPISE DATA SPACE CONNECTOR (EDC)

### 3.2 NON-NORMATIVE REFERENCES

*This section is non-normative*