SPECIFICATION

Submodel Intelligent Information for Use

Version 0.9

13 July 2023

Submodel Template of the

Asset Adminstration Shell

Imprint

Publisher

Steinbeis Innovation gGmbH
Adornostr. 8
70599 Stuttgart
Germany

Source for Specification Document

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Version history

202A-Month-Day	D Version	Release of the Submodel template
2023-July-26	Version 0.9	Renaming of the Submodel

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1 General

1.1 About this document

This document is a part of a specification series. Each part specifies the contents of a Submodel template for the Asset Administration Shell (AAS). The AAS is described in [1-3] and [6]. First exemplary Submodel contents were described in [4], while the actual format of this document was derived by the "Administration Shell in Practice" [5]. The format aims to be very concise, giving only minimal necessary information for applying a Submodel template, while leaving deeper descriptions and specification of concepts, structures and mapping to the respective documents [1-6].

The target group of the specification are developers and editors of technical documentation and manufacturer information, which are describing assets in smart manufacturing by means of the Asset Administration Shell (AAS) and therefore need to create a Submodel instance with a hierarchy of SubmodelElements. This document especially details on the question, which SubmodelElements with which semantic identification shall be used for this purpose.

1.2 Scope of the Submodel

This Submodel template aims at interoperable provision of information describing Intelligent Information for Use in regard to the asset of the respective Asset Administration Shell. Central element is the provisioning of properties [7], ideally interoperable by the means of dictionaries such as ECLASS and IEC CDD (Common Data Dictionary). The purpose of this document is to make selected specifications of Submodels in such manner that information about assets can be exchanged in a meaningful way between partners in a value creation network.

Target is the cross-manufacturer exchange of technical documentation as information for use. The technical documentation should be transferable as intelligent information, i.e., the content should be modular, semantically rich, and exchangeable in different media formats as well as in media-specific compilations.

Compared to the conventional document-based exchange of technical documentation, the aim is to enable dynamic, structured, and intelligent transmission that can provide content for users in a user-oriented form. This includes usage scenarios in Industry 4.0, websites, mobile apps, portal applications and display on HMIs. The relevant information should be able to be displayed to the user at the right time, in the right context, in the right format, and on the right end device.

The intended use-case is the provisioning of a standardized property structure to exchange and integrate intelligent information between companies, the departments of a company and information from different sources in general.

This concept can serve as a basis for standardizing the respective Submodel. The conception is based on existing norms, studies of common practices at enterprises, directives and standards so that a far-reaching acceptance can be achieved.

Beside standardized Submodel this template also introduces standardized SubmodelElementCollections (SMC) in order to improve the interoperability while modelling aspects and properties of intelligent information within other Submodels.

1.3 Relevant standards and sources of concepts for the Submodel template

According to [3], interoperable properties might be defined by standards, consortium specifications or manufacturer specifications. Useful standards providing sources of concepts are:

Table 1: List of example standards defining interoperable properties.

No.	***Reference***	***Originator/ organization***	***Link***
1	iiRDS 1.1	iiRDS Cons.	[iiRDS 1.1]
2	PAS “Intelligent Information Request and Delivery specification (iiRDS) – A Process Model for Information Architecture”	IEC	[LINK]
3	VDI 2770 Blatt 1:2020	VDI	[VDI2770]
4	IEC 82045-2:2004	IEC	[IEC82045-2]
5	IDTA 2004-1-2 Handover Documentation	IDTA	[IDTA 02004]
6	DCMI Metadata Terms	DCMI	[DCTERMS]
7	vCard Ontology - for describing People and Organizations	W3C	[vcard-rdf]
8	Internationalized Resource Identifiers (IRIs)	IETF	[rfc3987]
9	IEC/IEEE 82079-1	IEC	[IEC82079]

So called property dictionaries are used identify information elements (see Terms and Definitions of [6]). Such property dictionaries include:

- ECLASS, see: https://www.eclasscontent.com/
- IEC CDD, see: https://cdd.iec.ch/cdd/iec61987/iec61987.nsf and https://cdd.iec.ch/cdd/iec62683/cdddev.nsf

The Submodel primarily describes the characteristics and properties of technical documentation. As these characteristics and properties are specified and standardized in iiRDS, the Submodels uses the publicly accessible IRIs (Internationalized Resource Identifier) assigned in the iiRDS Standard.

2 Information set for Submodel Intelligent Information for Use

2.1 Approach

In compliance with IEC/IEEE 82079-1 the term "Information for Use" is defined as "information provided by the supplier that provides the target audience with concepts, procedures and reference material for the safe, effective, and efficient use of a supported product during its life cycle". Intelligent information is defined as "content enriched with metadata" following the Intelligent Information Request and Delivery Standard (iiRDS).

This Submodel specification describes all the information contained in the iiRDS specification. In this way, Submodels based on this specification can provide a complete handover documentation according to iiRDS. The respective handover documentation is called iiRDS Package. In order to fully represent the iiRDS specification, the Submodel has been divided into several sections. The specification is divided into seven sections, represented as SMCs.

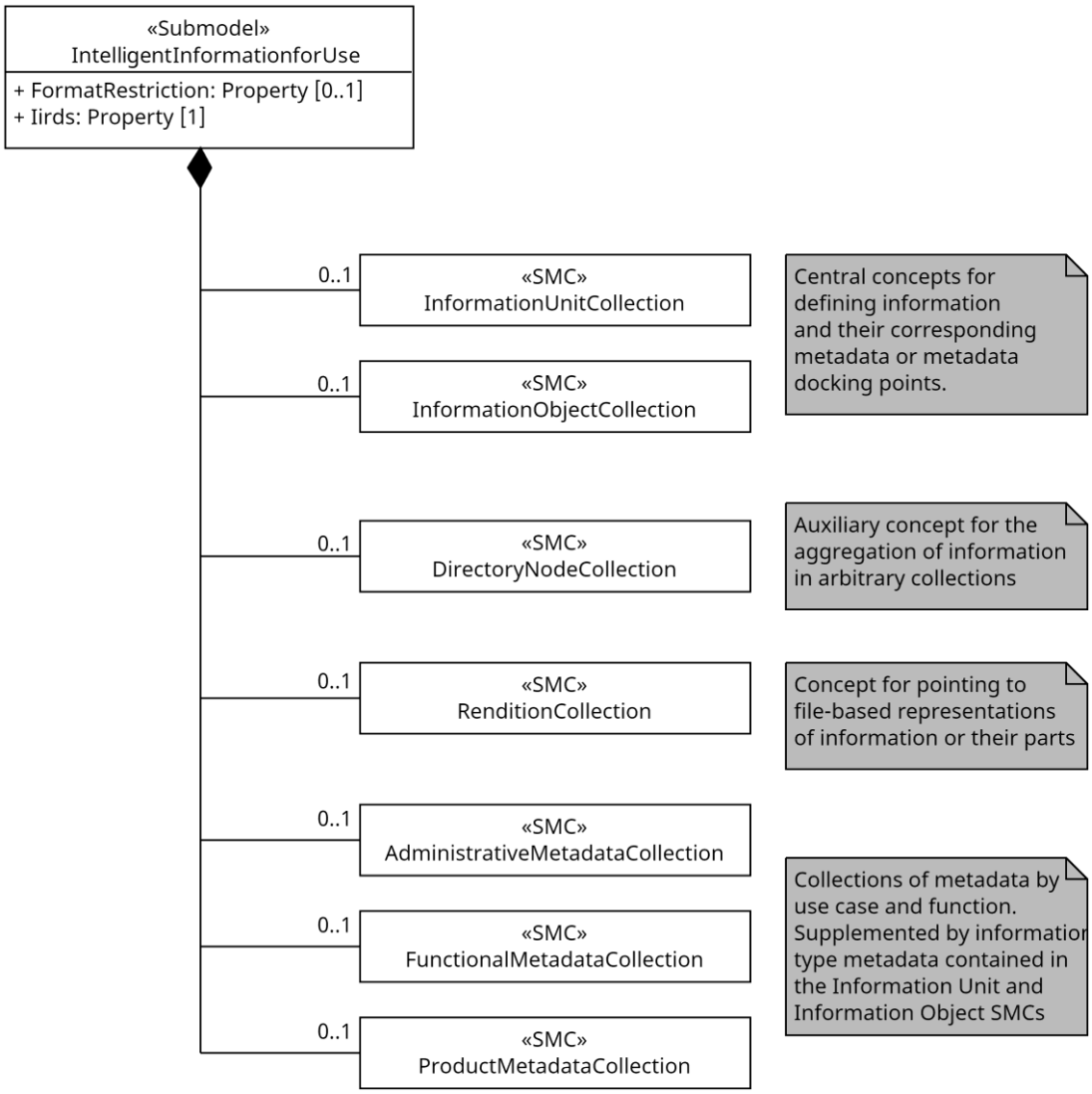

Figure 1: Overview Submodel Intelligent Information for Use

- **InformationUnitCollection:** The iiRDS Information Unit class is an abstract class that represents units of intelligent information. These units can be of type Document, Topic or Fragment. The SMC Information Unit contains all the Document, Topic and Fragment units represented by the iiRDS Package. The three subclasses are modelled as SMCs and contain all metadata assigned to them according to the iiRDS standard. The SMCs contain properties that describe the information unit. Relationships can be created from the SMCs to other SMCs, such as Administrative Metadata, to reference their contents.
- **InformationObjectCollection:** Information Objects group Information Units that describe the same content but differ in language or revision. The SMC InformationObjectCollection contains all the InformationObjects included in the iiRDS package.
- **DirectoryNodeCollection:** Directories are an ordered collection of Information Units that help the user navigate. Directory Nodes are the entry points of the referenced Information Unit. The SMC Directory Nodes contains all the Directory Nodes of the iiRDS Package that refer to an Information Unit.
- **RenditionCollection:** Renditions refer to the physical files represented by the iiRDS package. The SMC contains all renditions that refer to files.
- **AdministrativeMetadataCollection:** The SMC Administrative Metadata contains all metadata that belong to the administrative metadata group according to the iiRDS standard. The Submodel elements of the SMC Administrative Metadata can be referenced by Information Units.
- **FunctionalMetadataCollection:** The SMC Functional Metadata contains all metadata that belong to the functional metadata group according to the iiRDS standard. The Submodel elements of the SMC Functional Metadata can be referenced by Information Units.
- **ProductMetadataCollection:** The SMC Product Metadata contains docking point to information about the product, components, life cycle phases and product characteristics.

Information Units in iiRDS

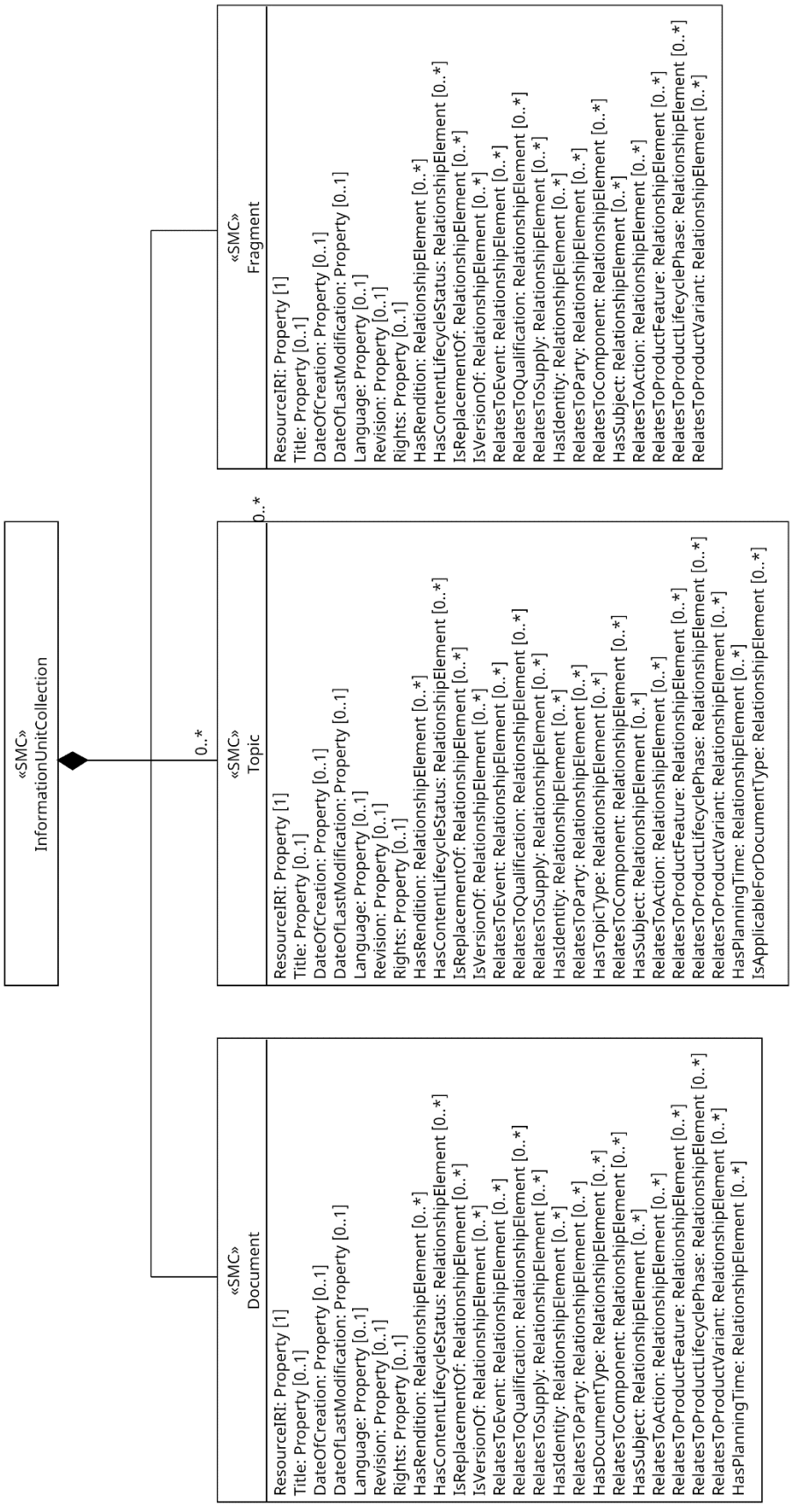

Figure 2 Overview InformationUnitCollection

While defining Submodels the following three aspects must be considered as suggested in [5]:

Use and economic relevance

The Submodel Intelligent Information for Use is designed to exchange intelligent information and thereby enables dynamic usage scenarios of user information, e.g., to reduce research times of service technicians, novel applications such as AR/VR or chatbots, and the display of configuration- and context-specific information.

The Submodel requires information to already be modelled in a way which is consistent with the iiRDS domain ontology and that the implementor is familiar with iiRDS and its concepts.

Possible functions and interactions

- Information Delivery
  Manufacturer want to transmit all relevant information about their products without information loss or extra work if the product information comes from supplier companies or from other departments in their organization. They want to share the information with other organizations in a suitable, modern form.
  Sample:
  - provide documentation in standard formats (iiRDS and VDI 2770)
  - transmit compiled information on incomplete components and integrated to the OEM customers in a modular way and with metadata.

- Information Integration
  Information creators want to provide intelligent information in different forms of presentation and in different media-specific compilations and make it accessible to other systems and organizations (e.g. via a help portal).
  Sample:
  - Compile and transfer information for a specific product or component on a case-by-case basis (e.g. cleaning).

- Information Retrieval
  Users want to find the right information for their problem and context quickly and easily. They want to receive only as much information as necessary (one topic with the right answer instead of many 100 PDF pages).
  Sample:
  - search/retrieve modular information from different documentations along the life cycle of affected components to perform the exchange.
  - dynamically retrieve all relevant information for a specific product variant.

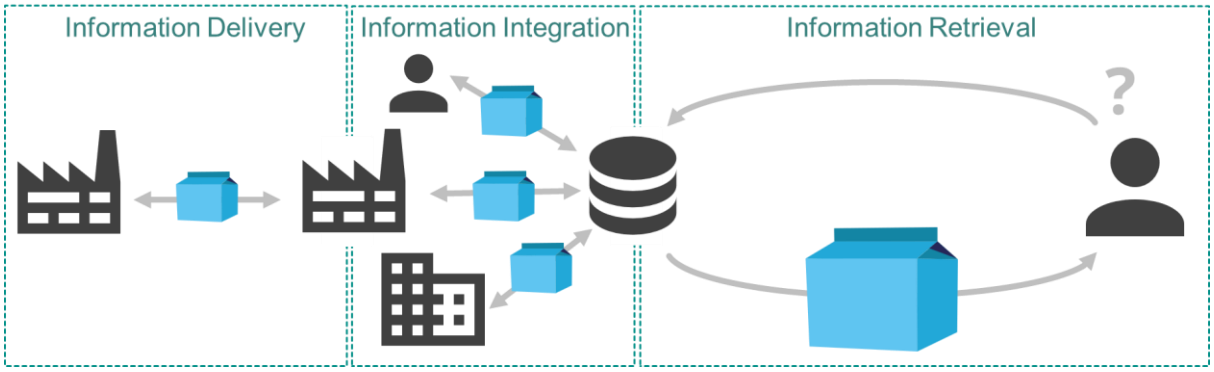

Figure 3: Overview of main scenarios

Property specification

See section 3 Submodel and Collections.

3 Submodel and Collections

3.1 Properties of the SMC "Intelligent Information for Use"

Table 2: Properties of SMC "Intelligent Information for Use"

idShort	IntelligentInformationforUse		
Class	submodel		
semanticId	https://admin-shell.io/iirds/1/1/IntelligentInformationforUse		
Parent	Asset Administration Shell, to which the information units shall be associated to		
Explanation	This Submodel defines, how the metadata set of iiRDS can be used inside the Asset Administration Shell		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] FormatRestriction	http://iirds.tekom.de/ iirds#formatRestriction restriction of media formats allowed in an iiRDS package	[string] A	[0..1]
[Property] iiRDSVersion	http://iirds.tekom.de/ iirds#iiRDSVersion iiRDS version with which the iiRDS package complies	[string] 1.1	[1]
[SMC] InformationUnit Collection	InformationUnitCollection collection of instances of iirds:Topic, iirds:Document and iirds:Fragment, which are subclasses of iirds:InformationUnit	[n.a.]	[0..1]
[SMC] InformationObject Collection	InformationUnitCollection collection of iirds:InformationObject instances	[n.a.]	[0..1]
[SMC] DirectoryNode Collection	DirectoryNodeCollection collection of iirds:DirectoryNode instances	[n.a.]	[0..1]
[SMC] Rendition Collection	RenditionCollection collection of iirds:rendition instances	[n.a.]	[0..1]
[SMC] Administrative Metadata	AdministrativeMetadataCollection collection of instances of the subclasses of iirds:AdministrativeMetadata	[n.a.]	[0..1]

Collection			
[SMC] Functional Metadata Collection	FunctionalMetadataCollection collection of instances of the subclasses of iirds:FunctionalMetadata	[n.a.]	[0..1]
[SMC] ProductMetadata Collection	ProductMetadataCollection collection of instances of the subclasses of iirds:ProductMetadata	[n.a.]	[0..1]

3.2 Properties of the SMC "InformationUnitCollection"

Table 3: Properties of SMC "InformationUnitCollection"

idShort	InformationUnitCollection		
Class	submodelElementCollection		
semanticId	InformationUnitCollection		
Parent	IntelligentInformationforUse		
Explanation	Collection of instances of iirds:Topic, iirds:Document and iirds:Fragment, which are subclasses of iirds:InformationUnit		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Document{00}	http://iirds.tekom.de/iirds#Document information unit consisting of an ordered set of information intended by the sender to be regarded as an entity	[n.a.] Document01	[0..*]
[SMC] Topic{00}	http://iirds.tekom.de/iirds#Topic information unit covering a single subject	[n.a.] Topic01	[0..*]
[SMC] Fragment{00}	http://iirds.tekom.de/iirds#Fragment information unit that requires additional context	[n.a.] Fragment01	[0..*]

3.3 Properties of the SMC "Document"

Table 4: Properties of SMC "Document"

idShort	Document
Class	submodelElementCollection
semanticId	http://iirds.tekom.de/iirds#Document

Parent	InformationUnitCollection		
Explanation	information unit consisting of an ordered set of information intended by the sender to be regarded as an entity		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] Resource IRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iiRDS classes and subclasses	[anyURI] urn:uuid:9cea7846-5404-4d4f-bd89-975954534921	[1]
[Property] Title	http://iirds.tekom.de/iirds#title name of the information unit	[string] PI-FAN Operating Manual	[0..1]
[Property] DateOf Creation	http://iirds.tekom.de/iirds#dateOfCreation date of creation of the resource	[dateTimeStamp] 2019-01-09T09:52:00+01:00	[0..1]
[Property] DateOf Last Modification	http://iirds.tekom.de/iirds#dateOf LastModification date and time of an information unit's last change	[dateTimeStamp] 2023-04-09T07:44:00+01:00	[0..1]
[Property] Language {00}	http://iirds.tekom.de/iirds#language identifier of the content's language	[string] en	[0..*]
[Property] Revision	http://iirds.tekom.de/iirds#revision version of an information unit	[string] 4	[0..1]
[MLP] Rights{00}	http://iirds.tekom.de/iirds#rights declaration of specific rights regarding the usage of the information	[n.a.] Content Copyright (c) 2015, PI-Fan Project	[0..*]
[Rel] Has Rendition {00}	http://iirds.tekom.de/iirds#has-rendition information unit's property referencing its rendition	[n.a.]	[0..*]
[Rel] HasContent Lifecycle Status{00}	http://iirds.tekom.de/iirds#has-content-lifecycle-status information unit's property referencing its content lifecycle status	[n.a.]	[0..*]
[Property] IsReplace	http://iirds.tekom.de/iirds#is-replacement-of	[string]	[0..1]

ment Of	information unit's property referencing the information unit to be replaced	urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	
[Rel] IsVersionOf	http://iirds.tekom.de/iirds#is-version-of information unit's property referencing its information object	[n.a.]	[0..1]
[Rel] RelatesTo Event{00}	http://iirds.tekom.de/iirds#relates-to-event information unit's property referencing an event	[n.a.]	[0..*]
[Rel] RelatesTo Qualification {00}	http://iirds.tekom.de/iirds#relates-to-qualification information unit's property referencing a qualification	[n.a.]	[0..*]
[Rel] RelatesTo Supply{00}	http://iirds.tekom.de/iirds#relates-to-supply information unit's property referencing a supply	[n.a.]	[0..*]
[Rel] HasIdentity {00}	http://iirds.tekom.de/iirds#has-identity iiRDS resource's property referencing an identifier	[n.a.]	[0..*]
[Rel] RelatesTo Party{00}	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..*]
[Rel] Has Document Type{00}	http://iirds.tekom.de/iirds#has-document-type document's property referencing its document type	[n.a.]	[0..*]
[Rel] RelatesTo Component {00}	http://iirds.tekom.de/iirds#relates-to-component information unit's property referencing a component	[n.a.]	[0..*]
[Rel] HasSubject {00}	http://iirds.tekom.de/iirds#has-subject information unit's property referencing its subject	[n.a.]	[0..*]
[Rel] RelatesTo Action{00}	http://iirds.tekom.de/iirds#relates-to-action information unit's property referencing an action	[n.a.]	[0..*]

[Rel] RelatesTo Product Feature{00}	http://iirds.tekom.de/iirds#relates-to-product-feature information unit's property referencing a product feature	[n.a.]	[0..*]
[Rel] RelatesTo Product Lifecycle Phase{00}	http://iirds.tekom.de/iirds#relates-to-product-lifecycle-phase information unit's property referencing a product lifecycle phase	[n.a.]	[0..*]
[Rel] RelatesTo Product Variant{00}	http://iirds.tekom.de/iirds#ProductVariant item or service offered on the market and designed to meet the needs or wishes of customers	[n.a.]	[0..*]
[Rel] HasPlanning Time{00}	http://iirds.tekom.de/iirds#has-planning-time information unit's property referencing the planning time	[n.a.]	[0..*]

3.4 Properties of the SMC "Topic"

Table 5: Properties of SMC "Topic"

idShort	Topic		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Topic		
Parent	InformationUnitCollection		
Explanation	Information unit covering a single subject		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[1]
[Rel] HasTopic Type{00}	http://iirds.tekom.de/iirds#has-topic-type information unit's property referencing its topic type	[n.a.]	[0..*]
[Rel] IsVersionOf	http://iirds.tekom.de/iirds#is-version-of information unit's property referencing its information object	[n.a.]	[0..1]

[Rel] RelatesTo Qualification {00}	http://iirds.tekom.de/ iirds#relates-to-qualification information unit's property referencing a qualification	[n.a.]	[0..*]
[Rel] RelatesTo Product Variant{00}	http://iirds.tekom.de/iirds#ProductVariant item or service offered on the market and designed to meet the needs or wishes of customers	[n.a.]	[0..*]
[Property] Title	http://iirds.tekom.de/iirds#title name of the information unit	[string] General safety instructions	[0..1]
[Property] DateOf Creation	http://iirds.tekom.de/iirds#dateOfCreation date of creation of the resource	[dateTimeStamp] 2019-01-09T09:52:00+01:00	[0..1]
[Property] DateOfLast Modification	http://iirds.tekom.de/iirds#dateOf LastModification date and time of an information unit's last change	[dateTimeStamp] 2019-01-09T09:52:00+01:00	[0..1]
[Property] Language{00}	http://iirds.tekom.de/iirds#language identifier of the content's language	[string] de	[0..*]
[Property] Revision	http://iirds.tekom.de/iirds#revision version of an information unit	[string] 2	[0..1]
[MLP] Rights{00}	http://iirds.tekom.de/iirds#rights declaration of specific rights regarding the usage of the information	[n.a.] Content Copyright (c) 2015, PI-Fan Project iiRDS Implementation Copyright (c) 2019, iiRDS Consortium	[0..*]
[Rel] HasRendition {00}	http://iirds.tekom.de/iirds#has-rendition information unit's property referencing its rendition	[n.a.]	[0..*]
[Rel] HasContent Lifecycle Status{00}	http://iirds.tekom.de/iirds#has-content-lifecycle-status information unit's property referencing its content lifecycle status	[n.a.]	[0..*]
[Property] IsReplace	http://iirds.tekom.de/iirds#is-replacement-of	[string]	[0..1]

ment Of	information unit's property referencing the information unit to be replaced	urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	
[Rel] RelatesTo Event{00}	http://iirds.tekom.de/iirds#relates-to-event information unit's property referencing an event	[n.a.]	[0..*]
[Rel] RelatesTo Supply{00}	http://iirds.tekom.de/iirds#relates-to-supply information unit's property referencing a supply	[n.a.]	[0..*]
[Rel] HasIdentity {00}	http://iirds.tekom.de/iirds#has-identity iiRDS resource's property referencing an identifier	[n.a.]	[0..*]
[Rel] RelatesTo Party{00}	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..*]
[Rel] RelatesTo Component {00}	http://iirds.tekom.de/iirds#relates-to-component information unit's property referencing a component	[n.a.]	[0..*]
[Rel] HasSubject {00}	http://iirds.tekom.de/iirds#has-subject information unit's property referencing its subject	[n.a.]	[0..*]
[Rel] RelatesTo Action{00}	http://iirds.tekom.de/iirds#relates-to-action information unit's property referencing an action	[n.a.]	[0..*]
[Rel] RelatesTo Product Feature{00}	http://iirds.tekom.de/iirds#relates-to-product-feature information unit's property referencing a product feature	[n.a.]	[0..*]
[Rel] RelatesTo Product Lifecycle Phase{00}	http://iirds.tekom.de/iirds#relates-to-product-lifecycle-phase information unit's property referencing a product lifecycle phase	[n.a.]	[0..*]
[Rel] IsApplicable ForDocument	http://iirds.tekom.de/iirds#is-applicable-for-document-type	[n.a.]	[0..*]

Type{00}	information unit's property referencing a document type the information unit is suitable for		
[Rel] HasPlanning Time{00}	http://iirds.tekom.de/iirds#has-planning-time information unit's property referencing the planning time	[n.a.]	[0..*]

3.5 Properties of the SMC "Fragment"

Table 6: Properties of SMC "Fragment"

idShort	Fragment		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Fragment		
Parent	InformationUnitCollection		
Explanation	Information unit that requires additional context		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[1]
[Rel] RelatesTo Product Variant{00}	http://iirds.tekom.de/iirds#ProductVariant item or service offered on the market and designed to meet the needs or wishes of customers	[n.a.]	[0..*]
[Property] Title	http://iirds.tekom.de/iirds#title name of the information unit	[string] Hint	[0..1]
[Property] DateOf Creation	http://iirds.tekom.de/iirds#dateOfCreation date of creation of the resource	[dateTimeStamp] 2021-01-09T09:52:00+01:00	[0..1]
[Property] DateOfLast Modification	http://iirds.tekom.de/iirds#dateOf LastModification date and time of an information unit's last change	[dateTimeStamp] 2022-01-09T09:52:00+01:00	[0..1]
[Property] Language {00}	http://iirds.tekom.de/iirds#language identifier of the content's language	[string] en	[0..*]
[Property]	http://iirds.tekom.de/iirds#revision	[string]	[0..1]

Revision	version of an information unit	6	
[MLP] Rights{00}	http://iirds.tekom.de/iirds#rights declaration of specific rights regarding the usage of the information	[n.a.] Content Copyright (c) 2015, PI-Fan Project	[0..*]
[Rel] HasRendition {00}	http://iirds.tekom.de/iirds#has-rendition information unit's property referencing its rendition	[n.a.]	[0..*]
[Rel] HasContent Lifecycle Status{00}	http://iirds.tekom.de/iirds#has-content-lifecycle-status information unit's property referencing its content lifecycle status	[n.a.]	[0..*]
[Property] IsReplacementOf	http://iirds.tekom.de/iirds#is-replacement-of information unit's property referencing the information unit to be replaced	[string] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Rel] IsVersionOf	http://iirds.tekom.de/iirds#is-version-of information unit's property referencing its information object	[n.a.]	[0..1]
[Rel] RelatesTo Event{00}	http://iirds.tekom.de/iirds#relates-to-event information unit's property referencing an event	[n.a.]	[0..*]
[Rel] RelatesTo Qualification {00}	http://iirds.tekom.de/iirds#relates-to-qualification information unit's property referencing a qualification	[n.a.]	[0..*]
[Rel] RelatesTo Supply{00}	http://iirds.tekom.de/iirds#relates-to-supply information unit's property referencing a supply	[n.a.]	[0..*]
[Rel] HasIdentity {00}	http://iirds.tekom.de/iirds#has-identity iiRDS resource's property referencing an identifier	[n.a.]	[0..*]
[Rel] RelatesTo Party{00}	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..*]
[Rel] RelatesTo Component {00}	http://iirds.tekom.de/iirds#relates-to-component information unit's property referencing a component	[n.a.]	[0..*]

[Rel] HasSubject {00}	http://iirds.tekom.de/iirds#has-subject information unit's property referencing its subject	[n.a.]	[0..*]
[Rel] RelatesTo Action{00}	http://iirds.tekom.de/iirds#relates-to-action information unit's property referencing an action	[n.a.]	[0..*]
[Rel] RelatesTo Product Feature{00}	http://iirds.tekom.de/iirds#relates-to-product-feature information unit's property referencing a product feature	[n.a.]	[0..*]
[Rel] RelatesTo Product Lifecycle Phase{00}	http://iirds.tekom.de/iirds#relates-to-product-lifecycle-phase information unit's property referencing a product lifecycle phase	[n.a.]	[0..*]

3.6 Properties of the SMC "InformationObjectCollection"

Table 7: Properties of SMC "InformationObjectCollection"

idShort	InformationObjectCollection		
Class	submodelElementCollection		
semanticId	InformationObjectCollection		
Parent	IntelligentInformationforUse		
Explanation	Collection of iirds:InformationObject instances		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] InformationObject{00}	http://iirds.tekom.de/iirds#InformationObject version- and language-independent abstraction of an information unit	[n.a.]	[0..*]

3.7 Properties of the SMC "InformationObject"

Table 8: Properties of SMC "InformationObject"

idShort	InformationObject
Class	submodelElementCollection
semanticId	http://iirds.tekom.de/iirds#InformationObject
Parent	InformationObjectCollection
Explanation	Version- and language-independent abstraction of an information unit

[SME type]	semanticID = [idType]value	[valueType]	card.
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[1]

3.8 Properties of the SMC "DirectoryNodeCollection"

Table 9: Properties of SMC "DirectoryNodeCollection"

idShort	DirectoryNodeCollection		
Class	submodelElementCollection		
semanticId	DirectoryNodeCollection		
Parent	IntelligentInformationforUse		
Explanation	collection of iirds:DirectoryNode instances		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] DirectoryNode{00}	http://iirds.tekom.de/iirds#DirectoryNode node in a tree-like, ordered collection	[n.a.]	[0..*]

3.9 Properties of the SMC "DirectoryNode"

Table 10: Properties of SMC "DirectoryNode"

idShort	DirectoryNode		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#DirectoryNode		
Parent	DirectoryNodeCollection		
Explanation	Node in a tree-like, ordered collection		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Rel] RelatesToInformationUnit	http://iirds.tekom.de/iirds#relates-to-information-unit directory node's property referencing the corresponding information unit	[n.a.]	[0..1]

[SMC] HasNextSibling	http://iirds.tekom.de/iirds#has-next-sibling directory node's property referencing the following directory node on the same hierarchy level in a directory structure	[n.a.]	[0..1]
[SMC] HasFirstChild	http://iirds.tekom.de/iirds#has-first-child directory node's property referencing the first directory node on the next subordinate level in a directory structure	[n.a.]	[0..1]
[Rel] HasDirectoryStructureType	http://iirds.tekom.de/iirds#has-directory-structure-type directory node's property referencing its node type	[n.a.]	[0..1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Inhaltsverzeichnis	[0..1]

3.10 Properties of the SMC "RenditionCollection"

Table 11: Properties of SMC "RenditionCollection"

idShort	RenditionCollection		
Class	submodelElementCollection		
semanticId	RenditionCollection		
Parent	IntelligentInformationforUse		
Explanation	Collection of iirds:Rendition instances		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Rendition{00}	http://iirds.tekom.de/iirds#Rendition content of an information unit in a specific format	[n.a.]	[0..*]

3.11 Properties of the SMC "Rendition"

Table 12: Properties of SMC "Rendition"

idShort	Rendition

Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Rendition		
Parent	RenditionCollection		
Explanation	content of an information unit in a specific format		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/ iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Property] Format	http://iirds.tekom.de/iirds#format media type of the rendition	[string] application/ xhtml+xml	[1]
[File] Source	http://iirds.tekom.de/iirds#source relative path of a file in the iiRDS package, containing the content of a rendition	[n.a.] /aasx/files/ 1_GenSafety.xhtml	[1]
[Rel] HasSelector	http://iirds.tekom.de/iirds#has-selector rendition's property referencing a selector	[n.a.]	[0..1]
[SMC] RangeSelector {00}	http://iirds.tekom.de/iirds#RangeSelector selector defining the start point and the end point of a part of content	[n.a.]	[0..*]
[SMC] FragmentSelector {00}	http://iirds.tekom.de/ iirds#FragmentSelector selector defining a part of content by a single identifier	[n.a.]	[0..*]

3.12 Properties of the SMC "RangeSelector"

Table 13: Properties of SMC "RangeSelector"

idShort	RangeSelector		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#RangeSelector		
Parent	Rendition		
Explanation	Selector defining the start point and the end point of a part of content		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	

[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Rel] HasStartSelector	http://iirds.tekom.de/iirds#has-start-selector range selector's property referencing the start of its range	[n.a.]	[1]
[Rel] HasEndSelector	http://iirds.tekom.de/iirds#has-end-selector range selector's property referencing the end of its range	[n.a.]	[1]

3.13 Properties of the SMC "FragmentSelector"

Table 14: Properties of SMC "FragmentSelector"

idShort	FragmentSelector		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#FragmentSelector		
Parent	Rendition		
Explanation	Selector defining a part of content by a single identifier		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Property] ConformsTo	http://purl.org/dc/terms/conformsTo an established standard to which the described resource conforms	[string] http://tools.ietf.org/rfc/rfc3023	[1]
[Property] Value	https://www.w3.org/TR/rdf12-schema/#ch_value used to describe structured values	[string] xpointer(id('chptr_1')/Section[1])	[1]

3.14 Properties of the SMC "AdministrativeMetadataCollection"

Table 15: Properties of SMC "AdministrativeMetadataCollection"

idShort	AdministrativeMetadataCollection
Class	submodelElementCollection
semanticId	AdministrativeMetadataCollection

Parent	IntelligentInformationforUse		
Explanation	Collection of instances of the subclasses of iirds:AdministrativeMetadata		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Content Lifecycle Status{00}	http://iirds.tekom.de/iirds#ContentLifeCycleStatus stage of an information unit in the information development process	[n.a.]	[0..*]
[SMC] Identity{00}	http://iirds.tekom.de/iirds#Identity complex identifier of a resource in an external system	[n.a.]	[0..*]
[SMC] Party{00}	http://iirds.tekom.de/iirds#Party person, organization or system	[n.a.]	[0..*]
[SMC] Identity Domain{00}	http://iirds.tekom.de/iirds#IdentityDomain organizational origin of an identifier that is assigned to an iiRDS identity	[n.a.]	[0..*]
[SMC] VCard{00}	http://www.w3.org/2006/vcard/ns#Kind vCard is a file format standard for electronic business cards	[n.a.]	[0..*]

3.15 Properties of the SMC "ContentLifecycleStatus"

Table 16: Properties of SMC "ContentLifecycleStatus"

idShort	ContentLifecycleStatus		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#ContentLifeCycleStatus		
Parent	AdministrativeMetadataCollection		
Explanation	Stage of an information unit in the information development process		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Property] DateOfEffect	http://iirds.tekom.de/iirds#dateOfEffect date and time on which the given content lifecycle status becomes valid	[dateTimeStamp] 2019-05-15T09:52:00 +01:00	[0..1]

[Property] DateOfExpiry	http://iirds.tekom.de/iirds#dateOfExpiry date and time on which the given content lifecycle status becomes invalid	[dateTimeStamp] 2021-01-09T09:52:00+01:00	[0..1]
[Property] DateOfStatus	http://iirds.tekom.de/iirds#dateOfStatus date and time of a lifecycle status's last change	[dateTimeStamp] 2021-01-09T09:52:00 +01:00	[0..1]
[Property] StatusComment {00}	http://iirds.tekom.de/iirds#statusComment note on a content lifecycle status	[string] Überschriften inkonsistent	[0..*]
[Property] Purpose	http://iirds.tekom.de/iirds#purpose reason for an information unit's lifecycle status	[string] Überarbeitung notwendig	[0..1]
[Rel] HasContent Lifecycle StatusValue	http://iirds.tekom.de/iirds#has-content-lifecycle-status-value content lifecycle status's property referencing its value	[n.a.]	[1]
[Rel] RelatesToParty	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..1]

3.16 Properties of the SMC "Identity"

Table 17: Properties of SMC "Identity"

idShort	Identity		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Identity		
Parent	AdministrativeMetadataCollection		
Explanation	Complex identifier of a resource in an external system		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:df1332ee-1a4c-4246-a51d-9edfbdd6c160	[0..1]
[Property] Identifier	http://iirds.tekom.de/iirds#identifier unique name of the resource within a given domain.	[string] 912567230	[1]

[Rel] HasIdentityDomain	http://iirds.tekom.de/iirds#has-identity-domain identifier's property referencing the domain in which it is unique	[n.a.]	[1]

3.17 Properties of the SMC "Party"

Table 18: Properties of SMC "Party"

idShort	Party		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Party		
Parent	AdministrativeMetadataCollection		
Explanation	Person, organization or system		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:17057163-c9f2-4b21-8210-89a13e4c9192	[1]
[Rel] HasPartyRole	http://iirds.tekom.de/iirds#has-party-role party's property referencing its role	[n.a.]	[0..1]
[Rel] RelatesToVcard	http://iirds.tekom.de/iirds#relates-to-vcard party's property referencing an organization or person	[n.a.]	[0..1]

3.18 Properties of the SMC "IdentityDomain"

Table 19: Properties of SMC "IdentityDomain"

idShort	IdentityDomain		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#IdentityDomain		
Parent	AdministrativeMetadataCollection		
Explanation	Organizational origin of an identifier that is assigned to an iiRDS identity		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Rel]	http://iirds.tekom.de/iirds#IdentityType	[n.a.]	[0..1]

HasIdentityType	distinguished set of identifiers that are assigned to an iiRDS identity		
[Rel] RelatesTo Party	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..1]

3.19 Properties of the SMC "FunctionalMetadataCollection"

Table 20: Properties of SMC "FunctionalMetadataCollection"

idShort	FunctionalMetadataCollection		
Class	submodelElementCollection		
semanticId	FunctionalMetadataCollection		
Parent	IntelligentInformationforUse		
Explanation	Collection of instances of the subclasses of iirds:FunctionalMetadata		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Supply{00}	http://iirds.tekom.de/iirds#Supply physical object used by an actor performing work tasks described in technical documentation	[n.a.]	[0..*]
[SMC] Event{00}	http://iirds.tekom.de/iirds#Event something noticeable that takes place at a given location and point in time	[n.a.]	[0..*]
[SMC] EventCode{00}	http://iirds.tekom.de/iirds#EventCode property to identify an event	[n.a.]	[0..*]
[SMC] EventType{00}	http://iirds.tekom.de/iirds#EventType event's property referencing its type	[n.a.]	[0..*]
[SMC] Role{00}	http://iirds.tekom.de/iirds#Role set of connected behaviors, privileges and obligations associated with a party	[n.a.]	[0..*]
[SMC] SkillLevel{00}	http://iirds.tekom.de/iirds#SkillLevel degree of qualification of an individual	[n.a.]	[0..*]
[SMC] Action{00}	http://iirds.tekom.de/iirds#Action atomic manipulation of an object by a participant	[n.a.]	[0..*]
[SMC] WorkingTime{00}	http://iirds.tekom.de/iirds#WorkingTime period of time that is required for conducting a specific task	[n.a.]	[0..*]

[SMC] Maintenance Interval{00}	http://iirds.tekom.de/ iirds#MaintenanceInterval period of time between scheduled maintenance operations	[n.a.]	[0..*]
[SMC] DownTime{00}	http://iirds.tekom.de/iirds#DownTime period of time during which an item is not in condition to perform its intended function	[n.a.]	[0..*]

3.20 Properties of the SMC "Supply"

Table 21: Properties of SMC "Supply"

idShort	Supply		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Supply		
Parent	FunctionalMetadataCollection		
Explanation	Physical object used by an actor performing work tasks described in technical documentation		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] https://www.i4icm.de/pifan#ScrewDriverPhillips	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Phillips Screw Driver	[0..1]

3.21 Properties of the SMC "Event"

Table 22: Properties of SMC "Event"

idShort	Event		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Event		
Parent	FunctionalMetadataCollection		
Explanation	Something noticeable that takes place at a given location and point in time		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	

[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:edf279ac-c0dd-4366-b0f0-15f3302cad00	[1]
[Rel] HasEventCode	http://iirds.tekom.de/iirds#has-event-code property to identify an event	[n.a.]	[1]
[Rel] HasEventType	http://iirds.tekom.de/iirds#has-event-type event's property referencing its type	[n.a.]	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Actuator locked - 2X222	[0..1]

3.22 Properties of the SMC "Role"

Table 23: Properties of SMC "Role"

idShort	Role		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Role		
Parent	FunctionalMetadataCollection		
Explanation	Set of connected behaviors, privileges and obligations associated with a party		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] https://www.i4icm.de/pifan#Operator	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Operator	[0..1]

3.23 Properties of the SMC "SkillLevel"

Table 24: Properties of SMC "SkillLevel"

idShort	SkillLevel
Class	submodelElementCollection
semanticId	http://iirds.tekom.de/iirds#SkillLevel

Parent	FunctionalMetadataCollection		
Explanation	Degree of qualification of an individual		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:f984029a-adc2-4995-8c8f-d330ce756cea	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Expert	[0..1]

3.24 Properties of the SMC "Action"

Table 25: Properties of SMC "Action"

idShort	Action		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Action		
Parent	FunctionalMetadataCollection		
Explanation	Atomic manipulation of an object by a participant		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:5d3c80f3-6e39-4fa9-ab4b-3cd9a5cbc6b5	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Cleaning	[0..1]

3.25 Properties of the SMC "WorkingTime"

Table 26: Properties of SMC "WorkingTime"

idShort	WorkingTime
Class	submodelElementCollection
semanticId	http://iirds.tekom.de/iirds#WorkingTime
Parent	FunctionalMetadataCollection

Explanation	Period of time that is required for conducting a specific task		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:23e9fbf1-f1b0-4689-b071-1f0cfd677c25	[0..1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Change engine	[0..1]
[Property] Duration	http://iirds.tekom.de/iirds#duration span of time	[string] PT30M	[1]

3.26 Properties of the SMC "MaintenanceInterval"

Table 27: Properties of SMC "MaintenanceInterval"

idShort	MaintenanceInterval		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#MaintenanceInterval		
Parent	FunctionalMetadataCollection		
Explanation	Period of time between scheduled maintenance operations		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:e7d6cdd8-3ebf-4359-9e79-d0961144daab	[0..1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Clean filters	[0..1]
[Property] Frequency	http://iirds.tekom.de/iirds#frequency intended interval between recurring maintanance tasks	[string] yearly	[1]
[Property] Duration	http://iirds.tekom.de/iirds#duration span of time	[string] PT30M	[1]

3.27 Properties of the SMC "DownTime"

Table 28: Properties of SMC "DownTime"

idShort	DownTime		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#DownTime		
Parent	FunctionalMetadataCollection		
Explanation	Period of time during which an item is not in condition to perform its intended function		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:57c02f53-0d1e-4d04-9d97-af9032d4952c	[0..1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Hardware-Defekt	[0..1]
[Property] Duration	http://iirds.tekom.de/iirds#duration span of time	[string] PT30M	[1]

3.28 Properties of the SMC "ProductMetadataCollection"

Table 29: Properties of SMC "ProductMetadataCollection"

idShort	ProductMetadataCollection		
Class	submodelElementCollection		
semanticId	ProductMetadataCollection		
Parent	IntelligentInformationforUse		
Explanation	Collection of instances of the subclasses of iirds:ProductMetadata		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[SMC] Component{00}	http://iirds.tekom.de/iirds#Component part used as a constituent in an assembled product, system or plant	[n.a.]	[0..*]
[SMC] Product Feature{00}	http://iirds.tekom.de/iirds#ProductFeature product characteristics	[n.a.]	[0..*]

[SMC] Product Variant{00}	http://iirds.tekom.de/iirds#ProductVariant item or service offered on the market and designed to meet the needs or wishes of customers	[n.a.]	[0..*]

3.29 Properties of the SMC "Component"

Table 30: Properties of SMC "Component"

idShort	Component		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#Component		
Parent	ProductMetadataCollection		
Explanation	Part used as a constituent in an assembled product, system or plant		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] https://www.i4icm.de/pifan#Rotor	[1]
[Ent] Asset{00}	{semantic id of the referenced asset} Entity in terms of the asset administration shell	[n.a.] 5C362E53	[0..*]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Rotor	[0..1]
[Rel] RelatesTo Party	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..1]

3.30 Properties of the SMC "ProductFeature"

Table 31: Properties of SMC "ProductFeature"

idShort	ProductFeature		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#ProductFeature		
Parent	ProductMetadataCollection		
Explanation	Product characteristics		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**

idShort	Description@en	example	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] urn:uuid:de513daa-eed8-5d90-ba3a-6024037ead45	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] Size-45	[0..1]

3.31 Properties of the SMC "ProductVariant"

Table 32: Properties of SMC "ProductVariant"

idShort	ProductVariant		
Class	submodelElementCollection		
semanticId	http://iirds.tekom.de/iirds#ProductVariant		
Parent	ProductMetadataCollection		
Explanation	Item or service offered on the market and designed to meet the needs or wishes of customers		
[SME type]	**semanticID = [idType]value**	**[valueType]**	**card.**
idShort	**Description@en**	**example**	
[Property] ResourceIRI	http://iirds.tekom.de/iirds#ResourceIRI Identifies instances of the iirds-classes and subclasses	[anyURI] https://www.i4icm.de/pifan#X5-DH2	[1]
[MLP] Label	http://www.w3.org/2000/01/rdf-schema#label used to provide a human-readable version of a resource's name	[n.a.] X5-DH2	[0..1]
[Rel] RelatesTo Party	http://iirds.tekom.de/iirds#relates-to-party iiRDS resource's property referencing a party	[n.a.]	[0..1]

Annex A: Explanations on used table formats

General
The used tables in this document try to outline information as concise as possible. They do not convey all information on Submodels and SubmodelElements. For this purpose, the definitive definitions are given by a separate file in form of an AASX file of the Submodel template and its elements.

Tables on Submodels and SubmodelElements
For clarity and brevity, a set of rules is used for the tables for describing Submodels and SubmodelElements.

- The tables follow in principle the same conventions as in [5].
- The table heads abbreviate 'cardinality' with 'card'.
- The tables often place two informations in different rows of the same table cell. In this case, the first information is marked out by sharp brackets [] form the second information. A special case are the semanticIds, which are marked out by the format: (type)(local)[idType]value.
- The types of SubmodelElements are abbreviated: SME

SME type Submodel	Element type
Property	Property
MLP	MultiLanguageProperty
Range	Range
File	File
Blob	Blob
Ref	ReferenceElement
Rel	RelationshipElement
SMC	SubmodelElementCollection

- If an idShort ends with '{00}', this indicates a suffix of the respective length (here: 2) of decimal digits, in order to make the idShort unique. A different idShort might be choosen, as long as it is unique in the parent's context.
- The Keys of semanticId in the main section feature only idType and value, such as: [IRI]https://admin-shell.io/vdi/2770/1/0/DocumentId/Id. The attributes "type" and "local" (typically "ConceptDescription" and "(local)" or "GlobalReference" and (no-local)") need to be set accordingly; see [6].
- If a table does not contain a column with "parent" heading, all represented attributes share the same parent. This parent is denoted in the head of the table.
- Multi-language strings are represented by the text value, followed by '@'-character and the ISO 639 language code: example@de.
- The [valueType] is only given for Properties.

Annex B: iiRDS – intelligent information Request and Delivery Standard

General
This chapter provides further information on approach and realization of Submodel information according to iiRDS Specification.

Background
iiRDS (intelligent information Request and Delivery Standard) is a technical standard for the delivery of digital user information, e.g. digital user manuals and handbooks. iiRDS can be used free of charge and is published under a Creative Commons license.

iiRDS was developed by an expert group of tekom (professional association for technical communication) from 2016. Since 2018, the standard has been maintained and further developed by the iiRDS consortium.

Information model of iiRDS
The aim of iiRDS is to create a delivery standard that enables cross-vendor delivery, exchange and aggregation of user information. This is particularly necessary in the context of Industry 4.0 solutions in order to link the technical documentation of different manufacturers in plants and smart factories. iiRDS is not intended to standardize the way in which content is created and managed, but only the delivery format.

Content enriched with iiRDS metadata can be found more quickly and specifically in self-service portals, documentation portals or apps, as they support search and filter functions, among other things.

iiRDS consists of two essential components:

- Metadata model for the technical documentation domain as an ontology that can serve as a basis for enriching the user information with metadata.
- Package format, which defines the storage structure of the delivered user information.

The full iiRDS Specification is available here: https://www.iirds.org/material-downloads/iirds-version-1-1

Mapping
The information that is defined in the iiRDS specification and can be used in iiRDS packages has been taken over into this Submodel specification. As a result, the information of a conventional iiRDS Package is identical to that of an iiRDS Submodel Handover Documentation. Due to the different information structures of RDF as the basis of iiRDS Packages and the metamodel of the AAS, the structure of the Submodel specification was adapted in such a way that it is conform to the metamodel of the AAS. The following basic adjustments were made.

- iiRDS packages are resolved during transformation in AAS. A reference to the iiRDS package (is-part-of-package) is therefore not required.

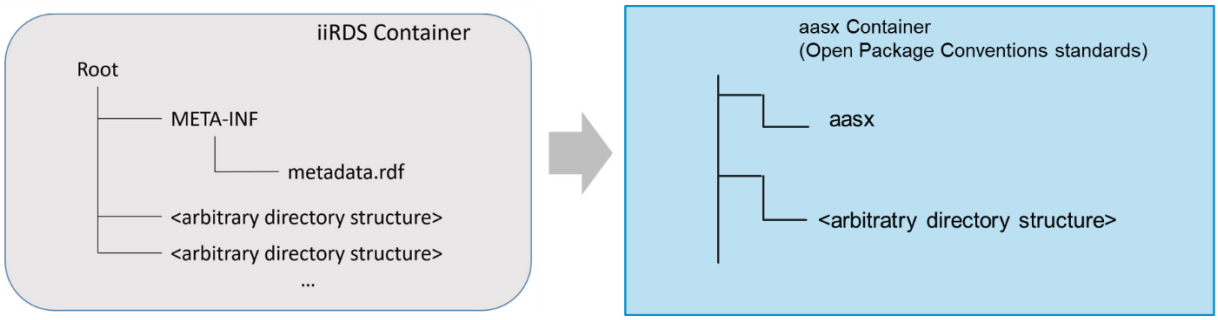

Figure 4 iiRDS Package compared with AASX instance

- The structure of the iiRDS specification is decomposed and mapped to the AAS metamodel.
- Eight basic SMCs are defined, representing the basic classes of the iiRDS specification.
- The individual properties of the iiRDS classes were modelled as Submodel elements (properties, relationships).
- Properties have been used where iiRDS properties are of type http://www.w3.org/2000/01/rdf-schema#Literal. (e.g. iirds:language)
- Relationships were used when iiRDS properties are of type http://www.w3.org/1999/02/22-rdf-syntax-ns#Property (e.g. iirds:has-content-lifecycle-status).
- Relationships refer either to content of other SMCs within the own AAS, to content of the concept description or to an entity.
- Own component hierarchies shall never be created in iiRDS packages. Hierarchy information shall be captured, if necessary, via the Hierarchical Structures enabling Bills of Material Submodel.
- The attribute rdf:about is specified as an own property with the name ResourceIRI.
- The Submodel specification maps the core iiRDS specification. However, the Submodel can be extended by further specifications such as the iiRDS Machinery Domain or proprietary extensions.
- This also applies to extensions of individual properties, e.g., LifecycleStatus
- To simplify the model, intermediate layers were removed, e.g., Documentation metadata, Information type.
- To follow the rules of the AASX structure it is necessary to implement contentLifecyleStatus in a different way than in iiRDS:

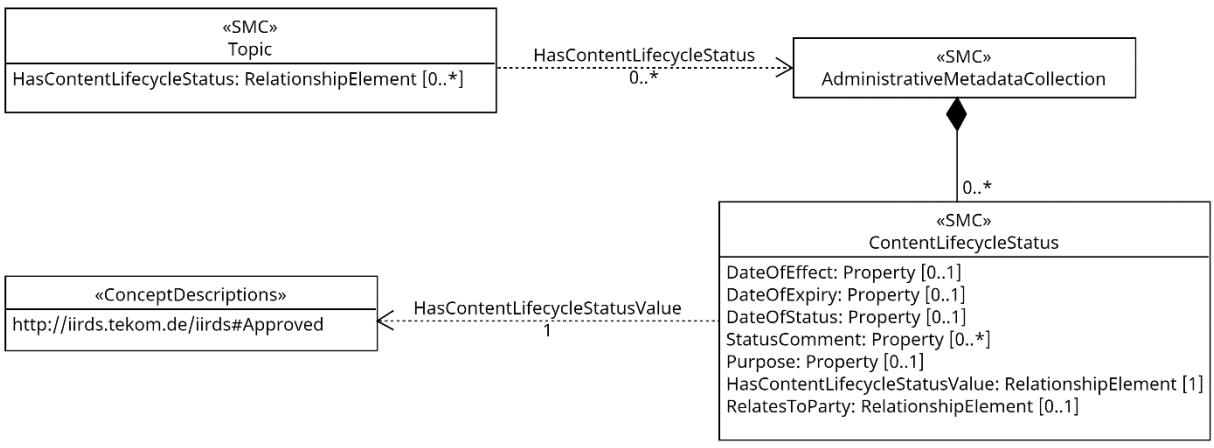

Figure 5 UML Information about Content Lifecycle

Value Lists (ConceptDescription)

The following list shows the ConceptDescriptions to which the relationships in the SubmodelCollections can refer. The relationship names contain the group, e.g. [Rel] HasDocumentType → DocumentType

DocumentType		
Administrator guide	http://iirds.tekom.de/ iirds#AdministratorGuide	Type of document. Contains instructions for the administration of a technical system.
Assembly instructions	http://iirds.tekom.de/ iirds#AssemblyInstructions	Type of document. Contains instructions enabling the operator to assemble a physical product so that it fulfills its intended use and does not endanger the health and safety of persons.
Bill of materials	http://iirds.tekom.de/ iirds#BillOfMaterials	List of sub-components, sub-modules and parts of a product. The materials are listed with their identity and characteristics so that they can be identified within the product and procured.
CE declaration of conformity	http://iirds.tekom.de/ iirds#CEDeclarationOf Conformity	Type of document. Created as a result of a procedure whereby the manufacture or authorized representative "ensures and declares" that the products concerned satisfy the requirements of the directives that apply to them.
Certificate	http://iirds.tekom.de/ iirds#Certificate	Document of legal nature that contains and certifies product information, quality, and characteristics. Usually acknowledged with a signature.
Contractual document	http://iirds.tekom.de/ iirds#ContractualDocument	Document that is part of or accompanies a contract.
Electronic identification plate	http://iirds.tekom.de/ iirds#ElectronicIdentification Plate	Electronically readable label on a machine or component that provides information on the identity of the manufacturer and the product, as well as on the technical characteristics of the product.
Identification document	http://iirds.tekom.de/ iirds#IdentificationDocument	Type of document. Identifies an object and provides descriptive or classifying information.
Installation instructions	http://iirds.tekom.de/ iirds#InstallationInstructions	Type of document. Contains instructions enabling the operator or administrator to assemble or install a physical product or software so that it fulfills its intended use.

Maintenance instructions	http://iirds.tekom.de/ iirds#MaintenanceInstructions	Type of document. Contains instructions of all technical and management actions intended to retain an item in a state in which it can perform as REQUIRED.
Operating instructions	http://iirds.tekom.de/ iirds#OperatingInstructions	Type of document. Contains instructions for operation and use of a technical system.
Parts catalog	http://iirds.tekom.de/ iirds#PartsCatalog	Type of document. Contains listings of product names and their part numbers and graphics which are necessary for the aftersales service, but do not include prices or availabilities.
Plan	http://iirds.tekom.de/ iirds#Plan	Describes documents containing technical plans for a component or machine.
Quick reference guide	http://iirds.tekom.de/ iirds#QuickGuide	Type of document. Describes a short document that contains selected instructions for a specific user group or purpose.
Repair instructions	http://iirds.tekom.de/ iirds#RepairInstructions	Type of document. Contains instructions for restoring a product to a working condition.
Safety instructions	http://iirds.tekom.de/ iirds#SafetyInstructions	Contains general safety-related information provided by the manufacturer that MUST be considered during assembly, operation, maintenance, repair, and disassembly of the product. Safety information related to individual tasks is provided in the tasks.
Sales catalog	http://iirds.tekom.de/ iirds#SalesCatalog	Type of document. Contains listings of available products of a producing company with consumers as the target group.
Specification	http://iirds.tekom.de/ iirds#Specification	Type of document. Contains requirements and/or statements describing properties and qualities of a product to be built or manufactured.
Technical drawing/diagram	http://iirds.tekom.de/ iirds#TechnicalDrawing Diagram	Type of document. Examples are flow diagrams and circuit diagrams.
Technical drawing/diagram	http://iirds.tekom.de/ iirds#TechnicalDrawing Diagram	Type of document. Examples are flow diagrams and circuit diagrams.
Transport instructions	http://iirds.tekom.de/ iirds#TransportInstructions	Type of document. Contains instructions for transporting the product or its components from one place to another.
TopicType		

Concept	http://iirds.tekom.de/iirds#GenericConcept	Topic type that provides background that helps readers understand essential information about a product, interface, or task.
Form	http://iirds.tekom.de/iirds#GenericForm	Generic instance of the Form class.
Learning	http://iirds.tekom.de/iirds#GenericLearning	Topic type that provides learning content.
Reference	http://iirds.tekom.de/iirds#GenericReference	Generic instance of the Reference class.
Task	http://iirds.tekom.de/iirds#GenericTask	Topic type that contains procedural information for work activities.
Troubleshooting	http://iirds.tekom.de/iirds#Generic Troubleshooting	Topic type that contains corrective action information that helps to fix an error or remove a malfunction.
DirectoryNodeType		
Index	http://iirds.tekom.de/iirds#Index	Index directory type
List of figures	http://iirds.tekom.de/iirds#ListOfFigures	List of figures
List of listings	http://iirds.tekom.de/iirds#ListOfListings	Code listing
List of tables	http://iirds.tekom.de/iirds#ListOfTables	List of tables
Table of contents	http://iirds.tekom.de/iirds#TableOfContents	Table of contents
ProductLifecyclePhase		
Acquisition	http://iirds.tekom.de/iirds#Acquisition	Lifecycle phase of a product during which services, goods, or works are acquired from an external source.
Configuration	http://iirds.tekom.de/iirds#Configuration	Lifecycle phase of a product describing activities related to configuring the settings of a technical system before use.
Decommissioning	http://iirds.tekom.de/iirds#Decommissioning	Lifecycle phase of a product describing the shut-down and transfer into a safe state.
Design	http://iirds.tekom.de/iirds#Design	Lifecycle phase of product design.
Development	http://iirds.tekom.de/iirds#Development	Lifecycle phase of a product progressing from detailed design to prototyping through pilot release to full product launch.
Diagnostics	http://iirds.tekom.de/iirds#Diagnostics	Lifecycle phase of a product containing procedures for locating errors.

Disposal	http://iirds.tekom.de/iirds#Disposal	Lifecycle phase of a product describing the elimination of components, mounted parts and lubricant considering the country-specific current law.
Emergency operation	http://iirds.tekom.de/iirds#EmergencyOperation	Product lifecycle phase of a technical system in which the system's functionality is reduced to a minimum due to an error or emergency situation.
Fault	http://iirds.tekom.de/iirds#Fault	Product lifecycle phase of a technical system in which the intended use and operation of a technical system or software is interrupted due to an error or malfunction.
After use	http://iirds.tekom.de/iirds#GenericAfterUse	Generic instance of the AfterUse class.
Design and realization	http://iirds.tekom.de/iirds#GenericDesignAndRealization	Generic instance of the DesignAndRealization class.
Putting to use	http://iirds.tekom.de/iirds#GenericPuttingToUse	Generic instance of the GenericPuttingToUse class.
Use	http://iirds.tekom.de/iirds#GenericUse	Generic instance of the Use class.
Installation	http://iirds.tekom.de/iirds#Installation	Lifecycle phase of a product containing procedures for installing and setting up a software or IT system.
Maintenance	http://iirds.tekom.de/iirds#Maintenance	Lifecycle phase of a product that describes activities of all technical and management actions intended to retain an item in a state in which it can perform as REQUIRED.
Operation	http://iirds.tekom.de/iirds#Operation	Lifecycle phase of a product in which a technical product or system is actively used and operated.
Production	http://iirds.tekom.de/iirds#Production	Lifecycle phase of a product in which the product is manufactured.
Repair	http://iirds.tekom.de/iirds#Repair	Lifecycle phase of a product that describes activities for restoring the product to a working and sound condition after damage or wear and tear.
Requirement analysis	http://iirds.tekom.de/iirds#RequirementsAnalysis	Lifecycle phase of a product belonging to the product design; comprises the analysis and definition of requirements for the future product.
InformationSubject		
Applicable standard	http://iirds.tekom.de/iirds#ApplicableStandards	Information subject related to conformity. Describes content related to standards that a product needs to fulfil.

Contact information	http://iirds.tekom.de/ iirds#ContactInformation	Information subject. Contact information of the supplier.
Declaration of conformity	http://iirds.tekom.de/ iirds#DeclarationOf Conformity	Information subject. Specifies that the information unit deals with the EU Declaration of Conformity for CE marking.
Foreseeable misuse	http://iirds.tekom.de/ iirds#ForeseeableMisuse	Information subject. Foreseeable misuse of a product.
Collection	http://iirds.tekom.de/ iirds#GenericCollection	Information subject. Indicates that the content represents a collection of information assembled from different information units.
Conformity	http://iirds.tekom.de/ iirds#GenericConformity	Generic instance of the Conformity class.
Formality	http://iirds.tekom.de/ iirds#GenericFormality	Generic instance of the Formality class.
Functionality	http://iirds.tekom.de/ iirds#GenericFunctionality	Generic instance of the Functionality class.
Process	http://iirds.tekom.de/ iirds#GenericProcess	Generic instance of the Process class.
Safety	http://iirds.tekom.de/ iirds#GenericSafety	Generic instance of the Safety class.
Technical data	http://iirds.tekom.de/ iirds#GenericTechnicalData	Generic instance of the TechnicalData class.
Technical overview	http://iirds.tekom.de/ iirds#GenericTechnical Overview	Generic instance of the TechnicalOverview class.
Intended use	http://iirds.tekom.de/ iirds#IntendedUse	Information subject: Legal concept outlining the field of application specified in matters of design and construction of the machinery which is described in the operating instructions/technical documentation, including considerations of the reasonable foreseeable use and potential misuse.
Legal information	http://iirds.tekom.de/ iirds#LegalInformation	Information subject for legal information.
License terms	http://iirds.tekom.de/ iirds#LicenceTerm	Information subject describing licensing conditions.
Manufacturer information	http://iirds.tekom.de/ iirds#Manufacturer Information	Information subject. Information about the manufacturer of a product like name and address.
Control element	http://iirds.tekom.de/ iirds#OperatingElement	Information subject. Describes a device that a person can use to influence a machine or plant.
Product identification	http://iirds.tekom.de/ iirds#ProductIdentification	Information subject: Describes a name plate or similar that identifies the product.

Product name	http://iirds.tekom.de/ iirds#ProductName	Information subject. Contains the name of the product.
Restriction on use	http://iirds.tekom.de/ iirds#RestrictionOnUse	Information subjects. Specifies that there are restrictions regarding the use of the product.
Risk assessment	http://iirds.tekom.de/ iirds#RiskAssessment	Information subject related to conformity. Specifies that the information unit contains information on the risk assessment made within the safety engineering of the product.
Safety instruction	http://iirds.tekom.de/ iirds#SafetyInstruction	Information subject. Safety instructions explain to the user how to handle a product in a safe way.
Scope of delivery	http://iirds.tekom.de/ iirds#ScopeOfDelivery	Information subject. Specifies the scope of the delivery.
Symbol	http://iirds.tekom.de/ iirds#Symbol	Information subject. Contains a list and explanation of symbols used in the documentation.
Warranty conditions	http://iirds.tekom.de/ iirds#WarrantyConditions	Information subject. Contains the warranty conditions.
IdentityType		
Article code	http://iirds.tekom.de/ iirds#ArticleCode	Examples of article code are material number, article number, or item number.
EAN	http://iirds.tekom.de/ iirds#EuropeanArticleNumber	European Article Number (EAN; also International Article Number, IAN) identifier for trade items.
GTIN	http://iirds.tekom.de/ iirds#GlobalTradeItemNumber	Global Trade Item Number (GTIN) is an identifier for trade items.
Instance of object URI	http://iirds.tekom.de/ iirds#ObjectInstanceURI	A globally biunique serial number, for example, according to the stipulations made in DIN SPEC 91406.
Order code	http://iirds.tekom.de/ iirds#OrderCode	Examples of order code are configuration number, product number, or code.
Product type	http://iirds.tekom.de/ iirds#ProductType	Examples of product type are labels of product variants and type or model.
Serial number	http://iirds.tekom.de/ iirds#SerialNumber	A serial number, serial ID or serial code identifying a single object instance.

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