



IDTA 02002-1-0

Submodel for Contact Information

24 May 2022

SPECIFICATION

Submodel Template of the
Asset Administration Shell

Imprint

Publisher

Industrial Digital Twin Association
Lyoner Strasse 18
60528 Frankfurt am Main
Germany
<https://www.industrialdigitaltwin.org/>

Version history

2022-05-24	1 st Version	Release of the Submodel template
------------	-------------------------	----------------------------------

Contents

1	General	7
1.1	About this document	7
1.2	Scope of the Submodel	7
1.3	Relevant standards and sources of concepts for the Submodel template	7
2	Information set for Submodel Contact Information	9
3	Submodel and collections	10
3.1	Properties of the Submodel "ContactInformations"	10
3.2	Properties of the SMC "ContactInformation"	11
3.3	Properties of the SMC "Phone"	14
3.4	Properties of the SMC "Fax"	15
3.5	Properties of the SMC "Email"	16
3.6	Properties of the SMC "IPCommunication"	17
4	Usage as SubmodelElementCollection	18
Annex A.	Explanations on used table formats	19
1.	General	19
2.	Tables on Submodels and SubmodelElements.....	19
	Bibliography	20

Figures

Figure 1: UML-Diagram for Submodel "ContactInformations" 10

Tables

Table 1 List of exemplary standards defining interoperable properties.....	7
Table 2: Properties of Submodel "ContactInformations"	10
Table 3: Properties of SMC "ContactInformation"	11
Table 4: Properties of SMC "Phone"	14
Table 5: Properties of SMC "Fax"	15
Table 6: Properties of SMC "Email"	16
Table 7: Properties of SMC "IPCommunication"	17

Foreword

We would like to thank Univ.-Prof. Dr.-Ing. Alexander Fay, Alaettin Dogan and Yuanheng Zhang of the department Mechanical and Civil Engineering at the Helmut Schmidt University / University of the Federal Armed Forces Hamburg and the working group “Contact Information” for their contribution to the document as well as the successful leading of discussions throughout the project.

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], [2], [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] to [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 contact information in regard to the asset of the respective Asset Administration Shell. Central element is the provision 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. It targets equipment for process industry and factory automation by defining standardized meta data.

The intended use-case is the provision of a standardized property structure for contact information, which can effectively accelerate the preparation for asset maintenance.

This concept can serve as a basis for standardizing the respective Submodel. The conception is based on studies of common practices at enterprises.

Beside standardized Submodel this template also introduces standardized SubmodelElementCollections (SMC) in order to improve the interoperability while modelling aspects of contact 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 exemplary standards defining interoperable properties

IEC 62890:2020-07 — Industrial-process measurement, control and automation - Life-cycle-management for systems and components	Describes basic concepts of product types and instances and the concepts of a life-cycle mode
VDMA 24903 — Obsolescence management – Exchange of information regarding change and discontinuance of products and items	Describes important event in the life-cycle of a product type and identifies important information elements to be conveyed

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>

In this document, properties are aimed to be described by ECLASS.

2 Information set for Submodel Contact Information

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

Use and economic relevance

The Submodel Contact Information is designed for service issues, e.g. maintenance or malfunction. The Submodel should show the available communication channels to reach the correct service provider without ambiguity. Beside manufacturers authorised partners may serve as service provider and contact for spare parts orders as well. In this way inquiries for repair services or spare parts can reach the right service contact directly and efficiently.

Possible functions and interactions

When a service issue occurs, customer can contact the responsible department of the manufacturer or an authorized service provider by using the communication channels specified in the Submodel. The properties for physical address and language availability can enable a rapid filtering of the wide range of all provided contacts. Furthermore, the specification of the time availability in contact channels like telephone or online communication helps customers to locate the right service contacts depending on the time when the issue occurs.

In regard to required property cardinalities, i.e. which property is mandatory or optional, this specification has been conceived to provide interoperable contact information via diverse channels. Therefore all properties within the SMC "ContactInformation" are defined as optional. If due to a specific use case further regulations or stipulations apply for providing contact information, the property cardinalities are to be adjusted accordingly. This flexibility in constraints also applies for re-usage of SMC "ContactInformation" in other Submodels, also see clause 4 "Usage as SubmodelElementCollection".

Property specification

See clause 3 "Submodel and collections".

3 Submodel and collections

3.1 Properties of the Submodel "ContactInformations"

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 2 describes the details of the Submodel structure combined with examples.

Figure 1: UML-Diagram for Submodel "ContactInformations"

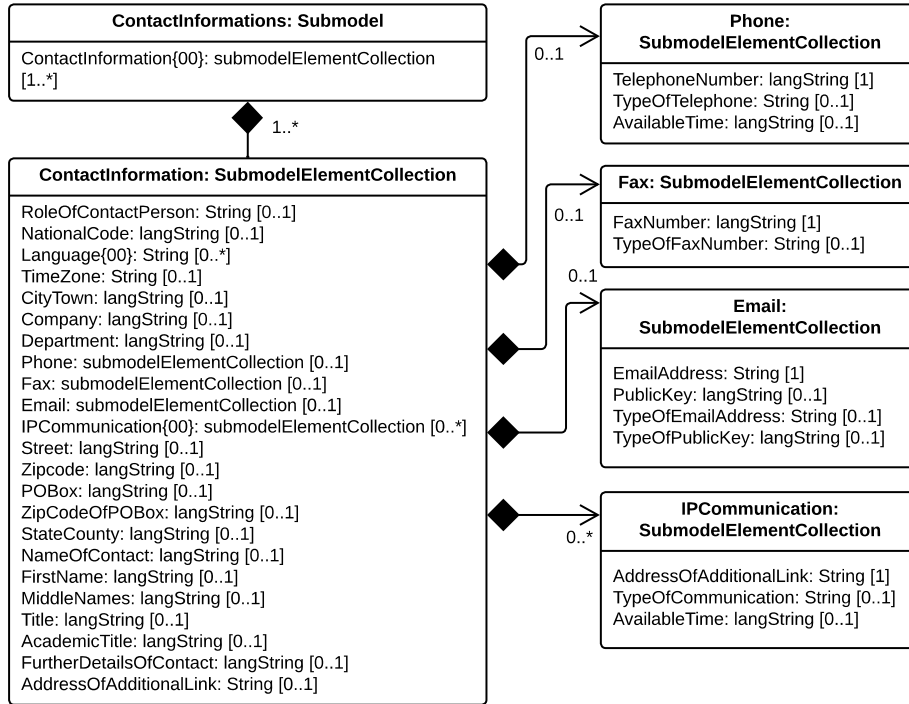


Table 2: Properties of Submodel "ContactInformations"

idShort:	ContactInformations Note: the above idShort shall always be as stated.		
Class:	Submodel		
semanticId:	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations		
Parent:	Asset Administration Shell with asset, which is a 3rd party article		
Explanation:	The Submodel "ContactInformations" is the collection for various contact information.		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[SubmodelElementCollection] ContactInformation{00}	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation The SME "ContactInformation" contains information on how to contact the manufacturer or an authorised service provider, e.g. when a maintenance service is required	n/a	[1..*]

3.2 Properties of the SMC “ContactInformation”

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 3 describes the details of the SMC structure combined with examples.

Table 3: Properties of SMC "ContactInformation"

idShort:	ContactInformation Note: the above idShort shall always be as stated.		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation		
isCaseOf	[IRDI] 0173-1#02-AAQ837#005		
AllowDuplicat es	True		
Parent:	Submodel “ContactInformations”		
Explanation:	The SMC “ContactInformation” contains information on how to contact the manufacturer or an authorised service provider, e.g. when a maintenance service is required		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[Property] RoleOfContactP erson	[IRDI] 0173-1#02-AAO204#003 function of a contact person in a process enumeration: 0173-1#07-AAS927#001 (administrativ contact), 0173-1#07-AAS928#001 (commercial contact), 0173-1#07-AAS929#001 (other contact), 0173-1#07- AAS930#001 (hazardous goods contact), 0173-1#07- AAS931#001 (technical contact) Note: the above mentioned ECLASS enumeration should be declared as “open” for further addition.	[String] 0173-1#07-AAS931#001 ECLASS enumeration IRDI is preferable. If no IRDI available, custom input as String may also be accepted.	[0..1]
[MLP] ¹ NationalCode	[IRDI] 0173-1#02-AAO134#002 code of a country Note: country codes defined accord. to ISO 3166-1	[langString] ¹ DE@de	[0..1]

¹ Recommendation: property declaration as MLP is required by its semantic definition. As the property value is language independent, users are recommended to provide maximal 1 string in any language of the user’s choice.

[Property] Language	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/Language isCaseOf: [IRDI] 0173-1#02-AAO895#003 Available language Note: language codes defined accord. to ISO 639-1 Note: as per ECLASS definition, Expression and representation of thoughts, information, feelings, ideas through characters	[String] de	[0..*]
[Property] TimeZone	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/TimeZone offsets from Coordinated Universal Time (UTC) Note: notation accord. to ISO 8601 Note: for time in UTC the zone designator "Z" is to be used	[String] Z -12:00 +14:00	[0..1]
[MLP] CityTown	[IRDI] 0173-1#02-AAO132#002 town or city Note: mandatory property according to EU Machine Directive 2006/42/EC.	[langString] Musterstadt@de	[0..1]
[MLP] Company	[IRDI] 0173-1#02-AAW001#001 name of the company	[langString] ABC Company@en	[0..1]
[MLP] Department	[IRDI] 0173-1#02-AAO127#003 administrative section within an organisation where a business partner is located	[langString] Vertrieb@de	[0..1]
[SubmodelElementCollection] Phone	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/Phone Phone number including type See separate clause	n/a	[0..1]
[SubmodelElementCollection] Fax	[IRDI] 0173-1#02-AAQ834#005 Fax number including type See separate clause	n/a	[0..1]
[SubmodelElementCollection] Email	[IRDI] 0173-1#02-AAQ836#005 E-mail address and encryption method See separate clause	n/a	[0..1]
[SubmodelElementCollection] IPCommunication{00}	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/IPCommunication IP-based communication channels, e.g. chat or video call See separate clause	n/a	[0..*]

[MLP] Street	[IRDI] 0173-1#02-AAO128#002 street name and house number	[langString] Musterstraße 1@de	[0..1]
[MLP] ¹ Zipcode	[IRDI] 0173-1#02-AAO129#002 ZIP code of address	[langString] ¹ 12345@de	[0..1]
[MLP] POBox	[IRDI] 0173-1#02-AAO130#002 P.O. box number	[langString] PF 1234@de	[0..1]
[MLP] ¹ ZipCodeOfPOBox	[IRDI] 0173-1#02-AAO131#002 ZIP code of P.O. box address	[langString] ¹ 12345@de	[0..1]
[MLP] StateCounty	[IRDI] 0173-1#02-AAO133#002 federal state a part of a state	[langString] Muster-Bundesland@de	[0..1]
[MLP] NameOfContact	[IRDI] 0173-1#02-AAO205#002 surname of a contact person	[langString]	[0..1]
[MLP] FirstName	[IRDI] 0173-1#02-AAO206#002 first name of a contact person	[langString]	[0..1]
[MLP] MiddleNames	[IRDI] 0173-1#02-AAO207#002 middle names of contact person	[langString]	[0..1]
[MLP] Title	[IRDI] 0173-1#02-AAO208#003 common, formal, religious, or other title preceding a contact person's name	[langString]	[0..1]
[MLP] AcademicTitle	[IRDI] 0173-1#02-AAO209#003 academic title preceding a contact person's name	[langString]	[0..1]
[MLP] FurtherDetailsOfContact	[IRDI] 0173-1#02-AAO210#002 additional information of the contact person	[langString]	[0..1]
[Property] AddressOfAdditionalLink	[IRDI] 0173-1#02-AAQ326#002 web site address where information about the product or contact is given	[String]	[0..1]

3.3 Properties of the SMC “Phone”

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 4 describes the details of the SMC structure combined with examples.

Table 4: Properties of SMC "Phone"

idShort:	Phone		
Class:	SubmodelElementCollection		
semanticId:	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/Phone		
isCaseOf	[IRDI] 0173-1#02-AAQ833#005		
Parent:	SMC “ContactInformation”		
Explanation:	Phone number including type		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[MLP] ¹ TelephoneNumber	[IRDI] 0173-1#02-AAO136#002 complete telephone number to be called to reach a business partner	[langString] ¹ +491234567890@de	[1]
[Property] TypeOfTelephone	[IRDI] 0173-1#02-AAO137#003 characterization of a telephone according to its location or usage enumeration: 0173-1#07-AAS754#001 (office), 0173-1#07-AAS755#001 (office mobile), 0173-1#07-AAS756#001 (secretary), 0173-1#07-AAS757#001 (substitute), 0173-1#07-AAS758#001 (home), 0173-1#07-AAS759#001 (private mobile)	[String] 0173-1#07-AAS754#001	[0..1]
[MLP] AvailableTime	[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/AvailableTime/ Specification of the available time window	[langString] Montag – Freitag 08:00 bis 16:00@de	[0..1]

3.4 Properties of the SMC “Fax”

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 5 describes the details of the SMC structure combined with examples.

Table 5: Properties of SMC "Fax"

idShort:	Fax		
Class:	SubmodelElementCollection		
semanticId:	[[IRDI] 0173-1#02-AAQ834#005		
Parent:	SMC “ContactInformation”		
Explanation:	Fax number including type		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[MLP] ¹ FaxNumber	[[IRDI] 0173-1#02-AAO195#002 complete telephone number to be called to reach a business partner's fax machine	[[langString] ¹ +491234567890@de	[1]
[Property] TypeOfFaxNumber	[[IRDI] 0173-1#02-AAO196#003 characterization of the fax according its location or usage enumeration: 0173-1#07-AAS754#001 (office), 0173-1#07-AAS756#001 (secretary), 0173-1#07-AAS758#001 (home)	[[String] 1	[0..1]

3.5 Properties of the SMC “Email”

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 6 describes the details of the SMC structure combined with examples.

Table 6: Properties of SMC "Email"

idShort:	Email		
Class:	SubmodelElementCollection		
semanticId:	[IRDI] 0173-1#02-AAQ836#005		
Parent:	SMC “ContactInformation”		
Explanation:	E-mail address and encryption method		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[Property] EmailAddress	[IRDI] 0173-1#02-AAO198#002 electronic mail address of a business partner	[String] email@muster-ag.de	[1]
[MLP] ¹ PublicKey	[IRDI] 0173-1#02-AAO200#002 public part of an unsymmetrical key pair to sign or encrypt text or messages	[langString] ¹	[0..1]
[Property] TypeOfEmailAddress	[IRDI] 0173-1#02-AAO199#003 characterization of an e-mail address according to its location or usage enumeration: 0173-1#07-AAS754#001 (office), 0173-1#07-AAS756#001 (secretary), 0173-1#07-AAS757#001 (substitute), 0173-1#07-AAS758#001 (home)	[String] 0173-1#07-AAS754#001	[0..1]
[MLP] TypeOfPublicKey	[IRDI] 0173-1#02-AAO201#002 characterization of a public key according to its encryption process	[langString]	[0..1]

3.6 Properties of the SMC “IPCommunication”

Figure 1 shows the UML-diagram defining the relevant properties which need to be set. Table 7 describes the details of the SMC structure combined with examples.

Table 7: Properties of SMC "IPCommunication"

idShort:	IPCommunication{00}		
Class:	SubmodelElementCollection		
semanticId:	[[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/IPCommunication/		
Parent:	SMC “ContactInformation”		
Explanation:	IP-based communication channels, e.g. chat or video call		
[SME type]	semanticId = [idType]value	[valueType]	card.
idShort	Description@en	example	
[Property] AddressOfAdditionalLink	[[IRDI] 0173-1#02-AAQ326#002 web site address where information about the product or contact is given	[String]	[1]
[Property] TypeOfCommunication	[[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/IPCommunication/TypeOfCommunication characterization of an IP-based communication channel	[String] Chat Video call	[0..1]
[MLP] AvailableTime	[[IRI] https://admin-shell.io/zvei/nameplate/1/0/ContactInformations/ContactInformation/AvailableTime/ Specification of the available time window	[langString] Montag – Freitag 08:00 bis 16:00@de	[0..1]

4 Usage as SubmodelElementCollection

Due to the fact that contact information can be re-used in various contexts beside service issues, the specified SMC "ContactInformation" in section 3 can be used within other Submodels. In this way the parent Submodel can utilize standardized means of providing contact information, while the specific context of contact information remains identifiable through the parent Submodel.

Annex A. Explanations on used table formats

1. 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.

2. 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 [] from 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 type	SubmodelElement 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 chosen, 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.

Bibliography

- [1] “Recommendations for implementing the strategic initiative INDUSTRIE 4.0”, acatech, April 2013. [Online]. Available <https://www.acatech.de/Publikation/recommendations-for-implementing-the-strategic-initiative-industrie-4-0-final-report-of-the-industrie-4-0-working-group/>
- [2] “Implementation Strategy Industrie 4.0: Report on the results of the Industrie 4.0 Platform”; BITKOM e.V. / VDMA e.V., /ZVEI e.V., April 2015. [Online]. Available: <https://www.bitkom.org/noindex/Publikationen/2016/Sonstiges/Implementation-Strategy-Industrie-40/2016-01-Implementation-Strategy-Industrie40.pdf>
- [3] “The Structure of the Administration Shell: TRILATERAL PERSPECTIVES from France, Italy and Germany”, March 2018, [Online]. Available: <https://www.plattform-i40.de/I40/Redaktion/EN/Downloads/Publikation/hm-2018-trilaterale-coop.html>
- [4] “Beispiele zur Verwaltungsschale der Industrie 4.0-Komponente – Basisteil (German)”; ZVEI e.V., Whitepaper, November 2016. [Online]. Available: <https://www.zvei.org/presse-medien/publikationen/beispiele-zur-verwaltungsschale-der-industrie-40-komponente-basisteil/>
- [5] “Verwaltungsschale in der Praxis. Wie definiere ich Teilmodelle, beispielhafte Teilmodelle und Interaktion zwischen Verwaltungsschalen (in German)”, Version 1.0, April 2019, Plattform Industrie 4.0 in Kooperation mit VDE GMA Fachausschuss 7.20, Federal Ministry for Economic Affairs and Energy (BMWi), Available: <https://www.plattform-i40.de/PI40/Redaktion/DE/Downloads/Publikation/2019-verwaltungsschale-in-der-praxis.html>
- [6] “Details of the Asset Administration Shell; Part 1 - The exchange of information between partners in the value chain of Industrie 4.0 (Version 3.0RC01)”, November 2020, [Online]. Available: <https://www.plattform-i40.de/PI40/Redaktion/EN/Downloads/Publikation/Details-of-the-Asset-Administration-Shell-Part1.html>
- [7] “Semantic interoperability: challenges in the digital transformation age”; IEC, International Electrotechnical Commission; 2019. [Online]. Available: <https://basecamp.iec.ch/download/iec-white-paper-semantic-interoperability-challenges-in-the-digital-transformation-age-en/>

www.industrialdigitaltwin.org