ISO/TS 10303-15:2024-07 (E)

Industrial automation systems and integration - Product data representation and exchange - Part 15: Description methods: SysML XMI to XSD transformation

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms,definitions,andabbreviatedterms 2
3.1 Terms and definitions 2
3.1.1 Terms related to SysML constructs 2
3.1.2 Terms related to XSD constructs 4
3.1.3 Terms related to Schematron rules 5
3.2 Abbreviated terms 5

4 Structure and components of the XSD 6
4.1 General 6
4.2 Presentation conventions 6
4.3 Main components of the XSD 7
4.4 XSD header 7
4.5 Common structural XML element definitions 7
4.6 ExternalRefBaseObject 9
4.6.1 General 9
4.6.2 SubObject and NamedSubObject 11
4.7 DataContainer 13
4.8 List of application object specifications 13
4.8.1 List and definition of the entities as application object specifications 13
4.8.2 Object attribute specifications 13
4.8.3 Attributes optionality and cardinality 14
4.8.4 Base root objects 15
4.8.5 Base objects 15
4.8.6 Instantiation of a subtype 16
4.8.7 Representation of XML identification attribute 16
4.8.8 Multilanguage support 17
4.8.9 Representation of Date and Time 17
4.9 Groups and simple types corresponding to Select Data Types and Enumerations 18
4.9.1 Group 18
4.9.2 Enumeration 18
4.9.3 Simple type 18

5 SysML XMI to XSD 18
5.1 General 18
5.2 Presentation conventions 19
5.3 Common mapping conventions 20
5.3.1 Reference to external Canonical XMI (CXMI) files 20
5.3.2 Xmi:id, xmi:uuid, and UUID 20
5.3.3 Assumed sysml:Block in fragments 20
5.3.4 Containment and reference relationships 21
5.3.5 Used stereotypes 21
5.3.6 Select Data Type and supertype 21
5.4 Mapping of the DataContainer 21

5.5 Mapping of Entity 22
5.5.1 General entity 22
5.5.2 Entity attribute ordering 23
5.5.3 Mapping of abstract entity 23
5.5.4 Mapping of entity with one supertype 23
5.5.5 Mapping of entity with more than one supertype 24
5.5.6 Mapping of entity with the Generic stereotype 26
5.5.7 Mapping of entity with the Enrichment stereotype 26

5.5.8 Mapping of entity without supertype and not used by containment 27
5.5.9 Mapping of entity without supertype and used by containment 27
5.6 Mapping of simple type 28
5.7 Mapping of aggregation type 31
5.8 Mapping of aggregation of aggregation type 32
5.9 Select Data Type 33
5.9.1 Mapping of Select Data Type 33
5.9.2 Proxy artefact 37
5.10 Mapping of enumeration type 37
5.11 Mapping of entity attribute 38
5.11.1 General 38
5.11.2 Mapping of multiplicity and optionality 39
5.11.3 Attribute typed as an Entity 41
5.11.4 Attribute typed as Select Data Type 42
5.11.5 Attribute typed as Enumeration type 43
5.11.6 Attribute typed as simple type 44
5.11.7 Fixed Value attribute 44
5.11.8 Inverse Generic attribute 45
5.11.9 Inverse Composite Aggregation attribute 46
5.11.10 Redefined attributes 48

6 SysML XMI to Schematron 48
6.1 General 48
6.2 Type of referenced subtype entity 49
6.3 Fixed Value attribute 50
6.4 Inverse Generic attribute 51
6.5 Redefinition 52
6.6 Constraint as formal proposition 54
6.7 ExternalRefBaseObject 55

Annex A (normative)Informationobjectregistration 57

Annex B (informative)SysMLXMItoXSDtransformation--Illustrativediagramsandfiles 58

Annex C (informative) EXPRESS / Information modelling constructs and the equivalent SysML modelling constructs 61

Bibliography 72