



IEC 62559-3

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# INTERNATIONAL STANDARD



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**Use case methodology –  
Part 3: Definition of use case template artefacts into an XML serialized format**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

FOREWORD.....	9
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references .....	14
3 Terms and definitions .....	14
4 Methodological framework for developing this standard .....	15
4.1 Model-based approach for developing the data exchange format .....	15
4.2 Example for the model-based process in the context of IEC 62559 .....	17
4.3 Development of specific data exchange profiles.....	20
5 Application of the methodological framework for defining a set of key syntactic exchange formats (use cases, actors, requirements) .....	20
6 Models' detailed content (automatic generation from UML models).....	21
6.1 UML use case core concepts (UML Information Model).....	21
6.1.1 General .....	21
6.1.2 Model package UseCaseCoreConcepts .....	21
6.2 Use case library exchange format .....	47
6.2.1 UML use case library exchange model (UML Contextual Model) .....	47
6.2.2 Use case library XML syntactic format .....	75
6.3 Actor library exchange Format .....	93
6.3.1 UML actor library exchange model (UML Contextual Model) .....	93
6.3.2 Actor library XML syntactic format .....	96
6.4 Requirement library exchange Format.....	98
6.4.1 UML requirement library exchange model (UML Contextual Model) .....	98
6.4.2 Requirement library XML syntactic format.....	101
Bibliography.....	103
Figure 1 – IEC 62559 standard series .....	11
Figure 2 – A common XML format for importing/exporting use case information between a variety of modelling software and repositories.....	13
Figure 3 – Model-based development framework for the definition of the IEC 62559-3 standard XML-based data exchange format .....	16
Figure 4 – UML Information Model for the Scenario-Actor relationship example .....	17
Figure 5 – UML Contextual Model based on the Scenario-Actor relationship example.....	18
Figure 6 – XML Schema corresponding to the Scenario-Actor relationship example.....	19
Figure 7 – Producing key XML exchange formats based on a unique IEC 62559 UML Information Model.....	21
Figure 8 – Class diagram UseCaseCoreConcepts::UseCaseCore_Libraries .....	22
Figure 9 – Class diagram UseCaseCoreConcepts::UseCaseCore_ActorLibrary.....	22
Figure 10 – Class diagram UseCaseCoreConcepts::UseCaseCore_UseCaseLibrary.....	23
Figure 11 – Class diagram UseCaseCoreConcepts::UseCaseCore_DetailedActivities.....	23
Figure 12 – Class diagram UseCaseCoreConcepts::UseCaseCore_AreaLibrary .....	24
Figure 13 – Class diagram UseCaseCoreConcepts::UseCaseCore_BusinessCaseLibrary .....	24
Figure 14 – Class diagram UseCaseCoreConcepts::UseCaseCore_BusinessObjectLibrary .....	25

Figure 15 – Class diagram UseCaseCoreConcepts::UseCaseCore_CommonTermLibrary .....	25
Figure 16 – Class diagram UseCaseCoreConcepts::UseCaseCore_RequirementLibrary .....	25
Figure 17 – Class diagram Primitives::Primitives .....	46
Figure 18 – Package diagram UseCase_ExchangeModel::ContextualModel_Dependency .....	48
Figure 19 – Class diagram UseCase_ExchangeModel::UseCase_Repository .....	49
Figure 20 – Class diagram UseCase_ExchangeModel::UseCase_ShortDescription .....	50
Figure 21 – Class diagram UseCase_ExchangeModel::UseCase_DetailedActivities .....	51
Figure 22 – Class diagram UseCase_ExchangeModel::UseCase_CompleteDescription .....	52
Figure 23 – Class diagram ActorLibrary_ExchangeModel::ActorLibrary .....	93
Figure 24 – Package diagram ActorLibrary_ExchangeModel::ActorLibrary .....	94
Figure 25 – Class diagram RequirementLibrary_ExchangeModel::RequirementLibrary .....	98
Figure 26 – Package diagram RequirementLibrary_ExchangeModel::RequirementLibrary .....	99
Table 1 – Attributes of UseCaseCoreConcepts::Activity .....	26
Table 2 – Association ends of UseCaseCoreConcepts::Activity with other classes .....	27
Table 3 – Attributes of UseCaseCoreConcepts::Actor .....	27
Table 4 – Association ends of UseCaseCoreConcepts::Actor with other classes .....	28
Table 5 – Attributes of UseCaseCoreConcepts::ActorGrouping .....	28
Table 6 – Association ends of UseCaseCoreConcepts::ActorGrouping with other classes .....	28
Table 7 – Attributes of UseCaseCoreConcepts::ActorLibrary .....	29
Table 8 – Association ends of UseCaseCoreConcepts::ActorLibrary with other classes .....	29
Table 9 – Attributes of UseCaseCoreConcepts::Area .....	29
Table 10 – Association ends of UseCaseCoreConcepts::Area with other classes .....	29
Table 11 – Attributes of UseCaseCoreConcepts::AreaLibrary .....	30
Table 12 – Association ends of UseCaseCoreConcepts::AreaLibrary with other classes .....	30
Table 13 – Attributes of UseCaseCoreConcepts::Assumption .....	30
Table 14 – Association ends of UseCaseCoreConcepts::Assumption with other classes .....	30
Table 15 – Attributes of UseCaseCoreConcepts::Author .....	31
Table 16 – Association ends of UseCaseCoreConcepts::Author with other classes .....	31
Table 17 – Attributes of UseCaseCoreConcepts::BusinessCase .....	31
Table 18 – Association ends of UseCaseCoreConcepts::BusinessCase with other classes .....	31
Table 19 – Attributes of UseCaseCoreConcepts::BusinessCaseLibrary .....	32
Table 20 – Association ends of UseCaseCoreConcepts::BusinessCaseLibrary with other classes .....	32
Table 21 – Attributes of UseCaseCoreConcepts::BusinessObject .....	32
Table 22 – Association ends of UseCaseCoreConcepts::BusinessObject with other classes .....	32
Table 23 – Attributes of UseCaseCoreConcepts::BusinessObjectLibrary .....	33
Table 24 – Association ends of UseCaseCoreConcepts::BusinessObjectLibrary with other classes .....	33
Table 25 – Attributes of UseCaseCoreConcepts::CommonTerm .....	33

Table 26 – Association ends of UseCaseCoreConcepts::CommonTerm with other classes .....	33
Table 27 – Attributes of UseCaseCoreConcepts::CommonTermLibrary .....	34
Table 28 – Association ends of UseCaseCoreConcepts::CommonTermLibrary with other classes .....	34
Table 29 – Attributes of UseCaseCoreConcepts::Condition .....	34
Table 30 – Association ends of UseCaseCoreConcepts::Condition with other classes.....	34
Table 31 – Attributes of UseCaseCoreConcepts::CustomInformation .....	35
Table 32 – Association ends of UseCaseCoreConcepts::CustomInformation with other classes .....	35
Table 33 – Attributes of UseCaseCoreConcepts::Drawing .....	35
Table 34 – Association ends of UseCaseCoreConcepts::Drawing with other classes.....	36
Table 35 – Literals of UseCaseCoreConcepts::DrawingClassification.....	36
Table 36 – Attributes of UseCaseCoreConcepts::FurtherActorInformation.....	36
Table 37 – Association ends of UseCaseCoreConcepts::FurtherActorInformation with other classes .....	37
Table 38 – Attributes of UseCaseCoreConcepts::IdentifiedObject .....	37
Table 39 – Attributes of UseCaseCoreConcepts::KeyPerformanceIndicator .....	37
Table 40 – Association ends of UseCaseCoreConcepts::KeyPerformanceIndicator with other classes .....	37
Table 41 – Attributes of UseCaseCoreConcepts::Narrative .....	38
Table 42 – Association ends of UseCaseCoreConcepts::Narrative with other classes .....	38
Table 43 – Attributes of UseCaseCoreConcepts::Objective .....	38
Table 44 – Association ends of UseCaseCoreConcepts::Objective with other classes.....	39
Table 45 – Attributes of UseCaseCoreConcepts::Reference .....	39
Table 46 – Association ends of UseCaseCoreConcepts::Reference with other classes .....	39
Table 47 – Attributes of UseCaseCoreConcepts::Remark .....	40
Table 48 – Association ends of UseCaseCoreConcepts::Remark with other classes .....	40
Table 49 – Attributes of UseCaseCoreConcepts::Requirement.....	40
Table 50 – Association ends of UseCaseCoreConcepts::Requirement with other classes .....	40
Table 51 – Attributes of UseCaseCoreConcepts::RequirementCategory.....	41
Table 52 – Association ends of UseCaseCoreConcepts::RequirementCategory with other classes .....	41
Table 53 – Attributes of UseCaseCoreConcepts::RequirementLibrary .....	41
Table 54 – Association ends of UseCaseCoreConcepts::RequirementLibrary with other classes .....	41
Table 55 – Attributes of UseCaseCoreConcepts::Scenario.....	42
Table 56 – Association ends of UseCaseCoreConcepts::Scenario with other classes.....	42
Table 57 – Attributes of UseCaseCoreConcepts::TriggeringEvent .....	42
Table 58 – Association ends of UseCaseCoreConcepts::TriggeringEvent with other classes .....	42
Table 59 – Attributes of UseCaseCoreConcepts::UseCase .....	43
Table 60 – Association ends of UseCaseCoreConcepts::UseCase with other classes .....	44
Table 61 – Attributes of UseCaseCoreConcepts::UseCaseLibrary.....	44

Table 62 – Association ends of UseCaseCoreConcepts::UseCaseLibrary with other classes .....	45
Table 63 – Attributes of UseCaseCoreConcepts::UseCaseRepository .....	45
Table 64 – Association ends of UseCaseCoreConcepts::UseCaseRepository with other classes .....	45
Table 65 – Attributes of UseCaseCoreConcepts::Version .....	46
Table 66 – Association ends of UseCaseCoreConcepts::Version with other classes .....	46
Table 67 – Attributes of UseCase_ExchangeModel::Activity .....	53
Table 68 – Association ends of UseCase_ExchangeModel::Activity with other classes .....	54
Table 69 – Attributes of UseCase_ExchangeModel::Actor .....	54
Table 70 – Association ends of UseCase_ExchangeModel::Actor with other classes .....	54
Table 71 – Attributes of UseCase_ExchangeModel::ActorGrouping .....	55
Table 72 – Association ends of UseCase_ExchangeModel::ActorGrouping with other classes .....	55
Table 73 – Attributes of UseCase_ExchangeModel::ActorLibrary .....	55
Table 74 – Association ends of UseCase_ExchangeModel::ActorLibrary with other classes .....	55
Table 75 – Attributes of UseCase_ExchangeModel::Area .....	56
Table 76 – Association ends of UseCase_ExchangeModel::Area with other classes .....	56
Table 77 – Attributes of UseCase_ExchangeModel::AreaLibrary .....	56
Table 78 – Association ends of UseCase_ExchangeModel::AreaLibrary with other classes .....	56
Table 79 – Attributes of UseCase_ExchangeModel::Assumption .....	56
Table 80 – Association ends of UseCase_ExchangeModel::Assumption with other classes .....	57
Table 81 – Attributes of UseCase_ExchangeModel::Author .....	57
Table 82 – Association ends of UseCase_ExchangeModel::Author with other classes .....	57
Table 83 – Attributes of UseCase_ExchangeModel::BusinessCase .....	57
Table 84 – Association ends of UseCase_ExchangeModel::BusinessCase with other classes .....	58
Table 85 – Attributes of UseCase_ExchangeModel::BusinessCaseLibrary .....	58
Table 86 – Association ends of UseCase_ExchangeModel::BusinessCaseLibrary with other classes .....	58
Table 87 – Attributes of UseCase_ExchangeModel::BusinessObject .....	58
Table 88 – Association ends of UseCase_ExchangeModel::BusinessObject with other classes .....	59
Table 89 – Attributes of UseCase_ExchangeModel::BusinessObjectLibrary .....	59
Table 90 – Association ends of UseCase_ExchangeModel::BusinessObjectLibrary with other classes .....	59
Table 91 – Attributes of UseCase_ExchangeModel::CommonTerm .....	59
Table 92 – Association ends of UseCase_ExchangeModel::CommonTerm with other classes .....	60
Table 93 – Attributes of UseCase_ExchangeModel::CommonTermLibrary .....	60
Table 94 – Association ends of UseCase_ExchangeModel::CommonTermLibrary with other classes .....	60
Table 95 – Attributes of UseCase_ExchangeModel::Condition .....	60

Table 96 – Association ends of UseCase_ExchangeModel::Condition with other classes .....	60
Table 97 – Attributes of UseCase_ExchangeModel::CustomInformation .....	61
Table 98 – Association ends of UseCase_ExchangeModel::CustomInformation with other classes .....	61
Table 99 – Attributes of UseCase_ExchangeModel::Drawing .....	61
Table 100 – Association ends of UseCase_ExchangeModel::Drawing with other classes .....	62
Table 101 – Literals of UseCase_ExchangeModel::DrawingClassification .....	62
Table 102 – Attributes of UseCase_ExchangeModel::KeyPerformanceIndicator .....	62
Table 103 – Association ends of UseCase_ExchangeModel::KeyPerformanceIndicator with other classes .....	63
Table 104 – Attributes of UseCase_ExchangeModel::Narrative .....	63
Table 105 – Association ends of UseCase_ExchangeModel::Narrative with other classes .....	63
Table 106 – Attributes of UseCase_ExchangeModel::Objective .....	64
Table 107 – Association ends of UseCase_ExchangeModel::Objective with other classes .....	64
Table 108 – Attributes of UseCase_ExchangeModel::Ref_Actor .....	64
Table 109 – Association ends of UseCase_ExchangeModel::Ref_Actor with other classes .....	64
Table 110 – Attributes of UseCase_ExchangeModel::Ref_Area .....	65
Table 111 – Association ends of UseCase_ExchangeModel::Ref_Area with other classes .....	65
Table 112 – Attributes of UseCase_ExchangeModel::Ref_BusinessCase .....	65
Table 113 – Association ends of UseCase_ExchangeModel:: Ref_BusinessCase with other classes .....	65
Table 114 – Attributes of UseCase_ExchangeModel::Ref_BusinessObject .....	65
Table 115 – Association ends of UseCase_ExchangeModel:: Ref_BusinessObject with other classes .....	66
Table 116 – Attributes of UseCase_ExchangeModel::Ref_CommonTerm .....	66
Table 117 – Association ends of UseCase_ExchangeModel::Ref_CommonTerm with other classes .....	66
Table 118 – Attributes of UseCase_ExchangeModel::Ref_Objective .....	66
Table 119 – Association ends of UseCase_ExchangeModel::Ref_Objective with other classes .....	66
Table 120 – Attributes of UseCase_ExchangeModel::Ref_Requirement .....	67
Table 121 – Association ends of UseCase_ExchangeModel::Ref_Requirement with other classes .....	67
Table 122 – Attributes of UseCase_ExchangeModel::Ref_UseCase .....	67
Table 123 – Association ends of UseCase_ExchangeModel::Ref_UseCase with other classes .....	67
Table 124 – Attributes of UseCase_ExchangeModel::Reference .....	68
Table 125 – Association ends of UseCase_ExchangeModel::Reference with other classes .....	68
Table 126 – Attributes of UseCase_ExchangeModel::Remark .....	68
Table 127 – Association ends of UseCase_ExchangeModel::Remark with other classes .....	68
Table 128 – Attributes of UseCase_ExchangeModel::Requirement .....	69

Table 129 – Association ends of UseCase_ExchangeModel::Requirement with other classes .....	69
Table 130 – Attributes of UseCase_ExchangeModel::RequirementCategory .....	69
Table 131 – Association ends of UseCase_ExchangeModel::RequirementCategory with other classes .....	69
Table 132 – Attributes of UseCase_ExchangeModel::RequirementLibrary.....	70
Table 133 – Association ends of UseCase_ExchangeModel::RequirementLibrary with other classes .....	70
Table 134 – Attributes of UseCase_ExchangeModel::Resource_String .....	70
Table 135 – Literals of UseCase_ExchangeModel::ResourceType .....	70
Table 136 – Attributes of UseCase_ExchangeModel::Scenario .....	70
Table 137 – Association ends of UseCase_ExchangeModel::Scenario with other classes .....	71
Table 138 – Attributes of UseCase_ExchangeModel::TriggeringEvent .....	71
Table 139 – Association ends of UseCase_ExchangeModel::TriggeringEvent with other classes .....	71
Table 140 – Attributes of UseCase_ExchangeModel::UseCase .....	72
Table 141 – Association ends of UseCase_ExchangeModel::UseCase with other classes .....	72
Table 142 – Attributes of UseCase_ExchangeModel::UseCaseLibrary .....	73
Table 143 – Association ends of UseCase_ExchangeModel::UseCaseLibrary with other classes .....	73
Table 144 – Attributes of UseCase_ExchangeModel::UseCaseRepository .....	73
Table 145 – Association ends of UseCase_ExchangeModel::UseCaseRepository with other classes .....	74
Table 146 – Attributes of UseCase_ExchangeModel::Version .....	74
Table 147 – Association ends of UseCase_ExchangeModel::Version with other classes .....	74
Table 148 – Attributes of UseCase_ExchangeModel::FurtherActorInformation .....	75
Table 149 – Association ends of UseCase_ExchangeModel::FurtherActorInformation with other classes .....	75
Table 150 – Use case library XSD .....	75
Table 151 – Attributes of ActorLibrary_ExchangeModel::Actor .....	95
Table 152 – Association ends of ActorLibrary_ExchangeModel::Actor with other classes .....	95
Table 153 – Attributes of ActorLibrary_ExchangeModel::ActorLibrary .....	95
Table 154 – Association ends of ActorLibrary_ExchangeModel::ActorLibrary with other classes .....	95
Table 155 – Attributes of ActorLibrary_ExchangeModel::Ref_Actor .....	96
Table 156 – Association ends of ActorLibrary_ExchangeModel::Ref_Actor with other classes .....	96
Table 157 – Association ends of ActorLibrary_ExchangeModel:: UseCaseRepository with other classes .....	96
Table 158 – Actor library XSD.....	96
Table 159 – Attributes of RequirementLibrary_ExchangeModel::RequirementLibrary .....	99
Table 160 – Association ends of RequirementLibrary_ExchangeModel::RequirementLibrary with other classes.....	100
Table 161 – Attributes of RequirementLibrary_ExchangeModel::RequirementCategory.....	100

Table 162 – Association ends of RequirementLibrary_ExchangeModel::RequirementCategory with other classes .....	100
Table 163 – Attributes of RequirementLibrary_ExchangeModel::Ref_RequirementCategory .....	100
Table 164 – Association ends of RequirementLibrary_ExchangeModel::Ref_RequirementCategory with other classes .....	101
Table 165 – Attributes of RequirementLibrary_ExchangeModel::Requirement .....	101
Table 166 – Association ends of RequirementLibrary_ExchangeModel::Requirement with other classes .....	101
Table 167 – Requirement library XSD .....	101



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**USE CASE METHODOLOGY –**
**Part 3: Definition of use case template artefacts  
into an XML serialized format**
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International Standard IEC 62559-3 has been prepared by IEC systems committee Smart Energy.

The text of this standard is based on the following documents:

CDV	Report on voting
SyCSmartEnergy/28/CDV	SyCSmartEnergy/48/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62559 series, published under the general title Use case methodology, can be found on the IEC website.

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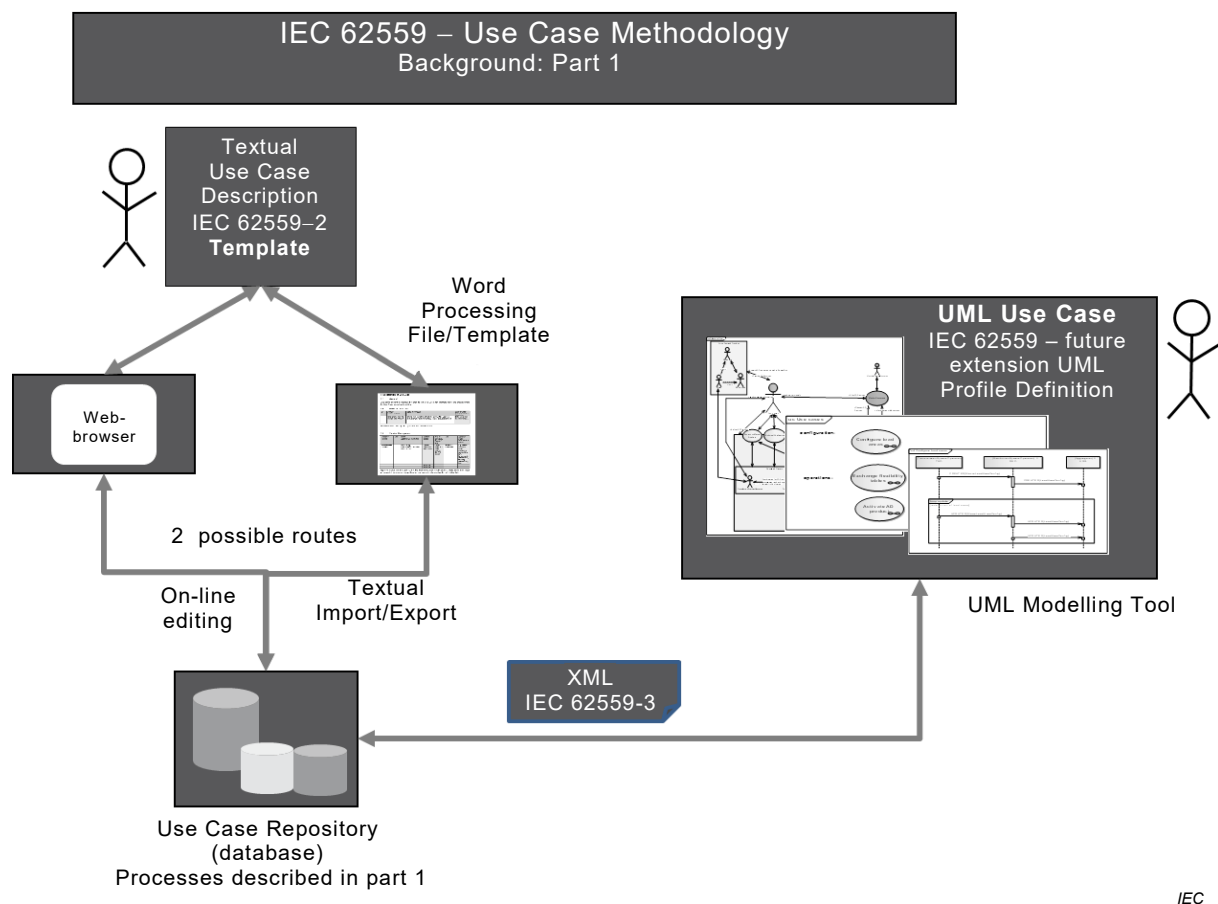
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## INTRODUCTION

For complex systems, the use case methodology supports a common understanding of functionalities, Actors and processes across different technical committees or even different organizations. Developed as software engineering tool, the methodology can be used to support the development of standards as it facilitates the analysis of requirements in relation to new or existing standards. Further arguments for the use case methodology and background information are available in IEC 62559-1.

Figure 1 provides an overview of the intended first parts of the IEC 62559 series, mainly describing the relation between IEC 62559-2 and IEC 62559-3.



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**Figure 1 – IEC 62559 standard series**

### IEC 62559-1 – Concept and processes in standardization

IEC 62559-1 will be the basis for a common use case repository in order to gather use cases within IEC on a common collaborative platform. This repository will also be used to organize a harmonization of use cases in order to provide broadly accepted generic use cases as a basis for further standardization work. It describes processes and provides basics for the use case methodology like terms or use case types.

### IEC 62559-2 – Definition of the templates for use cases, Actor list and requirements list

IEC 62559-2 defines the structure of a use case template, an Actor list and a list for requirements. The document is mainly based on IEC PAS 62559:2008 and shall be read together with IEC 62559-1.

### IEC 62559-3 – Definition of use case template artefacts into an XML serialized format

Based on IEC 62559-2, this document defines the required core concepts and their serialization into an XML format of a use case template, an Actor list and a list for detailed requirements. The XML format is used to transfer the content of the template to other engineering systems (e.g. UML modelling tools). These documents are developed using the energy system and Smart Grids as examples, but they are general enough to be transferred to other domains and systems. It is intended to develop a UML profile definition based on this part in the future.

The IEC 62559 series is needed to fulfil the SG3 decision 7 made by the SMB at its February 2010 meeting (SMB/4204/DL, Decision 137/10) requesting the urgent delivery of a generic use case repository for all Smart Grid applications. Nevertheless, the use case methodology described in this document is intended for a broader application within standardization exceeding Smart Grid systems.

More and more complex systems such as Smart Grids or Smart Cities are raising the question of managing system level requirements, which have to be fed by many domains of expertise (in standardization related to different Technical Committees (TCs)), and which have to be broken down further and shared by many TCs in charge of specifying standards to support these system level functions.

One way to handle this transversality efficiently is to set some common methods and terms. The use case methodology is the current state of the art and supports further engineering activities.

The use case methodology offers a unique way for sharing ideas and requirements of new use cases or business cases between many experts/TCs with different backgrounds: for example, domain experts with knowledge about energy systems or business processes on one hand and system-/IT-experts defining exchanged information and communication on the other hand. In the requirement development process, domain experts provide general ideas and functional requirements. The main goal is for system experts to detail down these use cases to a level where they can be used to specify interfaces, dedicated functionality, data and service model exchange. However, safety- or EMC-experts (as examples) may also make use of the described use cases, their terminology and identified requirements.

However the starting point is to set up a framework for consistency within IEC, helping IEC members to provide use cases in a consistent manner – IEC 62559 serves as a basis for use case repositories in order to gather, administrate, maintain, and evaluate use cases.

Within IEC, a use case repository serves as common collaborative platform for use case elaboration and to organize a harmonization of use cases in order to provide broadly accepted generic use cases as a basis for further standardization work.

But the use case template defined in this document may serve not only for the development of standards, but also – as was the original purpose of IEC PAS 62559:2008 – as a helpful means for the realization of projects within the area of complex systems. Also other applications, which need the benefits of a structured requirements development and formalized description of functionality, may make use of the suggested template.

The use case methodology is seen as a process which starts with the definition of business ideas, goals and requirements, detailing these in use case descriptions. This information can be used as a basis to identify/link reference architectures describing the types of components used, and going further down to an analysis for the further standardization process.

Further developments regarding the use case template are expected. These developments are mainly related to information, which is required in the use case description for further analysis, and which can be mapped to other information (e.g. to a reference architecture, IT security methods, standards and data models). Partly this is considered in the suggested template of IEC 62559-2. Further relations will be described separately as they are still under development and they can be considered for the further development of the IEC use case repository.

## USE CASE METHODOLOGY –

### Part 3: Definition of use case template artefacts into an XML serialized format

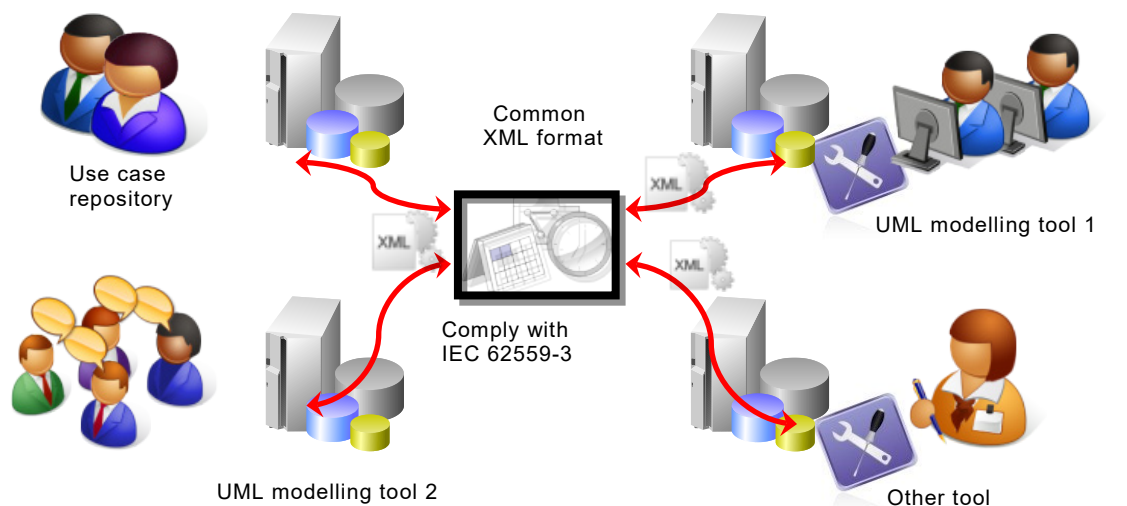
#### 1 Scope

In order to exchange use cases based on the template which is defined in IEC 62559-2, this part of IEC 62559 establishes the interfaces between the different use case repositories and/or UML engineering software tools.

Therefore, this document defines the required core concepts and their serialization into XML syntactic format of a use case template, an Actor list and list for detailed requirements.

As shown in Figure 2, the modelling approach is leveraging the use of UML in order to graphically represent the data contained in a use case based on the IEC 62559 template. Therefore the textual format of the use case template may be in the use case development process just a starting point for business experts or an easy way to modify use case data for non UML experts. As a consequence, it is important for the IEC 62559 series to provide a reliable way for converting this textual format into UML format and reciprocally. As soon as a use case repository is maintained based on the IEC 62559 series, another related need is to be able to import/export between different UML tools and different use case repositories the use case related information based on a tool independent format.

The main purpose of this document is to propose an independent format for transferring the use case information between modelling software. In order to satisfy this goal, the syntactic XML format is chosen to serialize the use case data. This document defines in detail the core concepts of the template into UML and their transformations into XML using the XSD standard.



IEC

**Figure 2 – A common XML format for importing/exporting use case information  
between a variety of modelling software and repositories**

This document, as shown in Figure 2, supports the interoperability between modelling software used by different companies over the world.

Once this level of interoperability is achieved, IEC 62559 can provide a reliable mechanism to interpret those XML data in order to represent graphically UML use cases. This need will be covered as well in a future part of IEC 62559 (to be defined).

This document focuses on a methodological framework which is also used by IEC TC 57 standards and which is summarized in Clause 4.

In order to exchange use cases based on the template which is defined in IEC 62559-2, this document establishes the interfaces between the different use case repositories and/or UML tools.

## **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62559-2, *Use case methodology – Part 2: Definition of the templates for use cases, actor list and requirements list*