IEC 62559-3

Edition 1.0 2017-12

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

ICS 29.020

ISBN 978-2-8322-5169-0

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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.

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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.

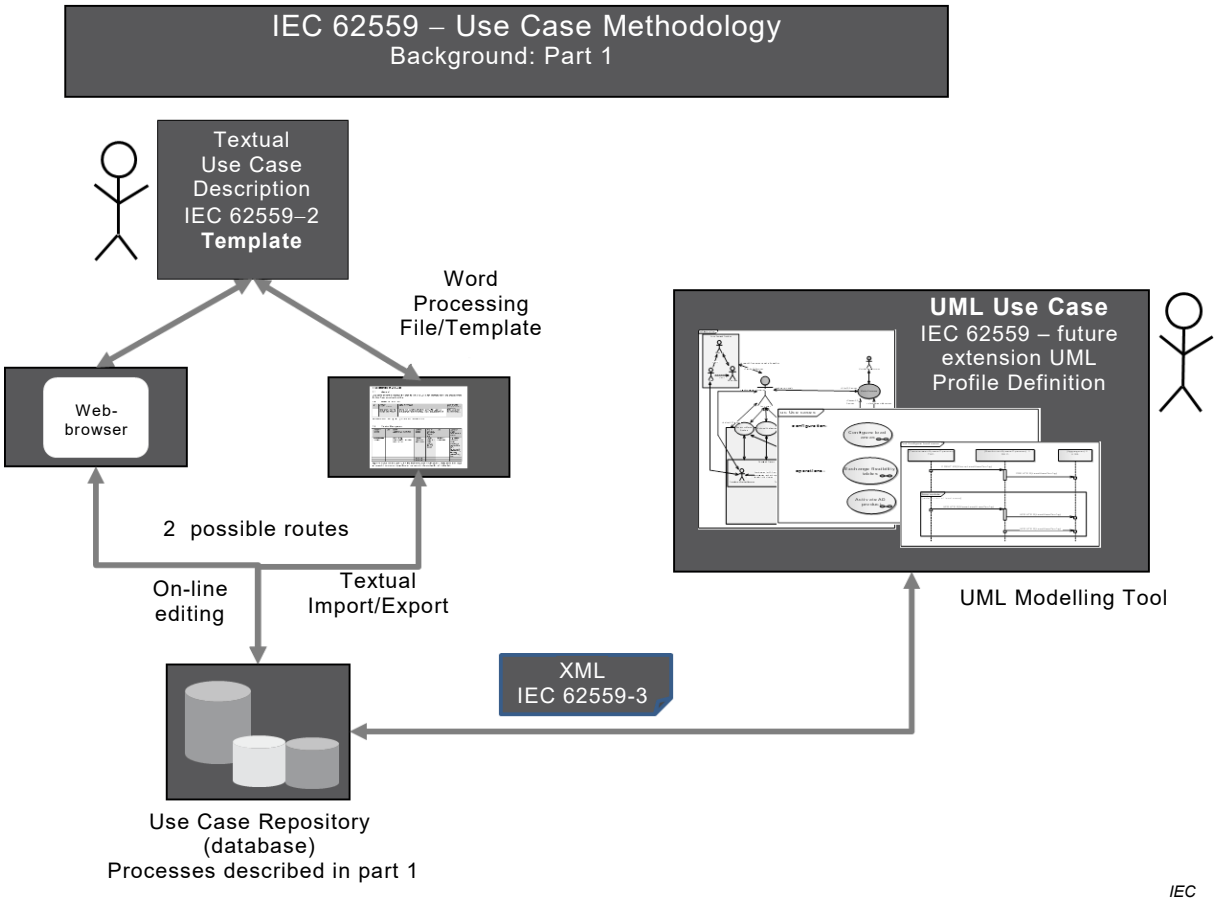

Figure 1 – IEC 62559 standard series

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.

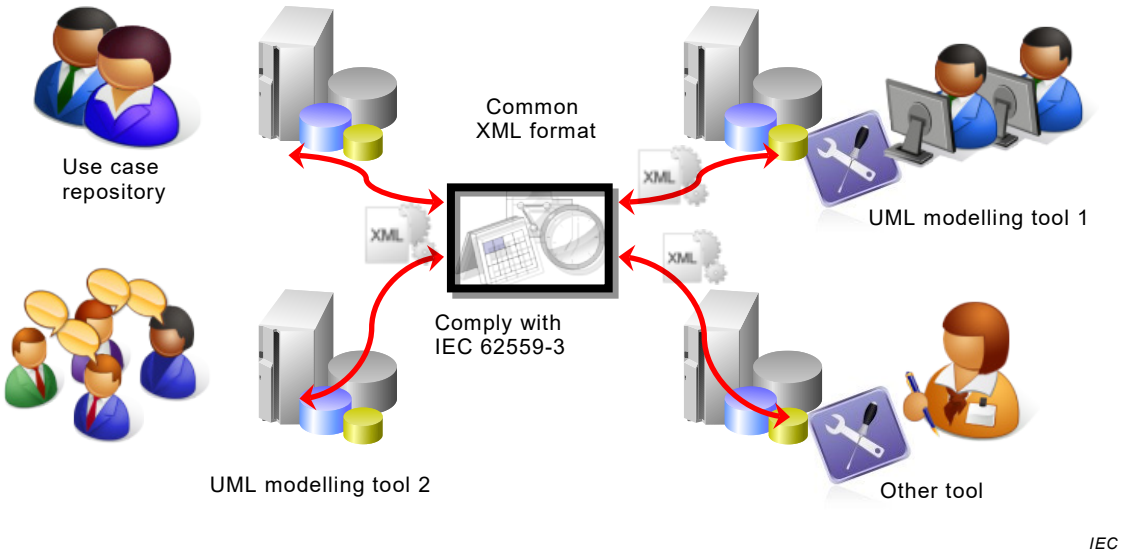

Figure 2 – A common XML format for importing/exporting use case information between a variety of modelling software and repositories

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*