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Part 2: Assurance case

Ingénierie du logiciel et des systèmes — Assurance du logiciel et des systèmes —

Partie 2: Cas d'assurance

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO/IEC documents should be noted. This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This second edition cancels and replaces the first edition (ISO/IEC 15026-2:2011), which has been technically revised.

The main changes are as follows:

— Clause 2 of the previous edition was deleted.

— The title of Clause 5 of the previous edition was changed and became Clause 4 of this edition.

— Revised contents of Clause 6 can be found in Clause 5 of this edition.

— Clause 7 was deleted and its revised contents can be found in 4.2 and 5.2 of this edition.

A list of all parts in the ISO/IEC/IEEE 15026 series can be found on the ISO website.

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Introduction

The purpose of this document is to define assurance case structure terminology, thereby improving consistency and comparability among instances of assurance cases and facilitating stakeholder communications, engineering decisions, and other uses of assurance cases.

This document does not place requirements on the quality of the contents but describes the structure and meaning of assurance cases with the necessary level of precision and detail so as to avoid inconsistent and subjective use of the terms.

Existing standards addressing different application areas and topics related to assurance cases possibly uses differing terminology and concepts when addressing common themes. This document is based on experience drawn from these specialized standards and guidelines.

While several notations and slightly varying terminologies are currently used in practice, this document does not require the use of any particular concrete representation including graphical representation. Likewise, it places no requirements on physical implementation of the data; in particular, it includes no requirements for redundancy or co-location.

Assurance cases are generally developed to support claims in areas such as safety, reliability, maintainability, human factors, operability, and security. They are applicable to any property of a system. These assurance cases are often called by more specific names, e.g. safety case or dependability case. ISO/IEC/IEEE 15026-1 provides concepts, terminology, background and a list of standards related to assurance cases.

This document uses the terminology and concepts consistent with ISO/IEC/IEEE 12207,[1] ISO/IEC/IEEE 15288,[5] and ISO/IEC/IEEE 15289.[6] This document does not presume or require that it is applied in conjunction with ISO/IEC/IEEE 12207[1] or ISO/IEC/IEEE 15288 [5].

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Systems and software engineering — Systems and software assurance —

Part 2: Assurance case

1 Scope

This document specifies requirements for structure terminology of assurance cases.

This document is applicable for developing and maintaining assurance cases.

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.

ISO/IEC/IEEE 15026-1, *Systems and software engineering — Systems and software assurance — Part 1: Concepts and vocabulary*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE 15026-1 and the following apply.

ISO, IEC and IEEE maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

— IEEE Standards Dictionary Online: available at https://dictionary.ieee.org

NOTE For additional terms and definitions in the field of systems and software engineering, see ISO/IEC/IEEE 24765,[7] which is published periodically as a "snapshot" of the SEVOCAB (Systems and software Engineering Vocabulary) database and is publicly accessible at computer.org/sevocab.

3.1.1
assurance case
auditable artefact that provides a convincing and sound argument for a claim on the basis of tangible evidence under a given context

Note 1 to entry: An argument is valid if and only if it is necessary that if all of the premises are true, then the conclusion is true. An argument is sound if and only it is valid and contains only true premises.

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3.1.2
assurance case report
auditable artefact that provides the claim of an *assurance case* (3.1.1) and a complete index of the argument and evidence of the assurance case such that the assurance case of interest can be assembled from the index

Note 1 to entry: An assurance case report is mapped to the report field [5.2 c)]. An assurance case report is an introduction to the assurance case. Its content varies from one case to another. For simple and/or small assurance cases a report can be superfluous. For larger or more complex assurance cases the report can include a system description, some of the argument and its supporting evidence e.g. the higher-level arguments and their supporting evidence.

Note 2 to entry: Assurance case reports are often issued as periodic updates to the assurance case at pre-agreed points such as at the end of a life cycle stage. They report on results of assurance activities done so far, an assessment of overall progress and a review of assurance activities' performance. Assurance case reports can be used at decision gates for stage exit/entry by suppliers and for project monitoring by acquirers.

3.1.3
basic assumption
assumption in a collection of claims shared by *assurance cases* (3.1.1) in a specific field

Note 1 to entry: Such a collection corresponds to a set of axioms in formal system in logic.

3.1.4
inference
reasoning step that derives a claim from a list of claims (premises) under a specified context

Note 1 to entry: The claim derived by inference is the conclusion, and the supported claims from which the inference derives the conclusion are the premises.

Note 2 to entry: There are special inferences called obvious inferences. See 5.3.4 EXAMPLE 2.

3.1.5
property
attribute of things

3.1.6
type
set of values, elements or items

3.1.7
undeveloped argument
placeholder argument to be replaced by a concrete argument

3.2 Abbreviated terms

CAE claims arguments evidence

GSN goal structuring notation

SACM structured assurance case metamodel

4 Use of assurance cases

4.1 Overview

Assurance that the system achieves certain objectives is particularly important when the system and its interaction with the environment are complex and evolving. Assurance cases make claims that concern selected properties of the system, and argue for the truth of those claims. While properties may be selected for any reason, the common reason of selection is that they are uncertain while high

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