

INTERNATIONAL
STANDARD

ISO/IEC/
IEEE
15026-1

First edition
2019-03

**Systems and software engineering —
Systems and software assurance —**

**Part 1:
Concepts and vocabulary**

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

Partie 1: Concepts et vocabulaire



Reference number
ISO/IEC/IEEE 15026-1:2019(E)

© ISO/IEC 2019
© IEEE 2019



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2019

© IEEE 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO or IEEE at the respective address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

Email: stds.ipr@ieee.org
Website: www.ieee.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Terms related to assurance and properties.....	2
3.2 Terms related to product and process.....	3
3.3 Terms related to integrity level.....	4
3.4 Terms related to conditions and consequences.....	6
3.5 Terms related to organization.....	8
4 Organization of this document	9
5 Basic concepts	9
5.1 General.....	9
5.2 Assurance.....	9
5.3 Stakeholders.....	10
5.4 System and product.....	10
5.5 Property.....	10
5.5.1 General.....	10
5.5.2 Properties as behaviours.....	11
5.6 Uncertainty and confidence.....	11
5.7 Conditions and initiating events.....	11
5.8 Consequences.....	12
6 Using multiple parts of ISO/IEC/IEEE 15026	12
6.1 General.....	12
6.2 Initial usage guidance.....	13
6.3 Relationships among parts of ISO/IEC/IEEE 15026.....	13
6.4 Authorities.....	14
7 ISO/IEC/IEEE 15026 (all parts) and the assurance case	14
7.1 General.....	14
7.2 Justification of method of reasoning.....	15
7.3 Means of obtaining and managing evidence.....	15
7.4 Certifications and accreditations.....	16
8 ISO/IEC/IEEE 15026 (all parts) and integrity levels	16
8.1 General.....	16
8.2 Risk analysis.....	17
9 ISO/IEC/IEEE 15026 (all parts) and the life cycle	17
9.1 General.....	17
9.2 Assurance activities in the life cycle.....	18
10 Summary	18
Bibliography	19
IEEE notices and abstract	28

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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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 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).

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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 first edition cancels and replaces ISO/IEC 15026-1:2013, which has been technically revised.

The main changes compared to the previous edition are as follows:

- definitions of terms introduced in ISO/IEC 15026-3:2015 are added;
- definitions of terms whose definitions are modified in ISO/IEC 15026-3:2015 are updated.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Software and systems assurance and closely related fields share concepts but have different vocabularies and perspectives. This document provides a unifying set of underlying concepts and an unambiguous use of terminology across these various fields. It provides a basis for elaboration, discussion and recording agreement and rationale regarding concepts and the vocabulary used uniformly across ISO/IEC/IEEE 15026 (all parts).

This document clarifies concepts needed for understanding software and systems assurance and, in particular, those central to the use of ISO/IEC 15026-2, ISO/IEC 15026-3 and ISO/IEC 15026-4. It supports shared concepts, issues and terminology applicable across a range of properties, application domains and technologies.

Systems and software engineering — Systems and software assurance —

Part 1: Concepts and vocabulary

1 Scope

This document defines assurance-related terms and establishes an organized set of concepts and relationships to form a basis for shared understanding across user communities for assurance. It provides information to users of the other parts of ISO/IEC/IEEE 15026 including the combined use of multiple parts. The essential concept introduced by ISO/IEC/IEEE 15026 (all parts) is the statement of claims in an assurance case and the support of those claims through argumentation and evidence. These claims are in the context of assurance for properties of systems and software within life cycle processes for the system or software product.

Assurance for a service being operated and managed on an ongoing basis is not covered in ISO/IEC/IEEE 15026 (all parts).

A variety of potential users of ISO/IEC/IEEE 15026 (all parts) exists including developers and maintainers of assurance cases and those who wish to develop, sustain, evaluate or acquire a system that possesses requirements for specific properties in such a way as to be more certain of those properties and their requirements. ISO/IEC/IEEE 15026 (all parts) uses concepts and terms consistent with ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288 and generally consistent with the ISO/IEC 25000 series, but the potential users of ISO/IEC/IEEE 15026 (all parts) need to understand the differences from concepts and terms to which they may be accustomed. This document attempts to clarify these differences.

The primary purpose of this document is to aid users of the other parts of ISO/IEC/IEEE 15026 by providing context, concepts and explanations for assurance, assurance cases and integrity levels. While essential to assurance practice, details regarding exactly how to measure, demonstrate or analyse particular properties are not covered. These are the subjects of more specialized standards of which a number are referenced and included in the Bibliography.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>
- IEEE Standards Dictionary Online: available at <http://dictionary.ieee.org>