

INTERNATIONAL
STANDARD

ISO/IEC/
IEEE
15026-4

First edition
2021-05

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

**Part 4:
Assurance in the life cycle**

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

Partie 4: Assurance du cycle de vie



Reference number
ISO/IEC/IEEE 15026-4:2021(E)

© ISO/IEC 2021
© IEEE 2021



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2021

© IEEE 2021

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
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	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Conformance	2
5 Key concepts	2
5.1 Process view	2
5.2 Assurance claim and assurance information	3
5.3 Using this document	3
5.3.1 General	3
5.3.2 Use for an agreement	3
5.3.3 Use for regulation	4
5.3.4 Use for development	4
6 System assurance process view	4
6.1 General	4
6.2 Purpose	4
6.3 Outcomes	4
6.4 Processes, activities and tasks that implement the system assurance process view	4
6.5 Guidance and recommendations	11
6.5.1 General	11
6.5.2 Acquisition process	12
6.5.3 Supply process	13
6.5.4 Life cycle model management process	13
6.5.5 Quality management process	13
6.5.6 Project planning process	14
6.5.7 Project assessment and control process	15
6.5.8 Decision management process	15
6.5.9 Risk management process	15
6.5.10 Configuration management process	16
6.5.11 Information management process	17
6.5.12 Quality assurance process	18
6.5.13 Business or mission analysis process	18
6.5.14 Stakeholder needs and requirements definition process	19
6.5.15 System requirements definition process	21
6.5.16 Architecture definition process	22
6.5.17 Design definition process	22
6.5.18 System analysis process	22
6.5.19 Implementation process	23
6.5.20 Integration process	23
6.5.21 Verification process	23
6.5.22 Transition process	23
6.5.23 Validation process	24
6.5.24 Operation process	24
6.5.25 Maintenance process	25
6.5.26 Disposal process	25
7 Software assurance process view	26
7.1 General	26
7.2 Purpose	26
7.3 Outcomes	26
7.4 Processes, activities and tasks that implement the software assurance process view	27
7.5 Guidance and recommendations	32

7.5.1	General.....	32
7.5.2	Configuration management process.....	33
7.5.3	System/software requirements definition process.....	34
7.5.4	Design definition process.....	35
7.5.5	Verification process.....	35
7.5.6	Maintenance process.....	35
Bibliography		37
IEEE Notices and Abstract		39

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 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) or the IEC list of patent declarations received (see <https://patents.iec.ch>).

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 15026-4:2012, which has been technically revised.

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

- References to the life cycle processes standards (ISO/IEC 15288:2008 and ISO/IEC 12207:2008, respectively) are changed to refer to their updated versions (ISO/IEC/IEEE 15288:2015 and ISO/IEC/IEEE 12207:2017, respectively).
- Outcomes of the process views are changed to make the link to their purpose clearer.

A list of all parts in the ISO/IEC 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

Many specialized standards and guidelines address specific application areas and topics related to assurance and use different concepts and terminology when addressing common themes. ISO/IEC/IEEE 15026-1 provides terminology and concepts used in ISO/IEC 15026 (all parts).

ISO/IEC 15026-2 provides minimum requirements for the structure and contents of assurance cases that treat claims regarding properties of a system or software product selected for special treatment. The results of performing the life cycle activities and tasks referenced in this document can be recorded in the form of the assurance case described in ISO/IEC 15026-2.

ISO/IEC 15026-3 specifies the concept of integrity levels with corresponding integrity level requirements that are required to be met in order to show the achievement of the integrity level.

ISO/IEC 15026-2, ISO/IEC 15026-3 and this document all use the concepts and vocabulary defined in ISO/IEC/IEEE 15026-1; however, any part may be applied independently of the others and the use of one does not require the use of any others.

Systems and software engineering — Systems and software assurance —

Part 4: Assurance in the life cycle

1 Scope

This document provides guidance and recommendations for assurance of a selected claim about the system-of-interest by achieving the claim and showing the achievement. The guidance and recommendations are given in a system assurance process view on top of ISO/IEC/IEEE 15288 and a software assurance process view on top of ISO/IEC/IEEE 12207.

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*

ISO/IEC/IEEE 15288, *Systems and software engineering — System life cycle processes*

ISO/IEC/IEEE 12207, *Systems and software engineering — Software life cycle processes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE 15026-1, ISO/IEC/IEEE 15288, and ISO/IEC/IEEE 12207 and the following apply.

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/>

3.1

assurance

grounds for justified confidence that a claim has been or will be achieved

Note 1 to entry: By definition, assurance is about a claim.

Note 2 to entry: The claim can be a conjunction of more than one claim.

[SOURCE: ISO/IEC/IEEE 15026-1:2019, 3.1.1, modified — Notes 1 and 2 to entry have been added.]

3.2

assurance argument

artefact that links tangible evidence and assumptions to provide a convincing and valid argument of a claim under a given context