DRAFT INTERNATIONAL STANDARD

ISO/IEC/IEEE/DIS 29119-2

ISO/IEC JTC **1**/SC **7**

Secretariat: **BIS**

Voting begins on:
2020-07-10

Voting terminates on:
2020-09-10

Software and systems engineering — Software testing —

Part 2:
Test processes

Ingénierie du logiciel et des systèmes — Essais du logiciel —

Partie 2: Processus des essais

ICS: 35.080

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

Reference number
ISO/IEC/IEEE/DIS 29119-2:2020(E)

© ISO/IEC 2020
© IEEE 2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2020
© IEEE 2020
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

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

Contents

Page

Foreword ..... **v**
Introduction ..... **vii**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Conformance **8**
4.1 Intended usage 8
4.1.1 Full conformance 9
4.1.2 Tailored conformance 9
5 Multi-Layer Test Process Model **9**
6 Organizational Test Process **11**
6.1 Introduction 11
6.2 Organizational Test Process 12
6.2.1 Overview 12
6.2.2 Purpose 13
6.2.3 Outcomes 13
6.2.4 Activities and tasks 13
6.2.5 Information items 14
7 Test Management Processes **15**
7.1 Introduction 15
7.2 Test Planning Process 16
7.2.1 Overview 16
7.2.2 Purpose 17
7.2.3 Outcomes 17
7.2.4 Activities and tasks 17
7.2.5 Information items 21
7.3 Test Monitoring and Control Process 21
7.3.1 Overview 21
7.3.2 Purpose 22
7.3.3 Outcomes 22
7.3.4 Activities and tasks 23
7.3.5 Information Items 24
7.4 Test Completion Process 25
7.4.1 Overview 25
7.4.2 Purpose 25
7.4.3 Outcomes 25
7.4.4 Activities and tasks 26
7.4.5 Information Items 27
8 Dynamic Test Processes **27**
8.1 Introduction 27
8.2 Test Design & Implementation Process 29
8.2.1 Overview 29
8.2.2 Purpose 30
8.2.3 Outcomes 30
8.2.4 Activities and tasks 30
8.2.5 Information Items 32
8.3 Test Environment & Data Management Process 32
8.3.1 Overview 32
8.3.2 Purpose 33
8.3.3 Outcomes 33
8.3.4 Activities and tasks 33

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

8.3.5 Information Items 35
8.4 Test Execution Process 35
8.4.1 Overview 35
8.4.2 Purpose 36
8.4.3 Outcomes 36
8.4.4 Activities and tasks 36
8.4.5 Information Items 37
8.5 Test Incident Reporting Process 38
8.5.1 Overview 38
8.5.2 Purpose 38
8.5.3 Outcomes 38
8.5.4 Activities and tasks 38
8.5.5 Information Items 39

Annex A (informative) **Example Application of the Test Design & Implementation Process** **40**

Annex B (normative) **ISO/IEC/IEEE 29119-2 and ISO/IEC 12207:2017 Process Alignment** **43**

Annex C (informative) **ISO/IEC/IEEE 29119-2 and ISO/IEC 17025:2017 process alignment** **47**

Annex D (informative) **ISO/IEC/IEEE 29119-2 and BS 7925-2:1998 process alignment** **48**

Annex E (informative) **Test Models** **49**

Bibliography **50**

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

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.

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of ISO/IEC JTC 1 is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is called to the possibility that implementation of this standard may require the use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. ISO/IEEE is not responsible for identifying essential patents or patent claims for which a license may be required, for conducting inquiries into the legal validity or scope of patents or patent claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance or a Patent Statement and Licensing Declaration Form, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from ISO or the IEEE Standards Association.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73ff3162-e1dd-4f77-801a-7c713d6a5b6f/iso-iec-ieee-dis-29119-2

ISO/IEC/IEEE 29119-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in cooperation with the Software & Systems Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

ISO/IEC 29119 consists of the following standards, under the general title *Software and systems engineering — Software testing*:

— *Part 1: Concepts and definitions*

— *Part 2: Test processes*

— *Part 3: Test documentation*

— *Part 4: Test techniques*

— *Part 5: Keyword-driven testing*

This is the second version of this standard. The main difference between the first version and the second version is in the definition of the Test Design and Implementation Process (clause 8.2). In the first version, this process was based on the use of test conditions. Feedback on use of the standard highlighted a problem with users' understanding of 'test conditions' and their use for deriving test

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

cases. This second version has replaced the use of ‘test conditions’ with ‘test models’. Annex E provides more detail on this change.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

Introduction

The purpose of this standard is to define a generic process model for software testing that can be used by any organization when performing any form of software testing. It comprises test process descriptions that define the software testing processes at the organizational level, test management level and dynamic test levels. Supporting informative diagrams describing the processes are also provided. ISO/IEC/IEEE 29119 supports dynamic testing, functional and non-functional testing, manual and automated testing, and scripted and unscripted testing. The processes defined in this document can be used in conjunction with any software development lifecycle model. Each process is defined using the generic process template that is provided in ISO/IEC TR 24774 Guidelines for Process Description, and covers the purpose, outcomes, activities, tasks and information items of each test process.

Testing is a key approach to risk mitigation in software development. This document follows a risk-based approach to testing. Risk-based testing is a best-practice approach to strategizing and managing testing, as it allows testing to be prioritized and focused on the most important features and quality attributes.

The concepts and vocabulary that support this series of international standards are defined in ISO/IEC/IEEE 29119-1 Concepts and definitions. Templates and examples of test documentation that are produced during the testing process are defined in ISO/IEC/IEEE 29119-3 Test documentation. Software test design techniques that can be used during testing are defined in ISO/IEC/IEEE 29119-4 Test techniques.

This series of international standards aims to provide those responsible for software testing with the information required to manage and perform software testing in any organization.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73ff2f62-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462a3b6/iso-iec-ieee-dis-29119-2

Software and systems engineering — Software testing —

Part 2:
Test processes

1 Scope

This document specifies test processes that can be used to govern, manage and implement software testing for any organization, project or testing activity. It comprises generic test process descriptions that define the software testing processes. Supporting informative diagrams describing the processes are also provided.

This document is applicable to testing in all software development lifecycle models.

This document is intended for, but not limited to, testers, test managers, developers and project managers, particularly those responsible for governing, managing and implementing software testing.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e4d4-40f7-8011-c735c462a3b6/iso-iec-ieee-dis-29119-2

2 Normative references

The following document, in whole or in part, is normatively referenced in this document and is indispensable for its application. The latest edition of the referenced document (including any amendments) applies.

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

NOTE Other International Standards useful for the implementation and interpretation of this document are listed in the bibliography.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE 24765 and the following apply.

Note 1 to entry Use of the terminology in this document is for ease of reference and is not mandatory for conformance with this document. The following terms and definitions are provided to assist with the understanding and readability of this document. Only terms critical to the understanding of this document are included. This clause is not intended to provide a complete list of testing terms. The Systems and Software Engineering Vocabulary ISO/IEC/IEEE 24765 can be referenced for terms not defined in this clause. This source is available at the following web site: http://www.computer.org/sevocab. All terms defined in this clause are also intentionally included in ISO/IEC/IEEE 29119-1, as that international standard includes all terms that are used in parts 1 to 5 of ISO/IEC/IEEE 29119.

3.1
actual results
set of behaviours or conditions of a test item, or set of conditions of associated data or the test environment, observed as a result of test execution

EXAMPLE Outputs to screen, outputs to hardware, changes to data, reports and communication messages sent.

3.2
completion criteria
conditions under which the testing activities are considered complete

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

3.3
dynamic testing
testing in which a test item is evaluated by executing it

3.4
expected results
observable predicted behaviour of the test item under specified conditions based on its specification or another source

3.5
exploratory testing
type of unscripted experience-based testing in which the tester spontaneously designs and executes tests based on the tester's existing relevant knowledge, prior exploration of the test item (including the results of previous tests), and heuristic "rules of thumb" regarding common software behaviours and types of failure

3.6
incident
anomalous or unexpected event, set of events, condition, or situation at any time during the life cycle of a project, product, service, or system

3.7
Incident Report
documentation of the occurrence, nature, and status of an incident

Note 1 to entry: Incident reports are also known as anomaly reports, bug reports, defect reports, error reports, issues, problem reports and trouble reports, amongst other terms.

3.8
Organizational Test Practices
documentation that expresses the generic requirements for the testing to be performed within an organization, providing detail on how the testing is to be performed

Note 1 to entry: The Organizational Test Practices is aligned with the Organizational Test Policy.

Note 2 to entry: An organization could have more than one Organizational Test Practices document to cover markedly different contexts, such one for mobile apps and one for safety critical systems.

Note 3 to entry: The Organizational Test Practices could incorporate the context of the Test Policy where no separate Test Policy is available.

3.9
Organizational Test Process
test process for developing and managing organizational test specifications

3.10
Organizational Test Specification
document that provides information about testing for an organization, i.e. information that is not project-specific

EXAMPLE The most common examples of organizational test specifications are the Organizational Test Policy and the Organizational Test Practices.

3.11
performance testing
type of testing conducted to evaluate the degree to which a test item accomplishes its designated functions within given constraints of time and other resources

3.12
product risk
risk that a product may be defective in some specific aspect of its function, quality, or structure

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-e1d4-40f7-8011-c733c462c3b6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

3.13
project risk
risk related to the management of a project

EXAMPLE Lack of staffing, strict deadlines, changing requirements.

3.14
regression testing
testing performed following modifications to a test item or to its operational environment, to identify whether failures in unmodified parts of the test item occur

Note 1 to entry: Regression testing differs from retesting in that it does not test that the modification works correctly, but that other parts of the system have not been accidentally affected by the change.

Note 2 to entry: The adequacy of a set of regression test cases depends on the item under test and on the modifications to that item or its operational environment.

3.15
retesting
confirmation testing
testing performed to check that modifications made to correct a fault have successfully removed the fault

Note 1 to entry: When retesting is performed it is often complemented by regression testing, which ensures that other unmodified parts of the test item have not been accidentally adversely affected by the modifications.

3.16
risk-based testing
testing in which the management, selection, prioritisation, and use of testing activities and resources are consciously based on corresponding types and levels of analysed risk

3.17
scripted testing
testing performed based on a documented test script

Note 1 to entry: This term normally applies to manually executed testing, rather than the execution of an automated script.

3.18
security testing
type of testing conducted to evaluate the degree to which a test item, and associated data and information, are protected so that unauthorized persons or systems cannot use, read, or modify them, and authorized persons or systems are not denied access to them

3.19
static testing
testing in which a test item is examined against a set of quality or other criteria without the test item being executed

EXAMPLE Reviews, static analysis.

3.20
test
activity in which a system or component is executed under specified conditions, the results are observed or recorded, and an evaluation is made of some aspect of the system or component

3.21
test basis
information used as the basis for test planning and test design

Note 1 to entry: The test basis may take the form of documentation, such as a requirements specification, design specification, or module specification, but may also be an undocumented understanding of the required behaviour.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/7bff262-e1d4-40f7-8011-c7334462a3b6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

3.22
test case
set of test case preconditions, inputs (including actions, where applicable) and expected results, developed to drive the execution of a test item to meet test objectives

Note 1 to entry: A test case is the lowest level of test implementation documentation (i.e. test cases are not made up of test cases) for the test level or type for which it is intended.

Note 2 to entry: Test case preconditions include test environment, existing data (e.g. databases), software under test and hardware.

Note 3 to entry: Inputs are the data information used to drive test execution.

3.23
Test Case Specification
documentation of a set of one or more test cases

3.24
Test Completion Process
Test Management Process for ensuring that useful test assets are made available for later use, test environments are left in a satisfactory condition, and the results of testing are recorded and communicated to relevant stakeholders

3.25
Test Completion Report
Test Summary Report
report that provides a summary of the testing that was performed

3.26
test condition
testable aspect of a component or system, such as a function, transaction, feature, quality attribute, or structural element identified as a basis for testing

Note 1 to entry: The ISO/IEC/IEEE 29119 set of standards do not use the concept of test conditions, but instead use the concept of a test model for test design. See Annex E for an explanation.

3.27
test coverage
degree, expressed as a percentage, to which specified test coverage items have been exercised by a test case or test cases

3.28
test coverage item
coverage item
measurable attribute of a test item that is the focus of testing

EXAMPLE Equivalence classes, transitions between states, executable statements.

3.29
test data
data created or selected to satisfy the input requirements for executing one or more test cases

Note 1 to entry: Test data could be stored within the test item (e.g. in arrays or flat files), or could come from external sources, such as other systems, hardware devices, or human operators.

3.30
Test Data Readiness Report
document describing the status of each test data requirement

3.31
Test Design and Implementation Process
test process for deriving and specifying test cases and test procedures

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/73fff262-c1d4-40f7-8014-3733c4623bb6/iso-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved

3.32
test design technique
test technique
procedure used to create or select a test model, identify test coverage items and derive corresponding test cases

EXAMPLE Equivalence partitioning, boundary value analysis, decision table testing, branch testing.

Note 1 to entry: The test design technique is typically used to achieve a required level of test coverage.

3.33
test environment
environment containing facilities, hardware, software, firmware, procedures, needed to conduct a test

Note 1 to entry: A test environment could contain multiple environments to accommodate specific test levels or types (e.g. a unit test environment, a performance test environment).

Note 2 to entry: A test environment could comprise several interconnected systems or virtual environments.

3.34
Test Environment Readiness Report
document that describes the status of the test environment

Note 1 to entry: This could list the status of each of the test environment requirements.

3.35
Test Environment Requirements
description of the necessary properties of the test environment

Note 1 to entry: All or parts of the Test Environment Requirements could reference where the information can be found, e.g. in the Organizational Test Practices document, Test Plan, and Test Specification.

3.36
Test Environment & Data Management Process
test process for establishing and maintaining a required test environment and corresponding test data

3.37
test execution
process of running a test on the test item, producing actual results

3.38
Test Execution Log
record of the execution of one or more test procedures

3.39
Test Execution Process
dynamic test process for executing test procedures created in the Test Design and Implementation Process in the prepared test environment and recording the results

3.40
Test Incident Reporting Process
dynamic test process for reporting incidents requiring further action that were identified during the test execution process to the relevant stakeholders

3.41
test item
test object
work product to be tested

EXAMPLE Software component, system, requirements document, design specification, user guide.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/7...-iec-ieee-dis-29119-2

© ISO/IEC 2020 – All rights reserved
© IEEE 2020 – All rights reserved