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Partie 2: Processus des essais*

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

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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.

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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

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

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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.

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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.

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

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

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

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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.

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

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.

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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.

3.42

test level

test phase

phase of testing that corresponds to a distinct life cycle stage with particular objectives used to mitigate specific risks

EXAMPLE The following are common test levels: unit testing, integration testing, system testing, acceptance testing.

3.43

test management

planning, scheduling, estimating, monitoring, reporting, control and completion of test activities

3.44

Test Management Process

process used for managing testing

EXAMPLE Test Planning Process, Test Monitoring and Control Process, Test Completion Process.

3.45

test model

representation of the test item, which is in the focus of testing

EXAMPLE Requirements statements, equivalence partitions, state transition diagram, use case description, decision table, input syntax, source code, control flow graph, parameters & values, classification tree, natural language.

Note 1 to entry: The test model and the required test coverage are used to identify test coverage items.

Note 2 to entry: A separate test model may be required for each different type of required test coverage included in the test completion criteria.

Note 3 to entry: A test model can include one or more test conditions.

Note 4 to entry: Test models are commonly used to support test design (e.g. they are used to support test design in ISO/IEC/IEEE 29119-4, and they are used in model-based testing). Other types of models exist to support other aspects of testing, such as test environment models, test maturity models and test architecture models.

3.46

Test Model Specification

document specifying the test model

3.47

Test Monitoring and Control Process

test management process for ensuring that testing is performed in line with a Test Plan and with organizational test specifications

3.48

test objective

reason for performing testing

EXAMPLE Checking for correct implementation, identification of defects, measuring quality.

3.49

Test Plan

detailed description of test objectives to be achieved and the means and schedule for achieving them, organised to coordinate testing activities for some test item or set of test items

Note 1 to entry: A project can have more than one Test Plan, for example there can be a project test plan (also known as a master test plan) that encompasses all testing activities on the project; further detail of particular test activities can be defined in separate test plans (e.g. a system test plan or a performance test plan).

Note 2 to entry: A Test Plan is typically a written document, although other formats could be possible as defined locally within an organization or project.

Note 3 to entry: Test plans can also be written for non-project activities, for example a maintenance test plan.

3.50

Test Planning Process

Test Management Process used to complete test planning and create and maintain Test Plans

3.51

Test Policy

Organizational Test Policy

executive-level document that describes the purpose, goals, principles and scope of testing within an organisation

Note 1 to entry: The Test Policy defines what testing is performed and what it is expected to achieve but does not detail how testing is to be performed.

Note 2 to entry: The Test Policy can provide a framework for establishing, reviewing and continually improving the organization's testing.

3.52

test procedure

sequence of test cases in execution order, with any associated actions required to set up preconditions and perform wrap-up activities post execution

3.53

Test Procedure Specification

test script

document specifying one or more test procedures

3.54

test process

set of testing activities performed to achieve a test objective

Note 1 to entry: The test process for a particular project can consist of multiple test levels and test types.

3.55

test result

indication of whether a specific test case has passed or failed, i.e. if the actual results corresponds to the expected results or if deviations were observed

3.56

test specification

complete documentation of the test design, test cases and test procedures for a specific test item

Note 1 to entry: A test specification can be detailed in one document, in a set of documents, or in other ways, for example in a mixture of documents and database entries.

3.57

Test Status Report

report that provides information about the status of the testing that is being performed in a specified reporting period

3.58

test strategy

part of the Test Plan that describes the approach to testing for a specific project, test level or test type

Note 1 to entry: The test strategy usually describes some or all of the following: the test levels and test types to be implemented; the retesting and regression testing to be employed; the test design techniques and corresponding test completion criteria to be used; test data; test environment and testing tool requirements; and expectations for test deliverables.