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**Systems and software engineering —  
Capabilities of review tools**

*Ingénierie des systèmes et du logiciel — Capacités des outils d'analyse*

**iTeh STANDARD PREVIEW**  
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[ISO/IEC 23396:2020](https://standards.iteh.ai/catalog/standards/sist/9a53f89d-c633-4792-9603-263e2fbe9ce7/iso-iec-23396-2020)

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
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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 document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <http://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](http://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*.

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](http://www.iso.org/members.html).

## Introduction

It is widely recognized that almost all software development organizations need to improve the quality of software at an appropriate cost and review is one important means. Applying reviews early in the lifecycle is known to reduce the amount of unnecessary rework in regular projects. This is because problem detection in upstream requires less cost than detection of problems by performing tests in downstream processes. By conducting the review in this way, it is possible to detect problems early, evaluate alternatives, improve organizational and personal processes, and improve work outcomes. ISO/IEC 20246 specifies a standard process for work product reviews.

Review support tools provide capabilities to improve review work and improve review quality, for example support for collaboration and communication between reviewers, logging and highlighting comments made on a work product, and support for review report generation.

Support tools are indispensable in the large-scale development project where the number of items pointed out in the review exceeds one thousand. Support tools are also actively used in small and medium-sized projects to improve review quality and efficiency. Indeed, various kinds of “review tools” are provided. For example, there is a relatively simple capability that allows you to add comments as a tag using the macro function of document creation. On the other hand, there are tools to support the progress management of the entire project in the large-scale development in which dozens of reviewers point out issues and the project manager monitors the status of the review implementation status.

In large organizations, it is very important to select appropriate tools from among various kinds of review tools. It is essential that the selected tool has a high degree of fairness and is evaluated according to public standards. For this purpose, ISO/IEC 20741 on the process of evaluation and selection of software engineering tools was published in 2017. However, ISO/IEC 20741 does not prescribe standard capabilities specific to reviews because it is generalized without depending on a specific tool field.

This document aims to define the capabilities of review support tools and to select the appropriate tool in combination with ISO/IEC 20741 for tool evaluation and selection (see [Annex E](#)). The review support tool assumed in this document supports the entire process specified in ISO/IEC 20246. For example, capabilities which support personal activities such as viewing and pointing out deliverables are necessary, and capabilities which support group activities such as reporting of situations are necessary (see [Annex D](#)). It is assumed that the check work itself such as the source code check defined in the ISO/IEC 30130 test tool is not included, and it is assumed that humans are checking.

# Systems and software engineering — Capabilities of review tools

## 1 Scope

This document specifies the capabilities of a tool to support review work.

The evaluation and selection of the review tools are performed in accordance with ISO/IEC 20741 which defines the general evaluation selection process and evaluation characteristics. This document defines capabilities specific to review tools in the process. By using these two standards together, it is possible to derive objective and reasonable results of the evaluation and selection of review tools.

The review work is based on the process, activities, and tasks defined in ISO/IEC 20246. It is also assumed that the review targets are defined in ISO/IEC 20246. The review work in this document is assumed not to be performed by a 3rd party, but within a project.

The review tool capabilities specified in this document harmonize with the review process defined in ISO/IEC 20246. This document does not include automated process, activities, or tasks for conducting reviews such as automated source code checkers defined in ISO/IEC 30130.

Issues which are identified in the review are recorded and managed by the tool; but defects found in tests and issues found in general except for reviews are out of the scope of this document.

## 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 20246, *Software and systems engineering — Work product reviews*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 20246 and the following apply.

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### entity

data concept that may have attributes and relationships to other entities

[SOURCE: ISO/TR 25100:2012, 2.1.3, modified — NOTE has been removed.]

### 3.2

#### review folder

*entity* (3.1) for binding one or more related reviews, including a list of the reviews and information common to the reviews

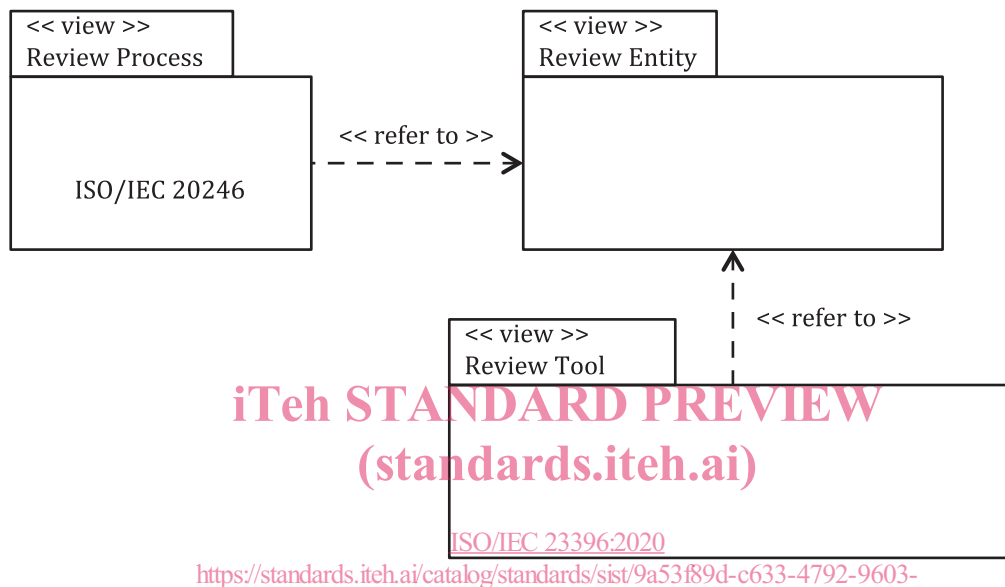
Note 1 to entry: The information common to the reviews can include information on members who can participate in or organize the reviews, and information on the classification given to the issues identified during the reviews.

## 4 Object model for review tools

### 4.1 Overview of the object model

The overall structure of the object model of review consists of the following elements:

- a) Review Process: a set of processes defined by ISO/IEC 20246,
- b) Review Entity: a set of elements that represents identifiable information which appears in Review Process and is described as a class in the object model, and
- c) Review Tool: a tool which supports to create, refer to, update, and delete Review Entity.



**Figure 1 — Overall structure of object model of review**

The object model diagrams, [Figure 1](#) to [Figure 3](#), are described using UML 2 (Unified Modelling Language 2) (see ISO/IEC 19505-2).

An object model for review tools can be identified to define tool capabilities by its input, process, and output.

### 4.2 Object model of review entities

ReviewFolder in this object model (hereinafter referred as ReviewFolder) stands for a review folder.

Review in this object model (hereinafter referred as Review) is an entity representing a single review in which all information, such as a list of work products to be reviewed, a list of participants, and a list of issues identified during the review, is recorded.

WorkProduct in this object model (hereinafter referred as WorkProduct) is an entity representing a work product which is defined in ISO/IEC 20246.

Member in this object model (hereinafter referred as Member) is an entity representing a member who participates in or organizes the review. It represents all roles defined in ISO/IEC 20246 such as author, review leader, and reviewer.

A single review is usually carried out on one or more WorkProduct by participants selected from Member.



IssueByReview in this object model (hereinafter referred as IssueByReview) is an entity representing an issue which is identified in the review.

NOTE 1 Issue is defined in ISO/IEC 20246.

PlaceOfIssueByReview in this object model (hereinafter referred as PlaceOfIssueByReview) is an entity representing a place where the issue is identified.

NOTE 2 There are two reasons why detection places of issues are set as independent entities on the model. The first reason is that the multiplicity of the relationship between WorkProduct and IssueByReview is many to many. That is, the same IssueByReview may be given to more than one PlaceOfIssueByReview, and multiple IssueByReview may be given to the same PlaceOfIssueByReview. The second reason is that the capability to support the discovery of the issue detection place is decisively important on the tool.

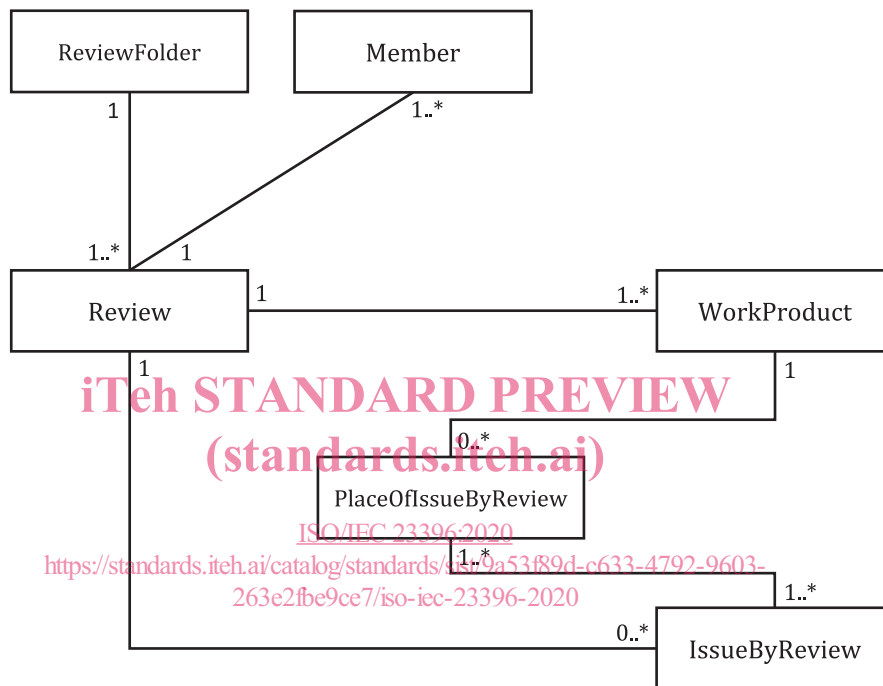
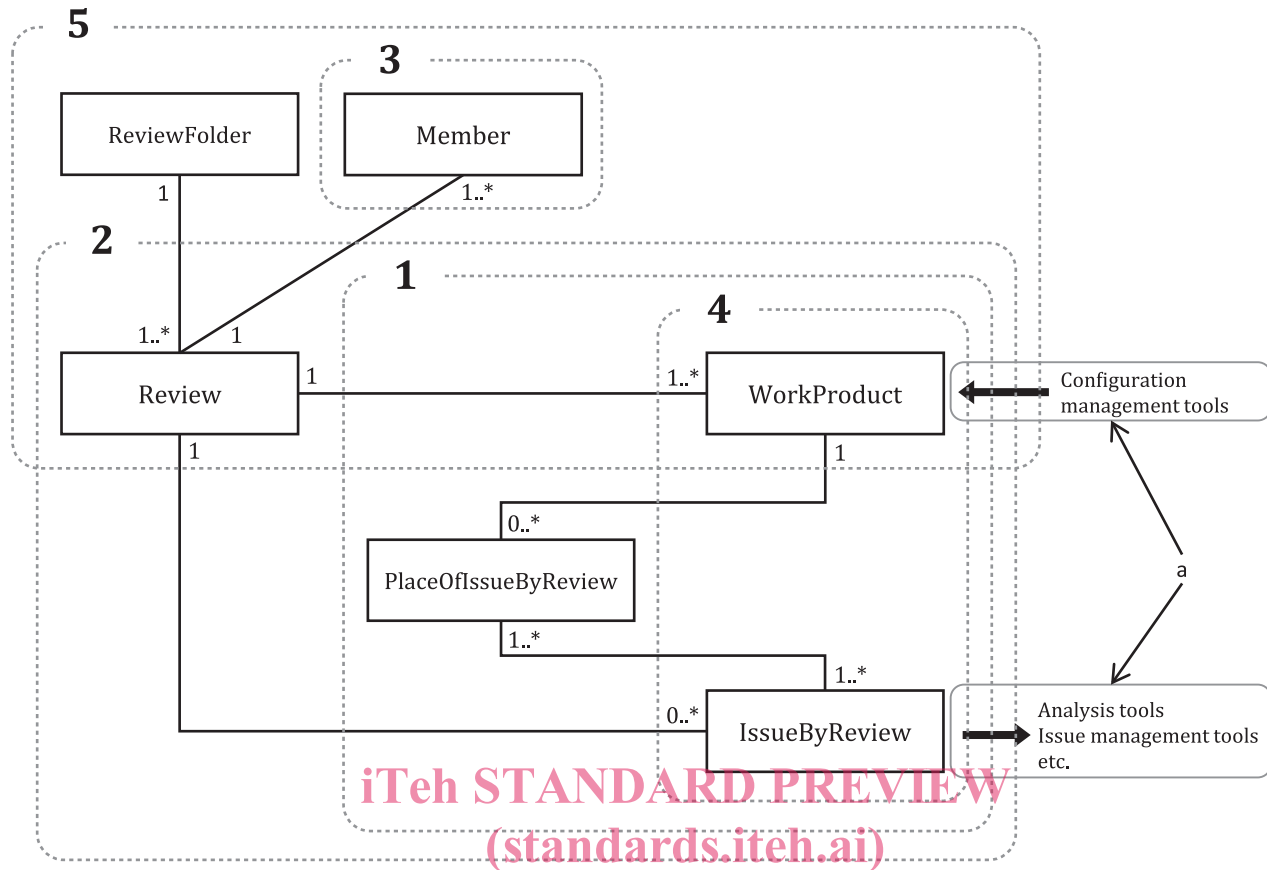


Figure 2 — Entities of review

The relationship between the entities described here and the activities defined in ISO/IEC 20246 is shown in Annex B.

### 4.3 Category of capabilities for review tools

On the object model of the review entity, capabilities are categorized into groups according to the group of entities to be handled (see Figure 3).



**Key**

- (1) A group of entities for capabilities of category "IssueByReview management"
  - (2) A group of entities for capabilities of category "Review metrics collection and report output"
  - (3) A group of entities for capabilities of category "Human communication report"
  - (4) A group of entities for capabilities of category "Linkage with other schools"
  - (5) A group of entities for capabilities of category "Administration"
- <sup>a</sup> Linking destination tools.

**Figure 3 — Category of capabilities**

1) IssueByReview management

It is a set of capabilities of managing individual IssueByReview identified during the review of a WorkProduct. It generates and updates IssueByReview. At the same time, accompanying pointing PlaceOfIssueByReview is also generated and updated.

This category is required for individual review and issue communication and analysis, such as supporting the easy detection of issues, recording of issues, recording of the status of issues, communication of issues, and recording of solutions. Furthermore, it is important that the records can be used for monitoring the status of each issue and analysing the progress of review as a whole.

2) Review metrics collection and report output

It is a set of capabilities to collect and compile information related to review metrics for a single review. It creates a review report. Review rate, reviewer progress rate, and reviewer completion criteria are managed by this group of entities.

## 3) Human communication support

It is a set of capabilities to support communication among the review organizer and review participants, such as messaging, chat, and mail distribution of review holding information.

It is important to support communication between each reviewer who usually performs an individual review at different places. These capabilities can avoid duplication of issues and promote new discoveries.

## 4) Linkage with other tools

It is a set of capabilities to import/export the information of each entity.

In the review, cooperation with multiple external tools is required, such as checking out the target work product from the configuration management tool, registering a problem that cannot be solved in the review process to the issue management tool.

## 5) Administration

It is a set of capabilities used by the administrator of the review, such as defining review folders and reviews and controlling the implementation of reviews. It generates and updates ReviewFolder and Review as well as related Member and WorkProduct.

## 5 Entities of review tools

### 5.1 Overview

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The following six entities to be handled by a review tool presented in [4.2](#) are defined in this clause:

- ReviewFolder; [ISO/IEC 23396:2020](#)
- Review; <https://standards.iteh.ai/catalog/standards/sist/9a53f89d-c633-4792-9603-263e2f9ce7/iso-iec-23396-2020>
- Member;
- WorkProduct;
- IssueByReview; and
- PlaceOfIssueByReview.

Detailed examples of each entity and the attributes contained therein are shown in [Annex A](#).

### 5.2 ReviewFolder

The following attributes are normally recorded:

- a name for identifying the review folder;
- a list of members who may participate in or organize reviews bound by this entity;
- names and values of classifications which are standard vocabularies to be uniformly used for each issue identified during reviews bound by this entity; and
- a list of reviews.

**EXAMPLE** The names of the classifications can include “severity” and “priority”. The values of the classifications can include “high”, “medium”, and “low”.

### 5.3 Review

This is information of each review bound by the review folder.

The following attributes are normally recorded:

- a review ID;
- a review name;
- a review type;
- a list of work products to be reviewed;
- a list of members planned to participate in the review;
- an organizer of the review;
- a list of participants in the review;
- a list of issues identified during the review;
- date and time when review started;
- date and time when review ended;
- time spent in the review;
- work product appraisal; and
- review decision.

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In addition, the following attributes may be recorded: <https://standards.iteh.ai/catalog/standards/sist/9a53f89d-c633-4792-9603-263e2f8e9ce7/iso-iec-23396-2020>

- purpose of the review;
- scheduled start date and time of the review;
- scheduled end date and time of the review;
- checklists used in the review;
- scenarios used in the review;
- support information such as standards;
- the review man-hours; and
- viewpoints of the review.

### 5.4 Member

This is information of members who are involved in the review. These members can be the organizer or participant of the review.

The following attributes are normally recorded:

- a member ID;
- a member name;
- an affiliation; and
- contact information.