

Information technology — Software process assessment — Part 3: Performing an assessment

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Contents

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Requirements	2
4.1	General	2
4.2	Defining the assessment input	2
4.3	Responsibilities	3
4.4	The assessment process	3
4.5	Recording the assessment output	4

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. 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 JTC1.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types :

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts ;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard ;
- type 3, where a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/IEC TR 15504-3, which is a Technical Report of type 2, was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC7, *Software engineering*.

ISO/IEC TR 15504 consists of the following parts, under the general title *Information Technology - Software Process Assessment*:

- Part 1 : *Concepts and introductory guide* (informative)
- Part 2 : *A reference model for processes and process capability* (normative)
- Part 3 : *Performing an assessment* (normative)
- Part 4 : *Guide to performing assessments* (informative)
- Part 5 : *An assessment model and indicator guidance* (informative)
- Part 6 : *Guide to competency of assessors* (informative)
- Part 7 : *Guide for use in process improvement* (informative)
- Part 8 : *Guide for use in determining supplier process capability* (informative)
- Part 9 : *Vocabulary* (normative)

Introduction

ISO/IEC TR 15504 provides a framework for software process assessment and sets out the minimum requirements for performing an assessment in order to ensure consistency and repeatability of the ratings. The requirements help to ensure that the assessment output is self-consistent, and provide evidence to substantiate the ratings and to verify compliance with the requirements.

Process assessment is applicable in the following circumstances:

- a) by or on behalf of an organization with the objective of understanding the state of its own processes for process improvement;
- b) by or on behalf of an organization with the objective of determining the suitability of its own processes for a particular requirement or class of requirements;
- c) by or on behalf of one organization with the objective of determining the suitability of another organization's processes for a particular contract or class of contracts.

Assessors may be from within the organization, external to the organization or a combination of both.

Process assessment is an activity that is performed either during a process improvement initiative as described in ISO/IEC TR 15504-7, or as part of a capability determination procedure as described in ISO/IEC TR 15504-8. In either case, the formal entry to the assessment process occurs with the compilation of the assessment input which defines the purpose of the assessment (why it is being carried out), the scope of the assessment (which processes are being assessed), what constraints, if any, apply to the assessment, and any additional information that needs to be gathered. The assessment input also defines the responsibility for carrying out the assessment.

An assessment is carried out against a defined scope utilizing a compatible model(s) of good software engineering practice created from, or mapped to, the reference model defined in ISO/IEC TR 15504-2. ISO/IEC TR 15504-5 contains an exemplar compatible model. The reference model defines a set of processes, characterized by statements of process purpose, and a set of process attributes that apply across all processes. The process attributes are grouped into six process capability levels that define an ordinal scale of capability. The assessment output consists of a set of process attribute ratings for each process assessed, and may also include the capability level achieved by that process.

An assessment is typically carried out by a team with or without the aid of tool support. The assessment is overseen by a competent assessor who has the necessary competence and skills, guidance for which is provided in ISO/IEC TR 15504-6. ISO/IEC TR 15504-4 provides guidance for interpreting the minimum requirements for performing an assessment.

This part of ISO/IEC TR 15504 assumes familiarity with the relevant guidance parts of the standard. It is primarily addressed to the competent assessor and other people, such as the sponsor of the assessment, who need to assure themselves that the requirements have been met. It will also be of value to developers of assessment methods and of tools to support an assessment.

Information technology — Software process assessment — Part 3: Performing an assessment

1 Scope

This part of ISO/IEC TR 15504 defines the minimum set of requirements for performing an assessment. These will increase the likelihood that results are objective, impartial, consistent, repeatable and representative of the processes assessed. Assessments may be compared when their assessment scopes are considered to be comparable.

The requirements form part of a process assessment framework which;

- a) encourages self-assessment ;
- b) takes into account the context in which the assessed processes operate ;
- c) produces sets of process ratings (process profiles) ;
- d) through process attributes applicable to all processes, addresses the ability of processes to achieve their purpose ;
- e) is appropriate across all application domains and sizes of organization.

ISO/IEC TR 15504 is not intended to be used in any scheme for the certification / registration of the process capability of an organization.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC TR 15504. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC TR 15504 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC TR 15504-2 - 1998, *Information technology - Software process assessment - Part 2: A reference model for processes and process capability*.

ISO/IEC TR 15504-9 :1998, *Information technology – Software process assessment – Part 9 : Vocabulary*.

3 Terms and definitions

For the purposes of this part of ISO/IEC TR 15504, the definitions given in ISO/IEC TR 15504-9 apply.

4 Requirements

4.1 General

In order to increase the likelihood of repeatable ratings for assessed processes this part of ISO/IEC TR 15504 sets out the requirements for conformant assessments. The requirements help to ensure that the assessment output is self-consistent and provides evidence to substantiate the ratings.

4.2 Defining the assessment input

4.2.1 The assessment input shall be defined prior to the data collection phase of an assessment and approved by the sponsor of the assessment.

4.2.2 At a minimum, the assessment input shall specify:

- a) the identity of the sponsor of the assessment and the sponsor's relationship to the organizational unit being assessed,
- b) the assessment purpose including alignment with business goals,
- c) the assessment scope including:
 - 1) the processes to be investigated within the organizational unit;
 - 2) the highest capability level to be investigated for each process within the assessment scope;
 - 3) the organizational unit that deploys these processes;
 - 4) the context which, as a minimum, includes:
 - i) the size of the organizational unit,
 - ii) the demographics of the organizational unit,
 - iii) the application domain of the products or services of the organizational unit,
 - iv) the size, criticality and complexity of the products or services,
 - v) the quality characteristics of the products (see, for example, ISO/IEC 9126-1991, *Software quality characteristics*).
- d) the assessment constraints which may include:
 - 1) availability of key resources,
 - 2) the maximum amount of time to be used for the assessment,
 - 3) specific processes or organisational units to be excluded from the assessment,
 - 4) the minimum, maximum or specific sample size or coverage that is desired for the assessment,
 - 5) the ownership of the assessment outputs and any restrictions on their use,
 - 6) controls on information resulting from a confidentiality agreement.
- e) the identity of the model(s) used within the assessment, which shall be compatible model(s) of good software engineering practice that meet the requirements defined in ISO/IEC TR 15504-2;
- f) the identity of the assessors, including the competent assessor with specific responsibilities for the assessment;

- g) the criteria for competence of the assessor who is responsible for the assessment;
- h) the identity of assesseees and support staff with specific responsibilities for the assessment;
- i) any additional information to be collected during the assessment to support process improvement or process capability determination, e.g. specific data (or metrics) that is needed to quantify the organization's ability to meet a particular business goal.

4.2.3 Any changes in the assessment input shall be agreed with the sponsor and documented in the assessment record.

4.3 Responsibilities

4.3.1 The sponsor of the assessment shall verify that the assessor who is to take responsibility for and oversee the assessment (the competent assessor) has the necessary competence and skills.

4.3.2 The sponsor shall ensure that resources (both assessors and assesseees where necessary) are made available to conduct the assessment.

4.3.3 The competent assessor shall confirm the sponsor's commitment to proceed with the assessment.

4.3.4 The competent assessor shall ensure that the assessment is conducted in accordance with the requirements of this part of ISO/IEC TR 15504.

4.3.5 The competent assessor shall ensure that participants in the assessment are briefed on the purpose, scope and approach of the assessment.

4.3.6 Assessors participating in the assessment shall have access to appropriate documented guidance on how to perform the defined assessment activities and the necessary competence to use any instruments or tools chosen to support the assessment.

4.3.7 The competent assessor shall ensure that all members of the assessment team have appropriate knowledge and skills.

4.3.8 On completion of the assessment, the competent assessor shall verify and document that the requirements have been met.

4.4 The assessment process

4.4.1 The assessment shall be conducted according to a documented process that is capable of meeting the assessment purpose.

4.4.2 The assessment process shall contain at minimum the following activities:

- a) **Planning** A plan for the assessment shall be developed and documented, specifying at minimum:
 - 1) the required inputs defined in this part of ISO/IEC TR 15504;
 - 2) the activities to be performed in conducting the assessment;
 - 3) the resources and schedule assigned to these activities;
 - 4) the selection and defined responsibilities of the assessors and organization participants in the assessment;
 - 5) the criteria for verification of the performance of the requirements; and
 - 6) a description of the planned assessment outputs.
- b) **Data Collection** Data required for evaluating the processes within the scope of the assessment [ref 4.2.2 (c) and (i)] shall be collected in a systematic and ordered manner, applying at minimum the following:

- 1) The strategy and techniques for the selection, collection, analysis of data and justification of the ratings shall be explicitly identified and shall be demonstrable;
 - 2) Correspondence shall be established between the organizational unit's processes specified in the assessment scope through the compatible model(s) used for assessment to the processes defined in the reference model in ISO/IEC TR 15504-2;
 - 3) Each process identified in the assessment scope shall be assessed on the basis of objective evidence;
 - 4) The objective evidence gathered for each attribute for each process assessed shall be sufficient to meet the assessment purpose and scope;
 - 5) Objective evidence, based on the indicators, that supports the assessors' judgement of process attribute ratings shall be recorded and maintained to provide the basis for verification of the ratings;
- c) **Data Validation** The data collected shall be validated. Actions shall be taken to ensure that the validated data sufficiently covers the assessment scope.
- d) **Process Rating** A rating shall be assigned based on validated data for each process attribute.
- 1) The set of process attribute ratings shall be recorded as the process profile for the defined organization unit;
 - 2) In order to provide the basis for repeatability across assessments, the defined set of assessment indicators in the compatible model(s) shall be used during the assessment to support the assessors' judgement in rating process attributes;
 - 3) The decision-making process (e.g. consensus of the assessment team or majority vote), that is used to derive rating judgements shall be recorded.
- e) **Reporting** The assessment results, including at minimum the outputs specified in Clause 4.5, shall be documented and reported to the Assessment Sponsor.

4.5 Recording the assessment output

4.5.1 Information which is pertinent to the assessment and will support understanding the output of the assessment shall be compiled and included in the assessment record for retention by the sponsor.

4.5.2 At a minimum, the assessment record shall contain:

- a) the date of the assessment;
- b) the assessment input;
- c) the identification of the objective evidence gathered;
- d) the assessment approach used;
- e) the set of process profiles resulting from the assessment (ie. one profile for each process assessed);
- f) the identification of any additional information collected during the assessment that was identified in the assessment input to support process improvement or process capability determination.