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Information technology — Process assessment — Guidance for performing process assessments

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Foreword

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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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC1, *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 and www.iec.ch/national-committees.

Introduction

Process assessment is a disciplined evaluation of an organizational unit's processes against a process assessment model. It is initiated as a result of a desire to determine and/or improve the performance of these processes.

The guidance in this document is primarily aimed at the lead assessor who has the responsibility for conducting the assessment, selection and use of models, documented assessment process and tools for the assessment.

The guidance may also be of use to the developers of assessment models, documented assessment processes and tools as an aid to understanding the requirements.

The assessors and other participants in an assessment may use the guidance to gain an understanding of process assessment.

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Information technology — Process assessment — Guidance for performing process assessments

1 Scope

This document provides an overview of process assessment and interprets the requirements of ISO/IEC 33002 and ISO/IEC 33004 through the provision of guidance on the selection and use of assessment models, documented assessment processes, and instruments or tools for assessment.

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.

2 Normative reference

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 33001, *Information technology — Process assessment — Concepts and terminology* /iso-

ISO/IEC 33002:2015, *Information Technology — Process Assessment — Requirements for performing process assessment*

ISO/IEC 33004:2015, *Information technology — Process assessment — Requirements for process reference, process assessment and maturity models*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 33001 apply.

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

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

4 Overview of process assessment

4.1 Process assessment

Process assessment is undertaken to understand the process quality characteristic of an organizational unit's current processes.

Process assessment deals with the processes (e.g. management, development, maintenance, support) used by an organization. This is accomplished by assessing the organizational unit's processes against a process assessment model conformant with the requirements for processes described in ISO/IEC 33004.

A process reference model defines the set of processes that are fundamental to good business practices in a selected domain. Building upon the foundation of a process reference mode, a process assessment model includes a set of process attributes, applicable to any processes, that characterize the selected process quality characteristic of a measurement framework.

Processes in a process reference model are grouped according to the type of activity they address. Each process has a defined purpose describing the high-level objectives that the process should achieve. The purpose statements describe what to do, but do not prescribe how the process should achieve its objectives.

Each process attribute in a measurement framework, as described in ISO/IEC 33003, enables the process quality characteristic to effectively achieve its purpose and contribute to meeting the business goals of the organizational unit.

Although a process reference model selected according to the requirements in ISO/IEC 33004 may cover a range of processes, in many cases a subset of these processes may be selected for assessment. For instance, the sponsor may wish to focus attention on one or more critical processes or on processes which are candidates for improvement actions.

The sophistication and complexity of the implemented process depend upon the context of that process within the organizational unit. For instance, the planning required for a five-person project team is likely to be much less than for a fifty-person team. This process context, recorded in the assessment input, influences how a lead assessor should judge and rate the process attributes for an implemented process. The process context also influences the degree of comparability between process attribute and/or process quality level ratings.

In some circumstances, it may be desirable to compare the outputs of the assessment of two or more organizational units, or for the same organizational unit at different times. A number of factors should be taken into account when comparing assessment results. These include but are not limited to:

- the sample size used to generate the ratings which influences the precision with which results may be compared;
- the purposes of the assessments that generated the assessment outputs - it may not be meaningful, for example, to compare an assessment whose purpose was to identify best (or worst) practice with one whose purpose was to identify representative practice;
- the documented assessment process or model(s) used;
- the competency of the assessors;
- the candour of the participants;
- the time spent on the assessment;
- the motivation of the assessor (i.e. internal assessor with incentives based on the assessment results or a consultant with a long-term relationship with the organization);
- the motivation of the assessment participants to be frank and forthcoming.

4.2 Process attribute rating scheme

A process assessment measurement framework is based on assessing processes. The guidance in [Clause 6](#) on information collection helps to increase the level of repeatability by different assessors.

Each process has a set of process attribute ratings that constitute the process profile.

For the assessment of process capability, process attribute ratings may be expressed using a process attribute rating scale as defined in ISO/IEC 33020.

NOTE The process capability level model defined in ISO/IEC 33020 defines a six-point ordinal scale of increasing process capability ranging from a process which is not capable of achieving its purpose (process capability level zero) to a process which optimizes its performance (process capability level 5). The process capability level model is described in terms of the process attribute ratings that must be achieved in order to achieve a particular level.

When more than one instance of a process is assessed, the assessor should use the recorded assessment information collected on all of the instances to make a judgment on the rating of each of the process attributes assessed for that process.

If there is a need for aggregation of ratings, the approach to the aggregation of ratings should be specified.

4.3 Process assessment classes

Three classes of assessment are identified, resulting in different level of confidence in the ratings of the selected organizational process quality characteristic. Specific requirements relating to each class are described in ISO/IEC 33002:2015, 4.6.

The classes of assessment are:

- Class 1 assessment: The goal of this class is to provide a level of confidence in the results of the assessment such that the results are suited for comparisons across different organizations.
- Class 2 assessment: The goal of this class is to provide a level of confidence in the assessment results that may indicate the overall level of performance of the key processes in the organization unit, which are suitable for comparisons of the results of an assessment across an organizational or product line scope.
- Class 3 assessment: The goal of this class is to generate results that may indicate critical opportunities for improvement and key areas of process related risk.

4.4 Process assessment approaches

As described in ISO/IEC 33002:2015, Annex A, the degree of independence of different types of bodies and the make-up of the assessment team performing an assessment can be categorised as follows.

- Category A: This typically represents an organization providing fully independent 3rd party services.
- Category B: This typically represents an organization providing 2nd or 3rd party services where the assessment team is led by a lead assessor from the independent organization and where the other assessment team members may be from the organization being assessed. Such an approach may be used where data is collected by internal team members and then verified by the lead assessor.
- Category C: This typically represents an internal but independent process group or quality assurance group within the organization being assessed but where there is a separate reporting line. This approach may be used in a large organization that has a separate functional group responsible for performing assessments.
- Category D: This typically represents an internal consultant that is assisting an organization in implementing process improvement which then assesses their capabilities. Many small organizations may follow such an approach where there is no customer pressure for an independent assessment to be performed. This may also be a team internal to the organization conducting a self-assessment to identify opportunities for improvement. There is no pressure to provide the result to any group outside the organization.

4.5 Assessment process

Irrespective of the type of assessment or the approach adopted, an assessment should be conducted according to a documented process. Some of the key elements of a documented assessment process are briefly described below. Note, however, that the guidance provided does not constitute a complete, documented process. Its role is to provide help in interpreting the requirements in ISO/IEC 33002 and ISO/IEC 33004, and to provide a starting point for selecting or creating a documented process.

NOTE An exemplar document assessment process is described in ISO/IEC TS 33030.

Depending upon the approach, a documented assessment process provides guidance on the following topics:

- assessment activities, including:
 - assessment planning;
 - data collection;
 - data validation;
 - determination of results;
 - assessment reporting;
- roles, responsibilities and competence;
- tools and instruments;
- aggregation approach;
- assessment inputs;
- assessment record.

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4.6 Process assessment model

A process assessment model is one that meets the requirements specified in ISO/IEC 33004. In summary, a process assessment model is one:

- that is suitable for the purpose of process assessment;
- whose fundamental elements can be mapped to a process reference model;
- that is equipped with sets of indicators for use during an assessment to gather the information about processes and process attributes;
- that has a formal mechanism for translating the information gathered using the model into process attribute ratings as defined in ISO/IEC 33004.

[Clause 5](#) provides guidance on the selection and use of a process assessment model.

NOTE The model in ISO/IEC TS 33061 is an example of the process assessment model applicable to the domain of software engineering.

4.7 Supporting instruments and tools

In all assessments, information needs to be collected, recorded, stored, collated, processed, analysed, retrieved and presented. In general, a documented assessment process should be supported by various instruments and tools for information gathering, processing and presentation. For some assessments, the support tools and instruments may be manual, i.e. paper-based (forms, questionnaires, checklists, etc.). In some cases, the volume and complexity of the assessment information is likely to be considerable, resulting in the need for automated support tools.

Regardless of the form of the supporting instruments and tools, their objectives are to help an assessor perform an assessment in a consistent and reliable manner, reducing assessor subjectivity and helping to ensure the validity, usability and comparability of assessment results. In order to achieve these objectives, the instruments and tools need to make the assessment model and its indicators accessible to the assessors.

4.8 Success factors for process assessment

4.8.1 General

The following factors should be considered essential to a successful process assessment.

4.8.2 Commitment

The sponsor should commit to the objectives established for an assessment to provide the authority to undertake the assessment within an organization. This commitment requires that the necessary resources, time and personnel are available to undertake the assessment. The commitment of the sponsor and the assessors is fundamentally important to ensuring that the objectives are met.

4.8.3 Motivation

The attitude of the organization's management, and the documented assessment process by which the information is collected, has a significant influence on the outcome of an assessment. The organizational unit's management, therefore, needs to motivate participants to be open and constructive. Process assessments focus on the process, not on the behaviour of organizational unit members implementing the process. The intent is to make the processes more effective in supporting the defined business goals, not to allocate blame to individuals.

Providing feedback and maintaining an atmosphere that encourages open discussion about preliminary findings during the assessment helps to ensure that the assessment output is meaningful to the organizational unit. The organization needs to recognise that the participants are a principal source of knowledge and experience about the process and that they are in a good position to identify potential weaknesses.

4.8.4 Confidentiality

Respect for the confidentiality of the sources of information and documentation gathered during assessment is essential in order to secure that information. If discussion techniques are utilized, consideration should be given to ensuring that participants do not feel threatened or have any concerns regarding confidentiality. Some of the information provided can be proprietary to the organization. It is therefore important that adequate controls are in place to handle such information.

4.8.5 Relevance

The organizational unit members should believe that the assessment will result in some benefits that will accrue to them directly or indirectly.

4.8.6 Credibility

The sponsor and the management and staff of the organizational unit should all believe that the assessment will deliver a result which is objective and is representative of the assessment scope. It is important that all parties can be confident that the assessors have adequate experience of assessment, are sufficiently impartial and have an adequate understanding of the organizational unit and its business to conduct the assessment.

5 Selection and use of a process assessment model

5.1 General

This clause provides guidance on the selection and use of a process assessment model as the basis for performing a processes assessment. The guidance is intended for use by the assessors and sponsors of assessments. It is not directed specifically at the developers of process assessment models, though it may be of use to them.

In performing a process assessment, the practices observed in the organization unit being assessed are compared against those defined in an assessment model of good practice, to determine the extent to which the performance of the practices results in achievement of the selected process quality characteristic representing the attributes of a process and its performance at a specific level of capability.

In order to achieve this, the model should contain descriptions of the practices to be observed, and indicators of the performance of these practices, so that the judgments of the selected process quality characteristic may be made reliably and consistently.

5.2 Compatibility with the process reference model

5.2.1 General

The identity of the process assessment model used within the assessment should be a process assessment model of good practice that meet the requirements defined in ISO/IEC 33004:2015, 6.3.

An important criterion for selecting a process assessment model is the ability to verify its conformance to the provisions of ISO/IEC 33004:2015, 6.4.

Conformance is essential in order to provide a degree of comparability between the results of different assessments by maximizing the reliability of different approaches and achieving a greater degree of uniformity in the reporting of results.

5.2.2 Process assessment model purpose

A process assessment model should be based on good practices and be suitable for the purpose of assessing the selected process quality characteristic.

There are many different types of modelling techniques available for describing, specifying and enacting processes.

Models that have not been specifically developed for the purpose of process assessment may not yield reliable results, and their suitability for purpose should be validated before selection.

5.2.3 Process assessment model scope

A process assessment model should encompass all, or a non-empty subset, of the set of processes in the selected process reference model.

A process assessment model should address all or a continuous subset of the levels (starting at level 1) of the chosen quality characteristic for all of the processes within its scope.

The process reference model should define a set of processes that cover best practices. Any assessment model, to be compatible with the process reference model, should contain at least a part of this scope. The scope of the model is normally directly equivalent to the process reference model. Alternatively, the model may be a sub-set, or a superset of the process reference model, covering all of the defined processes together with additional process descriptions outside the standard scope. A process assessment model may also include processes outside the process reference model providing it, such that the process assessment model encompasses at least one process from it.