TECHNICAL SPECIFICATION

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Data quality —

Part 60: Data quality management: Overview

Qualité des données —

Partie 60: Gestion de la qualité des données: Aperçu

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

ISO 8000 is organized as a series of parts, each published separately. The structure of ISO 8000 is described by ISO/TS 8000-1.

Each part of ISO 8000 is a member of one of the following series: general data quality, master data quality and product data quality. This document is a member of the general data quality series but applicable to all of the three data quality series.

A list of all parts in the ISO 8000 series can be found on the ISO website.

Introduction

The ability to create, collect, store, maintain, transfer, process and present information and data to support business processes in a timely and cost-effective manner requires both an understanding of the characteristics of the information and data that determine its quality, and an ability to measure, manage and report on information and data quality.

ISO 8000 defines characteristics of information and data that determine its quality, and provides methods to manage, measure and improve the quality of information and data.

When assessing the quality of information and data, it is useful to perform the assessment in accordance with documented methods. It is also important to document the tailoring of standardized methods with respect to the expectation and requirements pertinent to the business case at hand.

ISO 8000 includes parts applicable to all types of data and parts applicable to specific types of data. ISO 8000 can be used independently or in conjunction with quality management systems.

This document:

— specifies core concepts applicable to the parts of ISO 8000 related to data quality management;

— gives an overview of each of those parts;

— can be used on its own or in conjunction with other parts of ISO 8000.

This document is intended for use by those actors that have a vested interest in information or data quality, with a focus on one or more information systems and both inter- and intra-organization views, throughout all phases of the data life cycle.

Annex A contains an identifier that unambiguously identifies this document in an open information system.

Data quality —

Part 60:
Data quality management: Overview

1 Scope

This document introduces the concepts within the parts of ISO 8000 related to implementing, assessing and improving data quality management.

The following are within the scope of this document:

— a statement of the overall scope of those parts of ISO 8000 related to data quality management;

— an overview of ISO 8000-61, which specifies a process reference model for data quality management;

— an overview of ISO 8000-62, which specifies a model that conforms to some of the requirements of ISO/IEC 33004 and that establishes a basis on which to determine the maturity of an organization with respect to data quality management;

— an overview of ISO 8000-63, which specifies the measurement procedure and measurement stack by which to measure the characteristics of processes for data quality management;

— an overview of ISO 8000-64, which specifies a model that applies the Test Process Improvement method as a basis on which to determine the maturity of an organization with respect to data quality management.

The details for implementing the parts of ISO 8000 related to data quality management are outside 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 8000-2, *Data quality — Part 2: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8000-2 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/.

4 Implementing, assessing and improving data quality management

4.1 A value-driven approach to data quality management

Organizations will achieve effective and efficient data quality management by adopting an approach that is driven by delivering value to the organization. This approach covers the following:

— understanding the value and risks associated with data quality across the organization;

— measuring and assessing current data quality management processes with respect to the supported business processes;

— identifying and acting upon opportunities to improve data quality management with the greatest potential impact on organization value;

— after implementing changes, continuing a cycle of measuring, assessing and improving the processes of data quality management.

4.2 Relationship between the parts of ISO 8000 related to data quality management

The parts of ISO 8000 related to data quality management focus on the data quality management processes of an organization rather than on the quality of data itself. Although data quality can be improved by correction of data non-conformities whenever they are found, this method has a problem in not preventing the recurrence of non-conformities. When data quality management processes are established in the organization, it is possible to improve data quality continually by improving processes and modifying data quality criteria as a flexible response to a changing environment. These improvements and modifications are indicative of the maturity level of an organization with respect to data quality management. This level determines the capability of the organization to sustain data of appropriately high quality.

The purpose of the parts of ISO 8000 related to data quality management is to enable organizations to enhance data quality. This purpose is supported by parts that specify:

— a process reference model for data quality management;

— a procedure and measurement stack by which to measure the characteristics of processes;

— models for organizational process maturity.

The rest of this document describes each of these parts and the role of each within process assessment, as follows:

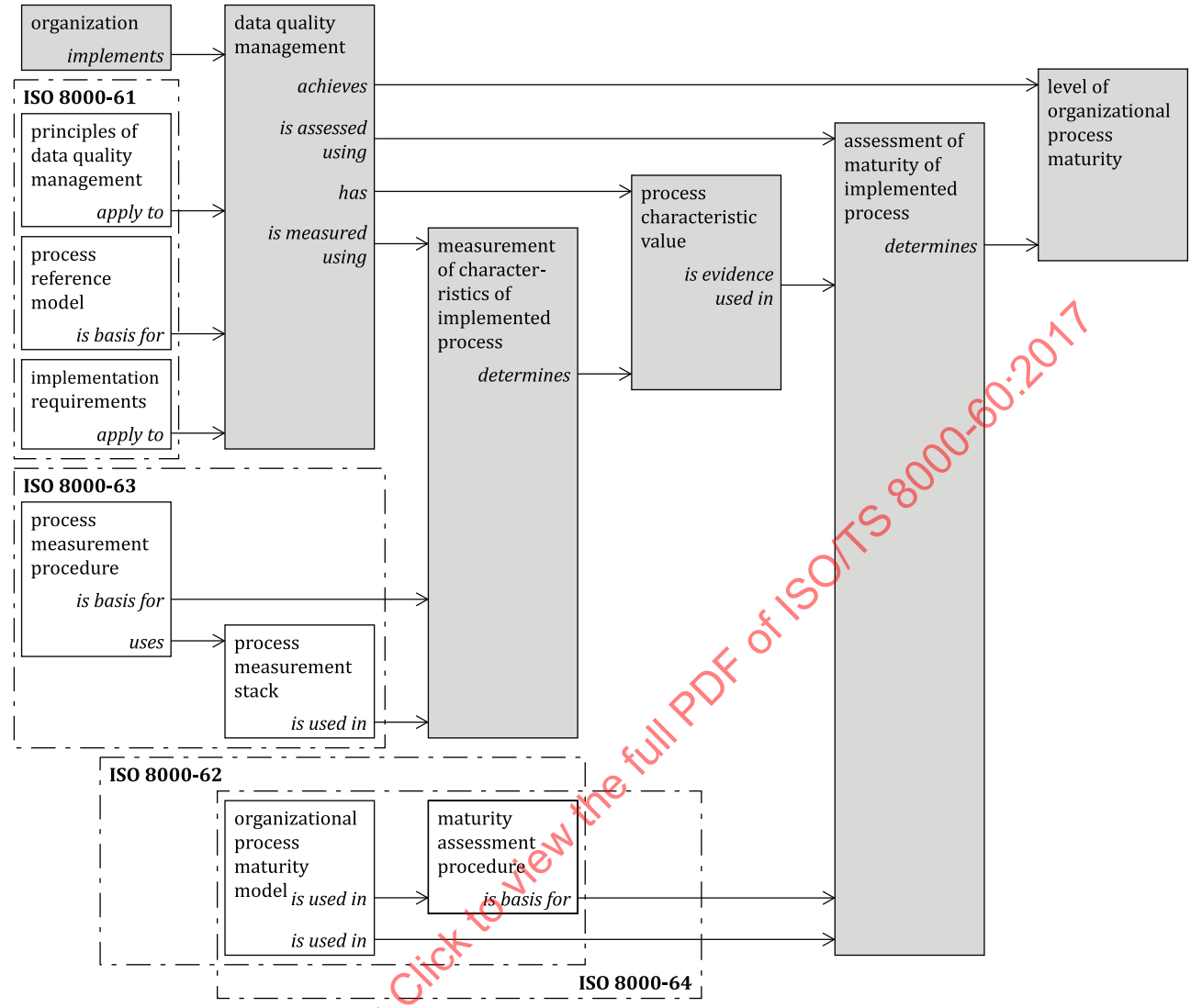
— ISO 8000-61 (see 4.3);

— ISO 8000-62 (see 4.4);

— ISO 8000-63 (see 4.5);

— ISO 8000-64 (see 4.6).

Figure 1 shows the relationship between these parts.



Key

scope of the identified standard number

standard specifies an instance of this class

user of the standard creates instance of this class

NOTE 1 ISO 8000-62 and ISO 8000-64 specify different instances of the classes that are in scope of both standards.

NOTE 2 See ISO/IEC 19505-1 for details on the notation in this figure.

Figure 1 — Parts of ISO 8000 related to data quality management

This document provides an overview of the parts of ISO 8000 related to data quality management. It describes how those parts fit together, and provides guidance for their selection and use. It explains the requirements contained within the parts and their applicability to:

— implementing, measuring, assessing and improving the processes of data quality management;

— constructing and selecting tools that support the implementation, measurement, assessment and improvement of the processes of data quality management.

ISO 8000-61 defines a process reference model. It specifies the processes required for data quality management. These processes can be:

— the subject of measuring their characteristics (as in ISO 8000-63);

— the scope across which to assess organizational process maturity (as in ISO 8000-62 and ISO 8000-64).

ISO 8000-62 supports organizations in assessing their process maturity with respect to data quality management as specified in ISO 8000-61. This support is in the form of particular elements of a maturity model. These elements conform to ISO/IEC 33004. Organizations can use these elements in combination with their own assessment indicators to determine the maturity level of an organization.

ISO 8000-63 specifies a measurement procedure and measurement stack for measuring the characteristics of processes. These characteristics are the evidence by which organizations can assess their process maturity for data quality management, for example using the maturity models within ISO 8000-62 and ISO 8000-64.

ISO 8000-64 supports organizations in assessing their process maturity with respect to data quality management as specified in ISO 8000-61. This support is in the form of a procedure that is based on the Test Process Improvement method.

4.3 Overview of ISO 8000-61

ISO 8000-61 specifies the processes required for data quality management (see Figure 2). Each process is defined by the purpose, outcomes and activities that are to be applied for planning, controlling, assuring and improving data quality. The processes are used as a reference model in assessing and improving data quality management.

ISO 8000-61 contains fundamental principles of data quality management, the structure of data quality management processes and a description of each process.

ISO 8000-61 covers the management of quality for digital data sets that include not only structured data stored in databases, but also less structured data such as images, audio, video and electronic documents. ISO 8000-61 is also intended for use by organizations that have multiple application systems sharing and exchanging data and that, therefore, need to manage data quality at the organization's level.

ISO 8000-61 specifies a process reference model for use by internal and external parties, including certification bodies, to assess process capability or organizational process maturity for data quality management, and enhance data quality through process improvement.

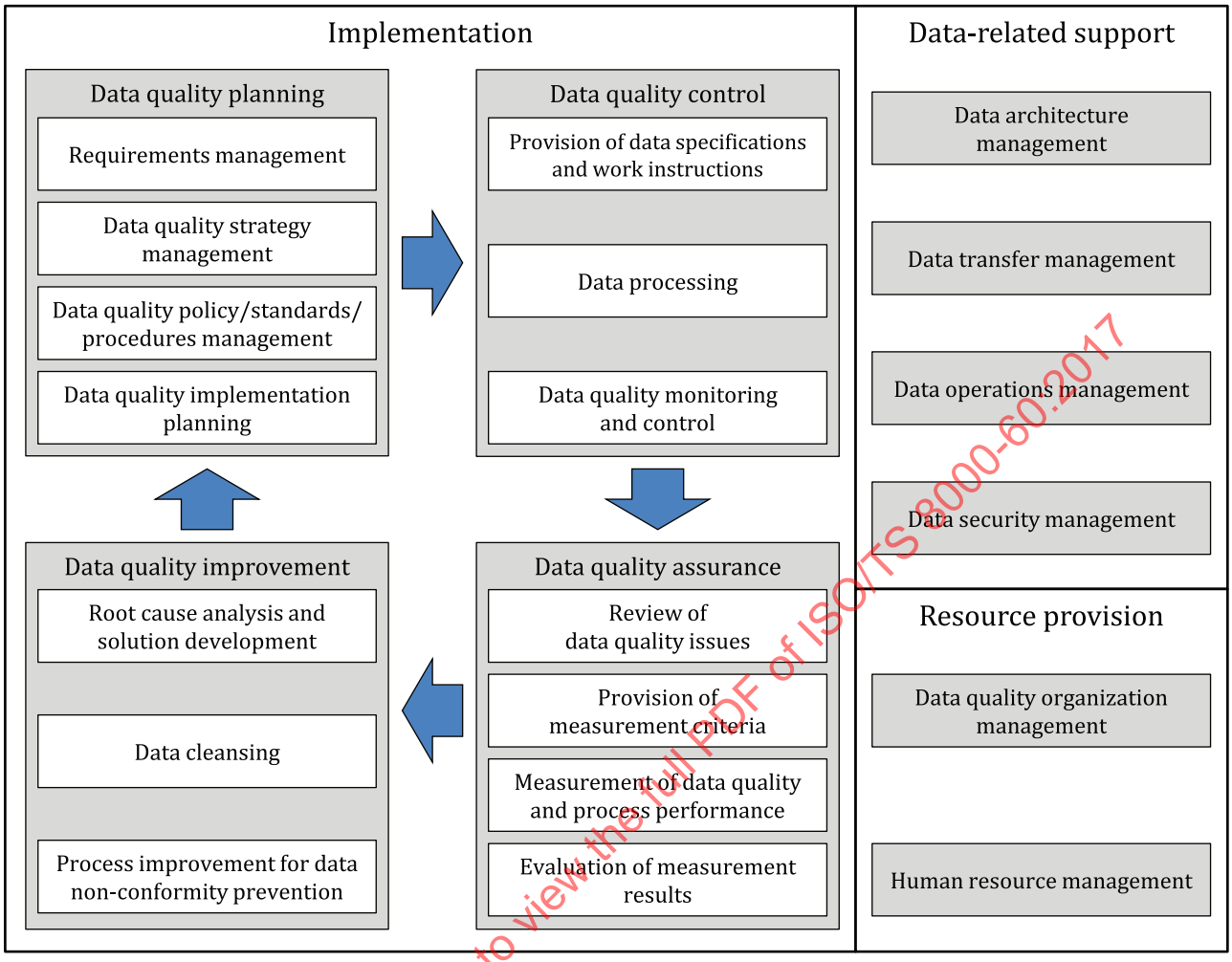


Figure 2 — Detailed structure of data quality management processes in ISO 8000-61

Data quality planning establishes data requirements and objectives for data quality, creating plans to achieve the objectives and evaluating the performance of the plans. Data quality planning consists of requirements management, data quality strategy management, data quality policy/standards/ procedures management and data quality implementation planning.

Data quality control is carried out based on the implementation plan established in the data quality planning. The process, when successful, delivers data that meet requirements. The process involves creating, using and updating data according to specified work instructions, and monitoring quality by checking whether the data conform to pre-determined specifications. Data quality control consists of the definition of data specifications and work instructions for data quality, data processing and data quality monitoring and control.

Data quality assurance measures data quality levels and the process performance related to data non-conformities or other issues that have arisen as a result of data quality planning or data quality control. This measurement provides evidence by which to evaluate the impact of any identified poor levels of data quality on the effectiveness and efficiency of business processes. Data quality assurance consists of the review of data quality issues, the provision of measurement criteria, the measurement of data quality and process performance and the evaluation of measurement results.

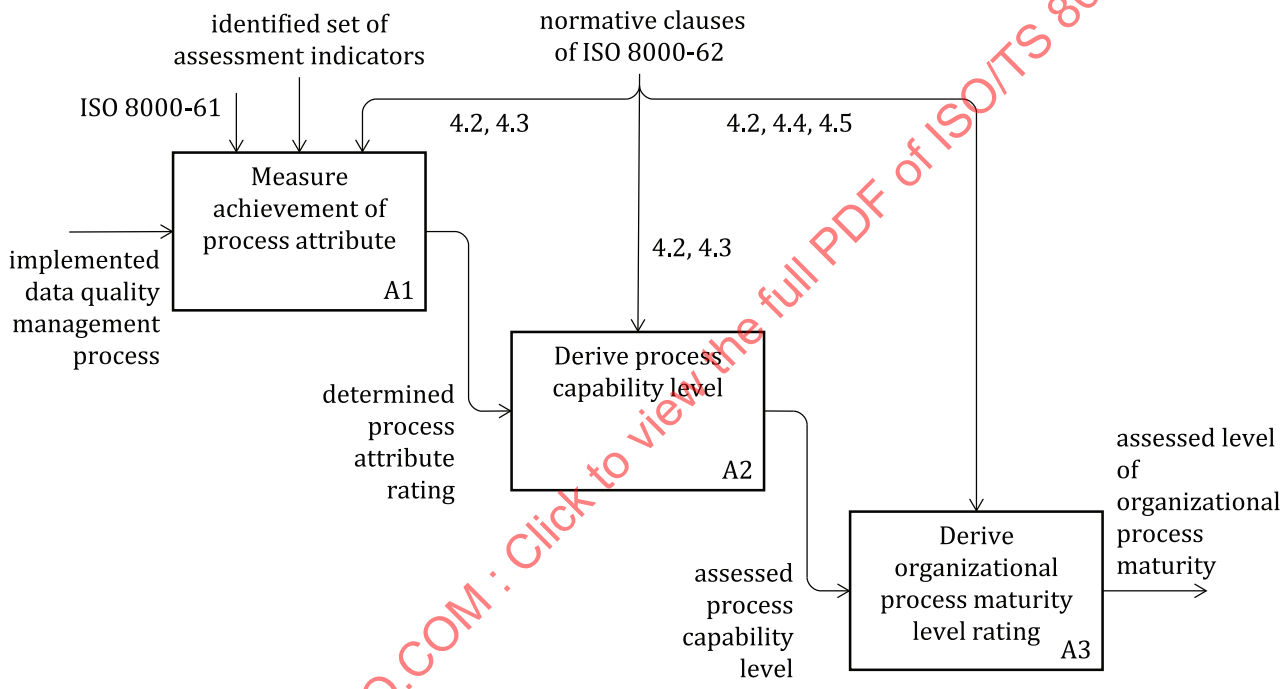
Data quality improvement involves analysing the root causes of data quality issues based on the assessment results derived from data quality assurance. In order to prevent future data non-conformities, data quality improvement corrects existing non-conformities and also transforms processes as appropriate. Data quality improvement consists of a root cause analysis and solution development, data cleansing and process improvement for data non-conformity prevention.

The purpose of data-related support is to provide the implementation process with input data, control information and support for the continuous improvement of data quality. Data-related support consists of data architecture management, data transfer management, data operations management and data security management.

The purpose of resource provision is to provide and control the organizational resources required for the performance of implementation and data-related support. Resource provision consists of data quality organization management and human resource management.

4.4 Overview of ISO 8000-62

ISO 8000-62 identifies those elements of the maturity model that exist in other standards and specifies additional elements of the maturity model. ISO 8000-62 provides guidance on assessing the maturity level of an organization. The purpose of assessing the organizational maturity level for data quality management is to understand how well the organization is fulfilling the requirements identified by the process reference model specified by ISO 8000-61 (see Figure 3).



NOTE See ISO/IEC/IEEE 31320-1 for details on the notation in this figure.

Figure 3 — A0 activity model: Assess organizational data quality management maturity using ISO 8000-62

ISO 8000-62 specifies the use of the model from ISO/IEC 33020 to derive process capability levels. This model links each process capability level to a corresponding set of ratings of the process attributes. The model identifies:

— six process capability levels, from incomplete to innovating;

— nine process attributes, from process performance to process innovation implementation;

— four process attribute ratings, from not achieved to fully achieved.

This model is for use by organizations when performing a process maturity assessment.

ISO 8000-62 specifies the following elements that do not exist in other standards:

— six maturity levels, from immature (Level 0) to innovating (Level 5);

— process profiles that indicate when organizations have achieved each of the maturity levels.

Each maturity level consists of a numeric indicator (i.e. 0 to 5), a title (e.g. “Basic”), a description of the state of an organization at that level of maturity and a sub-set of the processes from ISO 8000-61. This sub-set consists of the processes that are assessed when determining whether the organization has achieved the corresponding level of maturity.

Each process profile specifies the target for the process capability level of every process at the corresponding maturity level. If each of those processes is performing at that capability level or above, then the organization has achieved the particular level of maturity.

ISO 8000-62 provides guidance on assessing organizational process maturity by covering the following topics:

— assessment activities;

— roles, responsibilities and competence for performing assessment;

— assessment inputs and outputs;

— a fictional example of performing an assessment.

4.5 Overview of ISO 8000-63

ISO 8000-63 specifies the stack that an organization can instantiate to measure the characteristics of processes for data quality management. This stack consists of a goal, a question, an indicator and a metric as the structure by which to conduct measurement of an identified characteristic of the process. ISO 8000-63 provides fundamental principles of the measurement of process characteristics, the structure of the stack for the measurement of process characteristics, and the way in which the stack can support various approaches to assessing processes.

Process measurement consists of two phases:

— a definition phase, creating the inspection plan for measuring and rating the raw data using the measurement stack (see Figure 4);

— a measurement phase, obtaining and assessing the raw data values according to the defined inspection plan.

The definition phase consists of the following steps:

— identifying the intended purpose of the measurement results;

EXAMPLE To identify the use of the results in performing the assessment of organizational process maturity using the model in ISO 8000-64.

— identifying those characteristics of the process that are of significance to the intended purpose;

— identifying a set of goals, questions, indicators and metrics forming a measurement stack that can generate results suitable for determining values of the identified process characteristics;

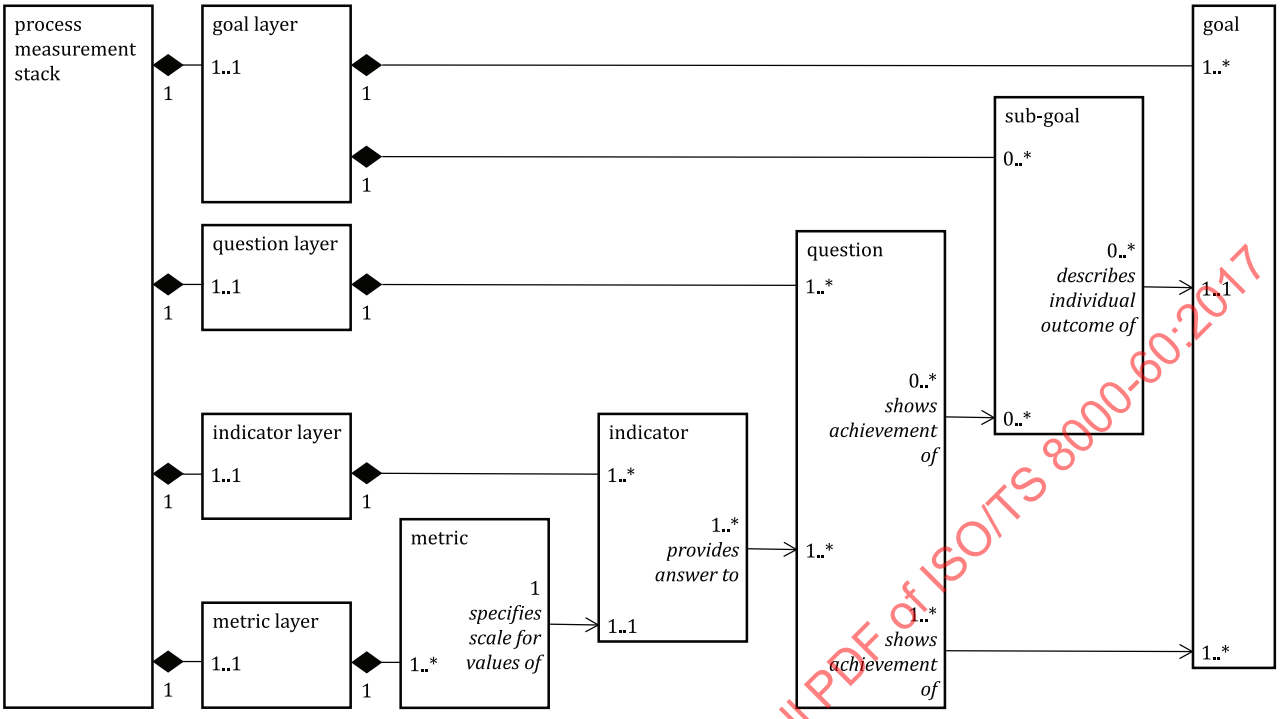
— identifying a mapping of how to transform the measurement results to determine the values of the identified process characteristics.

EXAMPLE The measurement results form the basis on which to determine the process attribute ratings for data quality management, when performing the assessment of organizational process maturity using the model in ISO 8000-62.

The measurement phase consists of the following steps:

— collecting the raw data values that form the measurement results;

— in accordance with the identified mapping, converting the raw data values into the values of the identified process characteristics.



NOTE See ISO/IEC 19505-1 for details on the notation in this figure.

Figure 4 — Constituents of the process measurement stack in ISO 8000-63

4.6 Overview of ISO 8000-64

ISO 8000-64 specifies the procedure by which an organization can create a model for use in assessing process maturity with respect to data quality management as specified in ISO 8000-61. This procedure consists of the following steps:

— instantiate the measurement stack according to ISO 8000-63;

NOTE Each indicator in the instantiated measurement stack is a key area in the terms of the Test Process Improvement method. Each key area is a specific scope for potential improvement.

— specify a frequency of measurement for each indicator in the instantiated measurement stack;

— specify a series of target values for each indicator;

— specify a series of steps in sequence at which one or more indicators achieve specified target values;

— specify the steps at which, if all the indicators have achieved each applicable specified target value, the organization has achieved each of a series of identified maturity levels.

In specifying the steps, this procedure captures the dependency of one or more indicators on one or more other indicators reaching specified target values. This dependency leads to the organization measuring each set of indicators in the sequence determined by the progression of the steps (i.e. one step at a time in strict numerical order).

