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**Information technology — Reference  
Model of Data Management**

*Technologies de l'information — Modèle de référence pour la gestion  
de données*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee 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.

In exceptional circumstances, the joint 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, when the joint 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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

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.

ISO/IEC TR 10032, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

## Introduction

ISO, in specifying a Reference Model of Data Management, recognizes that there are many implementors of data management systems. It is inevitable that different implementors use different terms to specify or refer to similar data management functions. Furthermore, the use of the same term to describe different functions is also common. There is a clear need to standardize the data management functions. This Technical Report fulfils that role by presenting a Reference Model of Data Management and defining the areas of this model which lend themselves to standardization.

This Technical Report defines the Reference Model of Data Management. It provides a common basis for the coordination of standards development for the purpose of data management, while allowing existing and emerging standards to be placed into perspective.

The term “data management” includes the description, creation, modification, use and control of data in information systems. Such data management functions may be performed as a common service for information systems applications. Alternatively, each application may define and control the data relevant to it. In the case in which data management functions are performed as a common service, it is desirable to provide standardized facilities for data access and control in order to permit the sharing of data by a number of users. Such standardization requires the determination of a number of interfaces for which individual standards may be developed.

The objectives of this Technical Report are to provide a framework allowing, within the scope specified in Clause 1, for the following:

- a) identification of interfaces;
- b) positioning all such interfaces relative to each other;
- c) identification of facilities provided at each interface;
- d) identification of the process which supports each interface and, where appropriate, of the data required for such support;
- e) positioning the use of the interfaces in terms of an information systems life cycle; and
- f) identification of the binding alternatives associated with each appropriate identified interface.

There are three major objectives which are applied in this Technical Report to data management standardization. These are as follows:

- a) Shareability of resources;
- b) Minimize cost of supporting an information system over its life cycle;
- c) Optimum use of standardization effort.

The shareability of resources objective applies to both information resources as represented by data in databases and to processor resources of the kind described in Clause 6. There is particular emphasis on the shareability of information resources located at different places and developed using different hardware and software. All shareability of resources is subject to access control.

The objective of minimizing the cost of supporting an information system applies to all phases of the information system life cycle, including design, development, operation and maintenance costs.

The objective associated with the optimum use of standardization effort refers to reducing the number of standards required and to simplifying the content of such standards.

This Technical Report identifies areas for developing or improving standards, and provides a common framework for maintaining consistency of all related standards.

This Technical Report provides a framework which allows teams of experts to work productively and independently on the development of standards for different components of information systems.

This Technical Report has sufficient generality to accommodate the development of new standards in response to advances in technology.

The description of the Reference Model of Data Management given in this Technical Report is presented as follows:

- Clause 4 introduces data management and the requirements based on information systems;
- Clause 5 explains the data concepts that are required for the Reference Model and how they relate to each other and the process concepts;
- Clause 6 provides an architectural model within which different data and processing components relevant to data management can be placed;
- Clause 7 describes the objectives and principles for data management standardization;
- Annex A is a list of related International Standards;
- Annex B shows how the existing and future SC 21/WG3 standards relate to the architectural model described in Clause 6;

This Technical Report specifies the classes of services that are expected to be provided by data management, and it provides a framework which describes the way in which they are related to each other. However, data management does not exist in isolation but within an environment providing other services such as data storage and communication, as is described in Clause 4.

Prior to completion of work on this Technical Report, data management standards were developed within ISO/IEC as indicated in Annex A of this document. The positioning of such International Standards using this Reference Model of Data Management is described in Annex B.



# Information technology — Reference Model of Data Management

## 1 Scope

This Technical Report defines the ISO Reference Model of Data Management. It establishes a framework for coordinating the development of existing and future standards for the management of persistent data in information systems. See Annex A for references to existing data management standards.

This Technical Report defines common terminology and concepts pertinent to all data held within information systems. Such concepts are used to define more specifically the services provided by particular data management components, such as database management systems or data dictionary systems. The definition of such related services identifies interfaces which may be the subject of future standardization.

This Technical Report does not specify services and protocols for data management. This Technical Report is neither an implementation specification for systems, nor a basis for appraising the conformance of implementations.

The scope of this Technical Report includes processes which are concerned with handling persistent data and their interaction with processes particular to the requirements of a specific information system. This includes common data management services such as those required to define, store, retrieve, update, maintain, backup, restore, and communicate applications and dictionary data.

The scope of this Technical Report includes consideration of standards for the management of data located on one or more computer systems, including services for distributed database management.

This Technical Report does not include within its scope common services normally provided by an operating system including those processes which are concerned with specific types of physical storage devices, specific techniques for storing data, and specific details of communications and human computer interfaces.

A data management standard defines services provided at an interface. It does not impose limitations on how processes are implemented.