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Information technology — Database languages — SQL multimedia and application packages —

Part 1:
Framework

Technologies de l'information — Langages de bases de données — Multimédia SQL et paquetages d'application —

Partie 1: Cadre général

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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.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 13249 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 13249-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This third edition cancels and replaces the second edition (ISO/IEC 13249-1:2002), which has been revised to be consistent with other parts of ISO/IEC 13249.

ISO/IEC 13249 consists of the following parts, under the general title *Information technology — Database languages — SQL multimedia and application packages*:

— *Part 1: Framework*

— *Part 2: Full-Text*

— *Part 3: Spatial*

— *Part 5: Still image*

— *Part 6: Data mining*

The following part is under preparation:

Parts other than this part of ISO/IEC 13249 specify requirements, and all are dependent on various parts of ISO/IEC 9075 and also on this part of ISO/IEC 13249.

Introduction

The purpose of ISO/IEC 13249 is to define multimedia and application specific types and their associated routines using the user-defined features in ISO/IEC 9075.

It is based on the content of ISO/IEC 9075 (all parts), *Information technology — Database languages — SQL*.

The organization of this part of ISO/IEC 13249 is as follows:

1) Clause 1, "Scope", specifies the scope of this part of ISO/IEC 13249.

2) Clause 2, "Normative references", identifies additional standards that, through reference in this part of ISO/IEC 13249, constitute provisions of this part of ISO/IEC 13249, and hence to all parts of ISO/IEC 13249.

3) Clause 3, "Terms and definitions", specifies terms and definitions used in this part of ISO/IEC 13249.

4) Clause 4, "Concepts", describes the concepts used in ISO/IEC 13249.

5) Clause 5, "Parts of ISO/IEC 13249", summarises the content of each of the parts of ISO/IEC 13249.

6) Clause 6, "Notation and conventions used in other parts", defines the notation and conventions used in other parts of ISO/IEC 13249.

7) Clause 7, "Implementation requirements", describes the requirements relating to the implementation of ISO/IEC 13249.

8) Clause 8, "Conformance", specifies the conformance requirements for all or some of the parts of ISO/IEC 13249.

9) Annex A, "ISO/IEC JTC1 formal procedures" is an informative annex. It describes the formal procedures for maintenance and interpretation of ISO/IEC 13249.

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Information technology — Database languages — SQL multimedia and application packages —

Part 1:
Framework

1 Scope

ISO/IEC 13249 defines a number of packages of generic data types common to various kinds of data used in multimedia and application areas, to enable that data to be stored and manipulated in an SQL database. The package in each subject area is defined as a part of ISO/IEC 13249.

This part of ISO/IEC 13249 defines those concepts, notations and conventions that are common to two or more other parts of ISO/IEC 13249. In particular, it describes the way ISO/IEC 9075 is used in other parts of ISO/IEC 13249 to define the user-defined types and their behaviour appropriate to each subject area.

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2 Normative references   (standards.iteh.ai)

The following referenced documents are indispensable for the application 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 9075-1, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*

ISO/IEC 9075-2, *Information technology — Database languages — SQL — Part 2: Foundation (SQL/Foundation)*

ISO/IEC 9075-11, *Information technology — Database languages — SQL — Part 11: Information and Definition Schemas (SQL/Schemata)*

3 Terms and definitions

3.1 Terms defined in ISO/IEC 9075-1

For the purposes of this document, the following terms defined in ISO/IEC 9075-1 apply.

a) compilation unit

b) data type

c) descriptor

d) identifier

e) implementation-defined

f)   implementation-dependent

g)   instance (of a value)

h)   null value

i)   row

j)   sequence

k)   SQL-environment

l)   SQL-implementation

m)   SQL-statement

n)   table

3.2   Terms defined in ISO/IEC 9075-2

For the purposes of this document, the following terms defined in ISO/IEC 9075-2 apply.

a)   assignment

b)   attribute

c)   cardinality

d)   constructor function

e)   declared type

f)   external routine

g)   mutator function

h)   observer function

i)   signature (of an SQL-invoked routine)

j)   SQL routine

k)   SQL-invoked routine

l)   subtype

m)   supertype

n)   type-preserving function

o)   user-defined type

p)   white space

3.3 Terms defined in this part of ISO/IEC 13249

For the purposes of this document, the following terms and definitions apply.

3.3.1
generic data type
kind of data not already defined in ISO/IEC 9075 that is used in a wider context than a single enterprise and for which there are advantages in standardizing the way it is represented

3.3.2
meta-variable
variable which is used to define implementation-dependent or implementation-defined constants

3.3.3
method
specific implementation of an action or transformation that a user-defined type performs or a representation of values of that type is subject to

NOTE   With such user-defined methods for structured types, an SQL-implementation allows users to extend the function of the database system in an object-oriented manner.

4   Concepts

4.1   Concepts taken from ISO/IEC 9075

The following concepts defined in ISO/IEC 9075 are used either in this part of ISO/IEC 13249 or in other parts of ISO/IEC 13249.

a)   array

b)   base table

c)   catalog

d)   character set

e)   column

f)   completion condition

g)   definition schema

h)   distinct type

i)   exception condition

j)   *False*

k)   field

l)   host language

m)   information schema

n)   maximal supertype

o)   ordering function

p)   predefined data type

q)   privilege

r)   source type

s)   SQL-agent

t)   SQL-data

u)   SQL-invoked method

Note Throughout this standard, the method is referred to SQL-invoked method.

v)   structured type

w)   subtype family

x)   transform function

y)   *True*

z)   *Unknown*

aa) user-defined cast

bb) view

4.2   Generic kinds of data

ISO/IEC 9075 defines the Database Language SQL, which is a language used to define and manipulate SQL-data. For the purposes of this part of ISO/IEC 13249, the SQL-data in an SQL-environment is referred to as an SQL database.

Using the data definition facilities of ISO/IEC 9075, an enterprise may develop an SQL database based on the kinds of data chosen for some specific purpose determined by the particular requirements of the enterprise.

Many kinds of data are used in a wider context than that of an individual enterprise, in which case there are benefits in being able to use a generic specification for the definition and manipulation of these kinds of data.

These benefits include the enabling of the following:

a)   shared understanding of this data;

b)   exchange of this data;

c)   provision of common manipulation facilities to process this data.

Recognition of these benefits has resulted in publicly available specifications for generic data types in the subject areas referred to in Clause 1,"Scope", of each part of ISO/IEC 13249.

Many enterprises have requirements to use such generic data types combined with their own enterprise-specific data types in an SQL database. These requirements include the manipulation of component elements of a generic data type, enabling both the construction and recording of user-defined types within an SQL database, and the use of these components in selection and retrieval of data from an SQL database. ISO/IEC 13249 addresses these requirements.

4.3   Use of ISO/IEC 9075

4.3.1   User-defined types and routines

ISO/IEC 9075 includes facilities for defining user-defined types. A user-defined type can be either a distinct type or a structured type. A distinct type is based on some predefined data type. A structured type has attributes specified as either SQL data types or other user-defined types. A structured type may be defined as a subtype of another structured type, with inheritance of its attributes. A user-defined type may be specified as the data type of a column of an SQL table.

A user-defined type can only be manipulated by associated routines.

An attribute has automatically an associated observer and mutator function to retrieve and change its value. Further routines may be defined in which the body of the routine, being the component that determines behaviour on invocation of the routine, is specified either by SQL statements or by reference to an external routine prepared in some other programming language.

Each part of ISO/IEC 13249 defines a number of user-defined types and associated routines, defined according to ISO/IEC 9075. The types and routines of each part are intended for use with data for a specific subject area. Each part constitutes a package that aims to satisfy the requirements for including generic data types for that subject area in an SQL database. It does not define how data from multiple subject areas may be combined.

Each user-defined type is fully defined using the SQL syntax of ISO/IEC 9075.

For each routine there is a specification of its signature, which includes its name and all parameters with their type. A routine body is specified either by SQL statements or by reference to a definition, which is given either in some formal language or as descriptive text.

The definition of a user-defined type in a part of ISO/IEC 13249 can include user-defined cast functions to convert between a value of the user-defined type and another data type.

The definition of a user-defined type in a part of ISO/IEC 13249 can include an ordering function to specify the order of two values of the user-defined type.

4.3.2   Information schema and definition schema

ISO/IEC 9075-11 defines the Information Schema and the Definition Schema for making descriptors of persistent database objects available to any application.

The Information Schema includes the descriptors of a number of schema objects including the Information Schema itself, mostly view definitions, that together allow every descriptor in that catalog to be accessed, but not changed, as though it was SQL-data. These views are defined in terms of the base tables of the Definition Schema. The only purpose of the Definition Schema is to provide a data model to support the Information Schema and to assist understanding.

Parts of ISO/IEC 13249 may define Information Schema views and corresponding Definition Schema base tables to provide information about the common manipulation facilities and data in the subject area applications. Applications can obtain information about facilities and data supported by these application packages by querying the application package's Information Schema views. SELECT privilege on all of Information Schema views may be granted to PUBLIC WITH GRANT OPTION so that they can be queried by any user and so that SELECT privilege can be further granted on views that reference these Information Schema views. Updating the data provided by these views is implementation-defined.

Parts of ISO/IEC 13249 may define additional schemas to provide a data model to support understanding of the related functions or required by an implementation of that part.   When views are provided in those schemas, these are enabled for access in the same way as any other tables. SELECT privilege on all of views in these schemas may be granted to PUBLIC so that they can be queried.