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

**Part 1:
Framework**

iTeh STANDARD PREVIEW
*Technologies de l'information — Langages de bases de données —
Multimédia SQL et paquetages d'application —
(standards.iteh.ai)
Partie 1: Cadre général*

ISO/IEC 13249-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC 13249-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Terms defined in ISO/IEC 9075-1.....	1
3.2 Terms defined in ISO/IEC 9075-2.....	2
3.3 Terms defined in this part of ISO/IEC 13249.....	2
4 Concepts	3
4.1 Concepts taken from parts of ISO/IEC 9075.....	3
4.2 Generic kinds of data and common table structures.....	4
4.3 Use of parts of ISO/IEC 9075.....	4
4.3.1 User-defined types and routines.....	4
4.3.2 Views and routines.....	5
4.3.3 Information schema and definition schema.....	5
4.4 Implementation of ISO/IEC 13249.....	6
4.5 Use of ISO/IEC 13249.....	6
4.5.1 Use of user defined types.....	6
4.5.2 Use of views.....	7
5 Parts of ISO/IEC 13249	7
6 Notations and conventions used in other parts	7
6.1 Notation.....	7
6.1.1 Notation of user-defined types and routines.....	7
6.1.2 Notation for defining a format of a value.....	8
6.1.3 Use of syntax elements defined in parts of ISO/IEC 9075.....	8
6.2 Conventions.....	9
6.2.1 Clause structure.....	9
6.2.2 Organization of specifications.....	9
6.2.3 Data type, attribute, SQL-invoked routine, and view identifiers.....	10
6.2.4 Parameter identifiers.....	10
6.2.5 Meta-variables.....	10
6.2.6 Symbols.....	10
6.2.7 Exceptions.....	10
6.2.8 Status codes.....	10
7 Implementation requirements	11
7.1 General.....	11
7.1.1 Schemas.....	11
7.1.2 USAGE privileges on user-defined types.....	11
7.1.3 UNDER privileges on user-defined types.....	11
7.1.4 EXECUTE privileges on routines.....	11
7.1.5 SELECT privilege on views.....	12
7.1.6 DELETE, INSERT, and UPDATE privilege on views.....	12
8 Conformance	12
8.1 Implementations.....	12
8.2 Relationship to other International Standards.....	13
8.3 Claim of conformance.....	13
8.4 Extensions and options.....	13
Annex A (informative) ISO/IEC JTC1 formal procedures	14

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.

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).

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. 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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 32, *Data management and interchange*.

This fourth edition cancels and replaces the third edition (ISO/IEC 13249-1:2007), which has been technically revised.

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*
- *Part 7: History*

Parts other than this part 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 this part of ISO/IEC 13249 is to define multimedia and application specific types and their associated routines using the user-defined features in parts of ISO/IEC 9075.

This document is based on the content of parts of ISO/IEC 9075, *Information technology – Database languages – SQL*.

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

- 1) [Clause 1](#) specifies the scope of this part of ISO/IEC 13249.
- 2) [Clause 2](#) identifies additional International Standards that, through reference in ISO/IEC 13249, constitute provisions of this part of ISO/IEC 13249, and hence to all parts of ISO/IEC 13249.
- 3) [Clause 3](#) specifies terms and definitions used in ISO/IEC 13249.
- 4) [Clause 4](#) describes the concepts used in ISO/IEC 13249.
- 5) [Clause 5](#) summarizes the content of each of the parts of ISO/IEC 13249.
- 6) [Clause 6](#) defines the notation and conventions used in other parts of ISO/IEC 13249.
- 7) [Clause 7](#) describes the requirements relating to the implementation of ISO/IEC 13249.
- 8) [Clause 8](#) specifies the conformance requirements for all or some of the parts of ISO/IEC 13249.
- 9) [Annex A](#) (Informative) describes the formal procedures for maintenance and interpretation of ISO/IEC 13249.

ISO/IEC 13249-1:2016
<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC 13249-1:2016

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>

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 and table structures 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 parts of ISO/IEC 9075 are used to define the user-defined types and their behaviour and views as a representation of table structures appropriate to each subject area.

2 Normative references

The following 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 9075-1, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)* (ISO/IEC 13249-1:2016)
<https://standards.iso.org/standards/info/iec/13249-1-2016>
53da9d0a17df/iso-iec-13249-1-2016

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

ISO/IEC 13249-1:2016(E)

- 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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 13249-1:2016](https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016)

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>

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 any part of 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

common table structure

set of a table name and a sequence of a column name and data type pairs of columns consisting of an SQL table that is used in a wider context than a single enterprise and for which there are advantages in standardizing the way it is represented

3.3.3**meta-variable**

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

3.3.4**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 1 to entry: With such user-defined methods for structured types, an SQL-implementation allows users to extend the function of the database system in object-oriented manner.

4 Concepts**4.1 Concepts taken from parts of ISO/IEC 9075**

The following concepts defined in parts of 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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>

<https://standards.iteh.ai/catalog/standards/sist/6cebcd2e-6f18-4dec-8de3-53da9d0a17df/iso-iec-13249-1-2016>

NOTE Throughout ISO/IEC 13249, 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 and common table structures

All parts of ISO/IEC 9075 define 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 parts 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 and common table structures in the subject areas referred to in [Clause 1](#) 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 and their own enterprise-specific tables with such common structures in an SQL database. These requirements include the manipulation of component elements of a generic data type and of a table with a common structure, enabling both the construction and recording of user-defined types and of rows of tables 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 parts of ISO/IEC 9075

4.3.1 User-defined types and routines

Parts of ISO/IEC 9075 include 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 parts of 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 parts 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 Views and routines

ISO/IEC 9075-2 includes facilities for defining viewed tables which are derived from one or more base tables or other viewed tables. A viewed table is also called simply a view.

ISO/IEC 13249 (all parts) can define views and base tables, which derive those views, for making descriptors of persistent database objects with common table structures in the subject area. The only purpose of defining the base tables is to provide a data model to support their deriving views and to assist understanding.

Each view and base table is fully defined using SQL syntax of ISO/IEC 9075-2. The definition of a base table includes its table name, a sequence of name and data type pairs of columns, and optional constraints. The definition of a view includes its table name, a sequence of column names, and a query expression which derives the view from base tables. The data types of columns of a view are derived from those of columns of base tables in the query expression.

ISO/IEC 13249 (all parts) can also define routines for manipulating rows of the views. For each routine there is a specification of its signature, which includes its routine name and a sequence of name and data type pairs of parameters. 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.

4.3.3 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.

ISO/IEC 13249 (all parts) 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.