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**Information technology — Database  
languages — SQL —**

**Part 4:  
Persistent stored modules (SQL/PSM)**

*Technologies de l'information — Langages de base de données —  
SQL —*

*Partie 4: Modules stockés persistants (SQL/PSM)*

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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.

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](http://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](http://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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

This sixth edition of ISO/IEC 9075-4 cancels and replaces the fifth edition (ISO/IEC 9075-4:2011), which has been technically revised.

A list of all parts in the ISO/IEC 9075 series, published under the general title *Information technology — Database languages — SQL*, can be found on the ISO website.

NOTE The individual parts of multi-part standards are not necessarily published together. New editions of one or more parts can be published without publication of new editions of other parts.

## Introduction

The organization of this part of ISO/IEC 9075 is as follows:

- 1) **Clause 1, “Scope”**, specifies the scope of this part of ISO/IEC 9075.
- 2) **Clause 2, “Normative references”**, identifies additional standards that, through reference in this part of ISO/IEC 9075, constitute provisions of this part of ISO/IEC 9075.
- 3) **Clause 3, “Definitions, notations, and conventions”**, defines the notations and conventions used in this part of ISO/IEC 9075.
- 4) **Clause 4, “Concepts”**, presents concepts used in the definition of persistent stored modules.
- 5) **Clause 5, “Lexical elements”**, defines a number of lexical elements used in the definition of persistent stored modules.
- 6) **Clause 6, “Scalar expressions”**, defines a number of scalar expressions used in the definition of persistent stored modules.
- 7) **Clause 7, “Query expressions”**, defines the elements of the language that produce rows and tables of data as used in persistent stored modules.
- 8) **Clause 9, “Additional common elements”**, defines additional common elements used in the definition of persistent stored modules.
- 9) **Clause 10, “Schema definition and manipulation”**, defines the schema definition and manipulation statements associated with the definition of persistent stored modules.
- 10) **Clause 11, “Access control”**, defines facilities for controlling access to SQL-data.
- 11) **Clause 12, “SQL-client modules”**, defines the facilities for using persistent stored modules.
- 12) **Clause 13, “Data manipulation”**, defines data manipulation operations associated with persistent stored modules.
- 13) **Clause 14, “Additional data manipulation rules”**, defines additional rules for data manipulation.
- 14) **Clause 15, “Control statements”**, defines the control statements used with persistent stored modules.
- 15) **Clause 16, “Dynamic SQL”**, defines the facilities for executing SQL-statements dynamically in the context of persistent stored modules.
- 16) **Clause 17, “Embedded SQL”**, defines the host language embeddings.
- 17) **Clause 18, “Diagnostics management”**, defines enhancements to the facilities used with persistent stored modules.
- 18) **Clause 19, “Information Schema”**, defines the Information and Definition Schema objects associated with persistent stored modules.
- 19) **Clause 20, “Definition Schema”**, defines base tables on which the viewed tables containing schema information depend.
- 20) **Clause 21, “Status codes”**, defines SQLSTATE values related to persistent stored modules.

- 21) **Clause 22, “Conformance”**, defines the criteria for conformance to this part of ISO/IEC 9075.
- 22) **Annex A, “SQL Conformance Summary”**, is an informative Annex. It summarizes the conformance requirements of the SQL language.
- 23) **Annex B, “Implementation-defined elements”**, is an informative Annex. It lists those features for which the body of this part of ISO/IEC 9075 states that the syntax, the meaning, the returned results, the effect on SQL-data and/or schemas, or any other behavior is partly or wholly implementation-defined.
- 24) **Annex C, “Implementation-dependent elements”**, is an informative Annex. It lists those features for which the body of this part of ISO/IEC 9075 states that the syntax, the meaning, the returned results, the effect on SQL-data and/or schemas, or any other behavior is partly or wholly implementation-dependent.
- 25) **Annex D, “Deprecated features”**, is an informative Annex. It lists features that the responsible Technical Committee intend will not appear in a future revised version of this part of ISO/IEC 9075.
- 26) **Annex E, “Incompatibilities with ISO/IEC 9075:2011”**, is an informative Annex. It lists incompatibilities with the previous version of this part of ISO/IEC 9075.
- 27) **Annex F, “SQL feature taxonomy”**, is an informative Annex. It identifies features of the SQL language specified in this part of ISO/IEC 9075 by an identifier and a short descriptive name. This taxonomy is used to specify conformance.
- 28) **Annex G, “Defect reports not addressed in this edition of this part of ISO/IEC 9075”**, is an informative Annex. It describes the Defect Reports that were known at the time of publication of this part of this International Standard. Each of these problems is a problem carried forward from the previous edition of ISO/IEC 9075. No new problems have been created in the drafting of this edition of this International Standard.

In the text of this part of ISO/IEC 9075, Clauses and Annexes begin new odd-numbered pages, and in **Clause 5, “Lexical elements”**, through **Clause 22, “Conformance”**, Subclauses begin new pages. Any resulting blank space is not significant.

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## Information technology — Database languages — SQL —

Part 4:

### Persistent Stored Modules (SQL/PSM)

#### 1 Scope

This part of International Standard ISO/IEC 9075 specifies the syntax and semantics of a database language for declaring and maintaining persistent database language routines in SQL-server modules.

The database language for <externally-invoked procedure>s and <SQL-invoked routine>s includes:

- The specification of statements to direct the flow of control.
- The assignment of the result of expressions to variables and parameters.
- The specification of condition handlers that allow SQL-invoked routines to deal with various conditions that arise during their execution.
- The specification of statements to signal and resignal conditions.
- The declaration of standing SQL-server cursors.
- The declaration of local variables.

It also includes the definition of the Information Schema tables that contain schema information pertaining to SQL-server modules and SQL-invoked routines.

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## 2 Normative references

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.

### 2.1 ISO and IEC standards

[ISO9075-1] ISO/IEC 9075-1:2016, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*.

[ISO9075-2] ISO/IEC 9075-2:2016, *Information technology — Database languages — SQL — Part 2: Foundation (SQL/Foundation)*.

[ISO9075-11] ISO/IEC 9075-11:2016, *Information technology — Database languages — SQL — Part 11: Information and Definition Schemas (SQL/Schemata)*.

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