INTERNATIONAL STANDARD

ISO/IEC 9075

Third edition
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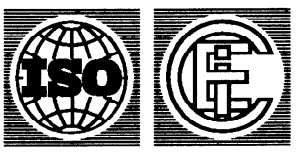
Information technology — Database languages — SQL

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



Reference number
ISO/IEC 9075:1992(E)

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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. 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.

International Standard ISO/IEC 9075 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology.*

This third edition cancels and replaces the second edition (ISO 9075:1989), which has been technically revised.

Annexes A, B, C, D, E and F of this International Standard are for information only.

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Introduction

This International Standard was approved in 1992.

This International Standard was developed from ISO/IEC 9075:1989, Information Systems, Database Language SQL with Integrity Enhancements, and replaces that International Standard. It adds significant new features and capabilities to the specifications. It is generally compatible with ISO/IEC 9075:1989, in the sense that, with very few exceptions, SQL language that conforms to ISO/IEC 9075:1989 also conforms to this International Standard, and will be treated in the same way by an implementation of this International Standard as it would by an implementation of ISO/IEC 9075:1989. The known incompatibilities between ISO/IEC 9075:1989 and this International Standard are stated in informative Annex E, "Incompatibilities with ISO/IEC 9075:1989".

Technical changes between ISO/IEC 9075:1989 and this International Standard include both improvements or enhancements to existing features and the definition of new features. Significant improvements in existing features include:

— A better definition of direct invocation of SQL language;

— Improved diagnostic capabilities, especially a new status parameter (SQLSTATE), a diagnostics area, and supporting statements.

Significant new features are:

1) Support for additional data types (DATE, TIME, TIMESTAMP, INTERVAL, BIT string, variable-length character and bit strings, and NATIONAL CHARACTER strings),

2) Support for character sets beyond that required to express SQL language itself and support for additional collations,

3) Support for additional scalar operations, such as string operations for concatenate and substring, date and time operations, and a form for conditional expressions,

4) Increased generality and orthogonality in the use of scalar-valued and table-valued query expressions,

5) Additional set operators (for example, union join, natural join, set difference, and set intersection),

6) Capability for domain definitions in the schema,

7) Support for Schema Manipulation capabilities (especially DROP and ALTER statements),

8) Support for bindings (modules and embedded syntax) in the Ada, C, and MUMPS languages,

9) Additional privilege capabilities,

10) Additional referential integrity facilities, including referential actions, subqueries in CHECK constraints, separate assertions, and user-controlled deferral of constraints,

11) Definition of an Information Schema,

12) Support for dynamic execution of SQL language,

13) Support for certain facilities required for Remote Database Access (especially connection management statements and qualified schema names),

14) Support for temporary tables,

15) Support for transaction consistency levels,

16) Support for data type conversions (CAST expressions among data types),

17) Support for scrolled cursors, and

18) A requirement for a flagging capability to aid in portability of application programs.

The organization of this International Standard is as follows:

1) Clause 1, "Scope", specifies the scope of this International Standard.

2) Clause 2, "Normative references", identifies additional standards that, through reference in this International Standard, constitute provisions of this International Standard.

3) Clause 3, "Definitions, notations, and conventions", defines the notations and conventions used in this International Standard.

4) Clause 4, "Concepts", presents concepts used in the definition of SQL.

5) Clause 5, "Lexical elements", defines the lexical elements of the language.

6) Clause 6, "Scalar expressions", defines the elements of the language that produce scalar values.

7) Clause 7, "Query expressions", defines the elements of the language that produce rows and tables of data.

8) Clause 8, "Predicates", defines the predicates of the language.

9) Clause 9, "Data assignment rules", specifies the rules for assignments that retrieve data from or store data into the database, and formation rules for set operations.

10) Clause 10, "Additional common elements", defines additional language elements that are used in various parts of the language.

11) Clause 11, "Schema definition and manipulation", defines facilities for creating and managing a schema.

12) Clause 12, "Module", defines modules and procedures.

13) Clause 13, "Data manipulation", defines the data manipulation statements.

14) Clause 14, "Transaction management", defines the SQL-transaction management statements.

15) Clause 15, "Connection management" defines the SQL-connection management statements.

16) Clause 16, "Session management", defines the SQL-session management statements.

17) Clause 17, "Dynamic SQL", defines the facilities for executing SQL-statements dynamically.

18) Clause 18, "Diagnostics management", defines the diagnostics management facilities.

19) Clause 19, "Embedded SQL", defines syntax for embedding SQL in certain standard programming languages.

20) Clause 20, "Direct invocation of SQL", defines the direct invocation of SQL language.

21) Clause 21, "Information Schema and Definition Schema", defines viewed tables that contain schema information.

22) Clause 22, "Status codes", defines values that identify the status of the execution of SQL-statements and the mechanisms by which those values are returned.

23) Clause 23, "Conformance", defines the criteria for conformance to this International standard.

24) Annex A, "Leveling the SQL Language", is an informative Annex. It lists the leveling rules defining the Entry SQL and Intermediate SQL subset levels of the SQL language.

25) Annex B, "Implementation-defined elements", is an informative Annex. It lists those features for which the body of the International Standard states that the syntax or meaning or effect on the database is partly or wholly implementation-defined, and describes the defining information that an implementor shall provide in each case.

26) Annex C, "Implementation-dependent elements", is an informative Annex. It lists those features for which the body of the International Standard states explicitly that the meaning or effect on the database is implementation-dependent.

27) Annex D, "Deprecated features", is an informative Annex. It lists features that the responsible Technical Committee intends will not appear in a future revised version of this International Standard.

28) Annex E, "Incompatibilities with ISO/IEC 9075:1989", is an informative Annex. It lists the incompatibilities between this version of this International Standard and ISO/IEC 9075:1989.

29) Annex F, "Maintenance and interpretation of SQL", is an informative Annex. It identifies SQL interpretations and corrections that have been processed by ISO/IEC JTC1/SC21 since adoption of ISO/IEC 9075:1989.

In the text of this International Standard, Clauses begin a new odd-numbered page, and in Clause 5, "Lexical elements", through Clause 22, "Status codes", Subclauses begin a new page. Any resulting blank space is not significant.