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

Part 13:

**SQL Routines and Types Using the Java™
Programming Language (SQL/JRT)**

iTeh STANDARD PREVIEW

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

*Partie 13: Routines et types utilisant le langage de programmation Java™
(SQL/JRT)*

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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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 3.

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 9075 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 9075-13 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

ISO/IEC 9075 consists of the following parts under the general title *Information technology — Database languages — SQL*:

- *Part 1: Framework (SQL/Framework)* [ISO/IEC 9075-13:2002](https://standards.iteh.ai/catalog/standards/sist/23a55bed-cc11-45f-adc9-b90268dc389f/iso-iec-9075-13-2002)
- *Part 2: Foundation (SQL/Foundation)*
- *Part 3: Call-Level Interface (SQL/CLI)*
- *Part 4: Persistent Stored Modules (SQL/PSM)*
- *Part 5: Host Language Bindings (SQL/Bindings)*
- *Part 9: Management of External Data (SQL/MED)*
- *Part 10: Object Language Bindings (SQL/OLB)*
- *Part 11: Information and definition schemas (SQL/Schemata)*
- *Part 13: SQL Routines and Types Using the Java™ Programming Language (SQL/JRT)*

Annexes A, B, C, D, E, F and G of this part of ISO/IEC 9075 are for information only.

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 Java routines and types.
- 5) Clause 5, “Lexical elements”, defines a number of lexical elements used in the definition of Java routines and types.
- 6) Clause 6, “Scalar expressions”, defines the elements of the language that produce scalar values.
- 7) Clause 7, “Predicates”, defines the predicates of the language.
- 8) Clause 8, “Additional common elements”, defines additional language elements that are used in various parts of the language.
- 9) Clause 9, “Schema definition and manipulation”, defines the schema definition and manipulation statements associated with the definition of Java routines and types.
- 10) Clause 10, “Access control”, defines facilities for controlling access to SQL-data.
- 11) Clause 11, “Built-in procedures”, defines new built-in procedures used in the definition of Java routines and types.
- 12) Clause 12, “Java topics”, defines the facilities supported by implementations of this part of ISO/IEC 9075 and the conventions used in deployment descriptor files.
- 13) Clause 13, “Information Schema”, defines viewed tables that contain schema information.
- 14) Clause 14, “Definition Schema”, defines base tables on which the viewed tables containing schema information depend.
- 15) Clause 15, “Status codes”, defines SQLSTATE values related to Java routines and types.
- 16) Clause 16, “Conformance”, defines the criteria for conformance to this part of ISO/IEC 9075.
- 17) Annex A, “SQL Conformance Summary”, is an informative Annex. It summarizes the conformance requirements of the SQL language.
- 18) 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.

- 19) 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.
- 20) Annex D, “SQL Feature Taxonomy”, is an informative Annex. It identifies features of the SQL language specified in this part of ISO/IEC 9075 by a numeric identifier and a short descriptive name. This taxonomy is used to specify conformance to Core SQL and may be used to develop other profiles involving the SQL language.
- 21) Annex E, “Routines tutorial”, is an informative Annex. It provides a tutorial on using the features defined in this part of ISO/IEC 9075 for defining and using SQL-invoked routines based on Java static methods.
- 22) Annex F, “Types tutorial”, is an informative Annex. It provides a tutorial on using the features defined in this part of ISO/IEC 9075 for defining and using SQL structured types based on Java classes.
- 23) Annex G, “Incompatibilities with ANSI NCITS 331”, is an informative Annex. It lists the incompatibilities between this edition of this part of ISO/IEC 9075 and NCITS 331.1 and NCITS 331.2.

In the text of this part of ISO/IEC 9075, Clauses begin a new odd-numbered page, and in Clause 5, “Lexical elements”, through Clause 16, “Conformance”, Subclauses begin a new page. Any resulting blank space is not significant.

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Information technology — Database languages — SQL —

Part 13: SQL Routines and Types Using the Java™ Programming Language (SQL/JRT)

1 Scope

This part of International Standard ISO/IEC 9075 specifies the ability to invoke static methods written in the Java™ programming language as SQL-invoked routines and to use classes defined in the Java programming language as SQL structured user-defined types. (Java is a registered trademark of Sun Microsystems, Inc.)

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2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9075. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 9075 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

2.1 JTC 1 standards

ISO 8824-1:1998, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO/IEC 9075-1:1999, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*

ISO/IEC 9075-2:1999, *Information technology — Database languages — SQL — Part 2: Foundation (SQL/Foundation)*

ISO/IEC 9075-5:1999, *Information technology — Database languages — SQL — Part 5: Host Language Bindings (SQL/Bindings)*

ISO/IEC 9075-10:2000, *Information technology — Database languages — SQL — Part 10: Object Language Bindings (SQL/OLB)*

2.2 Publicly-available specifications

The Java Language Specification, Second Edition, Bill Joy (Editor), Guy Steele, James Gosling, and Gilad Bracha, Addison-Wesley, 2000, ISBN 0-201-31008-2.

The Java Virtual Machine Specification, Second Edition, Tim Lindholm and Frank Yellin, Addison-Wesley, 1999, ISBN 0-201-43294-3.

Java 2 Platform, Standard Edition, v1.2.2, API Specification,
<http://web2.java.sun.com/products/jdk/1.2/docs/api/>.

Java Object Serialization Specification,
<http://web2.java.sun.com/products/jdk/1.2/docs/guide/serialization/spec/serialTOC.doc.html>.

The JavaBeans™ 1.01 Specification,
<http://java.sun.com/products/javabeans/docs/spec.html>.

ISO/IEC 9075-13:2002 (E)

2.2 Publicly-available specifications

JDBC™ 2.0 API, Version 1.0, Seth White & Mark Hapner, Sun Microsystems, Inc., 30 May, 1999.

JDBC 2.0 Standard Extension API, Version 1.0, Seth White & Mark Hapner, Sun Microsystems, Inc., 7 December, 1998.

JDBC API Tutorial and Reference, Second Edition: Universal Data Access for the Java 2 Platform, Seth White, Maydene Fisher, Rick Cattell, Graham Hamilton, and Mark Hapner, Addison Wesley, Reading MA, 1999, ISBN 0-201-43328-1.

W3C Architecture domain: Naming and Addressing (URLs),
<http://www.w3.org/Addressing/Activity.html>.

RFC 1738, *Uniform Resource Locators (URL)*, T. Berners-Lee, L. Maxinter, M. McCahill, December, 1994.

RFC 1808, *Relative Uniform Resource Locators*, R. Fielding, June, 1995.

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3 Definitions, notations, and conventions

3.1 Definitions

3.1.1 Definitions provided in Part 13

Insert this paragraph For the purposes of this part of ISO/IEC 9075, the definitions given in ISO/IEC 9075-1, ISO/IEC 9075-2, ISO/IEC 9075-5, and ISO/IEC 9075-10, and the following definitions, apply.

- a) **class file:** A file containing the compiled byte code for a Java class.
- b) **default connection:** a JDBC connection to the current SQL-implementation, SQL-session, and SQL-transaction established with the data source URL 'jdbc:default:connection'.
- c) **deployment descriptor:** one or more SQL-statements that specify <install actions> and <remove actions> to be taken, respectively, by the SQLJ.INSTALL_JAR and SQLJ.REMOVE_JAR procedures and that are contained in a *deployment descriptor file*. For example, when a JAR is installed, one or more <SQL-invoked routine>s that specify LANGUAGE JAVA and either PROCEDURE or FUNCTION and the associated <grant privilege statement>s can be specified in the deployment descriptor and executed as part of the install process.
- d) **deployment descriptor file:** a file containing deployment descriptors that is contained in a JAR, for which the JAR's manifest entry, as described by the java.util.jar section of *Java 2 Platform, Standard Edition, v1.2.2, API Specification*, specifies SQLJDeploymentDescriptor: TRUE.
<https://standards.iteh.ai/catalog/standards/sist/23a55bed-cc11-4f5f-adc9-b90268dc389f/iso-iec-9075-13-2002>
- e) **external Java data type:** an SQL user-defined type defined with a <user-defined type definition> that specifies an <external Java type clause>.
- f) **external Java routine:** an external routine defined with an <SQL-invoked routine> that specifies LANGUAGE JAVA and either PROCEDURE or FUNCTION, or defined with a <user-defined type definition> that specifies an <external Java type clause>.
- g) **installed JAR:** a JAR whose existence has been registered with the SQL-environment and whose contents have been copied into that SQL-environment due to execution of one of the procedures SQLJ.INSTALL_JAR and SQLJ.REPLACE_JAR.
- h) **Java Archive (JAR):** a zip formatted file, as described by the java.util.zip section of *Java 2 Platform, Standard Edition, v1.2.2, API Specification*, containing zero or more Java class and ser files, and zero or more deployment descriptor files. JARs are a normal vehicle for distributing Java programs and the mechanism specified by this International Standard to provide the implementation of external Java routines and external Java data types to an SQL-environment.
- i) **JVM:** A Java Virtual Machine, as defined by *The Java Virtual Machine Specification, Second Edition*.
- j) **ser file:** A file containing representations of Java objects in the form defined in *Java Object Serialization Specification*.