

# ISO/IEC 9075-1:2008-07 (E)

## Information technology\_ - Database languages\_ - SQL\_ - Part\_1: Framework (SQL/Framework)

---

<b>Contents</b>		<b>Page</b>
Foreword .....		ix
Introduction .....		x
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>3</b>
2.1	ISO and IEC standards .....	3
<b>3</b>	<b>Definitions and use of terms .....</b>	<b>5</b>
3.1	Definitions .....	5
3.1.1	Definitions provided in this standard .....	5
3.2	Use of terms .....	6
3.3	Informative elements .....	7
<b>4</b>	<b>Concepts .....</b>	<b>9</b>
4.1	Caveat .....	9
4.2	SQL-environments and their components .....	9
4.2.1	SQL-environments .....	9
4.2.2	SQL-agents .....	9
4.2.3	SQL-implementations .....	10
4.2.3.1	SQL-clients .....	10
4.2.3.2	SQL-servers .....	10
4.2.4	SQL-client modules .....	10
4.2.5	User identifiers .....	11
4.2.6	Roles .....	11
4.2.7	User mapping concepts .....	11
4.2.8	Routine mapping concepts .....	11
4.2.9	Catalogs and schemas .....	11
4.2.9.1	Catalogs .....	11
4.2.9.2	SQL-schemas .....	12
4.2.9.3	The Information Schema .....	12
4.2.9.4	The Definition Schema .....	12
4.2.10	Foreign servers and descriptors .....	12
4.2.11	Foreign-data wrappers and descriptors .....	13
4.2.12	SQL-data .....	13
4.3	Tables .....	13
4.4	SQL data types .....	14
4.4.1	General data type information .....	14
4.4.2	The null value .....	14
4.4.3	Predefined types .....	15
4.4.3.1	Numeric types .....	15
4.4.3.2	Character string types .....	15
4.4.3.3	Binary string types .....	15
4.4.3.4	Boolean type .....	15
4.4.3.5	Datetime types .....	16
4.4.3.6	Interval types .....	16
4.4.3.7	XML type .....	16
4.4.4	Constructed atomic types .....	16
4.4.4.1	Reference types .....	16
4.4.5	Constructed composite types .....	17
4.4.5.1	Collection types .....	17

4.4.5.2	Row types .....	17
4.4.5.3	Fields .....	17
4.5	Sites and operations on sites .....	17
4.5.1	Sites .....	17
4.5.2	Assignment .....	18
4.5.3	Nullability .....	18
4.6	SQL-schema objects .....	18
4.6.1	General SQL-schema object information .....	18
4.6.2	Descriptors relating to character sets .....	19
4.6.2.1	Character sets .....	19
4.6.2.2	Collations .....	19
4.6.2.3	Transliterations .....	19
4.6.3	Domains and their components .....	20
4.6.3.1	Domains .....	20
4.6.3.2	Domain constraints .....	20
4.6.4	User-defined types .....	20
4.6.4.1	Structured types .....	20
4.6.4.2	Distinct types .....	21
4.6.5	Base tables and their components .....	21
4.6.5.1	Base tables .....	21
4.6.5.2	Columns .....	21
4.6.5.3	Table constraints .....	21
4.6.5.4	Triggers .....	22
4.6.6	View definitions .....	22
4.6.7	Assertions .....	22
4.6.8	SQL-server modules (defined in [ISO9075-4]) .....	22
4.6.9	Schema routines .....	22
4.6.10	Sequence generators .....	23
4.6.11	Privileges .....	23
4.7	Integrity constraints and constraint checking .....	23
4.7.1	Constraint checking .....	23
4.7.2	Determinism and constraints .....	24
4.8	Communication between an SQL-agent and an SQL-server .....	24
4.8.1	Host languages .....	24
4.8.2	Parameter passing and data type correspondences .....	25
4.8.2.1	General parameter passing and data type correspondence information .....	25
4.8.2.2	Data type correspondences .....	25
4.8.2.3	Locators .....	25
4.8.2.4	Status parameters .....	25
4.8.2.5	Indicator parameters .....	26
4.8.3	Descriptor areas .....	26
4.8.4	Diagnostic information .....	26
4.8.5	SQL-transactions .....	26
4.9	Modules .....	27
4.10	Routines .....	27
4.10.1	General routine information .....	27
4.10.2	Type preserving functions .....	28
4.11	SQL-statements .....	29
4.11.1	Classes of SQL-statements .....	29
4.11.2	SQL-statements classified by function .....	29
5	The parts of ISO/IEC 9075 .....	31
5.1	Overview .....	31
5.2	ISO/IEC 9075-1: Framework (SQL/Framework) .....	31
5.3	ISO/IEC 9075-2: Foundation (SQL/Foundation) .....	32
5.3.1	Data types specified in [ISO9075-2] .....	32
5.3.2	Tables .....	32
5.3.3	Bindings methods .....	32
5.3.3.1	Embedded SQL .....	32
5.3.3.2	Dynamic SQL .....	32
5.3.3.3	Direct invocation of SQL .....	33
5.3.4	SQL-statements specified in [ISO9075-2] .....	33

5.4	ISO/IEC 9075-3: Call Level Interface (SQL/CLI) .....	34
5.5	ISO/IEC 9075-4: Persistent Stored Modules (SQL/PSM) .....	34
5.5.1	SQL-statements specified in [ISO9075-4] .....	35
5.6	ISO/IEC 9075-9: Management of External Data (SQL/MED) .....	35
5.7	ISO/IEC 9075-10: Object Language Bindings (SQL/OLB) .....	35
5.8	ISO/IEC 9075-11: Information and Definition Schemas (SQL/Schemata) .....	35
5.9	ISO/IEC 9075-13: Java Routines & Types Using the Java Programming Language (SQL/JRT) .....	36
5.10	ISO/IEC 9075-14: XML-Related Specifications (SQL/XML) .....	36
6	Notation and conventions used in other parts of ISO/IEC 9075 .....	37
6.1	Notation taken from [ISO10646] .....	37
6.2	Notation provided in this International Standard .....	37
6.3	Conventions .....	39
6.3.1	Specification of syntactic elements .....	39
6.3.2	Specification of the Information and Definition Schemata .....	39
6.3.3	Use of terms .....	40
6.3.3.1	Syntactic containment .....	40
6.3.3.2	Terms denoting rule requirements .....	41
6.3.3.3	Rule evaluation order .....	41
6.3.3.4	Conditional rules .....	42
6.3.3.5	Syntactic substitution .....	42
6.3.3.6	Other terms .....	43
6.3.3.7	Exceptions .....	43
6.3.3.8	General Rules not terminated on exception conditions .....	44
6.3.4	Descriptors .....	44
6.3.5	Relationships of parts within ISO/IEC 9075 .....	45
6.3.5.1	New and modified Clauses, Subclauses, and Annexes .....	45
6.3.5.2	New and modified tables and figures .....	47
6.3.5.3	Functions .....	47
6.3.5.4	New and modified Format items .....	47
6.3.5.5	New and modified paragraphs and rules .....	48
6.3.5.6	Modified annexes .....	49
6.3.6	Subclauses used as subroutines .....	49
6.3.7	Index typography .....	50
6.3.8	Feature ID and Feature Name .....	50
7	Annexes to the parts of ISO/IEC 9075 .....	53
7.1	SQL conformance summary .....	53
7.2	Implementation-defined elements .....	53
7.3	Implementation-dependent elements .....	53
7.4	Deprecated features .....	53
7.5	Incompatibilities with previous versions .....	53
7.6	SQL feature taxonomy .....	54
8	Conformance .....	55
8.1	Minimum conformance .....	55
8.2	Conformance to parts .....	55
8.3	Conformance to features .....	55
8.4	Conformance to SQL packages .....	56
8.4.1	Enhanced datetime facilities .....	57
8.4.2	Enhanced integrity management .....	57
8.4.3	PSM .....	57
8.4.4	Basic object support .....	58
8.4.5	Enhanced object support .....	58
8.4.6	Active database .....	58
8.4.7	OLAP .....	59
8.4.8	Extensions and options .....	59
8.5	SQL flagger .....	59
8.6	Claims of conformance .....	61
8.6.1	Requirements for SQL applications .....	61
8.6.2	Requirements for SQL-implementations .....	61

<b>Annex A Maintenance and interpretation of SQL (informative)</b> .....	<b>63</b>
<b>Annex B Implementation-defined elements (informative)</b> .....	<b>65</b>
<b>Annex C Implementation-dependent elements (informative)</b> .....	<b>67</b>
<b>Annex D Deprecated features (informative)</b> .....	<b>69</b>
<b>Annex E Incompatibilities with ISO/IEC 9075:2003 (informative)</b> .....	<b>71</b>
<b>Annex F SQL feature taxonomy (informative)</b> .....	<b>73</b>
<b>Annex G Defect reports not addressed in this edition of this part of ISO/IEC 9075 (informative)</b> .....	<b>75</b>
<b>Bibliography</b> .....	<b>77</b>
<b>Index</b> .....	<b>79</b>

## **Table**

**Page**

1	Relationships between externally-invoked and SQL-invoked routines. ....	28
2	Symbols used in BNF. ....	37
3	SQL Packages. ....	56
4	Feature taxonomy for optional features. ....	73