
**Information technology database
languages — SQL technical reports —
Part 8:
Multi-dimensional arrays (SQL/MDA)**

Langages de base de données IT — SQL rapport techniques —

Partie 8: Tableaux multidimensionnels

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Contents

Page

Foreword.....	vii
Introduction.....	viii
1 Scope.....	1
2 Normative references.....	3
3 Terms and definitions.....	5
4 Multidimensional Arrays (MDA) concepts.....	7
4.1 Concept.....	7
4.2 Why consider support for MDA in SQL?.....	7
4.3 Array representations.....	9
4.4 Use cases for MDA support in SQL.....	9
4.4.1 The use cases.....	9
4.4.2 Array data ingestion and storage.....	9
4.4.3 Integrated querying of array and relational data.....	10
4.4.4 Updating stored array data.....	10
4.4.5 Exporting arrays.....	10
4.5 Non-Use cases: Direct access to external array data.....	10
5 SQL/MDA data model.....	11
5.1 Data model concepts.....	11
5.2 MD-array.....	11
5.3 MD-array type definition.....	12
5.3.1 Type definition concepts.....	12
5.3.2 Element type.....	12
5.3.3 MD-dimension.....	13
5.3.4 MD-axis names.....	13
5.3.5 MD-axis lower and upper limits.....	13
5.3.6 Putting it all together.....	14
5.4 MD-array creation.....	16
5.4.1 MD-array creation concepts.....	16
5.4.2 Explicit element enumeration.....	17
5.4.3 From SQL table query result.....	18
5.4.4 Construction by implicit iteration.....	19
5.4.5 Decoding a format-encoded array.....	20
5.5 MD-array updating.....	21
5.5.1 MD-array updating introduction.....	21
5.5.2 Updating MD-arrays of equal MD-dimension.....	22
5.5.3 Updating MD-arrays of greater MD-dimension.....	23
5.5.4 Updating a single element of an MD-array.....	24
5.6 Exporting MD-arrays.....	24

5.6.1	Encoding to a data format.	24
5.6.2	Converting to an SQL table.	26
6	SQL/MDA operations.	29
6.1	Introduction to SQL/MDA operations.	29
6.2	MD-extent probing operators.	29
6.3	MD-array element reference.	31
6.4	MD-extent modifying operations.	32
6.4.1	Introduction to MDE-extent modifying operations.	32
6.4.2	Subsetting.	32
6.4.3	Reshaping.	34
6.4.4	Shifting.	36
6.4.5	MD-axis renaming.	36
6.5	MD-array deriving operators.	37
6.5.1	Introduction to MD-array deriving operators.	37
6.5.2	Scaling.	37
6.5.3	Concatenation.	39
6.5.4	Induced operations.	39
6.5.5	Join MD-arrays on their coordinates.	46
6.6	MD-array aggregation.	47
6.6.1	General aggregation expression.	47
6.6.2	Shorthand aggregation functions.	48
7	Remote sensing example.	51
7.1	Introduction to remote sensing example.	51
7.2	Data setup.	51
7.3	Band math.	53
7.3.1	Introduction to band math.	53
7.3.2	NDVI.	53
7.3.3	Band Swapping.	56
7.4	Histograms.	57
7.5	Change detection.	58
7.6	Extracting features.	59
7.7	Data search and filtering.	60
	Bibliography.	63
	Index.	65

Tables

Table	Page
1 Examples of MD-array type definitions.	15
2 Examples of MD-arrays constructed by element enumeration.	18
3 Examples of MD-arrays created with the constructor by iteration.	20
4 Examples of MD-arrays created from JSON-encoded arrays.	21
5 Examples of MD-arrays encoded to JSON arrays.	25
6 Result of example UNNEST query.	26
7 Result of example UNNEST query specifying WITH ORDINALITY.	27
8 Examples with MD-extent probing functions.	30
9 Result of MDEXTENT(kernel).	30
10 Result of MDEXTENT_MAX(kernel).	30
11 Examples of referencing a single element in an MD-array.	31
12 Examples of MD-array subsetting.	34
13 Examples of MD-extent reshaping.	35
14 Examples of MD-extent shifting.	36
15 Examples of MD-axis renaming.	37
16 Interpolation methods defined in ISO 19123:2005.	38
17 Examples of MD-array concatenation.	39
18 Examples of induced function application to MD-arrays.	42
19 Operations corresponding to the <md-array value expression> grammar rules.	44
20 Examples of induced MD-array expressions.	44
21 Example of induced MD-array casting.	45
22 Examples of induced CASE expression.	45
23 Examples of MDJOIN.	47
24 Identity elements for the <md-array aggregation operator>s.	47
25 Examples of general MD-array aggregation.	48
26 Predefined aggregation operators.	49
27 Landsat TM bands.	51

Figures

Figure	Page
1 Aerial greyscale image of size 1024x1024 (San Diego).	8
2 Relationships between MDA and SQL/MDA.	11
3 The structure of an MD-array value illustrated on a sample 3x3 array.	12
4 Placement of satellite images of each country on a world map (from Geographic Bounding Boxes).	14
5 Example of an SQL table that corresponds to a 3x3 MD-array.	19
6 Example of an SQL table converted to a 3x3 MD-array with MD-extent [i(-1:1), j(-1:1)].	19
7 Example of array update.	23
8 Updating a 3-D MD-array with a 2-D source MD-array.	24
9 MD-array subsetting examples.	32
10 MD-array reshaping example.	35
11 MD-array shifting example.	36
12 MD-array scaling example.	37
13 Concatenation examples.	39
14 Example of summing two MD-arrays.	40
15 Colorized array.	46
16 Visible color (RGB) bands of a Landsat TM scene.	52
17 NDVI result stretched to the range (0,255).	54
18 NDVI values between 0.2 and 0.4 shown in white, while everything else is black.	55
19 Color-mapped NDVI result, from dark blue, through grey, to dark green.	56
20 False color image constructed from the near IR, red and green bands.	57
21 Histogram of the NDVI index of a Landsat TM scene.	58
22 A composite image with an NDVI index from different years in each channel.	59
23 Natural RGB color of barrier islands area.	60
24 Binary image showing isolated islands.	60

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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.

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), or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

A list of all parts in the ISO/IEC 19075 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

NOTE 1 — The individual parts of multi-part standards are not necessarily published together. New editions of one or more parts may be published without publication of new editions of other parts.

Introduction

This Technical Report describes the definition and use of multi-dimensional arrays in SQL. Multidimensional arrays represent a core underlying structure of manifold science and engineering data. It is generally recognized today, therefore, that arrays have an essential role in Big Data and should become an integral part of the overall data type orchestration in information systems. This Technical Report discusses the syntax and semantics of operations on the MD-array data type defined in [ISO/IEC 9075-15](#).

The organization of this Technical Report is as follows:

- 1) [Clause 1, “Scope”](#), specifies the scope of this Technical Report.
- 2) [Clause 2, “Normative references”](#), identifies standards that are referenced by this Technical Report.
- 3) [Clause 4, “Multidimensional Arrays \(MDA\) concepts”](#), introduces the concept of Multidimensional Arrays.
- 4) [Clause 5, “SQL/MDA data model”](#), introduces the data model.
- 5) [Clause 6, “SQL/MDA operations”](#), covers the supported operations on MD-arrays..
- 6) [Clause 7, “Remote sensing example”](#), illustrates the supported functionality through realistic examples.

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Information technology database languages — SQL technical reports —**Part 8:****Multi-dimensional arrays (SQL/MDA)****1 Scope**

This Technical Report describes the support in SQL for Multi-Dimensional Arrays (MDA) as defined in [ISO/IEC 9075-15](#).

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2 Normative references

There are no normative references in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>.
- IEC Electropedia: available at <http://www.electropedia.org/>.

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 3.1 coordinate**
non-empty ordered list of integers
- 3.2 cardinality**
number of elements in an MD-array
- 3.3 MD-array**
ordered collection of elements of the same type associated with an MD-extent where each element is 1:1 associated with some coordinate within its MD-extent.
- NOTE 2 — A coordinate is within an MD-extent if every coordinate value from the integer list is greater than or equal to the lower limit, and less than or equal to the upper limit of the MD-interval of the MD-axis at the position in the MD-extent as the coordinate value has within the coordinate
- 3.4 MD-axis**
named MD-interval
- 3.5 MD-dimension**
number of MD-axes in the MD-extent of an MD-array
- NOTE 3 — Also known as “rank” outside of SQL/MDA
- 3.6 MD-extent**
non-empty ordered collection of MD-axes with no duplicate names
- 3.7 MD-interval**
integer interval given by a pair of lower and upper integer limits such that the lower limit is less than or equal to the upper limit; the interval is closed, *i.e.*, both limits are contained in it

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