



Certified Java Full Stack Professional - Capgemini College Connect

Introduction to Datatypes in MySQL

In MySQL, datatypes are used to represent:

- The nature of the data that can be stored in a database
- Possible values for that type,
- Operations that can be performed on that type
- Stored values of that type
- Efficient handling of data

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Data Types

1 Numeric Data Type

Exact numeric data types

For example, integer, decimal, numeric, etc.

2 Date and Time

Temporal values such as date, time, datetime, timestamp, and year

3 String Type

Hold plain text and binary data

For example, files, images, etc.

4 Binary Large Object Data Types (BLOB)

Hold a variable amount of data

Categories into four different types

5 Spatial Data Type

Hold various geometrical and geographical values

6 JSON Data Type

Added from version v5.7.8

Allows to store and access the JSON document

Characteristics Used to Determine the Data Type

1

Storage Size

The amount of space the data type occupies in the database

2

Data Range

The range of values that the data type can hold

3

Data Comparison

How MySQL performs a comparison of values of a particular data type.

4

Indexing

Ability to be efficiently indexed for faster retrieval

Numeric Datatypes

Signed or Unsigned Types

| | |
|-------------|---|
| TINYINT INT | very small integer up to 4 digits Takes 1 byte for storage. |
| SMALLINT | Small integer up to 5 digits Takes 2 byte for storage. |
| MEDIUMINT | Medium integer up to 9 digits Takes 3 byte for storage. |
| INT | Normal integer up to 11 digits Takes 4 byte for storage. |
| BIGINT | Large integer up to 20 digits Takes 5 byte for storage. |

Signed Types

| | |
|---------------|---|
| FLOAT (m,d) | display length (m) number of decimals (d) Default 10,2 2 bytes |
| DOUBLE (m,d) | display length (m) number of decimals (d) Default 10,2 8 bytes |
| DECIMAL (m,d) | display length (m) number of decimals (d) 1 byte |

Other Types

| | |
|---------|--|
| BIT (m) | No. of bits per value(m) Stores bit values Range 1 to 64 |
| BOOL | True or false condition 1 or 0 value only |
| BOOLEAN | Similar to BOOL |

Date and Time Data Type

| | | |
|---------------------|--|--|
| YEAR[(2 4)] | Year value as 2 digits or 4 digits. | The default is 4 digits. It takes 1 byte for storage. |
| DATE | Values range from '1000-01-01' to '9999-12-31'. | Displayed as 'yyyy-mm-dd'. It takes 3 bytes for storage. |
| TIME | Values range from '-838:59:59' to '838:59:59'. | Displayed as 'HH:MM:SS'. It takes 3 bytes plus fractional seconds for storage. |
| DATETIME | Values range from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'. | Displayed as 'yyyy-mm-dd hh:mm:ss'. It takes 5 bytes plus fractional seconds for storage. |
| TIMESTAMP(m) | Values range from '1970-01-01 00:00:01' UTC to '2038-01-19 03:14:07' TC. | Displayed as 'YYYY-MM-DD HH:MM:SS'. It takes 4 bytes plus fractional seconds for storage. |

String Datatype

| | | |
|-------------------------|---|---|
| CHAR(size) | It can have a maximum size of 255 characters. | Size is the number of characters to store. Fixed-length strings. |
| VARCHAR(size) | It can have a maximum size of 255 characters. | Size is the number of characters to store. Variable-length string. |
| TINYTEXT(size) | It can have a maximum size of 255 characters. | Size is the number of characters to store. |
| TEXT(size) | Maximum size of 65,535 characters. | Size is the number of characters to store |
| MEDIUMTEXT(size) | Maximum size of 16,777,215 characters. | Size is the number of characters to store |
| LONGTEXT(size) | Maximum size of 4GB or 4,294,967,295 characters. | Size is the number of characters to store |
| BINARY(size) | It can have a maximum size of 255 characters. | Fixed-length.. (introduced in MySQL 4.1.2) |
| VARBINARY(size) | It can have a maximum size of 255 characters. | Variable-length (introduced in MySQL 4.1.2) |
| ENUM | It takes 1 or 2 bytes that depend on the number of enumeration values. An ENUM can have a maximum of 65,535 values. | It uses numeric indexes (1, 2, 3...) to represent string values. |
| SET | It takes 1, 2, 3, 4, or 8 bytes that depends on the number of set members. It can store a maximum of 64 members. | It can hold zero or more, or any number of string values. They must be chosen from a predefined list of values specified during table creation. |

Binary Large Object Datatype

| Data Type Syntax | Maximum Size |
|------------------|---|
| TINYBLOB | It can hold a maximum size of 255 bytes. |
| BLOB(size) | It can hold the maximum size of 65,535 bytes. |
| MEDIUMBLOB | It can hold the maximum size of 16,777,215 bytes. |
| LOB | It can hold the maximum size of 4gb or 4,294,967,295 bytes. |

Spatial Data Types

| | |
|--------------------|---|
| GEOMETRY | It is a point or aggregate of points that can hold spatial values of any type that has a location. |
| POINT | A point in geometry represents a single location. It stores the values of X, Y coordinates. |
| POLYGON | It is a planar surface that represents multisided geometry. It can be defined by zero or more interior boundary and only one exterior boundary. |
| LINESTRING | It is a curve that has one or more point values. If it contains only two points, it always represents Line. |
| GEOMETRYCOLLECTION | It is a kind of geometry that has a collection of zero or more geometry values. |
| MULTILINESTRING | It is a multi-curve geometry that has a collection of linestring values. |
| MULTIPOINT | It is a collection of multiple point elements. Here, the point cannot be connected or ordered in any way. |
| MULTIPOLYGON | It is a multisurface object that represents a collection of multiple polygon elements. It is a type of two-dimensional geometry. |

JSON Data Type

MySQL provides support for native JSON data type from the version v5.7.8.
This data type allows us to store and access the JSON document quickly and efficiently.

The JSON data type has the following advantages over storing JSON-format strings in a string column:

- 1.It provides automatic validation of JSON documents. If we stored invalid documents in JSON columns, it would produce an error.
- 2.It provides an optimal storage format.