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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

3 Data Comparison

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

2 Data Range

The range of values that the data type can hold

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.
LONGBLOB	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.
MULTIPLYGON	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.