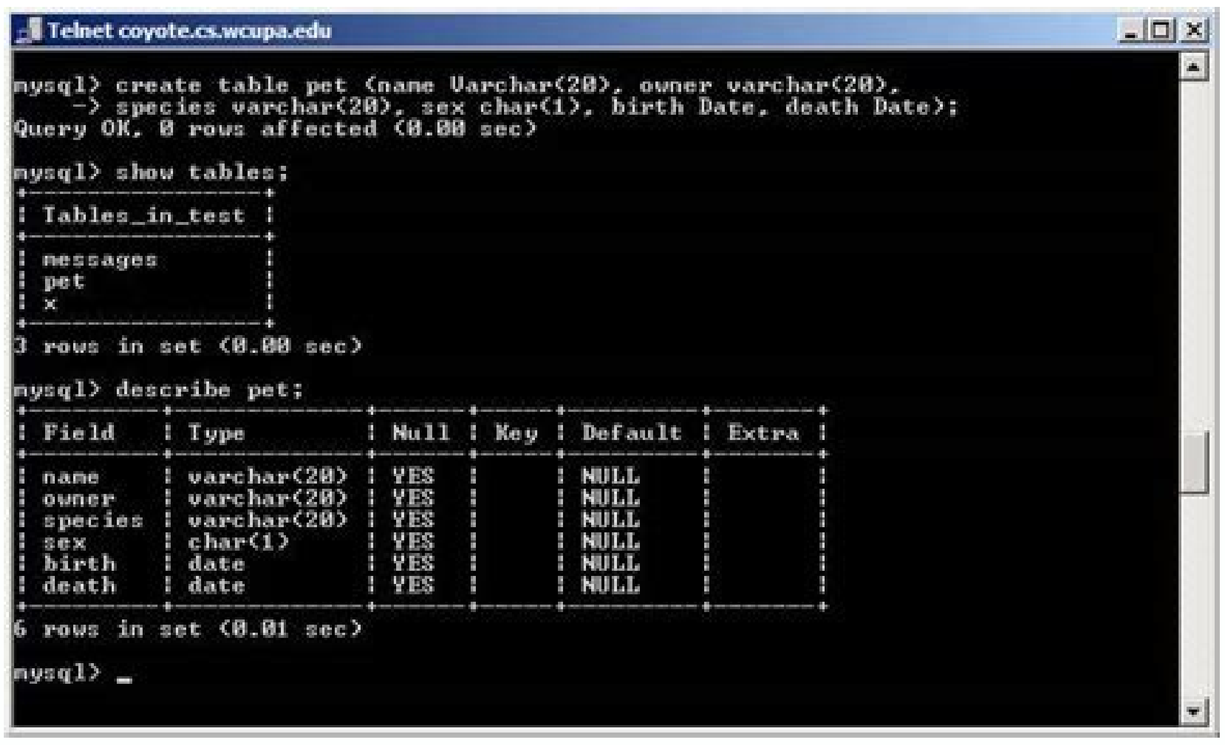
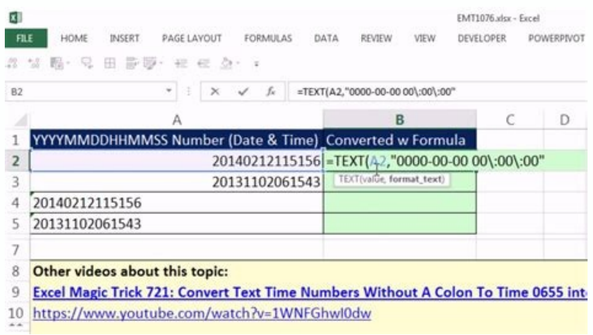
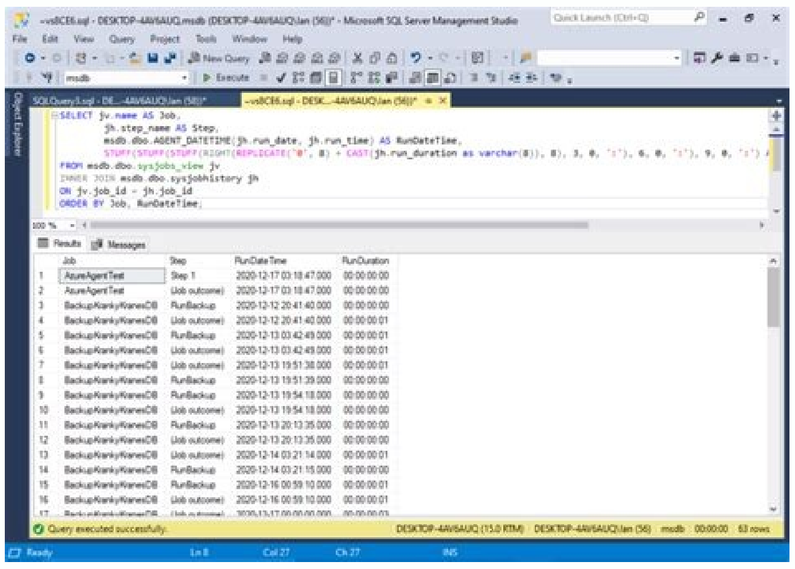
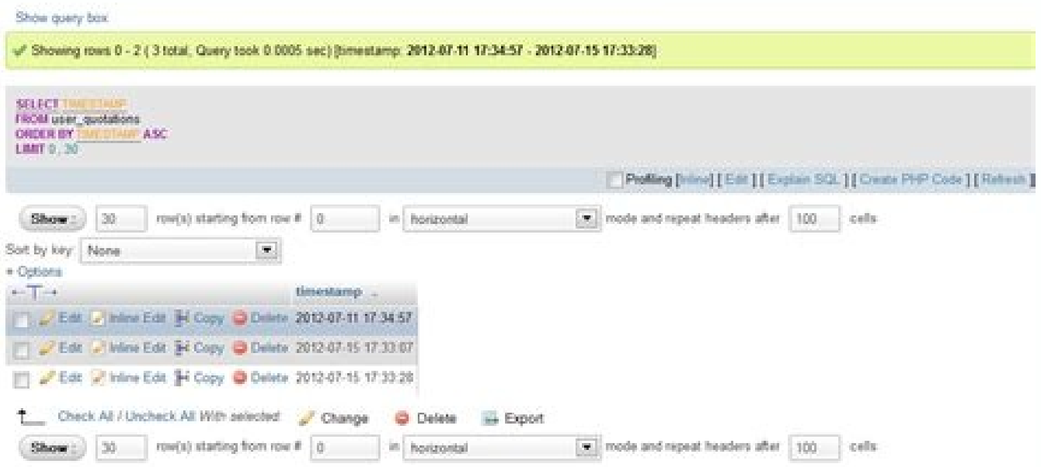
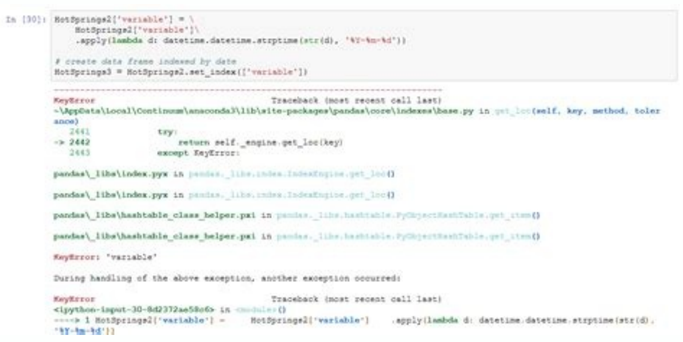
Mysql convert datetime to date format











Mysql date milliseconds. Convert php date to mysql datetime format. Javascript convert date to mysql datetime format.

You’d like to get the date from a date and time column in a MySQL database. Example: Our database has a table named travel with data in the columns id, first_name, last_name, and timestamp_of_booking. idfirst_namelast_nametimestamp_of_booking 1LisaWatson2019-04-20 14:15:34 2TomSmith2019-03-31 20:10:14 3AndyMarkus2019-08-03 10:05:45 4AliceBrown2019-07-01 12:47:54 For each traveler, let’s get their first and last name and the booking date only. (Note: The timestamp_of_booking column contains both date and time data.) Solution: We’ll use the DATE() function. Here’s the query you would write: SELECT first_name, last_name, DATE(timestamp_of_booking) AS date_of_booking FROM travel; Here’s the result of the query: first_namelast_namedate_of_booking LisaWatson2019-04-20 TomSmith2019-03-31 AndyMarkus2019-08-03 AliceBrown2019-07-01 Discussion: In MySQL, use the DATE() function to retrieve the date from a datetime or timestamp value. This function takes only one argument – either an expression which returns a date/datetime/ timestamp value or the name of a timestamp/datetime column. (In our example, we use a column of the timestamp data type.) The DATE() function returns only the date information. In our example, it returns ‘2019-03-31’ for Tom Smith’s booking date. Note that the time information is not included. Summary: in this tutorial, we will introduce you to the MySQL DATE data type and show you some useful date functions to handle the date data effectively.Introduction to MySQL DATE data typeMySQL DATE is one of the five temporal data types used for managing date values. MySQL uses yyyy-mm-dd format for storing a date value. This format is fixed and it is not possible to change it.For example, you may prefer to use mm-dd-yyyy format but you can’t. Instead, you follow the standard date format and use the DATE_FORMAT function to format the date the way you want.MySQL uses 3 bytes to store a DATE value. The DATE values range from 1000-01-01 to 9999-12-31. If you want to store a date value that is out of this range, you need to use a non-temporal data type like integer e.g., three columns, and each column for the year, month, and day. You also need to create stored functions to simulate the built-in date functions provided by MySQL, which is not recommended.When strict mode is disabled, MySQL converts any invalid date e.g., 2015-02-30 to the zero date value 0000-00-00.MySQL Date values with two-digit yearsMySQL stores the year of the date value using four digits. In case you use two-digit year values, MySQL still accepts them with the following rules:Year values in the range 00-69 are converted to 2000-2069.Year values in the range 70-99 are converted to 1970 – 1999.However, a date value with two digits is ambiguous therefore you should avoid using it.Let’s take a look at the following example.First, create a table named people with birth date column with DATE data type.CREATE TABLE people (id INT AUTO_INCREMENT PRIMARY KEY, first_name VARCHAR(50) NOT NULL, last_name VARCHAR(50) NOT NULL, birth_date DATE NOT NULL);Code language: SQL (Structured Query Language) (sql)Next, insert a row into the people table.INSERT INTO people(first_name,last_name,birth_date) VALUES('John','Doe','1990-09-01');Code language: SQL (Structured Query Language) (sql)Then, query the data from the people table.SELECT first_name, last_name, birth_date FROM people;Code language: SQL (Structured Query Language) (sql)After that, use the two-digit year format to insert data into the people table.INSERT INTO people(first_name,last_name,birth_date) VALUES('Jack','Daniel','01-09-01'), ('Lily','Bush','80-09-01');Code language: SQL (Structured Query Language) (sql)In the first row, we used 01 (range 00-69) as the year, so MySQL converted it to 2001. In the second row, we used 80 (range 70-99) as the year, MySQL converted it to 1980.Finally, we can query data from the people table to check whether data was converted based on the conversion rules.SELECT first_name, last_name, birth_date FROM people;Code language: SQL (Structured Query Language) (sql)MySQL DATE functionsMySQL provides many useful date functions that allow you to manipulate date effectively.To get the current date and time, you use NOW() function.Code language: SQL (Structured Query Language) (sql)+ | NOW() | + | 2017-05-13 07:59:38 | + 1 row in set (0.02 sec)Code language: SQL (Structured Query Language) (sql)To get only date part of a DATETIME value, you use the DATE() function.Code language: SQL (Structured Query Language) (sql)+ | DATE(NOW()) | + | 2015-07-13 | + 1 row in set (0.01 sec)Code language: SQL (Structured Query Language) (sql)To get the current system date, you use CURDATE() function as follows:Code language: SQL (Structured Query Language) (sql)+ | CURDATE() | + | 2015-07-13 | + 1 row in set (0.02 sec)Code language: SQL (Structured Query Language) (sql)To format a date value, you use DATE_FORMAT function. The following statement formats the date asmm/dd/yyyy using the date format pattern %m/%d/%Y :SELECT DATE_FORMAT(CURDATE(), '%m/%d/%Y') today;Code language: SQL (Structured Query Language) (sql)+ | today | + | 07/13/2015 | + 1 row in set (0.02 sec)Code language: SQL (Structured Query Language) (sql)To calculate the number of days between two date values, you use the DATEDIFF function as follows:SELECT DATEDIFF('2015-11-04','2014-11-04') days;Code language: SQL (Structured Query Language) (sql)+ | days | + | 365 | + 1 row in set (0.02 sec)Code language: SQL (Structured Query Language) (sql)To add a number of days, weeks, months, years, etc., to a date value, you use the DATE_ADD function:SELECT '2015-01-01' start, DATE_ADD('2015-01-01', INTERVAL 1 DAY) 'one day later', DATE_ADD('2015-01-01', INTERVAL 1 WEEK) 'one week later', DATE_ADD('2015-01-01', INTERVAL 1 MONTH) 'one month later', DATE_ADD('2015-01-01', INTERVAL 1 YEAR) 'one year later';Code language: SQL (Structured Query Language) (sql)Similarly, you can subtract an interval from a date using the DATE_SUB function:SELECT '2015-01-01' start, DATE_SUB('2015-01-01', INTERVAL 1 DAY) 'one day before', DATE_SUB('2015-01-01', INTERVAL 1 WEEK) 'one week before', DATE_SUB('2015-01-01', INTERVAL 1 MONTH) 'one month before', DATE_SUB('2015-01-01', INTERVAL 1 YEAR) 'one year before';Code language: SQL (Structured Query Language) (sql)If you want to get the day, month, quarter, and year of a date value, you can use the corresponding function DAY, MONTH, QUARTER, and YEAR as follows:SELECT DAY('2000-12-31') day, MONTH('2000-12-31') month, QUARTER('2000-12-31') quarter, YEAR('2000-12-31') year;Code language: SQL (Structured Query Language) (sql)+ | day | month | quarter | year | + | 31 | 12 | 4 | 2000 | + 1 row in set (0.00 sec)Code language: SQL (Structured Query Language) (sql)To get the week information week related functions. For example, WEEK function returns the week number, WEEKDAY function returns the weekday index, and WEEKOFYEAR function returns the calendar week.SELECT WEEKDAY('2000-12-31') weekday, WEEK('2000-12-31') week, WEEKOFYEAR('2000-12-31') weekofyear;Code language: SQL (Structured Query Language) (sql)+ | weekday | week | weekofyear | + | 6 | 53 | 52 | + 1 row in set (0.04 sec)Code language: SQL (Structured Query Language) (sql)The week function returns the week number with the zero-based index if you don’t pass the second argument or if you pass 0. If you pass 1, it will return week number with 1-indexed.SELECT WEEKDAY('2000-12-31') weekday, WEEK('2000-12-31',1) week, WEEKOFYEAR('2000-12-31') weekofyear;Code language: SQL (Structured Query Language) (sql)+ | weekday | week | weekofyear | + | 6 | 52 | 52 | + 1 row in set (0.00 sec)Code language: SQL (Structured Query Language) (sql)In this tutorial, you have learned about the MySQL DATE data type and how to use some useful date functions to manipulate date values.Was this tutorial helpful? 11.2.8 Conversion Between Date and Time Types To some extent, you can convert a value from one temporal type to another. However, there may be some alteration of the value or loss of information. In all cases, conversion between temporal types is subject to the range of valid values for the resulting type. For example, although DATE, DATETIME, and TIMESTAMP values all can be specified using the same set of formats, the types do not all have the same range of values. TIMESTAMP values cannot be earlier than 1970 UTC or later than '2038-01-19 03:14:07' UTC. This means that a date such as '1968-01-01', while valid as a DATE or DATETIME value, is not valid as a TIMESTAMP value and is converted to 0. Conversion of DATE values: Conversion to a DATETIME or TIMESTAMP value adds a time part of '00:00:00' because the DATE value contains no time information. Conversion to a TIME value is not useful; the result is '00:00:00'. Conversion of DATETIME and TIMESTAMP values: Conversion to a DATE value takes fractional seconds into account and rounds the time part. For example, '1999-12-31 23:59:59.499' becomes '1999-12-31', whereas '1999-12-31 23:59:59.500' becomes '2000-01-01'. Conversion to a TIME value discards the date part because the TIME type contains no date information. For conversion of TIME values to other temporal types, the value of CURRENT_DATE() is used for the date part. The TIME is interpreted as elapsed time (not time of day) and added to the date. This means that the date part of the result differs from the current date if the time value is outside the range from '00:00:00' to '23:59:59'. Suppose that the current date is '2012-01-01'. TIME values of '12:00:00', '24:00:00', and '-12:00:00', when converted to DATETIME or TIMESTAMP values, result in '2012-01-01 12:00:00', '2012-01-02 00:00:00', and '2011-12-31 12:00:00', respectively. Conversion of TIME to DATE is similar but discards the time part from the result: '2012-01-01', '2012-01-02', and '2011-12-31', respectively. Explicit conversion can be used to override implicit conversion. For example, in comparison of DATE and DATETIME values, the DATE value is coerced to the DATETIME type by adding a time part of '00:00:00'. To perform the comparison by ignoring the time part of the DATETIME value instead, use the CAST() function in the following way: date_col = CAST(datetime_col AS DATE) Conversion of TIME and DATETIME values to numeric form (for example, by adding +0) depends on whether the value contains a fractional seconds part. TIME(N) or DATETIME(N) is converted to integer when N is 0 (or omitted) and to a DECIMAL value with N decimal digits when N is greater than 0: mysql> SELECT CURTIME(), CURTIME()+0, CURTIME(3)+0; +----------+-----------+------------+ | CURTIME() | CURTIME()+0 | CURTIME(3)+0 | +----------+-----------+------------+ | 09:28:00 | 92800 | 92800.887 | +----------+-----------+------------+ mysql> SELECT NOW(), NOW()+0, NOW(3)+0; +---------------------+--------------+-------------------+ | NOW() | NOW()+0 | NOW(3)+0 | +---------------------+--------------+-------------------+ | 2012-08-15 09:28:00 | 20120815092800 | 20120815092800.889 | +---------------------+--------------+-------------------+ Page 2 11.2.9 2-Digit Years in Dates Date values with 2-digit years are ambiguous because the century is unknown. Such values must be interpreted into 4-digit form because MySQL stores years internally using 4 digits. For DATETIME, DATE, and TIMESTAMP types, MySQL interprets dates specified with ambiguous year values using these rules: Year values in the range 00-69 become 2000-2069. Year values in the range 70-99 become 1970-1999. For YEAR, the rules are the same, with this exception: A numeric 00 inserted into YEAR(4) results in 0000 rather than 2000. To specify zero for YEAR(4) and have it be interpreted as 2000, specify it as a string '0' or '00'. Remember that these rules are only heuristics that provide reasonable guesses as to what your data values mean. If the rules used by MySQL do not produce the values you require, you must provide unambiguous input containing 4-digit year values. ORDER BY properly sorts YEAR values that have 2-digit years. Some functions like MIN() and MAX() convert a YEAR to a number. This means that a value with a 2-digit year does not work properly with these functions. The fix in this case is to convert the YEAR to 4-digit year format. Page 3 The string data types are CHAR, VARCHAR, BINARY, VARBINARY, BLOB, TEXT, ENUM, and SET. For information about storage requirements of the string data types, see Section 11.6, “Data Type Storage Requirements”. For descriptions of functions that operate on string values, see Section 12.8, “String Functions and Operators”. Page 4 11.3.1 String Data Type Syntax The string data types are CHAR, VARCHAR, BINARY, VARBINARY, BLOB, TEXT, ENUM, and SET. In some cases, MySQL may change a string column to a type different from that given in a CREATE TABLE or ALTER TABLE statement. See Section 13.1.17.6, “Silent Column Specification Changes”. For definitions of character string columns (CHAR, VARCHAR, and the TEXT types), MySQL interprets length specifications in character units. For definitions of binary string columns (BINARY, VARBINARY, and the BLOB types), MySQL interprets length specifications in byte units. Column definitions for character string data types CHAR, VARCHAR, the TEXT types, ENUM, SET, and any synonyms) can specify the column character set and collation: CHARACTER SET specifies the character set. If desired, a collation for the character set can be specified with the COLLATE attribute, along with any other attributes. For example: CREATE TABLE t (c1 VARCHAR(20) CHARACTER SET utf8, c2 TEXT CHARACTER SET latin1 COLLATE latin1_general_cs); This table definition creates a column named c1 that has a character set of utf8 with the default collation for that character set, and a column named c2 that has a character set of latin1 and a case-sensitive (_cs) collation. The rules for assigning the character set and collation when either or both of CHARACTER SET and the COLLATE attribute are missing are described in Section 10.3.5, “Column Character Set and Collation”. CHARSET is a synonym for CHARACTER SET. Specifying the CHARACTER SET binary attribute for a character string data type causes the column to be created as the corresponding binary string data type: CHAR becomes BINARY, VARCHAR becomes VARBINARY, and TEXT becomes BLOB. For the ENUM and SET data types, this does not occur; they are created as declared. Suppose that you specify a table using this definition: CREATE TABLE t (c1 VARCHAR(10) CHARACTER SET binary, c2 TEXT CHARACTER SET binary, c3 ENUM('a','b','c') CHARACTER SET binary); The resulting table has this definition: CREATE TABLE t (c1 VARBINARY(10), c2 BLOB, c3 ENUM('a','b','c') CHARACTER SET binary); The BINARY attribute is a nonstandard MySQL extension that is shorthand for specifying the binary (_bin) collation of the column character set (or of the table default character set if no column character set is specified). In this case, comparison and sorting are based on numeric character code values. Suppose that you specify a table using this definition: CREATE TABLE t (c1 VARCHAR(10) CHARACTER SET latin1 BINARY, c2 TEXT BINARY) CHARACTER SET utf8mb4; The resulting table has this definition: CREATE TABLE t (c1 VARCHAR(10) CHARACTER SET latin1 COLLATE latin1_bin, c2 TEXT CHARACTER SET utf8mb4 COLLATE utf8mb4_bin) CHARACTER SET utf8mb4; The ASCII attribute is shorthand for CHARACTER SET latin1. The UNICODE attribute is shorthand for CHARACTER SET ucs2. Character column comparison and sorting are based on the collation assigned to the column. For the CHAR, VARCHAR, TEXT, ENUM, and SET data types, you can declare a column with a binary (_bin) collation or the BINARY attribute to cause comparison and sorting to use the underlying character code values rather than a lexical ordering. For additional information about use of character sets in MySQL, see Chapter 10, Character Sets, Collations, Unicode. [NATIONAL] CHAR[(M)] [CHARACTER SET charset_name] [COLLATE collation_name] A fixed-length string that is always right-padded with spaces to the specified length when stored. M represents the column length in characters. The range of M is 0 to 255. If M is omitted, the length is 1. CHAR is shorthand for CHARACTER. NATIONAL CHAR (or its equivalent short form, NCHAR) is the standard SQL way to define that a CHAR column should use some predefined character set. MySQL uses utf8 as this predefined character set. Section 10.3.7, “The National Character Set”. The CHAR BYTE data type is an alias for the BINARY data type. This is a compatibility feature. MySQL permits you to create a column of type CHAR(0). This is useful primarily when you must be compliant with old applications that depend on the existence of a column but that do not actually use its value. CHAR(0) is also quite nice when you need a column that can take only two values: A column that is defined as CHAR(0) NULL occupies only one bit and can take only the values NULL and '' (the empty string). [NATIONAL] VARCHAR(M) [CHARACTER SET charset_name] [COLLATE collation_name] A variable-length string. M represents the maximum column length in characters. The range of M is 0 to 65,535. The effective maximum length of a VARCHAR is subject to the maximum row size (65,535 bytes, which is shared among all columns) and the character set used. For example, utf8 characters can require up to three bytes per character, so a VARCHAR column that uses the utf8 character set can be declared to be a maximum of 21,844 characters. See Section 8.4.7, “Limits on Table Column Count and Row Size”. MySQL stores VARCHAR values as a 1-byte or 2-byte length prefix plus data. The length prefix indicates the number of bytes in the value. A VARCHAR column uses one length byte if values require no more than 255 bytes, two length bytes if values may require more than 255 bytes. MySQL follows the standard SQL specification, and does not remove trailing spaces from VARCHAR values. VARCHAR is shorthand for CHARACTER VARYING. NATIONAL VARCHAR is the standard SQL way to define that a VARCHAR column should use some predefined character set. MySQL uses utf8 as this predefined character set. Section 10.3.7, “The National Character Set”. NVARCHAR is shorthand for NATIONAL VARCHAR. BINARY[(M)] The BINARY type is similar to the CHAR type, but stores binary byte strings rather than nonbinary character strings. An optional length M represents the column length in bytes. If omitted, M defaults to 1. VARBINARY(M) The VARBINARY type is similar to the VARCHAR type, but stores binary byte strings rather than nonbinary character strings. M represents the maximum column length in bytes. TINYBLOB A BLOB column with a maximum length of 255 (28 − 1) bytes. Each TINYBLOB value is stored using a 1-byte length prefix that indicates the number of bytes in the value. TINYTEXT [CHARACTER SET charset_name] [COLLATE collation_name] A TEXT column with a maximum length of 255 (28 − 1) characters. The effective maximum length is less if the value contains multibyte characters. Each TINYTEXT value is stored using a 1-byte length prefix that indicates the number of bytes in the value. BLOB[(M)] A BLOB column with a maximum length of 65,535 (216 − 1) bytes. Each BLOB value is stored using a 2-byte length prefix that indicates the number of bytes in the value. An optional length M can be given for this type. If this is done, MySQL creates the column as the smallest BLOB type large enough to hold values M bytes long. TEXT[(M)] [CHARACTER SET charset_name] [COLLATE collation_name] A TEXT column with a maximum length of 65,535 (216 − 1) characters. The effective maximum length is less if the value contains multibyte characters. Each TEXT value is stored using a 2-byte length prefix that indicates the number of bytes in the value. An optional length M can be given for this type. If this is done, MySQL creates the column as the smallest TEXT type large enough to hold values M characters long. MEDIUMBLOB A BLOB column with a maximum length of 16,777,215 (224 − 1) bytes. Each MEDIUMBLOB value is stored using a 3-byte length prefix that indicates the number of bytes in the value. MEDIUMTEXT [CHARACTER SET charset_name] [COLLATE collation_name] A TEXT column with a maximum length of 16,777,215 (224 − 1) characters. The effective maximum length is less if the value contains multibyte characters. Each MEDIUMTEXT value is stored using a 3-byte length prefix that indicates the number of bytes in the value. LONGBLOB A BLOB column with a maximum length of 4,294,967,295 or 4GB (232 − 1) bytes. The effective maximum length of LONGBLOB columns depends on the configured maximum packet size in the client/server protocol and available memory. Each LONGBLOB value is stored using

a 4-byte length prefix that indicates the number of bytes in the value. LONGTEXT [CHARACTER SET charset_name] [COLLATE collation_name] A TEXT column with a maximum length of 4,294,967,295 or 4GB (232 − 1) characters. The effective maximum length is less if the value contains multibyte characters. The effective maximum length of LONGTEXT columns also depends on the configured maximum packet size in the client/server protocol and available memory. Each LONGTEXT value is stored using a 4-byte length prefix that indicates the number of bytes in the value. ENUM('value1','value2',...) [CHARACTER SET charset_name] [COLLATE collation_name] An enumeration. A string object that can have only one value, chosen from the list of values 'value1', 'value2', ..., NULL or the special '' error value. ENUM values are represented internally as integers. An ENUM column can have a maximum of 65,535 distinct elements. (The practical limit is less than 3000.) A table can have no more than 255 unique element list definitions among its ENUM and SET columns considered as a group. For more information on these limits, see Limits Imposed by .frm File Structure. SET('value1','value2',...) [CHARACTER SET charset_name] [COLLATE collation_name] A set. A string object that can have zero or more values, each of which must be chosen from the list of values 'value1', 'value2', ... SET values are represented internally as integers. A SET column can have a maximum of 64 distinct members. A table can have no more than 255 unique element list definitions among its ENUM and SET columns considered as a group. For more information on this limit, see Limits Imposed by .frm File Structure. Page 5 11.3.2 The CHAR and VARCHAR Types The CHAR and VARCHAR types are similar, but differ in the way they are stored and retrieved. They also differ in maximum length and in whether trailing spaces are retained. The CHAR and VARCHAR types are declared with a length that indicates the maximum number of characters you want to store. For example, CHAR(30) can hold up to 30 characters. The length of a CHAR column is fixed to the length that you declare when you create the table. The length can be any value from 0 to 255. When CHAR values are stored, they are right-padded with spaces to the specified length. When CHAR values are retrieved, trailing spaces are removed unless the PAD_CHAR_TO_FULL_LENGTH SQL mode is enabled. Values in VARCHAR columns are variable-length strings. The length can be specified as a value from 0 to 65,535. The effective maximum length of a VARCHAR is subject to the maximum row size (65,535 bytes, which is shared among all columns) and the character set used. See Section 8.4.7, “Limits on Table Column Count and Row Size”. In contrast to CHAR, VARCHAR values are stored as a 1-byte or 2-byte length prefix plus data. The length prefix indicates the number of bytes in the value. A column uses one length byte if values require no more than 255 bytes, two length bytes if values may require more than 255 bytes. If strict SQL mode is not enabled and you assign a value to a CHAR or VARCHAR column that exceeds the column's maximum length, the value is truncated to fit and a warning is generated. For truncation of nonspace characters, you can cause an error to occur (rather than a warning) and suppress insertion of the value by using strict SQL mode. See Section 5.1.10, “Server SQL Modes”. For VARCHAR columns, trailing spaces in excess of the column length are truncated prior to insertion and a warning is generated, regardless of the SQL mode in use. For CHAR columns, truncation of excess trailing spaces from inserted values is performed silently regardless of the SQL mode. VARCHAR values are not padded when they are stored. Trailing spaces are retained when values are stored and retrieved, in conformance with standard SQL. The following table illustrates the differences between CHAR and VARCHAR by showing the result of storing various string values into CHAR(4) and VARCHAR(4) columns (assuming that the column uses a single-byte character set such as latin1). The values shown as stored in the last row of the table apply only when not using strict SQL mode; if strict mode is enabled, values that exceed the column length are not stored, and an error results. InnoDB encodes fixed-length fields greater than or equal to 768 bytes in length as variable-length fields, which can be stored off-page. For example, a CHAR(255) column can exceed 768 bytes if the maximum byte length of the character set is greater than 3, as it is with utf8mb4. If a given value is stored into the CHAR(4) and VARCHAR(4) columns, the values retrieved from the columns are not always the same because trailing spaces are removed from CHAR columns upon retrieval. The following example illustrates this difference: mysql> CREATE TABLE vc (v VARCHAR(4), c CHAR(4)); Query OK, 0 rows affected (0.01 sec) mysql> INSERT INTO vc VALUES ('ab ', 'ab '); Query OK, 1 row affected (0.00 sec) mysql> SELECT CONCAT('(', v, ')'), CONCAT('(', c, ')') FROM vc; +---------------------+---------------------+ | CONCAT('(', v, ')') | CONCAT('(', c, ')') | +---------------------+---------------------+ | (ab) | (ab) | +---------------------+---------------------+ 1 row in set (0.06 sec) Values in CHAR, VARCHAR, and TEXT columns are sorted and compared according to the character set collation assigned to the column. All MySQL collations are of type PAD SPACE. This means that all CHAR, VARCHAR, and TEXT values are compared without regard to any trailing spaces. “Comparison” in this context does not include the LIKE pattern-matching operator, for which trailing spaces are significant. For example: mysql> CREATE TABLE names (myname CHAR(10)); Query OK, 0 rows affected (0.03 sec) mysql> INSERT INTO names VALUES ('Jones'); Query OK, 1 row affected (0.00 sec) mysql> SELECT myname = 'Jones', myname = 'Jones ' FROM names; +----------------+-----------------+ | myname = 'Jones' | myname = 'Jones ' | +----------------+-----------------+ | 1 | 1 | +----------------+-----------------+ 1 row in set (0.00 sec) mysql> SELECT myname LIKE 'Jones', myname LIKE 'Jones ' FROM names; +--------------------+---------------------+ | myname LIKE 'Jones' | myname LIKE 'Jones ' | +--------------------+---------------------+ | 1 | 0 | +--------------------+---------------------+ 1 row in set (0.00 sec) This is not affected by the server SQL mode. For those cases where trailing pad characters are stripped or comparisons ignore them, if a column has an index that requires unique values, inserting into the column values that differ only in number of trailing pad characters results in a duplicate-key error. For example, if a table contains 'a', an attempt to store 'a ' causes a duplicate-key error. Page 6 11.3.3 The BINARY and VARBINARY Types The BINARY and VARBINARY types are similar to CHAR and VARCHAR, except that they store binary strings rather than nonbinary strings. That is, they store byte strings rather than character strings. This means they have the binary character set and collation, and comparison and sorting are based on the numeric values of the bytes in the values. The permissible maximum length is the same for BINARY and VARBINARY as it is for CHAR and VARCHAR, except that the length for BINARY and VARBINARY is measured in bytes rather than characters. The BINARY and VARBINARY data types are distinct from the CHAR BINARY and VARCHAR BINARY data types. For the latter types, the BINARY attribute does not cause the column to be treated as a binary string column. Instead, it causes the binary (_bin) collation for the column character set (or the table default character set if no column character set is specified) to be used, and the column itself stores nonbinary character strings rather than binary byte strings. For example, if the default character set is latin1, CHAR(5) BINARY is treated as CHAR(5) CHARACTER SET latin1 COLLATE latin1_bin. This differs from BINARY(5), which stores 5-byte binary strings that have the binary character set and collation. For information about the differences between the binary collation of the binary character set and the _bin collations of nonbinary character sets, see Section 10.8.5, “The binary Collation Compared to _bin Collations”. If strict SQL mode is not enabled and you assign a value to a BINARY or VARBINARY column that exceeds the column's maximum length, the value is truncated to fit and a warning is generated. For cases of truncation, to cause an error to occur (rather than a warning) and suppress insertion of the value, use strict SQL mode. See Section 5.1.10, “Server SQL Modes”. When BINARY values are stored, they are right-padded with the pad value to the specified length. The pad value is 0x00 (the zero byte). Values are right-padded with 0x00 for inserts, and no trailing bytes are removed for retrievals. All bytes are significant in comparisons, including ORDER BY and DISTINCT operations. 0x00 and space differ in comparisons, with 0x00 sorting before space. Example: For a BINARY(3) column, 'a ' becomes 'a \0' when inserted. 'a\0' becomes 'a\0\0' when inserted. Both inserted values remain unchanged for retrievals. For VARBINARY, there is no padding for inserts and no bytes are stripped for retrievals. All bytes are significant in comparisons, including ORDER BY and DISTINCT operations. 0x00 and space differ in comparisons, with 0x00 sorting before space. For those cases where trailing pad bytes are stripped or comparisons ignore them, if a column has an index that requires unique values, inserting values into the column that differ only in number of trailing pad bytes results in a duplicate-key error. For example, if a table contains 'a', an attempt to store 'a\0' causes a duplicate-key error. You should consider the preceding padding and stripping characteristics carefully if you plan to use the BINARY data type for storing binary data and you require that the value retrieved be exactly the same as the value stored. The following example illustrates how 0x00-padding of BINARY values affects column value comparisons: mysql> CREATE TABLE t (c BINARY(3)); Query OK, 0 rows affected (0.01 sec) mysql> INSERT INTO t SET c = 'a'; Query OK, 1 row affected (0.01 sec) mysql> SELECT HEX(c), c = 'a', c = 'a\0\0' from t; +--------+---------+-------------+ | HEX(c) | c = 'a' | c = 'a\0\0' | +--------+---------+-------------+ | 610000 | 0 | 1 | +--------+---------+-------------+ 1 row in set (0.09 sec) If the value retrieved must be the same as the value specified for storage with no padding, it might be preferable to use VARBINARY or one of the BLOB data types instead. Page 7 11.3.4 The BLOB and TEXT Types A BLOB is a binary large object that can hold a variable amount of data. The four BLOB types are TINYBLOB, BLOB, MEDIUMBLOB, and LONGBLOB. These differ only in the maximum length of the values they can hold. The four TEXT types are TINYTEXT, TEXT, MEDIUMTEXT, and LONGTEXT. These correspond to the four BLOB types and have the same maximum lengths and storage requirements. See Section 11.6, “Data Type Storage Requirements”. BLOB values are treated as binary strings (byte strings). They have the binary character set and collation, and comparison and sorting are based on the numeric values of the bytes in column values. TEXT values are treated as nonbinary strings (character strings). They have a character set other than binary, and values are sorted and compared based on the collation of the character set. If strict SQL mode is not enabled and you assign a value to a BLOB or TEXT column that exceeds the column's maximum length, the value is truncated to fit and a warning is generated. For truncation of nonspace characters, you can cause an error to occur (rather than a warning) and suppress insertion of the value by using strict SQL mode. See Section 5.1.10, “Server SQL Modes”. Truncation of excess trailing spaces from values to be inserted into TEXT columns always generates a warning, regardless of the SQL mode. For TEXT and BLOB columns, there is no padding on insert and no bytes are stripped on select. If a TEXT column is indexed, index entry comparisons are space-padded at the end. This means that, if the index requires unique values, duplicate-key errors occur for values that differ only in the number of trailing spaces. For example, if a table contains 'a', an attempt to store 'a ' causes a duplicate-key error. This is not true for BLOB columns. In most respects, you can regard a BLOB column as a VARBINARY column that can be as large as you like. Similarly, you can regard a TEXT column as a VARCHAR column. BLOB and TEXT differ from VARBINARY and VARCHAR in the following ways: For indexes on BLOB and TEXT columns, you must specify an index prefix length. For CHAR and VARCHAR, a prefix length is optional. See Section 8.3.4, “Column Indexes”. BLOB and TEXT columns cannot have DEFAULT values. If you use the BINARY attribute with a TEXT data type, the column is assigned the binary (_bin) collation of the column character set. LONG and LONG VARCHAR map to the MEDIUMTEXT data type. This is a compatibility feature. MySQL Connector/ODBC defines BLOB values as LONGVARBINARY and TEXT values as LONGVARCHAR. Because BLOB and TEXT values can be extremely long, you might encounter some constraints in using them: Only the first max_sort_length bytes of the column are used when sorting. The default value of max_sort_length is 1024. You can make more bytes significant in sorting or grouping by increasing the value of max_sort_length at server startup or runtime. Any client can change the value of its session max_sort_length variable: mysql> SET max_sort_length = 2000; mysql> SELECT id, comment FROM t -> ORDER BY comment; Instances of BLOB or TEXT columns in the result of a query that is processed using a temporary table causes the server to use a table on disk rather than in memory because the MEMORY storage engine does not support those data types (see Section 8.4.4, “Internal Temporary Table Use in MySQL”). Use of disk incurs a performance penalty, so include BLOB or TEXT columns in the query result only if they are really needed. For example, avoid using SELECT *, which selects all columns. The maximum size of a BLOB or TEXT object is determined by its type, but the largest value you actually can transmit between the client and server is determined by the amount of available memory and the size of the communications buffers. You can change the message buffer size by changing the value of the max_allowed_packet variable, but you must do so for both the server and your client program. For example, both mysql and mysqldump enable you to change the client-side max_allowed_packet value. See Section 5.1.1, “Configuring the Server”, Section 4.5.1, “mysql — The MySQL Command-Line Client”, and Section 4.5.4, “mysqldump — A Database Backup Program”. You may also want to compare the packet sizes and the size of the data objects you are storing with the storage requirements, see Section 11.6, “Data Type Storage Requirements” Each BLOB or TEXT value is represented internally by a separately allocated object. This is in contrast to all other data types, for which storage is allocated once per column when the table is opened. In some cases, it may be desirable to store binary data such as media files in BLOB or TEXT columns. You may find MySQL's string handling functions useful for working with such data. See Section 12.8, “String Functions and Operators”. For security and other reasons, it is usually preferable to do so using application code rather than giving application users the FILE privilege. You can discuss specifics for various languages and platforms in the MySQL Forums (. Page 8 An ENUM is a string object with a value chosen from a list of permitted values that are enumerated explicitly in the column specification at table creation time. See Section 11.3.1, “String Data Type Syntax” for ENUM type syntax and length limits. The ENUM type has these advantages: Compact data storage in situations where a column has a limited set of possible values. The strings you specify as input values are automatically encoded as numbers. See Section 11.6, “Data Type Storage Requirements” for storage requirements for the ENUM type. Readable queries and output. The numbers are translated back to the corresponding strings in query results. and these potential issues to consider: If you make enumeration values that look like numbers, it is easy to mix up the literal values with their internal index numbers, as explained in Enumeration Limitations. Using ENUM columns in ORDER BY clauses requires extra care, as explained in Enumeration Sorting. Creating and Using ENUM Columns An enumeration value must be a quoted string literal. For example, you can create a table with an ENUM column like this: CREATE TABLE shirts (name VARCHAR(40), size ENUM('x-small', 'small', 'medium', 'large', 'x-large')); INSERT INTO shirts (name, size) VALUES ('dress shirt','large'), ('t-shirt','medium'), ('polo shirt','small'); SELECT name, size FROM shirts WHERE size = 'medium'; +---------+--------+ | name | size | +---------+--------+ | t-shirt | medium | +---------+--------+ UPDATE shirts SET size = 'small' WHERE size = 'large'; COMMIT; Inserting 1 million rows into this table with a value of 'medium' would require 1 million bytes of storage, as opposed to 6 million bytes if you stored the actual string 'medium' in a VARCHAR column. Index Values for Enumeration Literals Each enumeration value has an index: The elements listed in the column specification are assigned index numbers, beginning with 1. The index value of the empty string error value is 0. This means that you can use the following SELECT statement to find rows into which invalid ENUM values were assigned: mysql> SELECT * FROM tbl_name WHERE enum_col=0; The index of the NULL value is NULL. The term “index” here refers to a position within the list of enumeration values. It has nothing to do with table indexes. For example, a column specified as ENUM('Mercury', 'Venus', 'Earth') can have any of the values shown here. The index of each value is also shown. An ENUM column can have a maximum of 65,535 distinct elements. (The practical limit is less than 3000.) A table can have no more than 255 unique element list definitions among its ENUM and SET columns considered as a group. For more information on these limits, see Limits Imposed by .frm File Structure. If you retrieve an ENUM value in a numeric context, the column value's index is returned. For example, you can retrieve numeric values from an ENUM column like this: mysql> SELECT enum_col+0 FROM tbl_name; Functions such as SUM() or AVG() that expect a numeric argument cast the argument to a number if necessary. For ENUM values, the index number is used in the calculation. Handling of Enumeration Literals Trailing spaces are automatically deleted from ENUM member values in the table definition when a table is created. When retrieved, values stored into an ENUM column are displayed using the lettercase that was used in the column definition. Note that ENUM columns can be assigned a character set and collation. For binary or case-sensitive collations, lettercase is taken into account when assigning values to the column. If you store a number into an ENUM column, the number is treated as the index into the possible values, and the value stored is the enumeration member with that index. (However, this does not work with LOAD DATA, which treats all input as strings.) If the numeric value is quoted, it is still interpreted as an index if there is no matching string in the list of enumeration values. For these reasons, it is not advisable to define an ENUM column with enumeration values that look like numbers, because this can easily become confusing. For example, the following column has enumeration members with string values of '0', '1', and '2', but numeric index values of 1, 2, and 3: numbers ENUM('0','1','2') If you store 2, it is interpreted as an index value, and becomes '1' (the value with index 2). If you store '2', it matches an enumeration value, so it is stored as '2'. If you store '3', it does not match any enumeration value, so it is treated as an index and becomes '2' (the value with index 3). mysql> INSERT INTO t (numbers) VALUES(2),('2'),('3'); mysql> SELECT * FROM t; +---------+ | numbers | +---------+ | 1 | | 2 | | 2 | +---------+ To determine all possible values for an ENUM column, use SHOW COLUMNS FROM tbl_name LIKE 'enum_col' and parse the ENUM definition in the Type column of the output. In the C API, ENUM values are returned as strings. For information about using result set metadata to distinguish them from other strings, see C API Basic Data Structures. Empty or NULL Enumeration Values An enumeration value can also be the empty string ('') or NULL under certain circumstances: If you insert an invalid value into an ENUM (that is, a string not present in the list of permitted values), the empty string is inserted instead as a special error value. This string can be distinguished from a “normal” empty string by the fact that this string has the numeric value 0. See Index Values for Enumeration Literals for details about the numeric indexes for the enumeration values. If strict SQL mode is enabled, attempts to insert invalid ENUM values result in an error. If an ENUM column is declared to permit NULL, the NULL value is a valid value for the column, and the default value is NULL. If an ENUM column is declared NOT NULL, its default value is the first element of the list of permitted values. ENUM values are sorted based on their index numbers, which depend on the order in which the enumeration members were listed in the column specification. For example, 'b' sorts before 'a' for ENUM('b', 'a'). The empty string sorts before nonempty strings, and NULL values sort before all other enumeration values. To prevent unexpected results when using the ORDER BY clause on an ENUM column, use one of these techniques: Specify the ENUM list in alphabetic order. Make sure that the column is sorted lexically rather than by index number by coding ORDER BY CAST(col AS CHAR) or ORDER BY CONCAT(col). An enumeration value cannot be an expression, even one that evaluates to a string value. For example, this CREATE TABLE statement does not work because the CONCAT function cannot be used to construct an enumeration value: CREATE TABLE sizes (size ENUM('small', CONCAT('med','ium'), 'large')); You also cannot employ a user variable as an enumeration value. This pair of statements do not work: SET @mysize = 'medium'; CREATE TABLE sizes (size ENUM('small', @mysize, 'large')); We strongly recommend that you do not use numbers as enumeration values, because it does not save on storage over the appropriate TINYINT or SMALLINT type, and it is easy to mix up the strings and the underlying number values (which might not be the same) if you quote the ENUM values incorrectly. If you do use a number as an enumeration value, always enclose it in quotation marks. If the quotation marks are omitted, the number is regarded as an index. See Handling of Enumeration Literals to see how even a quoted number could be mistakenly used as a numeric index value. Duplicate values in the definition cause a warning, or an error if strict SQL mode is enabled. Page 9 A SET is a string object that can have zero or more values, each of which must be chosen from a list of permitted values specified when the table is created. SET column values that consist of multiple set members are specified with members separated by commas (,). A consequence of this is that SET member values should not themselves contain commas. For example, a column specified as SET('one', 'two') NOT NULL can have any of these values: '' 'one' 'two' 'one,two' A SET column can have a maximum of 64 distinct members. A table can have no more than 255 unique element list definitions among its ENUM and SET columns considered as a group. For more information on this limit, see Limits Imposed by .frm File Structure. Duplicate values in the definition cause a warning, or an error if strict SQL mode is enabled. Trailing spaces are automatically deleted from SET member values in the table definition when a table is created. See String Type Storage Requirements for storage requirements for the SET type. See Section 11.3.1, “String Data Type Syntax” for SET type syntax and length limits. When retrieved, values stored in a SET column are displayed using the lettercase that was used in the column definition. Note that SET columns can be assigned a character set and collation. For binary or case-sensitive collations, lettercase is taken into account when assigning values to the column. MySQL stores SET values numerically, with the low-order bit of the stored value corresponding to the first set member. If you retrieve a SET value in a numeric context, the value retrieved has bits set corresponding to the set members that make up the column value. For example, you can retrieve numeric values from a SET column like this: mysql> SELECT set_col+0 FROM tbl_name; If a number is stored into a SET column, the bits that are set in the binary representation of the number determine the set members in the column value. For a column specified as SET('a','b','c','d'), the members have the following decimal and binary values. If you assign a value of 9 to this column, that is 1001 in binary, so the first and fourth SET value members 'a' and 'd' are selected and the resulting value is 'a,d'. For a value containing more than one SET element, it does not matter what order the elements are listed in when you insert the value. It also does not matter how many times a given element is listed in the value. When the value is retrieved later, each element in the value appears once, with elements listed according to the order in which they were specified at table creation time. Suppose that a column is specified as SET('a','b','c','d'): mysql> CREATE TABLE myset (col SET('a', 'b', 'c', 'd')); If you insert the values 'a,d', 'd,a', 'a,d,d', 'a,d,a', and 'd,a,d': mysql> INSERT INTO myset (col) VALUES -> ('a,d'), ('d,a'), ('a,d,a'), ('a,d,d'), ('d,a,d'); Query OK, 5 rows affected (0.01 sec) Records: 5 Duplicates: 0 Warnings: 0 Then all these values appear as 'a,d' when retrieved: mysql> SELECT col FROM myset; +------+ | col | +------+ | a,d | | a,d | | a,d | | a,d | | a,d | +------+ 5 rows in set (0.04 sec) If you set a SET column to an unsupported value, the value is ignored and a warning is issued: mysql> INSERT INTO myset (col) VALUES ('a,d,d,s'); Query OK, 1 row affected, 1 warning (0.03 sec) mysql> SHOW WARNINGS; +---------+------+---+ | Level | Code | Message | +---------+------+---+ | Warning | 1265 | Data truncated for column 'col' at row 1 | +---------+------+---+ 1 row in set (0.04 sec) mysql> SELECT col FROM myset; +------+ | col | +------+ | a,d | | a,d | | a,d | | a,d | | a,d | | a,d | +------+ 6 rows in set (0.01 sec) If strict SQL mode is enabled, attempts to insert invalid SET values result in an error. SET values are sorted numerically. NULL values sort before non-NULL SET values. Functions such as SUM() or AVG() that expect a numeric argument cast the argument to a number if necessary. For SET values, the cast operation causes the numeric value to be used. Normally, you search for SET values using the FIND_IN_SET() function or the LIKE operator: mysql> SELECT * FROM tbl_name WHERE FIND_IN_SET('value',set_col)>0; mysql> SELECT * FROM tbl_name WHERE set_col LIKE '%value%'; The first statement finds rows where set_col contains the value set member. The second is similar, but not the same: It finds rows where set_col contains value anywhere, even as a substring of another set member. The following statements also are permitted: mysql> SELECT * FROM tbl_name WHERE set_col & 1; mysql> SELECT * FROM tbl_name WHERE set_col = 'val1,val2'; The first of these statements looks for values containing the first set member. The second looks for an exact match. Be careful with comparisons of the second type. Comparing set values to 'val1,val2' returns different results than comparing values to 'val2,val1'. You should specify the values in the same order they are listed in the column definition. To determine all possible values for a SET column, use SHOW COLUMNS FROM tbl_name LIKE set_col and parse the SET definition in the Type column of the output. In the C API, SET values are returned as strings. For information about using result set metadata to distinguish them from other strings, see C API Basic Data Structures. Page 10 The Open Geospatial Consortium (OGC) is an international consortium of more than 250 companies, agencies, and universities participating in the development of publicly available conceptual solutions that can be useful with all kinds of applications that manage spatial data. The Open Geospatial Consortium publishes the OpenGIS® Implementation Standard for Geographic information - Simple Feature Access - Part 2: SQL Option, a document that proposes several conceptual ways for extending an SQL RDBMS to support spatial data. This specification is available from the OGC website at . Following the OGC specification, MySQL implements spatial extensions as a subset of the SQL with Geometry Types environment. This term refers to an SQL environment that has been extended with a set of geometry types. A geometry-valued SQL column is implemented as a column that has a geometry type. The specification describes a set of SQL geometry types, as well as functions on those types to create and analyze geometry values. MySQL spatial extensions enable the generation, storage, and analysis of geographic features: Data types for representing spatial values Functions for manipulating spatial values Spatial indexing for improved access times to spatial columns The spatial data types and functions are available for MyISAM, InnoDB, NDB, and ARCHIVE tables. For indexing spatial columns, MyISAM supports both SPATIAL and non-SPATIAL indexes. The other storage engines support non-SPATIAL indexes, as described in Section 13.1.13, “CREATE INDEX Statement”. A geographic feature is anything in the world that has a location. A feature can be: An entity. For example, a mountain, a pond, a city. A space. For example, town district, the tropics. A definable location. For example, a crossroad, as a particular place where two streets intersect. Some documents use the term geospatial feature to refer to geographic features. Geometry is another word that denotes a geographic feature. Originally the word geometry meant measurement of the earth. Another meaning comes from cartography, referring to the geometric features that cartographers use to map the world. The discussion here considers these terms synonymous: geographic feature, geospatial feature, feature, or geometry. The term most commonly used is geometry, defined as a point or an aggregate of points representing anything in the world that has a location. The following material covers these topics: The spatial data types implemented in MySQL model The basis of the spatial extensions in the OpenGIS geometry model Data formats for representing spatial data How to use spatial data in MySQL Use of indexing for spatial data MySQL differences from the OpenGIS specification For information about functions that operate on spatial data, see Section 12.17, “Spatial Analysis Functions”. MySQL GIS Conformance and Compatibility MySQL does not implement the following GIS features: Additional Metadata Views OpenGIS specifications propose several additional metadata views. For example, a system view named GEOMETRY_COLUMNS contains a description of geometry columns, one row for each geometry column in the database. The OpenGIS function Length() on LineString and MultiLineString should be called in MySQL as GLength() The problem is that there is an existing SQL function Length() that calculates the length of string values, and sometimes it is not possible to distinguish whether the function is called in a textual or spatial context. The Open Geospatial Consortium publishes the OpenGIS® Implementation Standard for Geographic information - Simple feature access - Part 2: SQL option, a document that proposes several conceptual ways for extending an SQL RDBMS to support spatial data. The Open Geospatial Consortium (OGC) maintains a website at . The specification is available there at . It contains additional information relevant to the material here. If you have questions or concerns about the use of the spatial extensions to MySQL, you can discuss them in the GIS forum: . Page 11 11.4.1 Spatial Data Types MySQL has spatial data types that correspond to OpenGIS classes. The basis for these types is described in Section 11.4.2, “The OpenGIS Geometry Model”. Some spatial data types hold single geometry values: GEOMETRY POINT LINESTRING POLYGON GEOMETRY can store geometry values of any type. The other single-value types (POINT, LINESTRING, and POLYGON) restrict their values to a particular geometry type. The other spatial data types hold collections of values: MULTIPOINT MULTILINESTRING MULTIPOLYGON GEOMETRYCOLLECTION GEOMETRYCOLLECTION can store a collection of objects of any type. The other collection types (MULTIPOINT, MULTILINESTRING, and MULTIPOLYGON) restrict collection members to those having a particular geometry type. Example: To create a table named geom that has a column named g that can store values of any geometry type, use this statement: CREATE TABLE geom (g GEOMETRY); SPATIAL indexes can be created on NOT NULL spatial columns, so if you plan to index the column, declare it NOT NULL: CREATE TABLE geom (g GEOMETRY NOT NULL); For other examples showing how to use spatial data types in MySQL, see Section 11.4.4, “Creating Spatial Columns”. Page 12

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