MySQL Connector/C++ Release Notes

Abstract

This document contains release notes for the changes in each release of MySQL Connector/C++.

For additional MySQL Connector/C++ documentation, see MySQL Connector/C++ Developer Guide.

Updates to these notes occur as new product features are added, so that everybody can follow the development process. If a recent version is listed here that you cannot find on the download page (http://dev.mysql.com/downloads/), the version has not yet been released.

The documentation included in source and binary distributions may not be fully up to date with respect to release note entries because integration of the documentation occurs at release build time. For the most up-to-date release notes, please refer to the online documentation instead.

For legal information, see the Legal Notices.

For help with using MySQL, please visit either the MySQL Forums or MySQL Mailing Lists, where you can discuss your issues with other MySQL users.

For additional documentation on MySQL products, including translations of the documentation into other languages, and downloadable versions in variety of formats, including HTML and PDF formats, see the MySQL Documentation Library.

Document generated on: 2016-12-23 (revision: 10527)

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Preface and Legal Notices

This document contains release notes for the changes in each release of MySQL Connector/C++.

Legal Notices

Changes in MySQL Connector/C++ 2.0

Changes in MySQL Connector/C++ 2.0.3 (2016-10-19, Development Milestone)

MySQL Connector/C++ 2.0.3 is the next development milestone of the MySQL Connector/C++ 2.0 series, and the first public release. Apart from covering more X DevAPI features, it adds a new, plain C API, called XAPI, that offers functionality similar to X DevAPI to applications written in plain C. Thus, not only can MySQL Connector/C++ be used to write C++ applications, as before. Now, using the XAPI, MySQL Connector/C++ can be used to write plain C applications to access MySQL Database implementing a document store as well as execute traditional plain SQL statements. For more information about XAPI, refer to the documentation at http://dev.mysql.com/doc/dev/connector-cpp/xapi_ref.html.

Note

The X DevAPI requires at least MySQL Server version 5.7.12 or higher with the X Plugin enabled. For general documentation about how to get started using MySQL as a document store, see Using MySQL as a Document Store.

X DevAPI Notes

- New X DevAPI features added in this MySQL Connector/C++ release:
  - Methods for starting and controlling transactions
  - Using an X DevAPI URI or connection string to specify new session parameters
  - Capability of binding a session to the default shard and execute SQL statements there (using `XSession.bindToDefaultShard()`)
  - Methods for counting elements in a table or collection
  - Access to multiple result sets if present in a query result
  - Methods to count items in a result set and fetch a complete result set at once (using `fetchAll()`), instead of accessing items one by one (using `fetchOne()`)
  - Access to warnings reported when processing a statement (`getWarnings()`)

- Access to information about affected rows, generated auto-increment values, and identifiers of documents added to a collection

Changes in MySQL Connector/C++ 2.0.2 (Not released, Development Milestone)

MySQL Connector/C++ 2.0.2 is the next development milestone of the MySQL Connector/C++ 2.0 series. This series implements the new X DevAPI. The X DevAPI enables application developers to write code that combines the strengths of the relational and document models using a modern, NoSQL-like syntax that does not assume previous experience writing traditional SQL. It also allows working in a traditional way, using SQL queries, and thus provides functionality similar to the API used in the previous versions of the connector.

To learn more about how to write applications using the X DevAPI, see X DevAPI User Guide. For more information about how to use Connector/C++ 2.0 and how the X DevAPI is implemented in it, see http://dev.mysql.com/doc/dev/connector-cpp/.

Note

The X DevAPI requires at least MySQL Server version 5.7.12 or higher with the X Plugin enabled. For general documentation about how to get started using MySQL as a document store, see Using MySQL as a Document Store.

Version 2.0.2 has no changelog entries, or they have not been published because the product version has not been released.

Changes in MySQL Connector/C++ 2.0.1 (Not released, Development Milestone)

MySQL Connector/C++ 2.0.1 is the first development milestone of the MySQL Connector/C++ 2.0 series.

Version 2.0.1 has no changelog entries, or they have not been published because the product version has not been released.

Changes in MySQL Connector/C++ 1.1

Changes in MySQL Connector/C++ 1.1.8 (2016-12-16, General Availability)

- Security Notes
- Functionality Added or Changed
- Bugs Fixed

Security Notes

- OpenSSL is ending support for version 1.0.1 in December 2016; see https://www.openssl.org/policies/releasestrat.html. Consequently, Connector/C++ Commercial builds now use version 1.0.2 rather than version 1.0.1, and the linked OpenSSL library for the Connector/C++ Commercial has been updated from version 1.0.1 to version 1.0.2j. For a description of issues fixed in this version, see https://www.openssl.org/news/vulnerabilities.html.

  This change does not affect Oracle-produced MySQL Community builds of Connector/C++, which use the yaSSL library instead.

Functionality Added or Changed

- Connector/C++ now supports a `OPT_TLS_VERSION` connection option for specifying the protocols permitted for encrypted connections. The option value is string containing a comma-separated list of one or more protocol names. Example:

```
connection_properties["OPT_TLS_VERSION"] = sql::SQLString("TLSv1.1,TLSv1.2");
```

  The permitted values depend on the SSL library used to compile MySQL: `TLSv1`, `TLSv1.1`, `TLSv1.2` if OpenSSL was used; `TLSv1` and `TLSv1.1` if yaSSL was used. The default is to permit all available protocols.

  For more information about connection protocols in MySQL, see Secure Connection Protocols and Ciphers. (Bug #23496967)

- Connector/C++ now supports a `OPT_SSL_MODE` connection option for specifying the security state of the connection to the server. Permitted option values are `SSL_MODE_PREFERRED` (the default), `SSL_MODE_DISABLED`, `SSL_MODE_REQUIRED`, `SSL_MODE_VERIFY_CA`, and `SSL_MODE_VERIFY_IDENTITY`. These values correspond to the values of the `--ssl-mode` option supported by MySQL client programs; see Command Options for Secure Connections. For example, this setting specifies that the connection should be unencrypted:

```
connection_properties["OPT_SSL_MODE"] = sql::SSL_MODE_DISABLED;
```

  The `OPT_SSL_MODE` option comprises the capabilities of the `sslEnforce` and `sslVerify` connection options. Consequently, both of those options are now deprecated. (Bug #23496952)

- Connector/C++ now supports `OPT_MAX_ALLOWED_PACKET` and `OPT_NET_BUFFER_LENGTH` connection options. Each option takes a numeric value. They correspond to the `MYSQL_OPT_MAX_ALLOWED_PACKET` and `MYSQL_OPT_NET_BUFFER_LENGTH` options for the `mysql_options()` C API function.

- Issues compiling Connector/C++ under Visual Studio 2015 were corrected.

Bugs Fixed

- A segmentation fault could occur for attempts to insert a large string using a prepared statement. (Bug #23212333, Bug #81213)

- The certification verification checks that are enabled by the `verifySSL` connection option were not performed properly. (Bug #22931974)

- Connector/C++ failed to compile against a version of the MySQL C API older than 5.7. (Bug #22838573, Bug #80539, Bug #25201287)

Changes in MySQL Connector/C++ 1.1.7 (2016-01-20, General Availability)

Configuration Notes

- Binary distributions for this release of MySQL Connector/C++ were linked against `libmysqlclient` from MySQL 5.7.10, except for OS X 10.8/10.9, for which distributions were linked against MySQL 5.7.9.

This enables Connector/C++ to take advantage of features present in recent client library versions. Some examples:

- Support for the MySQL `JSON` data type is available. Current versions of MySQL Workbench require `JSON` support, so to build MySQL Workbench 6.3.5 or higher from source, it is necessary to use a version of Connector/C++ at least as recent as 1.1.7.
- Applications will attempt to establish a secure (encrypted) connection by default whenever the server is enabled to support secure connections, and fall back to an unencrypted connection otherwise. (This is as described at Configuring MySQL to Use Secure Connections.) To enforce a secure connection, such that an error occurs if secure connections are not available, applications can enable the `sslEnforce` connection option.

To build Connector/C++ from source, you must use either a General Availability version of MySQL 5.7 (5.7.9 or higher) or Connector/C 6.1.8 or higher. Set the `MYSQL_DIR` `CMake` option appropriately at configuration time as necessary. (Bug #22351273)

Security Notes

- The linked OpenSSL library for Connector/C++ Commercial has been updated to version 1.0.1q. Issues fixed in the new OpenSSL version are described at http://www.openssl.org/news/vulnerabilities.html.

  This change does not affect Oracle-produced MySQL Community builds of Connector/C++, which use the yaSSL library instead.

Spatial Data Support

- The required version of the Boost library for Connector/C++ builds has been raised to 1.56.0.

Bugs Fixed

- `MySQL_Prepared_ResultSet::relative()` failed to fetch the record due to a missing `proxy->fetch()` call. (Bug #21152054)
- During Connector/C++ builds, the MySQL Server `CXXFLAGS` and `CFLAGS` values were used rather than the system default values. To specify explicitly to use the server values, enable the new `USE_SERVER_CXXFLAGS` `CMake` option. (Bug #77655, Bug #21391025)

Changes in MySQL Connector/C++ 1.1.6 (2015-06-10, General Availability)

Security Notes

- **Security Fix:** Connector/C++ 1.1.6 Commercial upgrades the linked OpenSSL library to version 1.0.1m which has been publicly reported as not vulnerable to CVE-2015-0286. (CVE-2015-0286)

Functionality Added or Changed

- The `std::auto_ptr` class template is deprecated in C++11, and its usage has been replaced with `boost::scoped_ptr/shared_ptr`.

  The `CMAKE_ENABLE_C++11` `CMake` option has been added to permit enabling C++11 support. (Bug #75251)

- Connector/C++ now provides macros to indicate the versions of libraries against which it was built: `MYCPPCONN_STATIC_MYSQL_VERSION` and `MYCPPCONN_STATIC_MYSQL_VERSION_ID` (MySQL client library version, string and numeric), and `MYCPPCONN_BOOST_VERSION` (Boost library version, numeric). (Bug #75250)

Bugs Fixed

- With `defaultStatementResultType=FORWARD_ONLY` and a row position after the last row, using getter methods such as `getInt()` or `getString()` resulted in a segmentation fault. (Bug #20085944)
- For prepared statements, calling `wasNull()` before fetching data resulted in an assertion failure. (Bug #19938873)
- Result sets from prepared statements were not freed. (Bug #18135088)
- Connector/C++ failed to build against Boost-devel-1.41.0-25 on OLE6. (Bug #75063, Bug #20125824)
- Configuration failed if the `MYSQL_CONFIG_EXECUTABLE` option was specified and the MySQL installation path contained the characters `-m`. Installation failed if the build directory was not in the top source directory. (Bug #73502, Bug #19447498)
- For prepared statements, `getString()` did not return the fractional seconds part from temporal columns that had a fractional sections part. (Bug #68523, Bug #17218692)
- For queries of the form `SELECT MAX(bit_col) FROM table_with_bit_col`, `getString()` returned an incorrect result. (Bug #66235, Bug #14520822)
- For Connector/C++ builds from source, `make install` failed if only the static library had been built without the dynamic library. (Bug #52281, Bug #11759926)

Changes in MySQL Connector/C++ 1.1.5 (2014-11-26, General Availability)

Functionality Added or Changed

- `MySQL_Prepared_Statement::getMoreResults()` functionality has been implemented, so multiple result sets now can be fetched using a prepared statement. (Bug #19147677)
- Connector/C++ now supports the `defaultAuth`, `OPT_CONNECT_ATTR_DELETE`, `OPT_CONNECT_ATTR_RESET`, `OPT_LOCAL_INFILE`, `pluginDir`, `readDefaultFile`, `readDefaultGroup`, and `charsetDir` connection options, which correspond to the `MYSQL_DEFAULT_AUTH`, `MYSQL_OPT_CONNECT_ATTR_DELETE`, `MYSQL_OPT_CONNECT_ATTR_RESET`, `MYSQL_OPT_LOCAL_INFILE`, `MYSQL_PLUGIN_DIR`, `MYSQL_READ_DEFAULT_FILE`, `MYSQL_READ_DEFAULT_GROUP`, and `MYSQL_SET_CHARSET_DIR` options for the `mysql_options()` C API function.

  It is also possible to get and set the statement execution-time limit using the `MySQL_Statement::getQueryTimeout()` and `MySQL_Statement::setQueryTimeout()` methods. (Bug #73665, Bug #19479950)
- These methods were added: `Connection::isValid()` checks whether the connection is alive, and `Connection::reconnect()` reconnects if the connection has gone down. (Bug #65640, Bug #14207722)

- The Boost dependency was removed from the Connector/C++ API headers. These headers were using the `boost::variant` type, making it impossible to use Connector/C++ binaries without having Boost installed.

Bugs Fixed

- For installation from MSI packages, `variant.h` and `version_info.h` were missing from the `include/cppconn` folder. (Bug #19973637)
- For several valid client options, `getClientOption()` did not return a value. (Bug #19940314)
- A memory leak occurred when adding the `OPT_CONNECT_ATTR_ADD` parameter to the options list. (Bug #19938970)
- `getClientOption()` raised an assertion if the specified option was not set at connect time. (Bug #19938922)
- Several metadata flaws were corrected:
  - `getTables()` did not return a correct result when `TableType=VIEW` and `metadataUseInfoSchema=false`.
  - `getColumns()` did not return column inforomation when `metadataUseInfoSchema=TRUE`.
  - `getColumnName()` returned the display name instead of the actual column name.
  - `getProcedures()` returned a syntax error when `metadataUseInfoSchema=false`.

  (Bug #19505348, Bug #19147897, Bug #19244736, Bug #19505421)
- The `LOCALHOST` global variable was referenced at two places in C/C++ code, which could result in a double-free corruption error. (Bug #74616, Bug #19910311)
- `driver/version_info.h` (containing version macros) was not included in the installed header files. (Bug #73795, Bug #19553971)
- Several `CMake` issues were corrected:
  - `CMake` could misconfigure the link flags.
  - `CMake` did not pick up the `libmysqlclient` path from the `MYSQL_LIB_DIR` option.
  - For test suite compilation, `CMake` did not pick up `libmysqlclient` from the user-specified path, even if `MYSQL_LIB_DIR` and `DYNLOAD_MYSQL_LIB` were given.

  (Bug #73427, Bug #19315635, Bug #19370844, Bug #19940663)
- Connector/C++ issued a ping command every time `isClosed()` was called in a `Connection`, rather than just checking whether `close()` had been called earlier or when a fatal error occurred in an earlier operation. (Bug #69785, Bug #17186530)
- With the result set type set to `TYPE_FORWARD_ONLY`, `Statement::executeQuery()` returns almost immediately, but `MySQL_ResultSet::next()` and `MySQL_Prepared_ResultSet::next()` returned false if the connection was lost rather than throwing an exception, making it impossible to distinguish loss of connection from normal end of the result set. `MySQL_ResultSet::next()` and `MySQL_Prepared_ResultSet::next()` now throw an exception when the connection is lost. (Bug #69031, Bug #18886278)

- `Connection` objects shared internal state with `Statement` objects they spawned, preventing a connection close unless the `Statement` objects were destroyed first. A connection to the server now is closed by calling `Connection::close()` and invoking the `Connection` object destructor, without explicitly destroying the statement object.

Changes in MySQL Connector/C++ 1.1.4 (2014-07-31, General Availability)

Compilation Notes

- Connector/C++ is now compiled and linked with Connector/C 6.1.5 rather than with `libmysql`.
- Binary distributions of this Connector/C++ release were compiled using Boost 1.54.0. If you compile this Connector/C++ release from source, you must also use that Boost version.

Functionality Added or Changed

- Connector/C++ now supports the following connection options: `sslVerify` (boolean), `sslCRL` (string), and `sslCRLPath` (string). These correspond to the `MYSQL_OPT_SSL_VERIFY_SERVER_CERT`, `MYSQL_OPT_SSL_CRL`, and `MYSQL_OPT_SSL_CRLPATH` options for the `mysql_options()` C API function. (Bug #18461451)
- Connector/C++ has new methods to provide schema, table, and column character set and collation metadata for result sets:
  - `ResultSet * DatabaseMetaData::getSchemaCollation(const sql::SQLString& catalog, const sql::SQLString& schemaPattern)`
  - `ResultSet * DatabaseMetaData::getSchemaCharset(const sql::SQLString& catalog, const sql::SQLString& schemaPattern)`
  - `ResultSet * DatabaseMetaData::getTableCollation(const sql::SQLString& catalog, const sql::SQLString& schemaPattern, const sql::SQLString& tableNamePattern)`
  - `ResultSet * DatabaseMetaData::getTableCharset(const sql::SQLString& catalog, const sql::SQLString& schemaPattern, const sql::SQLString& tableNamePattern)`
  - `SQLString ResultSetMetaData::getColumnCollation(unsigned int columnIndex)`
  - `SQLString ResultSetMetaData::getColumnCharset(unsigned int columnIndex)`

  (Bug #72698, Bug #18803345)
- Connector/C++ now supports the `OPT_CONNECT_ATTR_ADD` option, which accepts an `std::map` argument. This option corresponds to the `MYSQL_OPT_CONNECT_ATTR_ADD` option for `mysql_options4()`. (Bug #72697, Bug #18803313)
- Connector/C++ now supports a `useLegacyAuth` connection option, which corresponds to the `MYSQL_SECURE_AUTH` option for the `mysql_options()` C API function, except that the sense is the logical negation. For example, to disable secure authentication, pass a `useLegacyAuth` value of true. (Bug #69492, Bug #16970753)

Bugs Fixed

- `MySQL_ResultSetMetaData::getColumnTypeName()` returned `UNKNOWN` for `LONG_BLOB` fields. (Bug #72700, Bug #18803414)
- Definitions for character sets and collations were added (`utf8mb4` in particular). (Bug #71606, Bug #18193771)
- Connector/C++ version-information methods have been revised to return the correct values. (Bug #66975, Bug #14680878)

Changes in MySQL Connector/C++ 1.1.3 (2013-03-08, General Availability)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Connector/C++ now supports an `OPT_ENABLE_CLEARTEXT_PLUGIN` connection option. If true, it enables the client-side cleartext authentication plugin. This client-side plugin is required, for example, for accounts that use the PAM server-side authentication plugin. (Bug #16520952)

Bugs Fixed

- `MySQL_ConnectionMetaData::getBestRowIdentifier()` considered only `PRIMARY KEY` columns usable for row identifiers. It now also considers `UNIQUE NOT NULL` columns suitable for the same purpose. (Bug #16277170)

Changes in MySQL Connector/C++ 1.1.2 (2013-02-05, General Availability)

Functionality Added or Changed

- Connector/C++ applications now can handle connecting to the server using an account for which the password had expired. Connector/C++ now supports three new connection options:
  - `OPT_CAN_HANDLE_EXPIRED_PASSWORDS`: If true, this indicates to the driver that the application can handle expired passwords.

    If the application specifies `OPT_CAN_HANDLE_EXPIRED_PASSWORDS` but the underlying `libmysqlclient` library does not support it, the driver returns `sql::mysql:deCLIENT_DOESNT_SUPPORT_FEATURE(820)`.
  - `preInit`: A string containing statements to run before driver initialization.
  - `postInit`: A string containing statements to run after driver initialization.

  A new file `driver/mysql_error.h` is being added to the MSI package. This file defines an `enum DRIVER_ERROR`, which contains the definition of `deCL_CANT_HANDLE_EXP_PWD`.

  In addition to the preceding changes, these problems with `Statement::executeUpdate` were fixed:
  - If `Statement::executeUpdate` executed multiple statements, the connection became unusable.
  - There was no exception if one of statements returned a result set. Now `executeUpdate` returns and update count for the last executed query.

For example code showing how to use the new options, see the file `test/unit/bugs/bugs.cpp` in the Connector/C++ distribution. (Bug #67325, Bug #15936764)

Changes in MySQL Connector/C++ 1.1.1 (2012-08-07, General Availability)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Connector/C++ is now built against `libmysqlclient` from MySQL 5.5.27, enabling support of authentification plugins and IPv6.
- URI format has been extended to better fit IPv6 addresses. You can now use `[]` to separate the host part of the URI.
- Added new method `ResultSetMetaData::isNumeric()` and implemented it in all classes that subclass from it.
- Added `MySQL_Connection::getLastStatementInfo()` which returns back the value of the `mysql_info()` function of the MySQL Client Library (`libmysqlclient`).

Bugs Fixed

- Compiling with Visual Studio 2010 could fail with compilation errors if the source contained a `#include <stdint.h>` line. The errors were typically of the form `cannot convert from 'type1' to 'type2'`. (Bug #14113387, Bug #60307)
- Fixed `stores(Lower|Mixed)Case(Quoted)Identifiers` methods.
- A statement that did not raise any warning could return warnings from a previously executed statement.
- `DatabaseMetaData::getSQLKeywords()` updated to match MySQL 5.5. Note that Connector/C++, just like Connector/J, returns the same list for every MySQL database version.

Changes in MySQL Connector/C++ 1.1.0 (2010-09-13, General Availability)

This fixes bugs since the first GA release 1.0.5 and introduces new features.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- **Incompatible Change:** API incompatible change: `ConnectPropertyVal` is no longer a `struct` by a typedef that uses `boost::variant`. Code such as:

```
sql::ConnectPropertyVal tmp;
tmp.str.val=passwd.c_str();
tmp.str.len=passwd.length();
connection_properties["password"] = tmp;
```

Should be changed to:

```
connection_properties["password"] = sql::ConnectPropertyVal(passwd);
```

- Instances of `std::auto_ptr` have been changed to `boost::scoped_ptr`. Scoped array instances now use boost::scoped_array. Further, `boost::shared_ptr` and `boost::weak_ptr` are now used for guarding access around result sets.
- `LDFLAGS`, `CXXFLAGS` and `CPPFLAGS` are now checked from the environment for every binary generated.
- The connection map property `OPT_RECONNECT` was changed to be of type `boolean` from `long long`.
- `get_driver_instance()` is now only available in dynamic library builds; static builds do not have this symbol. This was done to accommodate loading the DLL with `LoadLibrary` or `dlopen`. If you do not use `CMake` for building the source code you will need to define `mysqlcppconn_EXPORTS` if you are loading dynamically and want to use the `get_driver_instance()` entry point.
- `Connection::getClientOption(const sql::SQLString & optionName, void * optionValue)` now accepts the `optionName` values `metadataUseInfoSchema`, `defaultStatementResultType`, `defaultPreparedStatementResultType`, and `characterSetResults`. In the previous version only `metadataUseInfoSchema` was permitted. The same options are available for `Connection::setClientOption()`.

Bugs Fixed

- Certain header files were incorrectly present in the source distribution. The fix excludes dynamically generated and platform specific header files from source packages generated using CPack. (Bug #45846)
- `CMake` generated an error if configuring an out of source build, that is, when `CMake` was not called from the source root directory. (Bug #45843)
- Using Prepared Statements caused corruption of the heap. (Bug #45048)
- Missing includes when using GCC 4.4. Note that GCC 4.4 is not yet in use for any official Connector/C++ builds. (Bug #44931)
- A bug was fixed in Prepared Statements. The bug occurred when a stored procedure was prepared without any parameters. This led to an exception. (Bug #44931)
- Fixed a Prepared Statements performance issue. Reading large result sets was slow.
- Fixed bug in `ResultSetMetaData` for statements and prepared statements, `getScale` and `getPrecision` returned incorrect results.

Changes in MySQL Connector/C++ 1.0

Changes in MySQL Connector/C++ 1.0.5 (2009-04-21, General Availability)

This is the first General Availability (GA) release.

Functionality Added or Changed

- The interface of `sql::ConnectionMetaData`, `sql::ResultSetMetaData` and `sql::ParameterMetaData` was modified to have a protected destructor. As a result the client code has no need to destruct the metadata objects returned by the connector. Connector/C++ handles the required destruction. This enables statements such as:

```
connection->getMetaData->getSchema();
```

This avoids potential memory leaks that could occur as a result of losing the pointer returned by `getMetaData()`.

- Improved memory management. Handling of potential memory leak situations is more robust.
- Changed the interface of `sql::Driver` and `sql::Connection` so they accept the options map by alias instead of by value.
- Changed the return type of `sql::SQLException::getSQLState()` from `std::string` to `const char *` to be consistent with `std::exception::what()`.
- Implemented `getResultSetType()` and `setResultSetType()` for `Statement`. Uses `TYPE_FORWARD_ONLY`, which means unbuffered result set and `TYPE_SCROLL_INSENSITIVE`, which means buffered result set.
- Implemented `getResultSetType()` for `PreparedStatement`. The setter is not implemented because currently `PreparedStatement` cannot do refetching. Storing the result means the bind buffers will be correct.
- Added the option `defaultStatementResultType` to `MySQL_Connection::setClientOption()`. Also, the method now returns `sql::Connection *`.
- Added `Result::getType()`. Implemented for the three result set classes.
- Enabled tracing functionality when building with Microsoft Visual C++ 8 and later, which corresponds to Microsoft Visual Studio 2005 and later.
- Added better support for named pipes, on Windows. Use `pipe://` and add the path to the pipe. Shared memory connections are currently not supported.

Bugs Fixed

- A bug was fixed in `MySQL_Connection::setSessionVariable()`, which had been causing exceptions to be thrown.

Changes in MySQL Connector/C++ 1.0.4 (2009-03-31, Beta)

Functionality Added or Changed

- An installer was added for the Windows operating system.
- Minimum `CMake` version required was changed from 2.4.2 to 2.6.2. The latest version is required for building on Windows.
- `metadataUseInfoSchema` was added to the connection property map, which enables control of the `INFORMATION_SCHEMA` for metadata.
- Implemented `MySQL_ConnectionMetaData::supportsConvert(from, to)`.
- Added support for Connector/C.
- Introduced `ResultSetMetaData::isZerofill()`, which is not in the JDBC specification.

Bugs Fixed

- A bug was fixed in all implementations of `ResultSet::relative()` which was giving a wrong return value although positioning was working correctly.
- A leak was fixed in `MySQL_PreparedResultSet`, which occurred when the result contained a `BLOB` column.

Changes in MySQL Connector/C++ 1.0.3 (2009-03-02, Alpha)

Functionality Added or Changed

- Added new tests in `test/unit/classes`. Those tests are mostly about code coverage. Most of the actual functionality of the driver is tested by the tests found in `test/CJUnitPort`.
- New data types added to the list returned by `DatabaseMetaData::getTypeInfo()` are `FLOAT UNSIGNED`, `DECIMAL UNSIGNED`, `DOUBLE UNSIGNED`. Those tests may not be in the JDBC specification. However, due to the change you should be able to look up every type and type name returned by, for example, `ResultSetMetaData::getColumnTypeName()`.
- `MySQL_Driver::getPatchVersion` introduced.
- Major performance improvements due to new buffered `ResultSet` implementation.
- Addition of `test/unit/README` with instructions for writing bug and regression tests.
- Experimental support for STLPort. This feature may be removed again at any time later without prior warning! Type `cmake -L` for configuration instructions.
- Added properties enabled methods for connecting, which add many connect options. This uses a dictionary (map) of key value pairs. Methods added are `Driver::connect(map)`, and `Connection::Connection(map)`.
- New `BLOB` implementation. `sql::Blob` was removed in favor of `std::istream`. C++'s `IOStream` library is very powerful, similar to PHP's streams. It makes no sense to reinvent the wheel. For example, you can pass a `std::istringstream` object to `setBlob()` if the data is in memory, or just open a file `std::fstream` and let it stream to the DB, or write its own stream. This is also true for `getBlob()` where you can just copy data (if a buffered result set), or stream data (if implemented).
- Implemented `ResultSet::getBlob()` which returns `std::stream`.
- Fixed `MySQL_DatabaseMetaData::getTablePrivileges()`. Test cases were added in the first unit testing framework.
- Implemented `MySQL_Connection::setSessionVariable()` for setting system variables such as `sql_mode`.
- Implemented `MySQL_DatabaseMetaData::getColumnPrivileges()`.
- `cppconn/datatype.h` has changed and is now used again. Reimplemented the type subsystem to be more usable - more types for binary and nonbinary strings.
- Implementation for `MySQL_DatabaseMetaData::getImportedKeys()` for MySQL versions before 5.1.16 using `SHOW`, and above using `INFORMATION_SCHEMA`.

- Implemented `MySQL_ConnectionMetaData::getProcedureColumns()`.
- `make package_source` now packs with bzip2.
- Re-added `getTypeInfo()` with information about all types supported by MySQL and the `sql::DataType`.
- Changed the implementation of `MySQL_ConstructedResultSet` to use the more efficient O(1) access method. This should improve the speed with which the metadata result sets are used. Also, there is less copying during the construction of the result set, which means that all result sets returned from the metadata functions will be faster.
- Introduced, internally, `sql::mysql::MyVal` which has implicit constructors. Used in `mysql_metadata.cpp` to create result sets with native data instead of always string (varchar).
- Renamed `ResultSet::getLong()` to `ResultSet::getInt64()`. `resultset.h` includes typdefs for Windows to be able to use `int64_t`.
- Introduced `ResultSet::getUInt()` and `ResultSet::getUInt64()`.
- Improved the implementation for `ResultSetMetaData::isReadOnly()`. Values generated from views are read only. These generated values don't have `db` in `MYSQL_FIELD` set, while all normal columns do have.
- Implemented `MySQL_DatabaseMetaData::getExportedKeys()`.
- Implemented `MySQL_DatabaseMetaData::getCrossReference()`.

Bugs Fixed

- Bug fixed in `MySQL_PreparedResultSet::getString()`. Returned string that had real data but the length was random. Now, the string is initialized with the correct length and thus is binary safe.
- Corrected handling of unsigned server types to return correct values.
- Fixed handling of numeric columns in `ResultSetMetaData::isCaseSensitive` to return `false`.

Changes in MySQL Connector/C++ 1.0.2 (2008-12-19, Alpha)

Functionality Added or Changed

- Implemented `getScale()`, `getPrecision()` and `getColumnDisplaySize()` for `MySQL_ResultSetMetaData` and `MySQL_Prepared_ResultSetMetaData`.
- Changed `ResultSetMetaData` methods `getColumnDisplaySize()`, `getPrecision()`, `getScale()` to return `unsigned int` instead of `signed int`.
- `DATE`, `DATETIME` and `TIME` are now being handled when calling the `MySQL_PreparedResultSet` methods `getString()`, `getDouble()`, `getInt()`, `getLong()`, `getBoolean()`.
- Reverted implementation of `MySQL_DatabaseMetaData::getTypeInfo()`. Now unimplemented. In addition, removed `cppconn/datatype.h` for now, until a more robust implementation of the types can be developed.

- Implemented `MySQL_PreparedStatement::setNull()`.
- Implemented `MySQL_PreparedStatement::clearParameters()`.
- Added PHP script `examples/cpp_trace_analyzer.php` to filter the output of the debug trace. Please see the inline comments for documentation. This script is unsupported.
- Implemented `MySQL_ResultSetMetaData::getPrecision()` and `MySQL_Prepared_ResultSetMetaData::getPrecision()`, updating example.
- Added new unit test framework for JDBC compliance and regression testing.
- Added `test/unit` as a basis for general unit tests using the new test framework, see `test/unit/example` for basic usage examples.

Bugs Fixed

- Fixed `MySQL_PreparedStatementResultSet::getDouble()` to return the correct value when the underlying type is `MYSQL_TYPE_FLOAT`.
- Fixed bug in `MySQL_ConnectionMetaData::getIndexInfo()`. The method did not work because the schema name wasn't included in the query sent to the server.
- Fixed a bug in `MySQL_ConnectionMetaData::getColumns()` which was performing a cartesian product of the columns in the table times the columns matching `columnNamePattern`. The example `example/connection_meta_schemaobj.cpp` was extended to cover the function.
- Fixed bugs in `MySQL_DatabaseMetaData`. All `supportsCatalogXXXXX` methods were incorrectly returning `true` and all `supportsSchemaXXXX` methods were incorrectly returning `false`. Now `supportsCatalogXXXXX` returns `false` and `supportsSchemaXXXXX` returns `true`.
- Fixed bugs in the `MySQL_PreparedStatements` methods `setBigInt()` and `setDatetime()`. They decremented the internal column index before forwarding the request. This resulted in a double-decrement and therefore the wrong internal column index. The error message generated was:

```
setString() ... invalid "parameterIndex"
```

- Fixed a bug in `getString()`. `getString()` is now binary safe. A new example was also added.
- Fixed bug in `FLOAT` handling.
- Fixed `MySQL_PreparedStatement::setBlob()`. In the tests there is a simple example of a class implementing `sql::Blob`.

Changes in MySQL Connector/C++ 1.0.1 (2008-12-01, Alpha)

Functionality Added or Changed

- `sql::mysql::MySQL_SQLException` was removed. The distinction between server and client (connector) errors, based on the type of the exception, has been removed. However, the error code can still be checked to evaluate the error type.
- Support for (n)make install was added. You can change the default installation path. Carefully read the messages displayed after executing cmake. The following are installed:
  - Static and the dynamic version of the library, `libmysqlcppconn`.
  - Generic interface, `cppconn`.

  - Two MySQL specific headers:

    `mysql_driver.h`, use this if you want to get your connections from the driver instead of instantiating a `MySQL_Connection` object. This makes your code portable when using the common interface.

    `mysql_connection.h`, use this if you intend to link directly to the `MySQL_Connection` class and use its specifics not found in `sql::Connection`.

    However, you can make your application fully abstract by using the generic interface rather than these two headers.

- Driver Manager was removed.
- Added `ConnectionMetaData::getSchemas()` and `Connection::setSchema()`.
- `ConnectionMetaData::getCatalogTerm()` returns not applicable, there is no counterpart to catalog in Connector/C++.
- Added experimental GCov support, `cmake -DMYSQLCPPCONN_GCOV_ENABLE:BOOL=1`
- All examples can be given optional connection parameters on the command line, for example:

```
examples/connect tcp://host:port user pass database
```

  or

```
examples/connect unix:///path/to/mysql.sock user pass database
```

- Renamed `ConnectionMetaData::getTables: TABLE_COMMENT` to `REMARKS`.
- Renamed `ConnectionMetaData::getProcedures: PROCEDURE_SCHEMA` to `PROCEDURE_SCHEM`.
- Renamed `ConnectionMetaData::getPrimaryKeys(): COLUMN` to `COLUMN_NAME`, `SEQUENCE` to `KEY_SEQ`, and `INDEX_NAME` to `PK_NAME`.
- Renamed `ConnectionMetaData::getImportedKeys(): PKTABLE_CATALOG` to `PKTABLE_CAT`, `PKTABLE_SCHEMA` to `PKTABLE_SCHEM`, `FKTABLE_CATALOG` to `FKTABLE_CAT`, `FKTABLE_SCHEMA` to `FKTABLE_SCHEM`.
- Changed metadata column name `TABLE_CATALOG` to `TABLE_CAT` and `TABLE_SCHEMA` to `TABLE_SCHEM` to ensure JDBC compliance.
- Introduced experimental CPack support, see make help.
- All tests changed to create TAP compliant output.
- Renamed `sql::DbcMethodNotImplemented` to `sql::MethodNotImplementedException`
- Renamed `sql::DbcInvalidArgument` to `sql::InvalidArgumentException`
- Changed `sql::DbcException` to implement the interface of JDBC's `SQLException`. Renamed to `sql::SQLException`.
- Converted Connector/J tests were added.
- MySQL Workbench 5.1 changed to use Connector/C++ for its database connectivity.

- New directory layout.