MySQL Connector/J 5.1 Release Notes

Abstract

This document contains release notes for the changes in each release of MySQL Connector/J 5.1. It also contains release notes for earlier series of Connector/J.

Support EOL for MySQL Connector/J 5.1

Per Oracle's Lifetime Support policy, as of Feb 9th, 2021, MySQL Connector/J 5.1 series is covered under Oracle Sustaining Support. Users are encouraged to upgrade to MySQL Connector/J 8.0 series.

For additional Connector/J documentation, see MySQL Connector/J 5.1 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 (https://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 the MySQL Forums, where you can discuss your issues with other MySQL users.

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Preface and Legal Notices

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

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Changes in MySQL Connector/J 5.1

Changes in MySQL Connector/J 5.1.49 (2020-04-29, General Availability)

Version 5.1.49 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.6, 5.7, and 8.0. It supports the Java Database Connectivity (JDBC) 4.2 API.

Functionality Added or Changed

- Default value of the connection property `allowLoadLocalInfile` has been changed to `false`. Applications that use the `LOAD DATA LOCAL INFILE` statement on MySQL Servers need to set this property to `true` explicitly. (Bug #29261254, Bug #30866178)

- The allowable versions of TLS protocol used for connecting to the server, when no restrictions have been set using the connection properties `enabledTLSProtocols`, have been changed to:
  - `TLSv1`, `TLSv1.1`, and `TLSv1.2` for MySQL Community Servers 8.0, 5.7.28 and later, and 5.6.46 and later, and for commercial versions of MySQL Server 5.6, 5.7, and 8.0.
  - `TLSv1` and `TLSv1.1` for all other versions of MySQL Servers.

- The following third-party libraries have been removed from the distribution bundles for Connector/J:
  - C3P0 (required for building Connector/J from source)
  - JBoss common JDBC wrapper (required for building Connector/J from source)
  - Simple Logging Facade API (required for using the logging capabilities provided by the default implementation of org.slf4j.Logger.Slf4JLogger by Connector/J, and for building Connector/J from source)

Users who need those libraries have to obtain them on their own. See Installing Connector/J from a Binary Distribution and Installing from Source for details.

Bugs Fixed

- When trying to set a parameter for a `PreparedStatement` using the method `PreparedStatement.setObject(parameterIndex, "false", Types.BOOLEAN)`, the value was set to `true` instead of `false`. (Bug #30911870, Bug #98237)

- In line with good XML practices, DTD processing has been disabled for Connector/J's MySQL Fabric XML parser. (Bug #30657312)

- Methods of the `ResultSetUtil` class that are no longer used in Connector/J 5.1 have been removed. (Bug #30636056)
• For some prepared statements, calling `getMetaData()` on them resulted in an Incorrect DATE error, even when no DATE values were involved. This was due to some recent changes on the MySQL Server, to which this patch adjusts Connector/J. (Bug #30151808, Bug #96442)

References: See also: Bug #29025656, Bug #28940878.

• When working with a load balancing setup, if the connection property `loadBalanceStrategy` was set to bestResponseTime and connections to all the hosts in the original setup failed, Connector/J hung, even if there were actually newly-added hosts available. This was because Connector/J mishandled the host whitelist, and this patch corrects the problem. (Bug #23143279)

• Inserting values in batch using a `PreparedStatement` failed for an INSERT ...VALUE statement but worked for an INSERT ... VALUES statement, while they are synonymous for MySQL. (Bug #21181501, Bug #77183)

Changes in MySQL Connector/J 5.1.48 (2019-07-29, General Availability)

Version 5.1.48 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.6, 5.7, and 8.0. It supports the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed

• Important Change: For MySQL Server 8.0.14 and later, 5.7.25 and later, 5.6.43 and later, and 5.5.63 and later, minimal permissions on named pipes are granted to clients that use them to connect to the server. Connector/J, however, can only use named pipes when granted full access on them. As a workaround, the MySQL Server that Connector/J wants to connect to must be started with the system variable `named_pipe_full_access_group`; see the description for the system variable for more details. (Bug #28971500)

• The collation `utf8mb4_zh_0900_as_cs` has been added to the `CharsetMapping` class. (Bug #29244101)

• The list of MySQL Server reserved words, stored as the `MYSQL_KEYWORDS` string in the `DatabaseMetaData` class, has been updated. (Bug #28268619, Bug #91435)

• A number of private parameters of `ProfilerEvents` (for example, `hostname`) had no getters for accessing them from outside of the class instance. Getter methods have now been added for all the parameters of the class. (Bug #20010454, Bug #74690)

• Added support for the `utf8mb4_0900_bin` collation, which is now supported by MySQL Server 8.0.17.

Bugs Fixed

• When a `CallableStatement` was used to call a stored procedure or function that did not exist on the server or that the client had no rights to access its parameters’ metadata, Connector/J tried to infer the parameter metadata from the SQL call string itself, but did so wrongly. It was because Connector/J did not distinguish between a stored procedure and a stored function in its inference, and this fix makes Connector/J do so now. (Bug #29907618)

• `ResultSetMetaData.getTableName()` returned null when no applicable results could be returned for a column. However, the JDBC documentation specified an empty string to be returned in that case. This fix makes the method behave as documented. The same correction has been made for `getCatalogName()` and `getSchemaName()` . (Bug #29452669, Bug #94585)

• Because the SHOW PROCESSLIST statement might cause the server to fail sometimes, Connector/J now avoids using the statement, but queries the performance scheme instead for the information it needs. (Bug #29329326)
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• Enabling logSlowQueries resulted in many unnecessary calls of LogUtils.findCallingClassAndMethod(). With this fix, LogUtils.findCallingClassAndMethod() is called only when profileSQL is true and even in that case, the number of calls are reduced to a minimal to avoid the excessive stack trace data the function used to generate. Thanks to Florian Agsteiner for contributing to the fix. (Bug #29277648, Bug #94101, Bug #17640628, Bug #70877)

• For an SSL connection, after a client disconnected from a server by calling Connection.close(), the TCP connection remained in the TIME_WAIT state on the server side. With this fix, the connection remains in the TIME_WAIT state on the client side instead, in most cases. (Bug #29054329, Bug #93590)

• A memory leak occurred if Connector/J was loaded via the bootstrap class path instead of the main application classpath. It was because AbandonedConnectionCleanupThread failed to initialize its internal thread in that case, so that references for closed connections were not cleaned up, and their number kept growing. This fix repairs the clean up process for closed connections and also makes the process thread safe. (Bug #28747636, Bug #92508)

• PreparedStatement.setTimestamp threw a NullPointerException if getParameterMetaData() was called before the statement was executed. This fix adds the missing null checks to getParameterMetaData() to avoid the exception. (Bug #28529781, Bug #92089)

• Setting the connection property characterEncoding to an encoding that maps to the MySQL character set latin1 or utf8mb4 did not result in the corresponding default connection collation (latin1_swedish_ci or utf8mb4_0900_ai_ci, respectively) to be used on the server. With this fix, the server default is used in the situation. (Bug #28207422)

• Characters returned in a ResultSet were garbled when a server-side PreparedStatement was used, and the query involved concatenation of a number and a string with multi-byte characters. That was due to an issue with the number-to-string conversion involved, which has been corrected by this fix. (Bug #27453692)

• ResultSet.updateRow() failed with a MySQLSyntaxErrorException when the server was in NO_BACKSLASH_ESCAPES SQL mode and some but not all text columns were updated. It was because Connector/J sent the strings as hex literals in that case and added to them unnecessary quotes for escapes. This fix add checks to avoid quotes for being added unnecessarily. (Bug #22850444, Bug #80441)

• PreparedStatement.executeUpdate() failed with a MySQLSyntaxErrorException when the server was in NO_BACKSLASH_ESCAPES SQL mode and BLOB data types were involved in the statement. It was because Connector/J did not escape single quotes in BLOB value properly in NO_BACKSLASH_ESCAPES mode, and the problem has been corrected by this fix. (Bug #20913289)

• When a procedure and a function with the same name existed in a database, Connector/J retrieved parameter information from both at the same time by default, causing various errors at statement executions. This fix leverages the JDBC 4 DatabaseMetaData methods to return parameter information only from the procedure or function of interest, so that statements are executed without errors. (Bug #19531305, Bug #73774)

• Calling ProfilerEvent.pack() resulted in an ArrayIndexOutOfBoundsException. It was due to a mishandling of data types, which has been corrected by this fix. (Bug #11750577, Bug #41172)

Changes in MySQL Connector/J 5.1.47 (2018-08-17)

Version 5.1.47 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, 5.7, and 8.0. It supports the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed

• Bugs Fixed
Functionality Added or Changed

- The value UTF-8 for the connection property `characterEncoding` now maps to the `utf8mb4` character set on the server and, for MySQL Server 5.5.2 and later, `characterEncoding=UTF-8` can now be used to set the connection character set to `utf8mb4` even if `character_set_server` has been set to something else on the server. (Before this change, the server must have `character_set_server=utf8mb4` for Connector/J to use that character set.)

Also, if the connection property `connectionCollation` is also set and is incompatible with the value of `characterEncoding`, `characterEncoding` will be overridden with the encoding corresponding to `connectionCollation`.

See Using Character Sets and Unicode for details, including how to use the `utf8mb3` character set now for connection. (Bug #23227334, Bug #81196)

Bugs Fixed

- Setting `rewriteBatchedStatements=true` and `useLocalTransactionState=true` caused transactions to be uncommitted for batched `UPDATE` and `DELETE` statements. It was due to the intermediate queries for enabling multiquery support on the server resetting the local transaction state as a side effect. With this fix, the local transaction state is preserved when the intermediate queries are executed. (Bug #27658489, Bug #89948)

- Rewriting prepared `INSERT` statements in a multiquery batch failed with a `BatchUpdateException` when the statements did not contain place holders. This was due a faulty mechanism for query rewriting, which has been corrected by this fix. (Bug #25501750, Bug #84813)

- When using batched prepared statements with multiple queries per statement, queries rewriting was incorrect, resulting in the wrong queries being sent to the server. (Bug #23098159, Bug #81063)

- `ResultSet.updateRow()` failed when the character set used by a column in the `ResultSet` did not match that of the connection's encoding. With this fix, values for the affected columns are first converted to `String` before the update, so that the character set difference is properly handled. (Bug #22847443, Bug #80532)

- Record updates failed for a scrollable and updatable `PreparedStatement` when the `WHERE` clause for the updater or refresher contained fractional timestamp values and the connection property `sendFractionalSeconds` was set to `false`. It was because in the situation, Connector/J did not perform the proper adjustments of the fractional parts in the `WHERE` clause values according to the length of the field’s fractional part as defined in the database. This fix makes Connector/J perform the proper adjustment to the fractional part, so that the `WHERE` clause value can be properly compared to the value fetched from the database.

Moreover, `useJDBCCompliantTimezoneShift()`, `useGmtMillisForDatetimes()`, and `useSSPSCompatibleTimezoneShift()` were applied to the `WHERE` clause values while they should not be, and this fix removes their applications. (Bug #22305979)

- When a `java.util.Date` value was bound to a `PreparedStatement` parameter, attempts to format the value by a proleptic `GregorianCalendar` failed to make the dates proleptic, so that dates before the Julian-Gregorian cutover (October 15, 1582) were stored wrongly. With this fix, a proleptic calendar is properly used if supplied to the `setDate()` method.

Note that when trying to set or retrieve dates before the Julian-Gregorian cutover with `PreparedStatement` methods, a proleptic `GregorianCalendar` should always be explicitly supplied to the `setDate()` and `getDate()` method. For details, see Known Issues and Limitations. (Bug #18749544, Bug #72609)

Changes in MySQL Connector/J 5.1.46 (2018-03-12)

Version 5.1.46 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, 5.7, and 8.0. It supports the Java Database Connectivity (JDBC) 4.2 API.
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- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Because Connector/J restricted TLS versions to v1.1 and below by default when connecting to MySQL Community Server 8.0 (which used to be compiled with yaSSL by default and thus supporting only TLS v1.1 and below), it failed to connect to a MySQL 8.0.4 Community Server (which has been compiled with OpenSSL by default and thus supports TLS v1.2) that was configured to only allow TLS v1.2 connections. TLS v1.2 is now enabled for connections with MySQL Community Server 8.0.4 and later. (Bug #27374581)

- The bundle for Connector/J 5.1 delivered by Oracle now contains an additional jar package with the name `mysql-connector-java-5.1.VER.jar` (mysql-connector-java-commercial-5.1.VER.jar for commercial bundles). It is identical with the other jar package with the original package named `mysql-connector-java-5.1.VER-bin.jar` (mysql-connector-java-commercial-5.1.VER-bin.jar for commercial bundles), except for its more Maven-friendly file name. (Bug #27231383)

- The lower bound for the connection property `packetDebugBufferSize` has been changed to 1, to avoid the connection errors that occur when the value is set to 0. (Bug #26819691)

- For multi-host connections, when a MySQL Server was configured with `autocommit=0`, `Connection.getAutoCommit()` did not return the correct value. This was because `useLocalSessionState=true` was assumed for multi-host connections, which might not be the case, resulting thus in inconsistent session states.

  With this fix, by default, Connector/J executes some extra queries in the connection synchronization process to guarantee consistent session states between the client and the server at any connection switch. This would mean, however, that when none of the hosts are available during an attempted server switch, an exception for closed connection will be thrown immediately while, in earlier Connector/J versions, there would be a connection error thrown first before a closed connection error. Error handling in some applications might need to be adjusted accordingly.

  Applications can skip the new session state synchronization mechanism by having `useLocalSessionState=true`. (Bug #26314325, Bug #86741)

- Connector/J now supports the new `caching_sha2_password` authentication plugin for MySQL 8.0, which is the default authentication plugin for MySQL 8.0.4 and later (see Caching SHA-2 Pluggable Authentication for details).

  Note

  To authenticate accounts with the `caching_sha2_password` plugin, either a secure connection to the server using SSL or an unencrypted connection that supports password exchange using an RSA key pair (enabled by setting one or both of the connecting properties `allowPublicKeyRetrieval` and `serverRSAPublicKeyFile`) must be used.

  Because earlier versions of Connector/J 5.1 do not support the `caching_sha2_password` authentication plugin and therefore will not be able to connect to accounts that authenticate with the new plugin (which might include the root account created by default during a new installation of a MySQL 8.0 Server), it is highly recommended that you upgrade now to Connector/J 5.1.46, to help ensure that your applications continue to work smoothly with the latest MySQL 8.0 Server.

Bugs Fixed

- When Connector/J 5.1.44 or earlier connected to MySQL 5.7.20 or later, warnings are issued because Connector/J used the deprecated system variables `tx_isolation` and `tx_read_only`. 
These SQL-level warnings, returned from a `SHOW WARNINGS` statement, might cause some applications to throw errors and stop working. With this fix, the deprecated variables are no longer used for MySQL 5.7.20 and later; also, to avoid similar issues, a `SHOW WARNINGS` statement is no longer issued for the use of deprecated variables. (Bug #27029657, Bug #88227)

- When the default database was not specified for a connection, the connection attributes did not get stored in the `session_connect_attrs` table in the Performance Schema of the MySQL Server. (Bug #22362474, Bug #79612)

**Changes in MySQL Connector/J 5.1.45 (2017-11-30)**

Version 5.1.45 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

- Functionality Added or Changed
- Bugs Fixed

**Functionality Added or Changed**

- Character set mappings have been added for the following collations:
  - `utf8mb4_ja_0900_as_cs_ks`
  - `utf8mb4_0900_as_ci`
  - `utf8mb4_ru_0900_ai_ci`
  - `utf8mb4_ru_0900_as_cs`

  (Bug #26724085)

**Bugs Fixed**

- With the combination of the connection properties `useServerPrepStmts=true`, `useInformationSchema=true`, `useCursorFetch=true`, and `defaultFetchSize=N`, if a warning was returned for a query during connection initialization, a `NullPointerException` would result when Connector/J tried to get the warning. That was because the charsets were not yet initialized in the connection at the time. This fix corrects the problem by preventing cursors from being used when Connector/J fetches warnings from the server. (Bug #27131768)

- When a communications exception was thrown by Connector/J after a socket timeout event, because the current transaction did not get rolled back automatically, if `autoReconnect=true`, the next statement execution by Connector/J might reuse the old server session and continued with the previous transaction. This might confuse the client application on the transaction status of the statements it was handling. This fix corrects the issue by forcibly closing the network resources after a communication or IO exception, causing the server to rollback the transaction. (Bug #27047676, Bug #88232)

- Normally, when the `socketTimeout` option has been set and a socket timeout occurs on the client side, the server may continue working and returning query results. At the next query executed after the timeout, Connector/J first clears the socket input stream and then sends a ping request to the server.

  However, an error occurred if the `autoReconnect` option was set to `true` and, after reconnection, a new query was executed by Connector/J, and the results from the previous queries arrived before Connector/J sent its ping request to the server, in which case the old packages might be mistaken as results for the new query. This fix corrects the issue by forcibly closing the network resources after a communication or IO exception. The next statement execution recreates the IO stream if `autoReconnect=true`; otherwise, the connection stays closed. (Bug #27040063, Bug #88242)
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• High garbage collection pressure was observed when there were a lot of queries performed using server-side prepared statements. This patch reduces the pressure by optimizing the generation process of the cache keys for the prepared statements. Thanks to Johnathan Crawford for contributing the patch. (Bug #26939943, Bug #88021)

• A number of regression tests for former bug fixes failed when they were run against MySQL Server 8.0.3, because binary logging has been enabled by default on the server. The tests have now been fixed. (Bug #26794652)

• A number of regression tests for former bug fixes failed when they were run against MySQL Server 8.0.3 because of the name changes of some of the INFORMATION_SCHEMA tables on the server. The tests have now been fixed. (Bug #26794602)

• When server-side prepared statements and cursor-based result sets were used, exceptions were thrown when applications made calls to get output parameters of INTEGER or BIGINT type from a result set. (Bug #26771560, Bug #87704)

Changes in MySQL Connector/J 5.1.44 (2017-08-30)

Version 5.1.44 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• A new connection property, enabledTLSProtocols, can now be used to override the default restrictions on the TLS versions to be used for connections, which are determined by the version of the MySQL Server that is being connected to. By providing a comma-separated list of values to this option (for example, “TLSv1,TLSv1.1,TLSv1.2”) users can, for example, prevent connections from using older TLS version, or allow connections to use TLS versions only supported by a user-compiled MySQL Server. See the entry for the new property in Configuration Properties for Connector/J for details. Thanks to Todd Farmer for contributing the code. (Bug #26646676)

Bugs Fixed

• Important Change: Following the changes in MySQL Server 8.0.3, the system variables tx_isolation and tx_read_only have been replaced with transaction_isolation and transaction_read_only in the code of Connector/J. Users should update Connector/J to this latest release in order to connect to MySQL 8.0.3. They should also make the same adjustments to their own applications if they use the old variables in their codes. (Bug #26440544)

• When using cached server-side prepared statements, a memory leak occurred as references to opened statements were being kept while the statements were being decached; it happened when either the close() method has been called twice on a statement, or when there were conflicting cache entries for a statement and the older entry had not been closed and removed from the opened statement list. This fix makes sure the statements are properly closed in both cases. Thanks to Eduard Gurskiy for contributing to the fix. (Bug #26633984, Bug #87429)

• The regression test for Bug#63800 failed because the default value of the system variable explicit_defaults_for_timestamp of MySQL Server has been changed since release 8.0.2. The test has been adjusted to take the change into consideration. (Bug #26501245)

Changes in MySQL Connector/J 5.1.43 (2017-07-21)

Version 5.1.43 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed
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- **Bugs Fixed**

**Functionality Added or Changed**

- Connecting to MySQL Server 8.0.3 using Connector/J resulted in an `SQLException: Unknown system variable 'query_cache_size'`, because the query cache has been removed from the server. All query cache server variables and functionality has now been removed from Connector/J 5.1. (Bug #26399958)

- Updated the timezone mappings using the latest IANA and CLDR time zone databases. (Bug #25946965)

- A new option for the `loadBalancingStrategy` connection property called `serverAffinity` has been added. The servers listed in the new connection property `serverAffinityOrder` (which should be a subset of the servers in the host list of the connection URL) are contacted in the order they are listed until a server is available or until the list of servers is exhausted, at which point a random load-balancing strategy is used with the hosts not listed by `serverAffinityOrder`. See descriptions for `loadBalancingStrategy` and `serverAffinityOrder` in Configuration Properties for Connector/J for details. (Bug #20182108)

- **Bugs Fixed**

  - Secure JDBC connections did not fall back to the default truststore when a custom one was not provided. (Bug #26243128)

  - Connector/J failed a number of regression tests in the testsuite related to geographic information system (GIS) functions because of changes to GIS support by the MySQL server. The fix corrects the tests. (Bug #26239946, Bug #26140577)

  - Attempts to connect to a server started with collation `utf8mb4_de_pb_0900_ai_ci` resulted in null pointer exceptions. (Bug #26090721)

  - In `com/mysql/jdbc/ServerPreparedStatement.java`, the arguments `resultSetType` and `resultSetConcurrency` for a call of `Connection.prepareStatement()` were swapped. (Bug #25874048, Bug #85885)

  - A `NullPointerException` was returned when `getDate()`, `getTime()`, or `getTimestamp()` was called with a null `Calendar`. This fix makes Connector/J throw an `SQLException` in the case. (Bug #25650305)

  - Some JDBC proxied objects were missing the proper handlings of the `equals()` methods, thus even comparison of one of these proxied objects to its own self with `equals()` yielded false. This patch introduces proper handlings for the `equals()` method in all the relevant proxies. (Bug #21931572, Bug #78313)

  - A server-side prepared statement was not closed when the same statement was being prepared again while the original statement was being cached. This was caused by the silent replacement of the cache entry of the old statement by the new. When this happened repeatedly, it caused eventually the complaint that `max_prepared_stmt_count` was exceeded. This fix makes sure that when a cache entry for a statement replaces an older one, the older statement is immediately closed. (Bug #20066806, Bug #74932)

**Changes in MySQL Connector/J 5.1.42 (2017-04-28)**

Version 5.1.42 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

- **Functionality Added or Changed**

- **Bugs Fixed**
Functionality Added or Changed

- A **null** value can now be extracted from a result set to a class belonging to the *java.time* package. Before, such an extraction resulted in a `NullPointerException` being thrown. Thanks to Martin Desharnais for contributing to the fix. (Bug #25250938, Bug #84189)

- Connector/J now checks that a MySQL server's SSL certificate and the Certificate Authority (CA) that issued it are not expired before establishing an SSL connection with the server, even if the connection property `verifyServerCertificate` is set to `false`. (Bug #20515688)

- Name-value pairs contained in the connection property `sessionVariables` can now be separated by either commas or a semicolons. (Bug #17757070)

- Added Japanese collation for the `utf8mb4` character set.

Bugs Fixed

- An invalid timezone identifier was used in `StatementRegressionTest.java` of the Connector/J testsuite. (Bug #25687718, Bug #85351)

- A `mysql` client failed to establish an SSL connection to the server using the SSL certificates provided in the Connector/J source package. It was because the certificates have been generated with the same Common Name. This fix corrects the Common Names and regenerates the SSL certificates. (Bug #25636947)

- The unit test `testsuite.simple.ResultSetTest.testPadding` failed with the error `Unknown character set: 'gb18030'` after the collation map updates in release 5.1.40. (Bug #25556597)

- In a multi-host connection, query timeouts did not occur as configured. It was because the `CancelTask` thread, when trying to access the top level, virtual connection object, ran into a race condition with the connection monitor and then hung. With this fix, the `CancelTask` thread is passed a direct reference to the underlying physical connection, with which it can execute the cancellation. (Bug #25490163, Bug #84783)

- `CallableStatement.extractProcedureName()` did not return the correct result when the procedure name contained a dash. This was due to an error in the `stripComments()` method of the `StringUtils` class, which has now been corrected. (Bug #25321524, Bug #84324)

- The `ConnectionImpl.isReadOnly()` method returned a confusing error message when it could not retrieve the read-only status of the server. The message has now been changed to “Could not retrieve transaction read-only status from server.” (Bug #25101890, Bug #83834)

- A `NullPointerException` was thrown when a null boolean value was being read from the database. (Bug #25048406, Bug #83662)

- After a `BIT` value had been retrieved from a result set, the `wasNull()` method of the result set returned value for the last `wasNull()` query instead of the value for the last retrieved column. (Bug #24841670, Bug #83368)

- Using a partially-quoted identifier (with only the database or the procedure name quoted) or a nonexistent parameter to register an output parameter in a `CallableStatement` caused a `NullPointerException`. With this fix, a partially-quoted identifier is accepted, and a nonexistent parameter causes a `SQLException` to be thrown. (Bug #22333996, Bug #79561)

- `DatabaseMetaData.getProcedureColumns()` and `DatabaseMetaData.getFunctionColumns()` did not return expected results. This was due to the errors with the matching algorithm for the column names, which have now been fixed. Notice that, however, the effects of the connection parameter `getProceduresReturnsFunctions` on the two methods when JDBC 4 is used remain unchanged. (Bug #19531384, Bug #73775)

- When an `UpdatableResultSet` was used, trying to close the result set and its prepared statement simultaneously by different threads might result in a deadlock. This fix updates the synchronization mechanism for `UpdatableResultSet` to avoid the issue. (Bug #17653733, Bug #70704)
• After a connection had already switched catalog with `setCatalog()`, cached data from the old catalog was returned for a reused server-side prepared statement. With this fix, the cache of a server-side prepared statement cache now includes the catalog in its key to avoid wrong cache hits when the statement is reused on another catalog. (Bug #16714868, Bug #66430)

Changes in MySQL Connector/J 5.1.41 (2017-02-28)

Version 5.1.41 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

Bugs Fixed

• Connections failed with `MySQLSyntaxErrorException: Unknown character set when connectionCollation=ISO-8859-13`. This was due to an error with Connector/J's internal charset mapping, which has now been fixed. (Bug #25504578)

• When loading classes through some external class loaders, `com.mysql.jdbc.Util` threw an `NoClassDefFoundError`. This was caused by `Class.getPackage()` returning null when some external class loaders were used. This fix replaces those calls of `Class.getPackage()` with calls of the new method `Class.getName()`, which return package names that are extracted from the fully-qualified class names. (Bug #25048543, Bug #83052)

• In the manifest for the Connector/J JAR file, the `Import-Package` directive specified version numbers for the `javax.net.ssl` package. The specification was unnecessary, and it caused the configuration of an SSL connection to a MySQL server to fail in an OSGi environment. The version requirement has now been removed. (Bug #24942672, Bug #82826)

• In a Fabric setup, when multiple threads required to have hashes computed, an `ArrayIndexOutOfBoundsException` might be thrown from inside `HashShardMapping`. This fix prevents the issue by having `HashShardMapping.getShardIndexForKey()` synchronized. (Bug #24289730, Bug #82203)

• When the configuration property `cacheResultSetMetadata` was set to `true`, a ping query using a `PreparedStatement` failed with a `NullPointerException`. This fix moves the ping query to an earlier stage of the statement execution, which prevents the exception. (Bug #23535001, Bug #81706)

• The `setFabricShardTable()` method failed to parse qualified table names (in the format of `database_name.table_name`), which causes `SQLExceptions` to be thrown. (Bug #23264511, Bug #81108)

• A race condition occurred when a call of `Connection.setNetworkTimeout()` was followed closely by a call of `Connection.close()`, and a `NullPointerException` might result if the connection was closed before the executor supplied to `setNetworkTimeout()` was able to set the timeout, as the executor would run into a null `mysqlConnection` object. This fix removed the race condition. (Bug #21181249, Bug #75615)

• With the connection properties `cacheServerConfiguration=true` and `elideSetAutoCommits=true`, any new connection to the server obtained after the first connection was established had the variable `autoCommit` equalled `false`, even if the value of the variable was `true` on the server. That was because the value of `autoCommit` was not properly initialized when a new connection was established, and this fix corrects that.

Also, since release 5.1.41, the functionality of the property `elideSetAutoCommits` has been disabled due to Bug# 66884. Any value given for the property is now ignored by Connector/J. (Bug #17756825, Bug #70785)

• When using Tomcat and a web application that utilized Connector/J was down, Tomcat was unable to stop the `AbandonedConnectionCleanupThread` started internally by Connector/J, leading to multiple instances of the thread when the web application was restarted; or, Tomcat was able to stop the thread but unable to restart it on reload of the web application. Different combinations of
Tomcat's default settings, usage of Tomcat's ServletContextListener feature, and locations of the Connector/J jar could result in the undesired behaviors, as well as warning messages in the Tomcat error log saying it was unable to stop the thread and a memory leak was likely.

The implementation of AbandonedConnectionCleanupThread has now been improved, so that there are now four ways for developers to deal with the situation:

- When the default Tomcat configuration is used and the Connector/J jar is put into a local library directory, the new built-in application detector in Connector/J now detects the stopping of the web application within 5 seconds and kills AbandonedConnectionCleanupThread. Any unnecessary warnings about the thread being unstoppable are also avoided. If the Connector/J jar is put into a global library directory, the thread is left running until the JVM is unloaded.

- When Tomcat's context is configured with the attribute clearReferencesStopThreads="true", Tomcat is going to stop all spawned threads when the application stops unless Connector/J is being shared with other web applications, in which case Connector/J is now protected against an inappropriate stop by Tomcat; the warning about the non-stoppable thread is still issued into Tomcat's error log.

- When a ServletContextListener is implemented within each web application that calls AbandonedConnectionCleanupThread.checkedShutdown() on context destruction, Connector/J now, again, skips this operation if the driver is potentially shared with other applications. No warning about the thread being unstoppable is issued to Tomcat's error log in this case.

- When AbandonedConnectionCleanupThread.uncheckedShutdown() is called, the AbandonedConnectionCleanupThread is closed even if Connector/J is shared with other applications. However, it may not be possible to restart the thread afterwards.

(Bug #17035755, Bug #69526)

References: See also: Bug #14570236, Bug #16443387.

Changes in MySQL Connector/J 5.1.40 (2016-10-03)

Version 5.1.40 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- A very old workaround for Bug#36326 (fixed in release 5.1.32) has been removed, so Connector/J can now use local transaction states when the MySQL server has query cache enabled. (Bug #19974685)

- Added support for the error codes of two MySQL server errors, ER_XA_RBTIMEOUT and ER_XA_RBDEADLOCK. (Bug #13702433, Bug #64188)

Bugs Fixed

- In certain cases, the exception interceptor was being triggered twice in the internal SQLException factory method. Also, if the exception interceptor returned an exception with the cause already initialized, the same factory method would fail to initialize the cause again, and the real cause for the exception remained uncaptured. (Bug #23743956)

- Continuing to use a Fabric connection after one of the slaves was removed might result in a ConcurrentModificationException. This happened because the list of slave hosts managed by Connector/J was being traversed and modified at the same time as the replication topology was
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• When the connection property `useCursorFetch` was "true" and updatable result sets were used, `executeQuery()` failed for JSON data with an `SQLException: Unknown type`. It was because the data decoding routine for updatable JSON data was missing from Connector/J, and it has now been implemented. (Bug #23197238)

• The `FabricMySQLConnectionProxy` method `nativeSQL()` always returned `null` The method is now properly implemented. (Bug #23103408, Bug #81072)

• In a Fabric setup, `getMetaData().supportsMixedCaseIdentifiers()` always returned "true," even if `lower_case_table_names` was set to "1" on the servers. This was because `FabricMySQLConnectionProxy.lowerCaseTableNames()` was not implemented properly. With this fix, the function now returns the proper value for the current active connection, so that `getMetaData().supportsMixedCaseIdentifiers()` also returns the correct value.

Users are reminded that in a Fabric setup, `lower_case_table_names`, as well as all other settings, should be configured the same way for all servers in the Fabric server group. (Bug #23103406, Bug #81056)

• A memory leakage occurred when the connection properties `cachePrepStmts` and `useServerPrepStmts` were both set to be `true` and server-side prepared statements were set as non-poolable, which resulted in the prepared statement being not closable by the client, and the number of prepared statements then kept on increasing.

When the memory leakage described above occurred, it did not make Connector/J fail, as Connector/J switched to using client-side prepared statements when the maximum number of prepared statements was reached. However, when `rewriteBatchedStatements` was also set to true, the switch to client-side prepared statements did not occur, and Connector/J threw the `MySQLSyntaxErrorException` ("Can't create more than max_prepared_stmt_count statements") when the client wanted to create more prepared statements than allowed.

This fix corrected the way prepared statements are handled in order to avoid both of the problems described above. (Bug #22954007, Bug #80615)

• `ResultSet.getString()` sometimes returned garbled data for columns of the JSON data type. This was because JSON data was binary encoded by MySQL using the utf8mb4 character set, but decoded by Connector/J using the ISO-8859-1 character set. This patch fixes the decoding for JSON data. Thanks to Dong Song Ling for contributing to the fix. (Bug #22891845, Bug #80631)

• When working with MySQL Fabric, Connector/J hung when the Fabric node was down. With this fix, when the Fabric node is down, all active connections continue to work based on the cached information on the server group and the sharding setup, although no new connections can be established. (Bug #22750465)

• When Connector/J retrieved the value of a `BIT` column as an integer using, for example, `getInt()` or `getLong()`, it returned a wrong value if the BIT value happened to be equivalent to the decimal value of some ASCII digit. This was because Connector/J attempted to parse the value as a string-encoded integer; thus, for example, the BIT value “110001” (decimal 49 in binary) was interpreted as the string “1” (whose ASCII value in decimal is 49), so the numerical value of “1” was returned. This fix corrected the parsing behavior of Connector/J on `BIT` values, so they are always interpreted as binary coded. (Bug #21938551, Bug #78685)

• Connector/J could not parse the host name and port number from connection URLs staring with the word “address,” resulting in an `UnknownHostException`. This was because the URLs were being interpreted incorrectly as using the alternate URL format, which starts with “address=....” This patch fixes the parser for proper interpretation of the URL in the situation. (Bug #21389278, Bug #77649)

• When the connection property `useLocalTransactionState` was set to “true” and `autocommit` was set to “false” on the server, if any exception was thrown, any further calls for `rollback()` or
commit() were not sent to the server. It was because when there was an exception while executing a query, Connector/J lost the information regarding the server's transaction state. This patch fixes this issue by preserving the previous transaction state for the current connection when any exception is thrown. (Bug #20212882, Bug #75209)

- An invalid connection URL caused Connector/J to throw a NullPointerException. With this fix, an SQLException is thrown instead in the situation. (Bug #18759269, Bug #72632)

- When a very large amount of compressed data is transmitted from the server to the client and under very special circumstances, a CommunicationsException might occur. It happened when a single compressed packet from the server was not big enough to provide an entire uncompressed packet to the client side. With this fix, Connector/J reads as many compressed packets as necessary to fill the size of the uncompressed packet that was being requested. Thanks to Ryosuke Yamazaki for contributing to the fix. (Bug #11756431, Bug #48346)

Changes in MySQL Connector/J 5.1.39 (2016-05-09)

Version 5.1.39 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

- Functionality Added or Changed

  - For MySQL server 5.7.5 and later, the EOF packet in the MySQL server/client protocol has been deprecated and replaced by the OK packet. The change is now supported by Connector/J. (Bug #23212347)

- Bugs Fixed

  - Connector/J hung, returned a NullPointerException, or returned an incorrect exception when using result sets with the properties TYPE_FORWARD_ONLY and CONCUR_UPDATABLE. It was due to an inaccurate check for the cursor for the result set. This fix makes sure Connector/J checks accurately on whether a cursor has been requested, both when executing a statement and fetching its results. (Bug #23201930)

  - When using server-side prepared statements with profileSQL=true and useInformationSchema=true, an SQLException ("ResultSet is from UPDATE. No Data") occurred when the client tried to advance to the next row in the result set. This was due to a failure of an internal query for metadata, which is now prevented by this fix. (Bug #23188498)

  - LoadBalanceConnectionGroupManager.removeHost() was not removing hosts as expected. This fix tries to ensure that host removals will be successful under different situations. (Bug #22848249)

    References: See also: Bug #22678872.

  - For connections with useCursorFetch=true and fetch size set with defaultFetchSize or setFetchSize, if data from a TIME and a BLOB data column was selected together, corrupted value for the TIME data was returned. (Bug #22833410, Bug #60522)

  - For a load-balanced connection, an ArrayIndexOutOfBoundsException was thrown when ConnectionGroupManager.removeHost() was called. It was due to an error in LoadBalancedConnectionProxy.removeHost(), which has now been fixed. (Bug #22730682)

  - A Fabric connection threw a NullPointerException when all hosts have been removed from its host list, or when the internal load-balanced connection became null due to inconsistency of the replication connection. This fix adds to Connector/J the abilities to handle those situations. Also, a new connection property, loadBalanceHostRemovalGracePeriod, has been introduced,
which sets the grace period for waiting to remove the currently active host from a load-balanced connection. See the entry for the new property in Configuration Properties for Connector/J for details. (Bug #22678872)

References: See also: Bug #22848249.

• FabricMySQLDataSource.getConnection() threw a null pointer exception when a master failover took place. (Bug #22598938)

• The OSGi manifest file in the Connector/J JAR file did not expose the MySQL Fabric packages, so the Fabric-related classes could not be resolved even though they were present in the JAR file. (Bug #22385172)

• With some Tomcat web applications, when Connector/J connects to the server with useLegacyDatetimeCode=false without setting serverTimeZone, a NullPointerException was returned. This was because the timezone property file for Connector/J was loaded by the bootstrap class loader, which did not know the location of the property file and thus failed to load it. This fix avoids the problem by making Connector/J use the same class loader for both the property file and the Connector/J classes. (Bug #22353759, Bug #79343)

• When using JDBC 4.2 and with the connection property cachePrepStmts set to "true," after a prepared statement had been cached, rerunning the SQL statement resulted in a pre-JDBC 4.2 PreparedStatement object being instantiated. This fix prevents the problem by having the PreparedStatement instantiated by a factory instead of a constructor method. (Bug #22352812, Bug #79598)

• At every connection, Connector/J got the sql_mode variable from the server and tried to parse it as a number; because sql_mode is not a number (except for very old versions of MySQL), a NumberFormatException was always thrown and then caught by the code. This fix refactored the code to avoid the unnecessary throwing and catching of the error. (Bug #21181466, Bug #77171)

• When inserting multiple timestamp values into a table with useLegacyDatetimeCode=false and useCursorFetch=true, after a null value had been inserted, further inserts could not change a timestamp's value. This fix makes sure the binding of the value is reset before a new insert takes place. (Bug #20685487, Bug #75956)

• The exception message in CallableStatement() for incorrect output parameter registration gave little detail and the wrong error code. (Bug #18068303, Bug #71131)

• Calling getTimestamp() on a timestamp column resulted in a java.sql.SQLException ("Cannot convert value ... to TIMESTAMP"). That was due to the missing metadata for each row in the ResultSet. This fix ensures that the metadata is no longer missing. (Bug #16738378, Bug #56479)

• On very fast servers with other third-party components accessing the data, a ConcurrentModificationException was sometimes thrown. This fix prevents the exception by adding a synchronization to ConnectionImpl.closeAllOpenStatements(), and by refactoring part of the code inside the method. (Bug #16736619, Bug #59462)

Changes in MySQL Connector/J 5.1.38 (2015-12-07)

Version 5.1.38 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It supports the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• When connecting to a MySQL server 5.7 instance that supports TLS, Connector/J now prefers a TLS over a plain TCP connection. (Bug #21947042)
• Two new connection properties, `allowSlaveDownConnections` and `readFromMasterWhenNoSlaves`, have been introduced for configuring replication-aware connections. See Configuring Source/Replica Replication with Connector/J and the entries for the new properties in Configuration Properties for Connector/J for details. (Bug #21286268)

Bugs Fixed

• In a Fabric environment, a `ClassCastException` resulted when a stored procedure was called with an `INOUT` parameter. This was because in this situation, what was being cast was a proxied version of the object. This fix extracts the underlying object from its proxy, allowing it to be cast to the implementing class. (Bug #22096981)

• `getTypeInfo()` erroneously returned a `PRECISION` value of “255” instead of “65535” for the data type `VARBINARY`. (Bug #21978216)

• A deadlock was observed when in the same server group, two concurrent threads were using different Fabric connections, and one executed a failover procedure while the other simultaneously called a method that acquired a lock on the underlying replication connection instance monitor. This fix revised the locking mechanism of replication connections, in order to prevent the observed deadlocks. (Bug #21966391, Bug #21934573, Bug #78710)

• State information of a Fabric group was not updated by Connector/J after a local cache’s Time to Live (TTL) expired, which resulted in the client not recognizing any topology changes happening to the group like a master failover, a server rejoining, and so on. (Bug #21296840, Bug #17910835)

• Connector/J threw an `AbstractMethodError` when a JDBC 4 functionality (for example, `createBlob()`) was used on a replication-aware connection. This has been fixed by putting replication connections under the multi-host connection proxy structure that Connector/J has been using for load-balanced and failover connections. (Bug #11763419)

References: See also: Bug #11763401.

• After the initial call of `Connection.setReadOnly()` following the creation of a replication-aware connection, subsequent calls of `Connection.setReadOnly()` could not change the nature of the connection. This has been fixed by putting replication connections under the multi-host connection proxy structure that Connector/J has been using for load-balanced and failover connections. (Bug #11763401)

References: See also: Bug #11763419.

Changes in MySQL Connector/J 5.1.37 (2015-10-15)

Version 5.1.37 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, 5.6, and 5.7. It is also the first release of MySQL Connector/J to support the Java Database Connectivity (JDBC) 4.2 API.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• `methodCompressedInputStream.getNextPacketFromServer()` has been refactored to reduce memory use and garbage collection efforts caused by the use of the inflater. (Bug #21648826, Bug #78106)

• The code for executing a `REPLACE` statement when `rewriteBatchedStatements=true` has been refactored by putting multiple batched statements into a single query, making it work more like an `INSERT` statement. This increases the efficiency for running `REPLACE` statements. Thanks to Jie Han for contributing the code. (Bug #21429909, Bug #77681)
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- A new connection property, `sendFractionalSeconds=true|false`, has been introduced. It controls whether fractional seconds in timestamps are to be truncated on the client side or to be sent to the server side for truncation there. See the entry for the new property in Configuration Properties for Connector/J for details. Thanks to Kwon Nam Son for contributing the code. (Bug #21304726, Bug #77449)

- A new connection property, `enableEscapeProcessing`, has been introduced for supporting JDBC 4.2. It sets the default escape processing behavior for Statement objects. See the entry for the new property in Configuration Properties for Connector/J for details.

- Connector/J now supports the JSON data type, which has been supported by the MySQL server since release 5.7.8.

### Bugs Fixed

- A `ClassCastException` resulted for a Fabric connection when `rewriteBatchedStatements` was “true” and a batch update was rewritten. (Bug #21876798)

- A number of regression tests in the testsuite failed when they were run against MySQL 5.7, because the `NO_AUTO_CREATE_USER` SQL mode had become the default behavior of the server since MySQL 5.7.7, making some `GRANT` statements in the test fail when a new user had to be created. With this fix, `CREATE USER` statements have been added to the regressions tests when needed, to prevent the test failures. (Bug #21697684, Bug #78225)

- Connecting to MySQL 5.0 and 5.1 using Connector/J 5.1.36 resulted in an `SQLException`, with a complaint for an “Unknown system variable 'language'”. (Bug #21415165, Bug #77665)

- The `IS_GENERATEDCOLUMN` field was empty in the result returned by `DatabaseMetaData.getColumns()`. This fix corrects the field so that it contains a `YES` or `NO` according to whether the column is generated or not. (Bug #20969312, Bug #76859)

- `getTypeInfo()` returned an incorrect `PRECISION` value of “255” for the data type of `VARCHAR`. The return value has been corrected to “65535.” (Bug #20675539, Bug #76187)

- When a connection is forcefully closed with `abortInternal()` in the `ConnectionImpl` class, a null point exception sometimes resulted. This is now avoided by putting the associated `this.io.releaseResources()` call inside a try block, so that the exception, unavoidable due to a race condition, can be properly caught and ignored. (Bug #20536592, Bug #75849)

- If the MySQL server’s default authentication method was SHA256 but neither one of the Connector/J connection properties `allowPublicKeyRetrieval` and `serverRSAPublicKeyFile` was set, the authentication failed with a `TransientConnectionException`, complaining that the public key could not be retrieved. With this fix, authentication continues in the situation, allowing other enabled authentication methods to be tried. (Bug #20433047, Bug #75670)

- When a lock wait timeout occurred, an `SQLException` was thrown while an `SQLTransientException` should be thrown instead. It was due to a wrong SQLState number used in the code, which has now been fixed. (Bug #16634180)

- When the time zone on the MySQL server was configured to “GMT” but the client was in a different time zone, Connector/J would make wrong adjustments for event timestamps when working with the server. (Bug #11758179, Bug #50348)

### Changes in MySQL Connector/J 5.1.36 (2015-07-02)

Version 5.1.36 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, and 5.6.

- **Functionality Added or Changed**

- **Bugs Fixed**
Functionality Added or Changed

- The files in the Maven Central Repository for each Connector/J release have been reorganized and a source artifact (*-sources.jar) has been added, for release 5.1.21 and after. (Bug #20283655, Bug #75335)

Bugs Fixed

- Results returned by DatabaseMetaData.getCatalogs() were not properly sorted by catalog name. (Bug #21215151)

- A class cast exception occurred when Connector/J was executing a streaming prepared statement in a Fabric environment. (Bug #21184949, Bug #77217)

- Connector/J did not use the character set specified with the connection property passwordCharacterEncoding for authentication. With this fix, the property is now honored. If it is not set, Connector/J uses the value of characterEncoding instead; if even that is not set, Connector/J defaults to UTF-8 for the password’s encoding. (Bug #20825727)

- A failover did not occur for a MySQL Fabric connection during the failure of a master server. It was because the state change of the Fabric connection group was not handled properly, which has been corrected by this fix. (Bug #20821888, Bug #75113)

- When the getDate() and getTime() methods of ResultSet were called to retrieve values with fractional seconds, a “bad format” error occurred. With this fix, the fractional seconds are dropped before the retrieved values are converted into a Date or Time object. (Bug #20804635)

- A StringIndexOutOfBoundsException occurred when getProcedureColumns() were trying to return ENUM or SET type procedures or functions that involved reserved words. That was caused by a problem in the parser for the functions’ or procedures’ CREATE statements, which this fix corrects. (Bug #20727196)

- At every connection, Connector/J executed a SHOW VARIABLES WHERE statement over a multitude of variables, which consumed a lot of time and memory. To improve the efficiency of the code, this fix replaces the statement with the more efficient SELECT @@variable query and also implements some other related changes. (Bug #20408891, Bug #75592)

- getProcedures(), getFunctions(), getProcedureColumns(), and getFunctionColumns() returned duplicate results when the connection parameter nullCatalogMeansCurrent was set to “false.” (Bug #19803348)

- An UnsupportedEncodingException during handshake gave rise to a NullPointerException. With this fix, the NullPointerException is no longer thrown, and a proper error message is provided by Connector/J. (Bug #18758686, Bug #72630)

- When using Connector/J with MySQL Fabric, the createGroup() method failed with a ClassCastException. (Bug #18719760, Bug #72546)

- Using Connector/J to connect with non-null user name and password to a MySQL Fabric server that had authentication disabled resulted in a NullPointerException. (Bug #18425861, Bug #72077)

- The change user functionality in Connector/J was dependent on Bug# 70865 of the MySQL server (for releases 5.5 and later, the server unnecessarily sends a plugin_request_packet for every COM_CHANGE_USER packet). That dependence made the com.mysql.jdbc.jdbc2.optional.MysqlConnectionPoolDataSource interface fail for server versions or forks that did not have the same bug. This fix removes that dependence and makes the interface function properly, whether the server suffers Bug# 70865 or not. (Bug #17810800, Bug #70927)

- JDBC4MySQLPooledConnection keeps a list of statementEventListener instances named statementEventListeners, which is used as monitor lock whenever the
fireStatementEvent() method is called. However, because the pooled connection’s close() method set statementEventListener to be null, if a prepared statement was closed after its holding pooled connection had already been closed, the subsequent fireStatementEvent() call would run into a NullPointerException. This fix prevents the problem by having JDBC4MySQLPooledConnection initializing statementEventListeners properly and never setting it to null, thus allowing it to be used all the time as a monitor lock. (Bug #16444069, Bug #62452)

Changes in MySQL Connector/J 5.1.35 (2015-03-23)

Version 5.1.35 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, and 5.6.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- The failover support by Connector/J has been refactored to be implemented independently of Connector/J's load-balancing feature. This resolves a number of issues including, for example, (1) a failover being triggered inadvertently, (2) a failover process kept trying to connect to an unavailable server (while there was an available one), and (3) the number of active connections kept growing until Connector/J threw an exception when there were successive failovers within the same connection. (The issues are regressions of Bug #75168.) (Bug #20533907, Bug #75885)

- A number of new configuration properties have been introduced:
  
  - enabledSSLCipherSuites: For setting the enabled cipher suites used by JSSE. This configuration property needs to be set when using Java 7 or lower or MySQL Server Community edition version 5.7.6 or higher.
  
  - readOnlyPropagatesToServer: For controlling the implicit propagation of the read-only transaction access mode to the server, which affects optimization for InnoDB read-only transactions.
  
- noTimezoneConversionForDateType and cacheDefaultTimezone: For improving Connector/J's time zone support; see the changelog entry for Bug #18028319/Bug #71084 below for details.

See the descriptions for these properties in Configuration Properties for Connector/J for more details.

- Connector/J now exposes the PreparedStatement.ParseInfo class for external usage, with no capture of the connection, which allows global, highly-concurrent parse caches to be implemented.

Bugs Fixed

- Issues with a number of the regression tests in the Connector/J test suite caused them to fail when they were run against MySQL 5.7.6. Those tests have now been fixed. (Bug #20606107)

- Calling the function Clob.setString() with valid input resulted in a string index out of bounds exception. (Bug #20453712)

- Calling the function Clob.position() resulted in an exception, because the function passed the wrong index value to the getSubString() function. (Bug #20453712)

- When in streaming mode, if Connector/J encountered an exception while reading from the stream, a subsequent call to the close() method of the result set would put the thread into a blocking state, from which it would not exit. With this fix, the result set can now be properly closed when, due to an error, there is no more data to be loaded from the stream. (Bug #20272931, Bug #75309)
• The `setTimestamp` method failed in a Fabric connection with a null pointer exception. It was because the implementation for the `getCalendarInstanceForSessionOrNew` method was missing, which has been added by this fix to Connector/J. (Bug #20217686, Bug #75080)

• When using JDBC 4 features of Connector/J 5.1 with JDK 6 and above, custom implementations of the interface `LoadBalanceExceptionChecker` failed to work. This was because most of the JDBC 4-specific classes of Connector/J do not implement a JDBC interface directly, but extend other JDBC 3 classes instead, so that the `LoadBalancingConnectionProxy.isInterfaceJdbc()` check did not work. This fix makes the checking work by extending its search to include also the super classes. (Bug #20204783, Bug #75168)

• The `readRemainingMultiPackets` method in the `MysqlIO` class returned incorrect results when a row was larger than 16MB in size. This fix corrects the wrong type conversion occurred during the calculation, which caused the problem. (Bug #19536780)

• Calling `getString()` after `rs.relative()` had been called with an argument smaller than “-1” resulted in a null pointer exception, because `rs.relative()` could not handle the argument properly. (Bug #19536780)

• All occurrences of the `StringBuffer` class in the Connector/J code has been replaced with the `StringBuilder` class, in order to improve code performance. (Bug #19465516, Bug #73595)

• Quoted identifiers in some SQL statements were not properly escaped. (Bug #18925727)

• A `java.sql.Date` value was stored incorrectly on the server and also returned incorrectly if the client and the server were in different time zones when `useLegacyDatetimeCode=false` or `useTimezone=true`. This was due to the time-zone conversion performed by Connector/J on the SQL DATE type. To avoid the issue, a new property `noTimezoneConversionForDateType` has been created for Connector/J, which is set to “true” by default, preventing Connector/J to perform the kind of time-zone conversion that caused this bug.

In addition, another new property `cacheDefaultTimezone` has been created: when it is set to “true” (by default), Connector/J caches the time zone first obtained from the client and uses it throughout the time the application is running. When it is set to “false,” Connector/J becomes aware of time zone changes in the client at runtime that are initiated by calling `java.util.TimeZone.setDefault(zone)`. (Bug #18028319, Bug #71084)

• A deadlock occurred when concurrent prepared statements making use of timestamp objects were executed in a single connection. To avoid this, the locking mechanism involved has been changed, so that the calendar object for the session is only locked when it is actually being used. (Bug #15936443, Bug #67760)

• There was an unnecessary call of `targetCalendar.setTime()` in the `newSetTimestampInternal()` method of the `PreparedStatement.java` class, which modified the user-supplied `Calendar` object and might cause side effects for the client application. The unnecessary call has now been eliminated by the fix put in for Bug #18028319/Bug #71084. (Bug #11761585, Bug #54095)

Changes in MySQL Connector/J 5.1.34 (2014-11-04)

Version 5.1.34 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, and 5.6.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• Connector/J now supports connections to MySQL servers through a SOCKS proxy. Two new configuration properties, `socksProxyHost` and `socksProxyPort`, have been introduced to
support this new feature; see the entries for them in Configuration Properties for Connector/J for
details. Note that authentication is not directly supported in the current implementation for SOCKS
proxy support. (Bug #13940005, Bug #64862)

• The process for building Connector/J from source has been revamped to fix incompatibilities with
Eclipse 4.4, remove dependency on Ant Contrib, improve on the documentation for the code, and
to improve on the structure of the output. See Installing from Source for the updated instructions for
building Connector/J 5.1.34.

Bugs Fixed

• When connecting to MySQL server 5.7.4 or earlier, the connection failed when the password
was blank for any users created on the server using the mysql_old_password plugin. This fix
refactored the testOldPasswordPlugin of Connector/J so that it works well with the server under
the situation. (Bug #19383371)

• An exception was thrown when users tried to run the testsuite.fabric test cases without
specifying the property com.mysql.fabric.testsuite.port. With this fix, the Fabric test cases
will not be run unless the test environment has been configured. (Bug #18474141)

Changes in MySQL Connector/J 5.1.33 (2014-09-25)

Version 5.1.33 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL
Server versions 5.5, and 5.6.

Bugs Fixed

• Many parameters specified with options when making an Ant build of Connector/J from source
(for example, com.mysql.jdbc.testsuite.url.sha256default) were not set as system
properties and thus were not available for use in the JUnit tests in the testsuite. With this fix, all
com.mysql.jdbc.test.* and com.mysql.jdbc.testsuite.* parameters are forwarded to the JUnit tests.
(Bug #19505524)

• The 4-byte UTF8 (utfbmb4) character encoding could not be used with Connector/J when the
server collation was set to anything other than the default value (utf8mb4_general_ci). This fix
makes Connector/J detect and set the proper character mapping for any utfmb4 collation. (Bug
#19479242, Bug #73663)

• XA connections failed with a class cast exception for a load-balanced configuration with
pinGlobalTxToPhysicalConnection=true. This was because some XA-related classes
used com.mysql.jdbc.ConnectionImpl in method parameters during calls. This fix makes
the classes use com.mysql.jdbc.Connection instead in those cases. (Bug #19450418, Bug
#73594)

• The MANIFEST.MF file for the JAR package of Connector/J included an empty line between the
attributes Import-Package and Name, which was interpreted as a mark for the end of the main
section of the manifest file. This fix removes the empty line. (Bug #19365473, Bug #73474)

• changeUser() calls might result in a connection exception (“Got packets out of order”) or a freeze if
the useCompression option was set to true. (Bug #19354014, Bug #19443777, Bug #73577)

• The tests testByteStreamInsert and testUseCompress in the Connector/J testsuite
failed with the message “Row size too large (> 8126)...” when they were run against the MySQL
server version 5.6.20. This is due to a known limitation with the server version, for which
innodb_log_file_size has to be set to a value greater than 10 times the largest BLOB
data size found in the rows of the tables plus the length of other variable length fields (that is,
VARCHAR, VARBINARY, and TEXT type fields) (see the MySQL 5.6.20 changelog for details).
This fix adds, for MySQL 5.6.20, a check for innodb_log_file_size to assert that its value is
335544320 or larger and throws an exception if it is not so, asking the user to increase the size of
innodb_log_file_size. (Bug #19172037)
• Using Java 6 or later, running `LOAD DATA` with a prepared statement resulted in an `IndexOutOfBoundsException`. This was a regression introduced by an issue in the patch for Bug #72008, which has now been fixed. (Bug #19171665, Bug #73163)

References: This issue is a regression of: Bug #72008.

• Connector/J failed the test for Bug# 64205 in the testsuite, thus might return a garbled error message for an invalid query when connected to MySQL server 5.5 or later. The failure was a regression introduced by the fix for Bug #18836319, which made the issuing of `SET NAMES` dependent on the character set difference between the server and the connection. This fix corrects the way by which the error messages are interpreted, so that they will come out right at any stage of a connection. (Bug #19145408)

References: This issue is a regression of: Bug #18836319.

• Errors occur when Connector/J mapped Windows time zones to Olson time zones for “Caucasus Standard Time” and “Georgian Standard Time”. This fix corrected and updated all the time-zone mappings in Connector/J using the data from the IANA Time Database v.2014g and the Unicode Common Locale Data Repository (CLDR) v.25. (Bug #17527948, Bug #70436)

• The test case `testsuite.simple.XATest.testRecover` failed when run against MySQL servers 5.7.0 to 5.7.4, because Connector/J did not understand the new output format for `XA RECOVER` that was introduced since MySQL 5.7.0 for fixing Bug #19505524. That fix has recently been reverted in MySQL 5.7.5, so that XA RECOVER output is now, by default, in the old format again. The test case, which runs well with MySQL 5.7.5, is now skipped for server versions 5.7.0-5.7.4. (Bug #17441747)

References: This issue is a regression of: Bug #19505524.

**Changes in MySQL Connector/J 5.1.32 (2014-08-11)**

Version 5.1.32 is a maintenance release of the production 5.1 branch. It is suitable for use with MySQL Server versions 5.5, and 5.6.

• **Functionality Added or Changed**

• **Bugs Fixed**

**Functionality Added or Changed**

• Connector/J used to always check every SQL statement in a server-side prepared statement to see whether it contained the `ON DUPLICATE KEY UPDATE` clause; but because the clause is only used with `INSERT` statements, the checks are unnecessary for other SQL statements while they reduce the performance of Connector/J. A new, boolean connection property `avoidCheckOnDuplicateKeyUpdateInSQL` has been added, by which the checks for the `ON DUPLICATE KEY UPDATE` clause can be disabled. (Bug #18232840, Bug #71672)

• Connector/J now supports Fabric 1.5. Older versions of Fabric are no longer supported.

**Bugs Fixed**

• Preparing a call to a stored procedure with Fabric caused a null pointer exception to be thrown. (Bug #19034681, Bug #73070)

• A bug in the Linux kernel version 3.6 and earlier caused the `MysqlIO.clearInputStream()` method to enter an endless loop. This fix changes the way the looping condition is evaluated, in order to avoid the problem. (Bug #19022745, Bug #73053)

• Connector/J returned the incorrect return code “0” for a thrown exception when the failure happened in the context of a global XA transaction. With this fix, Connector/J now wraps any unexpected exception in an `XAEException` in that case and returns the error code `XAER_RMFAIL`. (Bug #18970520, Bug #72890)
• Calling the changeUser method to switch to a user created using the sha256_password plugin would result in a null pointer exception. This was due to the fact that the fromServer buffer was unavailable when changeUser called the sha256_password plugin, and this fix makes the plugin accommodate to that. (Bug #18869381)

• The test testSha256PasswordPlugin failed when executed against a commercial version of the MySQL server. (Bug #18852682)

• Connecting to a user on the server created using the sha256_password plugin failed when the password specified by the client was an empty string (or when no password was specified). This fix makes Connector/J allow an empty password in that case, sending it to the server without applying RSA encryption on it. (Bug #18852587)

• Trying to use any character sets other than UTF-8 for communications between client programs and the MySQL server caused Connector/J to perform extra queries after the initial connection, resulting in higher latency and overhead for the connection. To prevent extra queries, this fix eliminates the mechanism of setting the character set to values other than “utf-8” by issuing a SET NAMES statement to the server, and allows the use of the connection property characterEncoding to set the character set value in Connector/J’s response packet during handshake. (Bug #18836319, Bug #72712)

• Connector/J failed the test ConnectionRegressionTest.testBug7607() when Java 8 was used, due to the new static character set mappings in Java 8. The bug no longer exits after a refactoring of the character set code for Connector/J 5.1.32. (Bug #18809129)

• A null pointer exception was thrown in isInterfaceJdbc() sometimes when load balancing was used and the application involved runtime instrumentations. (Bug #18691866, Bug #72502)

• The keys generated by INSERT statements using the ON DUPLICATE KEY UPDATE clause were incorrect when the clause “ON DUPLICATE KEY UPDATE” was not written exactly as so (for example, when spaces or comments were inserted in between the words). (Bug #18344403, Bug #71923)

• XA connections failed with a ClassCastException for a load-balanced configuration with multiple hosts. This was because some XA-related classes used com.mysql.jdbc.ConnectionImpl in method parameters during calls. This fix makes the classes use com.mysql.jdbc.Connection instead in those cases. (Bug #16722757, Bug #62577)

• The Ant script for building Connector/J from source failed to check the availability of javac and rt.jar from JDK 1.6 before compilation. That caused compilation to fail when the two files weren’t available. This fix corrects the step in the build script that checks for those files before compilation. (Bug #11748301, Bug #35829)

Changes in MySQL Connector/J 5.1.31 (2014-06-07)

Version 5.1.31 is a maintenance release of the production 5.1 branch. It is suitable for use with many MySQL Server versions, including 4.1, 5.0, 5.1, 5.4, 5.5, and 5.6.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• Added support for sha256_password authentication with RSA encryption.

Bugs Fixed

• The option name gatherPerfMetrics in the fullDebug.properties file was misspelled as gatherPerfMetrics. That resulted in the performance metrics not being logged. The name has been corrected in both the file and the Connector/J manual. (Bug #18598665, Bug #72326)
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- The MySQL Fabric driver did not properly propagate exceptions thrown during connection creation using JDBC 4. (Bug #18549472, Bug #72301)

- In the method `MysqlIO.unpackBinaryResultSetRow`, an array was created unnecessarily to hold the null bit mask. With this fix, Connector/J avoids the creation of the array by making use of the data that is still variable in the original buffer object. (Bug #18403456, Bug #72023)

- In the method `PreparedStatement.ParseInfo`, a character array was created unnecessarily out of a string object. This fix removed the unnecessary instantiation of the array. (Bug #18403199, Bug #72006)

- When trying to get an integer from a column value that was not a number, instead of a `NumberFormatException`, an `ArrayIndexOutOfBoundsException` was thrown instead due to an off-by-one error. This fix corrects the stop condition for trimming spaces in the beginning of byte buffers in the `getShort()`, `getInt()`, and `getLong()` methods in the `StringUtils` class. (Bug #18402873, Bug #72000)

- The `StringUtils.getBytes` methods have been refactored to avoid unnecessary creations of string objects for encoding character arrays into bytes. Also, unneeded `StringBuffers` are replaced by `StringBuilders`. (Bug #18389973, Bug #72008)

- When exception interceptors were used, the `init()` method was called twice for each exception interceptor, once by `Util.loadExtensions()` and again by `ConnectionImpl.ExceptionInterceptorChain.init()`. This fix eliminates the calls by `ExceptionInterceptorChain.init()`. (Bug #18318197, Bug #71850)

- After a non-SSL socket had been transformed into an SSL socket, `Connection` was still keeping its reference to the wrapped, non-SSL socket, failing to recognize that the type of connection had been changed. This fix creates a new `StandardSSLSocketFactory` class, which implements `SocketFactory` and wraps the initial `SocketFactory.afterHandshake()` method. `MysqlIO.socketFactory` was replaced after the socket transformation, so that `afterHandshake()` is performed on the old factory but returns the new socket. (Bug #18260918, Bug #71753)

- When `rewriteBatchedStatements=true` and `useAffectedRows=true` were set, `executeBatch()` returned the number of affected rows as given by the server, which was not a reliable value unless it was a “0”. That behavior was due to the fix for Bug#68562, which was implemented in Connector/J 5.1.27 (see the changelog for the release), and has been breaking a number of applications that use Connector/J. In this new fix, Connector/J returns `Statement.SUCCESS_NO_INFO` as a result for each statement in the batch as long as there are more than one batched statement and the returned value for the affected rows from the server is greater than “0”. Connector/J returns a “0” otherwise, which indicates that no rows have been affected. (Bug #18009254, Bug #61213)

- If `profileSQL` was enabled, a memory leak would occur after a connection was lost and continuous attempts were made to reconnect. It was because `ProfilerEventHandlerFactory` kept a map in which dead connections kept on accumulating. This fix refactors the `ProfilerEventHandlerFactory` and eliminates that map. (Bug #16737192, Bug #55680)

- When `useCursorFetch` was set to `true`, Connector/J would attempt to send XA commands as server prepared statements, which were unsupported, and the commands would have to be resent as plain statements. This fix stops Connector/J from sending XA commands as server prepared statements. (Bug #16708231, Bug #67803)

- When closing a server-prepared statement twice and `cachePrepStmts=true`, the second call closed the statement as expected. However, if a call of `Connection.prepareStatement()` was made again with exactly same SQL string, Connector/J obtained the closed statement from the cache and failed by throwing an exception. With this fix, `ServerPreparedStatement.close()` detects and ignores subsequent `close()` calls on cached statements that have already been closed. (Bug #16004987, Bug #66947)
Changes in MySQL Connector/J 5.1.30 (2014-03-31)

Version 5.1.30 is a maintenance release of the production 5.1 branch. It is suitable for use with many MySQL Server versions, including 4.1, 5.0, 5.1, 5.4, 5.5, and 5.6.

- **Functionality Added or Changed**

- **Bugs Fixed**

**Functionality Added or Changed**

- Connector/J now supports MySQL Fabric.

**Bugs Fixed**

- Replaced a for loop with the `System.arraycopy()` method for copying array values in the `MysqlIO.unpackNativeEncodedColumn()` and `LoadBalancingConnectionProxy.addHost()` methods, in order to improve the two methods' performance. (Bug #18327245, Bug #71861)

- Avoided the use of an iterator over the list of statement interceptors in the methods `MysqlIO.invokeStatementInterceptorsPost()` and `MysqlIO.invokeStatementInterceptorsPre()`, so that Connector/J does not increase the stack size unnecessarily. (Bug #18236388, Bug #71679)

- The `Field.getStringFromBytes()` method created a useless byte array when using JVM's converter and the encoding defined by the connection. This fix makes the method call `StringUtils.toString()` using the original buffer instead of creating a temporary byte array for the call. (Bug #18228668, Bug #71623)

- Improved on the code for integer-to-hex conversion when building XA commands by avoiding the creation of temporary character arrays, thus enhancing performance. (Bug #18228302, Bug #71621)

- It was intended that if a previous query on a connection had used the `setMaxRows()` method, in the next query, Connector/J would not cancel that by setting `SQL_SELECT_LIMIT=DEFAULT` if the query contained a `LIMIT` clause. However, in the actual implementation, the maximum row setting was reused in the subsequent query in various situations beyond expectation (for example, when a table name contains the string “limit” in it). This fix removes the `LIMIT`-clause parsing and replaces it by a better way of controlling the maximum rows per session. (Bug #18110320, Bug #71396)

- There were sporadic cases of the key store file being open hundreds of times and causing some “Too many files open” errors. This fix makes sure that in com.mysql.jdbc.ExportControlled and in `MysqlIO.sendFileToServer()`, the input stream for the key store file is explicitly closed after use. (Bug #18107621, Bug #71432)

- When working with MySQL 5.6, calling `PreparedStatement.setTimestamp()` resulted in a `java.lang.StringIndexOutOfBoundsException` being thrown if the `Timestamp` contained a fractional second. This fix corrects the digit truncation performed in the `formatNanos()` method, which was the cause of the problem. (Bug #18091639)

- Calling `ResultSet.close()` on an already closed ResultSet caused a SQLException. While the exception was silently discarded, it did result in performance issues. This fix makes Connector/J comply with the Java specification that when a ResultSet object is already closed, application of the `close` method on it should be a no-op. (Bug #16722637, Bug #67318)

- Fixed the problem of the wrong source being provided when the build property `com.mysql.jdbc.noCryptoBuild` was set.

Changes in MySQL Connector/J 5.1.29 (2014-02-03)

Version 5.1.29 is a maintenance release of the production 5.1 branch. It is suitable for use with many MySQL Server versions, including 4.1, 5.0, 5.1, 5.4, 5.5, and 5.6.
MySQL Connector/J 5.1 Release Notes

Functionality Added or Changed

- Added a new connection property detectCustomCollations=[true|false]. When its value is false (which is the default value), the ConnectionImpl.buildCollationMapping() method, for detecting non-standard character sets or collations, will NOT be called during the instantiation of a connection, thus shortening the time for establishing a connection.

The introduction of this new property with the default value of false alters the old default behaviour of calling ConnectionImpl.buildCollationMapping() at each connection. If non-standard character sets or collations might be used, users should set detectCustomCollations=true. (Bug #17874902, Bug #71038)

Bugs Fixed

- DatabaseMetaData.getKeywords() did not return the latest reserved words as found in MySQL Server’s documentation (for example, in Keywords and Reserved Words). This fix makes the function generate, as per the JDBC API specification, a list of the latest MySQL and SQL standard keywords that are not also SQL92 (or, depending on the JDBC version in use, SQL2003) keywords. (Bug #17647584, Bug #70701)

Changes in MySQL Connector/J 5.1.28 (2013-12-23)

Version 5.1.28 is a maintenance release of the production 5.1 branch. It is suitable for use with many MySQL Server versions, including 4.1, 5.0, 5.1, 5.4, 5.5 and 5.6.

Functionality Added or Changed

- Added support for live management for replication hosts. This enables users to change replication topographies (for example, adding or removing a host, or promoting a slave to master) without having to restart an application. See Live Reconfiguration of Replication Topography for details. (Bug #70842)

Bugs Fixed

- A shadow declaration of com.mysql.jdbc.OperationNotSupportedException is removed from com.mysql.jdbc.RowDataDynamic. (Bug #17833137, Bug #70969)
- An incorrect SQLException subclass was thrown during a query interruption. This fix creates a new, JDBC4-specific version of MySQLQueryInterruptedException, which subclasses MySQLNonTransientException. (Bug #17750877, Bug #70835)
- A validation is added to check if blobSendChunkSize is negative (which is the case when maxAllowedPacket is set with a value less than or equal to “8203”) when useServerPrepStmts=true. It throws an exception when the validation fails. (Bug #17184082, Bug #69777)
- When the connection property dontTrackOpenResources=true was used, the result set was closed after a Statement.close() was issued. (Bug #17164058, Bug #69746)
- The timeout limit set by DriverManager.setLoginTimeout() was not honored during a handshake attempt. This fix adds the DriverManager.setLoginTimeout() control to the function NonRegisteringDriver.connect(): if the defined timeout is reached, the connection creation is cancelled and an exception is thrown. (Bug #17015317, Bug #69579)
- The method Statement.closeOnCompletion() was not working. (Bug #16691047, Bug #68916)
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• With cacheResultSetMetadata=true, cacheCallableStmts=true, and cachePrepStmts=true, if a stored procedure that returns a result set was called, calling the stored procedure a second time resulted in a null pointer exception being thrown for initializeResultsMetadataFromCache. (Bug #11762713, Bug #55340)

• Connector/J's SQL escape sequence processor was confused by multiple backslashes. The EscapeTokenizer has been re-factored to process multiple backslashes properly. (Bug #11759035, Bug #51313)

Changes in MySQL Connector/J 5.1.27 (2013-11-04)

Version 5.1.27 is a maintenance release of the MySQL Connector/J production 5.1 branch. It is suitable for use with many MySQL Server versions, including 4.1, 5.0, 5.1, 5.4, 5.5 and 5.6.

• Functionality Added or Changed
• Bugs Fixed

Functionality Added or Changed

• Added support for multi-master replication topographies, which can now be specified using the following host definition syntax: address=(host=hostname) (port=3306) (type=[master|slave]).

• Added the flag CLIENT_PLUGIN_AUTH_LENENC_CLIENT_DATA and support for authentication data up to a length of $2^{64}-1$ bytes.

• Added support for EXPLAIN for UPDATE and DELETE. Extended slow query warning with query execution plan for INSERT, REPLACE, UPDATE, and DELETE.

Bugs Fixed

• When attempting to connect to a server using long, multibyte user name and database name, an Array Index Out Of Bounds Exception was thrown. This fix prevents the problem by increasing the space reserved for those strings. (Bug #17251955)

• When setting a connection property with a value for blobSendChuckSize, largeRowSizeThreshold, or locatorFetchBufferSize, the suffix “G” was not recognized and caused an error to be thrown. With this fix, Connector/J now supports using “G” or “GB” for gigabyte for the purpose, as well as “KB” for kilobyte and “MB” for megabyte. (Bug #17015673, Bug #69452)

• When there was an attempt to create a second branch with a duplicate ID on the same MySQL server instance, the XAException.errorCode returned by Connector/J was not equal to XAException.XAER_DUPID. (Bug #16979862, Bug #69506)

• The SYSTEM TABLE type was handled inconsistently in different methods: DatabaseMetaData.getTypeTypes() did not return system tables, and DatabaseMetaData.getTables() did not return all system tables. With this fix, the table types SYSTEM TABLE and SYSTEM VIEW are returned by getTypeTypes(), and getTables() now returns tables from the internal schemas mysql and performance_schema as instances of SYSTEM TABLE and tables from information_schema as instances of SYSTEM VIEW. (Bug #16879239, Bug #69290)

• JDBC authentication failed when there was a null byte in the scramble, because com.mysql.jdbc.MysqlIO.doHandshake only read up to the first null byte when reading in the first eight bytes of the scramble. (Bug #16723048, Bug #62469)

• When rewriteBatchedStatements=true and useAffectedRows=true were set, executeBatch() did not return the number of affected rows as expected, but always returned a “1,” even if no rows were affected (for example, when an ON DUPLICATE KEY UPDATE clause was applicable but the data needed no changes). The “1” was actually a hardwired value, a workaround
for a known issue on the server side, which does not return the number of affected rows in such cases. This fix makes Connector/J just return the value given by the server anyway, which means the returned number of affected rows is reliable now if Connector/J returns a “0” [no rows affected]; nonzero values returned should not be trusted, though. (Bug #16442951, Bug #68562)

• In a replication-aware deployment, when the master was not reachable, new connections could not be made, or the replication driver just hung. As part of the new multiple-master support feature, users can now set the property allowMasterDownConnections=true to allow connections to be established even when no master hosts are available. (Bug #11757979, Bug #50105, Bug #16443992, Bug #63354)

• Calling ResultSet.absolute(0) caused Connector/J to throw an error. This fix makes ResultSet.absolute(0) behave like ResultSet.beforeFirst(), as required by the JDBC specifications. (Bug #11749136, Bug #38252)

• After setting the connection property yearIsDateType=false, the method ResultSet.getMetaData().getColumnClassName() still returned the Java type of a YEAR column as java.sql.Date although internally it was being treated as java.sql.Short. This fix corrects the metadata for a YEAR column under this situation, so that the correct Java type of java.sql.Short is returned. Please note that the method ResultSet.getMetaData().getColumnType(), however, returns java.sql.Types.DATE irrespective of the yearIsDateType setting. (Bug #11748097, Bug #35115)

• The string returned by DatabaseMetaData.getDriverVersion() contains the unexpanded expression “${svn.Revision}” or “${bzr.revision-id}” instead of the actual revision number of Connector/J. (Bug #50538, Bug #11758345)

Changes in MySQL Connector/J 5.1.26 (2013-08-01)

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• Added a toString() method to the PreparedStatementWrapper class to help debug prepared statements. (Bug #42267, Bug #11751418)

Bugs Fixed

• An out of memory error occurred when the compression protocol was enabled with the connection option useCompression=true. This fix stops the memory leak that caused the error by making sure that CompressedInputStream releases its reference to the connection object when the input stream closes. (Bug #68400, Bug #16478043)

• The results returned by the method DatabaseMetaData.getIndexInfo() were not sorted in the order described in the JDBC specification (NON_UNIQUE, TYPE, INDEX_NAME, and ORDINAL_POSITION). (Bug #68098, Bug #16224299)

• DatabaseMetaData.getColumns() threw a MySQLSyntaxErrorException if the schema contains tables with ANSI quoted names with leading and trailing back quotes (\`). When those names were passed as parameters in unquoted form, Connector/J treated them as quoted because of the back quotes, and thus the error. This fix adds the behavior that when the connection property pedantic was set to true, methods like DatabaseMetaData.getColumns() treat all parameters as unquoted. (Bug #65871, Bug #14598704)

• Connector/J silently ignored calls to ResultSet.updateRow when the cursor was on the insert row. This fix ensures that an SQLException is thrown with those calls, as described in the JDBC specification. (Bug #45757, Bug #11754192)

Changes in MySQL Connector/J 5.1.25 (2013-05-01)
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• **Functionality Added or Changed**

• **Bugs Fixed**

**Functionality Added or Changed**

• When connecting to MySQL server 5.6 or later, Connector/J now sends to the server a number of connection attributes that will be exposed in the relevant `PERFORMANCE_SCHEMA` tables. By default, the following attributes are sent:
  - `client_version`: version number of MySQL Connector/J
  - `client_name`: “MySQL Connector Java”
  - `client_license`: “commercial” or “GPL,” depending on the build used
  - `runtime_vendor`: JVM vendor name
  - `runtime_version`: JVM version

The list of attributes can be augmented, and the sending of the attributes can be suppressed. See the description for `connectionAttributes` in Configuration Properties for Connector/J for details.

**Bugs Fixed**

• The “mysql-connector-java-5.1.24.jar” prepared for maven.org contained the artifact, META-INF/INDEX.LIST, which incorrectly pointed to “mysql-connector-java-5.1.24-bin.jar”. For Connector/J 5.1.25, META-INF/INDEX.LIST has been corrected and now points to “mysql-connector-java-5.1.25.jar”.

The work around for “mysql-connector-java-5.1.24.jar” prepared for maven.org is to rename the JAR file to “mysql-connector-java-5.1.24-bin.jar” or to download the MySQL Connector/J 5.1.24 driver from [http://dev.mysql.com/downloads/connector/j/](http://dev.mysql.com/downloads/connector/j/). (Bug #16574419)

• The `getDriverName()` function would return “MySQL-AB JDBC Driver” as the driver name. This fix changes the driver name string to “MySQL Connector Java”. (Bug #16436511)

• With the connection option `rewriteBatchedStatements=true`, after a batch insert, the `batchStatement` was closed twice. This caused some unnecessary throwing and catching of errors, impacting code performance. This fix nullifies the `batchStatement` after the first calling of the `close()` method in order to avoid a second closing. (Bug #69308, Bug #16879267)

• The `DatabaseMetaData` methods of `getFunctions` and `getFunctionColumns` returned information for both stored functions and procedures when value of the connection option `useInformationSchema` was false. On the other hand, `getProcedures` and `getProcedureColumns` always return information for both stored procedures and functions. The behaviours of the four functions are inconsistent with the idea introduced since JDBC4 to separate the “get” functions for stored functions and procedures. The functions are modified as follows:
  - `getFunctions` and `getFunctionColumns` now only return information for stored functions (not for stored procedures), irrespective of the value of `useInformationSchema`.

• For `getProcedures` and `getProcedureColumns`, in order to maintain backward compatibility with pre-JDBC4 implementations, a new connection option, `getProceduresReturnColumns`, is created, whose default value of `true` makes `getProcedures` and `getProcedureColumns` return information for both stored procedures and functions. Setting the option to `false` makes the functions return only information for stored procedures. (Bug #69298, Bug #16845965)

• `ReplicationConnection.isMasterConnection()`, which is intended to check if the current connection is the master connection, would always return “false”. This fix implements logic that returns “true” if the current connection is the master connection. (Bug #68763, Bug #16545334)
• When using Connector/J in a replication deployment, all of the slave connections would not be pinged. This fix ensures that all active physical connections to slaves are pinged, and that communication exceptions are thrown if:
  • The master connection ping fails, and the connection is currently set to use the master connection via `Connection.setReadOnly(false)`.
  • The Connection object is set to use the slave via `Connection.setReadOnly(true)`, and the currently-selected slave connection ping fails.
(Bug #68733, Bug #16526938)

• Producing Connector/J JAR packages in Eclipse using Ant tasks would result in a JAR file without compiled class files. Compile-related tasks in the Ant script would direct compilation targets to the `bin` directory (for Eclipse compatibility), while JAR related tasks were directed to `{buildDir}/${fullProdName}`. This fix changes the JAR task reference to `{compiler.output}` instead of `{buildDir}/${fullProdName}`. (Bug #68664, Bug #16486957)

• Tomcat failed to stop abandoned connection cleanup threads. The fix for Bug#65909 introduced the ability to stop daemon threads started by the Connector/J driver but it also cleared references from daemon threads to the parent classloader. When the `clearReferencesStopThreads` property is set to “true” in `context.xml`, Tomcat analyzes classloaders to detect and stop lost threads. This fix ensures that abandoned connection cleanup threads retain a reference to the parent classloader.
(Bug #68556, Bug #16443387)

• The `DatabaseMetaData.getProcedureColumns()` method returned wrong `COLUMN_TYPE` values. (Bug #68307, Bug #1670803)

• An exception occurred if `NULL` was passed to a stored procedure `INOUT` parameter. (Bug #60816, Bug #12800874)

• The result set returned by `getTables` did not contain all the columns as specified in the JDBC specification. Even though the missing columns are not meaningful to MySQL, the `getTables` method is modified to add null fields to the result set in order to make it compliant with the JDBC specification. Other methods including `getColumns`, `getFunctionColumns`, `getFunctions`, `getProcedureColumns`, and `getUDTs` are also modified to address the same issue pertaining to them. (Bug #44451, Bug #11753081)

### Changes in MySQL Connector/J 5.1.24 (2013-03-12)

#### Bugs Fixed

- The `Statement.cancel()` was made less susceptible to deadlocking, to allow application servers to immediately cancel operations that fail due to transaction timeouts or network issues. The `abortInternal()` method that was previously part of the `MySQLConnection` interface is now available through the `Connection` interface, so it can be tested for and called if available. (Bug #16224249)

- When a statement was accessing a table in streaming mode, terminating the statement by issuing `KILL QUERY` from another session could cause a `SQLException "Query execution was interrupted"` and a stall when the original session issued a `ResultSet.close()` or `Statement.close()` method call. This issue resulted from a race condition and so could happen intermittently. (Bug #16198772, Bug #64204)

- When the connection options `noDatetimeStringSync` and `useTimezone` were specified together, which is not allowed, the error message referred to an incorrect option name `noDatetimessync`. (Bug #16061665, Bug #68011)

- The `connection.getQueryTimeoutKillsConnection()` method could be called with a null parameter, causing `NullPointerException` errors and stack traces. The error depended on a race condition and so occurred intermittently. (Bug #13943631, Bug #64805)
Changes in MySQL Connector/J 5.1.23 (2013-02-05)

Fixes bugs found since release 5.1.22. Also adds support and test cases for several new features from MySQL Server 5.6.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- New test cases cover new features from MySQL Server 5.6:
  - Explicit partition selection syntax.
  - EXCHANGE PARTITION syntax.
  - Transportable tablespaces syntax: LOCK TABLES ... FOR EXPORT.
  - CREATE TABLE ... DATA DIRECTORY = '/absolute/path/to/directory/' syntax for InnoDB tables.
  - New ALTER TABLE syntax: ALGORITHM and LOCK keywords.
  - Added support of password expiration protocol. This introduces a new Boolean connection property disconnectOnExpiredPasswords:
    - If disconnectOnExpiredPasswords=true and the password has expired, the connection will be rejected by server with ErrorCode == 1820 (ER_MUST_CHANGE_PASSWORD).
    - If disconnectOnExpiredPasswords=false, the connection enters “sandbox” mode, where all commands except SET PASSWORD = ... and SET PASSWORD FOR CURRENT_USER() = ... cause an error to be thrown. The user needs to reconnect though, after setting the password, because Connector/J requires additional information from the server that is not available in the “sandbox” mode.
  - Static charset/collation maps were updated, particularly for the ucs2_unicode_ci and utf8_unicode_ci collations.
  - Connection.setReadOnly() will take advantage of server-side support for read-only transactions present in MySQL 5.6 and newer. Calling .isReadOnly() will incur a round-trip if useLocalSessionState is not enabled.
  - The driver now allows the mechanism for caching MySQL server configuration values replaceable at runtime, via the serverConfigCacheFactory property. The default is an implementation that is a per-VM concurrent map, keyed by URL. The driver will invalidate cache entries when SQLException exceptions that indicate communications errors are thrown (on the assumption that the server has been or is restarting). The driver also invalidates cache entries if the server version that is being connected to differs from the one that was present when the cached values were populated.

To replace the default implementation, implement CacheAdapterFactory<String, Map<String, String>>, and specify the fully-qualified class name of this implementation for the serverConfigCacheFactory connection option.

Bugs Fixed

- Stack trace used for point-of-origin in log and exception messages caused a Permgen leak when an application was redeployed, because the WebappClassLoader could not be garbage collected. We no longer store the entire stack trace, only the calling class and method, and only when using the usage advisor or when profiling. (Bug #16097851, Bug #67954)
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• With the connection setting `useCompression=true`, the SQL statement `LOAD DATA LOCAL` could cause a `java.net.SocketException` error due to a broken pipe. (Bug #15895369, Bug #11237)

• The `nativeSQL()` method would always truncate fractional seconds rather than preserving the fractional part in the output string. Now Connector/J checks the server version: it preserves the fractional part for MySQL 5.6.4 and greater, and truncates the fractional part for older versions. (Bug #14748459, Bug #60598)

• With the new MySQL server password hashing feature enabled, different results could be returned from `ResultSet` and `CachedRowSet`. The test suite was modified to not perform comparison of `PASSWORD()` results when the setting `old_passwords=2`, because with SHA-256 password hashing enabled, the function return results are nondeterministic. (Bug #14665141)

• The cleanup thread for abandoned connections in the `NonRegisteringDriver` class was refactored to have a static shutdown method. Memory was allocated but never released. If you encountered this leak problem, implement the context listener in your application with the `AbandonedConnectionCleanupThread.shutdown()` call in the `contextDestroyed` method. This issue was found in applications running under the Tomcat application server, but it might have also applied to other application servers.

For example:

```java
@WebListener
public class YourThreadsListener implements ServletContextListener {
    public void contextDestroyed(ServletContextEvent arg0) {
        try {
            AbandonedConnectionCleanupThread.shutdown();
        } catch (InterruptedException e) {
        }
    }
    ...
}
```

Note that if container does not support annotations, you add the description to `web.xml`:

```xml
<listener>
    <listener-class>user.package.YourThreadsListener</listener-class>
</listener>
```

(Bug #14570236, Bug #65909)

• With the connection parameter `rewriteBatchedStatements=true`, `ResultSetRow.getTimeFast` could give an incorrect value for `TIME` columns containing a fractional part. (Bug #14260352)

• If a `timestamp` value was passed through prepared statement parameters, fractional-second precision was stripped off, even if the underlying field (such as `VARCHAR(255)`) could store the full value. A workaround was to convert the timestamp value to a string when specifying the prepared statement argument, for example `prepped_stmt.setString(1,time_stamp.toString())`. This was partly fixed in 5.1.19, but that fix did not cover the case with the setting `useLegacyDatetimeCode=true`. (Bug #11750017, Bug #40279, Bug #60584)

• `executeQuery()` in `Statement.java` let `TRUNCATE TABLE` queries be executed, although that method is supposed to block any request that modifies the database. `TRUNCATE TABLE` and `RENAME TABLE` are now filtered for `executeQuery()`. (Bug #11748257, Bug #35653)

• Compiling Connector/J from source failed when using a non-Sun/Oracle JDK, because the Ant target `compile-testsuite` contained a `AppletRegressionTest` that used a Sun-specific class (`sun.applet.AppletSecurity`). This fix removes the `AppletRegressionTest` and thus the dependence on the Sun class from the build process. (Bug #11745319, Bug #13509)

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Changes in MySQL Connector/J 5.1.22 (2012-09-11)

Fixes bugs found since release 5.1.21.

Bugs Fixed

- **Performance:** The `com.mysql.jdbc.getCharsetNameForIndex()` method was made more efficient, resulting in better performance for queries against tables containing many columns with string data types. (Bug #14236302, Bug #65508)

- The `LoadBalancingConnectionProxy.pickNewConnection()` method could incorrectly flag the current connection as invalid after testing another connection. The selection process could choose another (potentially offline) host, leading to a "connection is closed" error when trying to use a connection after re-balancing:

```plaintext
No operations allowed after connection closed.
Connection closed after inability to pick valid new connection during fail-over.
```

(Bug #14563127)

- With `profileSQL=true` and `useNanosForElapsedTime=true` specified in the connection URL, query and fetch duration were not reported correctly. The `com.mysql.jdbc.MysqlIO.sqlQueryDirect()` method always measured times in milliseconds rather than switching between milliseconds and nanoseconds. (Bug #14273046, Bug #57662)

- ResultSet objects created by the `getGeneratedKeys()` method were not being automatically closed, leading to potential memory leaks if the application did not explicitly close the ResultSet objects. (Bug #14192873, Bug #65503)

- Implemented the `getVersionColumns()` method, which formerly always returned an empty result set. Now this method returns the timestamp columns that are updated every time a row is changed. (Bug #13636546, Bug #63800)

- Connecting to a server that used a UCS2 character set would throw an exception:

```plaintext
com.mysql.jdbc.exceptions.jdbc4.MySQLSyntaxErrorException: You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '??' at line 1
```

Now, Connector/J sets `characterEncoding` implicitly to UTF-8 when the server character set is UCS2. Because the Connector/J UTF-8 implementation does not cover all UCS-2 characters, note that truncation might occur in some cases. (Bug #11751035, Bug #41752)

- Connector/J now avoids synchronization issues in terms of locking order and prepared statements.

Changes in MySQL Connector/J 5.1.21 (2012-07-03)

Fixes bugs found since release 5.1.20.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Connector/J applications can now connect to MySQL servers that use the PAM authentication system. See Connecting Using PAM Authentication for details about the Connector/J support, and PAM Pluggable Authentication for information about this authentication feature of the MySQL server. (Bug #13608088)
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Bugs Fixed

• When a new instance of authentication plugin is obtained (either the default one, or one named in Auth Challenge Packet or in Auth Method Switch Request Packet), it must be checked if plugin's confidentiality requirements are satisfied. If the plugin requested in the Auth Method Switch Request Packet required a secure connection, an insecure connection could be established instead. (Bug #13980303)

• With a connection encoding of gbk and a server encoding of latin1, a call such as PreparedStatement.setString(1, "0f0f0702") could throw an exception java.lang.StringIndexOutOfBoundsException. (Bug #13943893, Bug #64731)

• When Connector/J was connected to a MySQL 5.5 server, the error message for an invalid query could be returned in the wrong character set and appear garbled. (Bug #13702427, Bug #64205)

• By default, if an I/O error occurred while executing a query a deadlock could occur as Connector/J attempted to close all open statements (by calling method ConnectionImpl#closeAllOpenStatements) The deadlock would occur if any execute*(*) method of another instance of the StatementImpl class was called by another thread. A workaround was to set the property dontTrackOpenResources to true. (Bug #12590053, Bug #61247)

• Specifying a nonexistent character set in the characterEncoding or characterSetResults connection options could produce a NullPointerException error. The error could occur with a typographical mistake, such as using a hyphen instead of an underscore in the name. (Bug #11749010, Bug #37931)

• The timezone entry was missing for “MEST - Middle European Summer Time”. (Bug #11748548, Bug #36662)

Changes in MySQL Connector/J 5.1.20 (2012-05-01)

Fixes bugs found since release 5.1.19.

Bugs Fixed

• **Important Change:** This fix corrects an issue introduced in Connector/J 5.1.19 that caused connection errors with MySQL 4.1 and earlier servers. A java.lang.ClassCastException exception occurred during connection initialization when com.mysql.jdbc.ConnectionImpl.buildCollationMapping() interpreted the output of the SHOW COLLATION statement. (Bug #13958793)

• Using Connector/J 5.1.19 in combination with JBoss could result in an error while establishing a connection: MySQLNonTransientConnectionException: Bad handshake. This issue occurred when using the old-style password hash, which requires the mysql_old_password plugin during handshake. A workaround was to replace the 16-byte hash with a 41-byte one, as explained in Password Hashing in MySQL. (Bug #13990612, Bug #64983)

• A java.lang.StringIndexOutOfBoundsException exception could occur when manipulating date/time values with fractional seconds. (Bug #13960556)

• A MySQLSyntaxErrorException could occur when calling certain methods while connected to a MySQL 5.6.5 or higher server. Affected methods included StatementImpl.execute() and PreparedStatement.execute(). The cause was the removal of the SET OPTION syntax in the MySQL Server. The methods were modified to use the newer SET syntax internally. (Bug #13955027)

• The savepoint identifier generated by the java.sql.Connection#.setSavepoint() function could be misinterpreted as a floating-point number, for example values such as 123e10 or 123e10foo. Such values could cause replication errors on slave servers because the values are not quoted in the binary log. The fix ensures that the savepoint identifiers do not begin with digits. (Bug #11763271, Bug #55962)
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- If the string `limit` was used in a column name, prepared statements incorrectly treated the statement as if it used a `LIMIT` clause. For example, a prepared statement with `maxrows` set to 0 could incorrectly reuse the value from a previous call to `setMaxRows()`. This issue applied to both quoted and unquoted column names, and server-side and client-side prepared statements. (Bug #11748492, Bug #36478)

**Changes in MySQL Connector/J 5.1.19 (April 2012)**

Fixes bugs found since release 5.1.18.

- **Functionality Added or Changed**
- **Bugs Fixed**

**Functionality Added or Changed**

- For a UTF-8 table using a collation other than the default (`utf8_general_ci`), the precision of the `ResultSetMetaData` could be different from the precision specified in the `CREATE TABLE` statement. The fix corrects the return value from `getMaxBytesPerChar()`.

  This fix changes the behavior of some connection string parameters. `useDynamicCharsetInfo` no longer has any effect. With the setting `cacheServerConfiguration=true`, the cached settings also include the results of the `SHOW CHARACTER SET` statement. (Bug #13495590, Bug #63456)

- Added support for pluggable authentication, via the `com.mysql.jdbc.AuthenticationPlugin` interface (which extends the standard “extension” interface). Examples are in `com/mysql/jdbc/authentication` and in `testsuite.regression.ConnectionRegressionTest`. This feature introduces three new connection properties:

  - `authenticationPlugins` defines a comma-delimited list of classes that implement `com.mysql.jdbc.AuthenticationPlugin` and are used for authentication unless disabled by the `disabledAuthenticationPlugins` property.

  - `disabledAuthenticationPlugins` defines a comma-delimited list of classes implementing `com.mysql.jdbc.AuthenticationPlugin` or mechanisms, i.e. `mysql_native_password`. The authentication plugins or mechanisms cannot be used for authentication. Authentication will fail if it requires one of these classes. It is an error to disable the default authentication plugin, either the one named by `defaultAuthenticationPlugin` property or the hardcoded one if `defaultAuthenticationPlugin` property is not set.

  - `defaultAuthenticationPlugin` defines the name of a class implementing `com.mysql.jdbc.AuthenticationPlugin`, which is used as the default authentication plugin. It is an error to use a class that is not listed in `authenticationPlugins` and is not one of the built-in plugins. It is an error to set as default a plugin that is disabled by being listed in the `disabledAuthenticationPlugins` property. It is an error to set this value to null or the empty string; there must be at least one valid default authentication plugin specified for the connection, meeting all the constraints listed above.

**Bugs Fixed**

- **Performance**: An unnecessary call to `bind()` during socket operations could limit scalability on some platforms. (Bug #13875070, Bug #63811)

- `setMaxRows` was not correctly processed during metadata collection for client-side prepared statements, causing the entire result set to be fetched and possibly leading to an out-of-memory error. (Bug #13839395, Bug #64621)

- A problem with processing escape sequences (in `com.mysql.jdbc.EscapeProcessor#escapeSQL`) could cause certain statements to fail. For example, a `CREATE TABLE` statement with a clause such as `CONSTRAINT `fk_`` was not parsed correctly. (Bug #13612316, Bug #63526)
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- The `sjis` character set was incorrectly mapped to `MS392`, which was in turn mapped to `cp932`, resulting in garbled characters in some cases. In Connector/J 5.1.19, the mappings of character sets and collations were refactored to avoid such multi-step mappings. (Bug #13589875)

- Underprivileged execution of stored procedures fixed. (Bug #13508993, Bug #61203)

- A combination of failover connections, proxied or prepared statements, and database connection pool could cause a memory leak due to improper implementation of `equals()`. (Bug #13441718, Bug #63284)

- `com.mysql.jdbc.ResultSetRow.getTimestampFast()` did not account for all valid `TIME` lengths. (Bug #60582, Bug #16592635)

- The `Connection.changeUser()` method did not check for closed connections, leading to `NullPointerException` errors when this method was called on a closed connection.

- Reduced the memory overhead for server-side prepared statements. Each prepared statement allocated a 4K buffer for converting streams. Now this allocation is skipped when no `set*Stream()` methods have been used.

Changes in MySQL Connector/J 5.1.18 (2011-10-04)

Fixes bugs found since release 5.1.17.

- Functionality Added or Changed

- Bugs Fixed

**Functionality Added or Changed**

- Added the function `MYSQL_INDEX_TO_MYSQL_CHARSET` to retrieve the server charset name, using an index instead of parsing variables to `CharsetMapping.java`

**Bugs Fixed**

- The `LRUCache` implementation removed the eldest entry, rather than the least-recently accessed. (Bug #13036537)

- Changed `cacheCallableStatements` to `cacheCallableStmts` in `maxPerformance.properties`, to allow proper caching. (Bug #13036309)

- Added a new `ant` flag, `com.mysql.jdbc.junit.fork`, which controls whether JUnit will fork new processes for testing. Valid values for the flag are:
  - `on`: fork new process; the default and legacy behavior.
  - `off`: do not fork new process; required for Windows, or `process fork failure` errors will result while running the test suite via `ant` on Windows. (Bug #12784170)

- Not putting a space between `VALUES()` and `ON DUPLICATE KEY UPDATE` causes connector/J to both (A) Rewrite the query, although it includes an `ON UPDATE` statement and (B) To generate the wrong query with multiple `ON DUPLICATE KEY` statements. (Bug #12565726)

- The `loadBalanceBlacklistTimeout` option was not functioning properly. Working connections were not being removed from the blacklist. (Bug #63135)

- The "old" warnings were returned when `Statement.getWarnings()` was called after `Statement.clearWarnings()`. (Bug #61866, Bug #12791594)

- Connector/J now guards against the condition where a call to `KILL QUERY` will kill the next query issued by the server, if no query is in process. (Bug #61501)
• Calling `Statement.cancel()` on a statement that isn’t currently executing, will cause a later-executed query on the same connection to be unexpectedly canceled. The driver now guards against this condition, but it is an underlying server issue. The MySQL statement `KILL QUERY` (which is what the driver uses to implement `Statement.cancel()`) is rather non-deterministic, and thus the use of `Statement.cancel()` should be avoided if possible. (Bug #61501)

• A connection could not be established when the URL contained both `sessionVariables` and `characterEncoding`. (Bug #61201, Bug #12649557)

• Reverting changes made to `ConnectionImpl.java`, the private boolean `characterSetNamesMatches` function.

Changes in MySQL Connector/J 5.1.17 (2011-07-07)

Fixes bugs found since release 5.1.16.

Bugs Fixed

• `LIKE` was not optimized in then server when run against `INFORMATION_SCHEMA` tables and no wildcards were used. Databases/tables with ‘_’ or ‘%’ in their names (escaped or not) are handled by this code path, although slower, since it is rare to find these characters in table names in SQL. If there is a ‘_’ or ‘%’ in the string, `LIKE` takes care of that; otherwise, ‘=’ is now used instead. The only exception is the `information_schema` database, which is handled separately. The patch covers both `getTables()` and `getColumns()` (Bug #61332)

• The first call to a stored procedure failed with “No Database Selected”. The workaround introduced in `DatabaseMetaData.getCallStmtParameterTypes` to fix the server bug where `SHOW CREATE PROCEDURE` was not respecting lowercase table names was misbehaving when the connection was not attached to a database and on case-insensitive operating systems. (Bug #61150)

• There was a concurrency bottleneck in Java’s character set encoding/decoding when converting bytes to/from `String` values.

  Important

  No longer use `String.getBytes(...)`, or `new String(byte[]...)`. Use the `StringUtils` method instead. (Bug #61105)

• Connector/J now avoids a concurrent bottleneck in Java’s character set encoding/decoding when converting bytes to and from instances of `String`. (Bug #61105, Bug #12622056)

Changes in MySQL Connector/J 5.1.16 (Not released)

Fixes bugs found since release 5.1.15.

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• The `Connection.isServerLocal()` method can now determine if a connection is against a server on the same host.

Bugs Fixed

• When auto-reconnect was used with `cacheServerConfiguration`, errors could occur when the host changed (in an HA setup, for example). (Bug #12325877)
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- DBMD.getTables and getColumns fail with table names that contain a dot (like "junk_[Sp:e,c/C-h+a=.r]"). The workaround is to use useInformationSchema=True. (Bug #11782297)

- Fixed a timestamp offset bug in com.mysql.jdbc.ResultSetRow.getTimestampFast(). (Bug #60313, Bug #11890729)

- ResultSetRow.getTimestampFast and getTime had invalid offsets. (Bug #60313)

- wasNull was not set for a DATE field with the value of 0000-00-00 in getDate(), although zeroDateTimeBehavior is defined as convertToNull. (Bug #57808)

- A bypassing of the server protocol bug, where the DB should be null-terminated whether it exists or not. This affects COM_CHANGE_USER. (Bug #54425)

- Fixed a bug where Connector/J would kill the matching ConnectionID, but on the wrong server. (Bug #54135)

Changes in MySQL Connector/J 5.1.15 (2011-02-09)

Fixes bugs found since release 5.1.14.

Bugs Fixed

- Optional logging class com.mysql.jdbc.log.Log4JLogger was not included in the source/binary package for 5.1.14.

  5.1.15 will ship with an SLF4J logger (which can then be plugged into Log4J). Unfortunately, it is not possible to ship a direct Log4J integration because the GPL is not compatible with Log4J's license. (Bug #58511, Bug #11766408)

- The hard-coded list of reserved words in Connector/J was not updated to reflect the list of reserved words in MySQL Server 5.5. (Bug #59224)

- MySqlProcedure accepted null arguments as parameters, however the JDBC meta data did not indicate that. (Bug #38367, Bug #11749186)

- Using Connector/J to connect from a z/OS machine to a MySQL Server failed when the database name to connect to was included in the connection URL. This was because the name was sent in z/OS default platform encoding, but the MySQL Server expected Latin1.

  It should be noted that when connecting from systems that do not use Latin1 as the default platform encoding, the following connection string options can be useful: passwordCharacterEncoding=ASCII and characterEncoding=ASCII. (Bug #18086, Bug #11745647)

Changes in MySQL Connector/J 5.1.14 (2010-12-06)

Fixes bugs found since release 5.1.13.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Connector/J's dependence on the org.apache.commons.logging package has been removed. (Bug #11756133, Bug #48013)

- Connector/J's load-balancing functionality only allowed the following events to trigger failover:

  - Transaction commit/rollback
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- CommunicationExceptions

- Matches to user-defined Exceptions using the loadBalanceSQLStateFailover, loadBalanceSQLExceptionSubclassFailover or loadBalanceExceptionChecker property.

This meant that connections where auto-commit was enabled were not balanced, except for Exceptions, and this was problematic in the case of distribution of read-only work across slaves in a replication deployment.

The ability to load-balance while auto-commit is enabled has now been added to Connector/J. This introduces two new properties:

1. loadBalanceAutoCommitStatementThreshold - defines the number of matching statements which will trigger the driver to (potentially) swap physical server connections. The default value (0) retains the previously established behavior that connections with auto-commit enabled are never balanced.

2. loadBalanceAutoCommitStatementRegex - the regular expression against which statements must match. The default value (blank) matches all statements.

Load-balancing will be done after the statement is executed, before control is returned to the application. If rebalancing fails, the driver will silently swallow the resulting Exception (as the statement itself completed successfully). (Bug #55723)

Bugs Fixed

- Connection failover left slave/secondary in read-only mode. Failover attempts between two read-write masters did not properly set this.currentConn.setReadOnly(false). (Bug #58706)

- The CallableStatementRegression test suite failed with a Null Pointer Exception because the OUT parameter in the I__S.PARAMETERS table had no name, that is COLUMN_NAME had the value NULL. (Bug #58232)

- Connector/J mapped both 3-byte and 4-byte UTF8 encodings to the same Java UTF8 encoding.

To use 3-byte UTF8 with Connector/J set characterEncoding=utf8 and set useUnicode=true in the connection string.

To use 4-byte UTF8 with Connector/J configure the MySQL server with character_set_server=utf8mb4. Connector/J will then use that setting as long as characterEncoding has not been set in the connection string. This is equivalent to autodetection of the character set. (Bug #58232)

- DatabaseMetaData.supportsMultipleResultSets() was hard-coded to return false, even though Connector/J supports multiple result sets. (Bug #57380)

- Using the useOldUTF8Behavior parameter failed to set the connection character set to latin1 as required.

In versions prior to 5.1.3, the handshake was done using latin1, and while there was logic in place to explicitly set the character set after the handshake was complete, this was bypassed when useOldUTF8Behavior was true. This was not a problem until 5.1.3, when the handshake was modified to use utf8, but the logic continued to allow the character set configured during that handshake process to be retained for later use. As a result, useOldUTF8Behavior effectively failed. (Bug #57262)

- Invoking a stored procedure containing output parameters by its full name, where the procedure was located in another database, generated the following exception:

  Parameter index of 1 is out of range (1, 0)
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(Bug #57022)

- When a JDBC client disconnected from a remote server using `Connection.close()`, the TCP connection remained in the `TIME_WAIT` state on the server side, rather than on the client side. (Bug #56979)

- Leaving Trust/ClientCertStoreType properties unset caused an exception to be thrown when connecting with `useSSL=true`, as no default was used. (Bug #56955)

- When load-balanced connections swap servers, certain session state was copied from the previously active connection to the newly selected connection. State synchronized included:
  - Auto-commit state
  - Transaction isolation state
  - Current schema/catalog

However, the read-only state was not synchronized, which caused problems if a write was attempted on a read-only connection. (Bug #56706)

- When using Connector/J configured for failover (jdbc:mysql://host1,host2,... URLs), the non-primary servers re-balanced when the transactions on the master were committed or rolled-back. (Bug #56429)

- An unhandled Null Pointer Exception (NPE) was generated in `DatabaseMetaData.java` when calling an incorrectly cased function name where no permission to access `mysql.proc` was available.

  In addition to catching potential NPEs, a guard against calling JDBC functions with `db_name.proc_name` notation was also added. (Bug #56305)

- Added diagnostic information to `SQLException` messages that are caused by usage of a closed load-balanced connection, to help clarify the root cause of a connection closure. (Bug #56200)

  Attempting to use JDBC4 functions on `Connection` objects resulted in errors being generated:

  ```
   at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
   at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:39)
   at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:25)
   at java.lang.reflect.Method.invoke(Method.java:597)
   at com.mysql.jdbc.LoadBalancingConnectionProxy.invoke(LoadBalancingConnectionProxy.java:476)
   at $Proxy0.createBlob(Unknown Source)
  ```

  (Bug #56099)

- Connector/J could exit with a "parameter index out of range" error when executing stored procedures. (Bug #55328, Bug #11762701)

Changes in MySQL Connector/J 5.1.13 (2010-06-24)

Fixes bugs found since release 5.1.12.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Connector/J did not support `utf8mb4` for servers 5.5.2 and newer.
Connector/J now auto-detects servers configured with `character_set_server=utf8mb4` or treats the Java encoding `utf-8` passed using `characterEncoding=...` as `utf8mb4` in the `SET NAMES=...` calls it makes when establishing the connection. (Bug #54175)

**Bugs Fixed**

- The method `unSafeStatementInterceptors()` contained an erroneous line of code, which resulted in the interceptor being called, but the result being thrown away. (Bug #53041)

- There was a performance regression of roughly 25% between r906 and r907, which appeared to be caused by pushing the Proxy down to the I/O layer. (Bug #52534)

- Logic in implementations of `LoadBalancingConnectionProxy` and `LoadBalanceStrategy` behaved differently as to which `SQLException`s trigger failover to a new host. The former looked at the first two characters of the SQLState:

```
if (sqlState.startsWith("08"))
```

The latter used a different test:

```
if (sqlEx instanceof CommunicationsException
    || "08S01".equals(sqlEx.getSQLState())) {
```

This meant it was possible for a new `Connection` object to throw an `Exception` when the first selected host was unavailable. This happened because `MySqlIO.createNewIO()` could throw an `SQLException` with a SQLState of "08001", which did not trigger the "try another host" logic in the `LoadBalanceStrategy` implementations, so an `Exception` was thrown after having only attempted connecting to a single host. (Bug #52231)

- In the file `DatabaseMetadata.java`, the function `private void getCallStmtParameterTypes` failed if the parameter was defined over more than one line by using the '\n' character. (Bug #52167)

- The catalog parameter, `PARAM_CAT`, was not correctly processed when calling for metadata with `getMetaData()` on stored procedures. This was because `PARAM_CAT` was hardcoded in the code to `NULL`. In the case where `nullcatalogmeanscurrent` was `true`, which is its default value, a crash did not occur, but the metadata returned was for the stored procedures from the catalog currently attached to. If, however, `nullcatalogmeanscurrent` was set to `false` then a crash resulted.

  Connector/J has been changed so that when `NULL` is passed as `PARAM_CAT` it will not crash when `nullcatalogmeanscurrent` is `false`, but rather iterate all catalogs in search of stored procedures. This means that `PARAM_CAT` is no longer hardcoded to `NULL` (see Bug #51904). (Bug #51912)

- A load balanced `Connection` object with multiple open underlying physical connections rebalanced on `commit()`, `rollback()`, or on a communication exception, without validating the existing connection. This caused a problem when there was no pinging of the physical connections, using queries starting with `/* ping */`, to ensure they remained active. This meant that calls to `Connection.commit()` could throw a `SQLException`. This did not occur when the transaction was actually committed; it occurred when the new connection was chosen and the driver attempted to set the auto-commit or transaction isolation state on the newly chosen physical connection. (Bug #51783)

- The `rollback()` method could fail to rethrow a `SQLException` if the server became unavailable during a rollback. The errant code only rethrew when `ignoreNonTxTables` was true and the exception did not have the error code 1196, `SQLError.ER_WARNING_NOT_COMPLETE_ROLLBACK`. (Bug #51776)
• When the `allowMultiQueries` connection string option was set to `true`, a call to `Statement.executeBatch()` scanned the query for escape codes, even though `setEscapeProcessing(false)` had been called previously. (Bug #51704)

• When a `StatementInterceptor` was used and an alternate `ResultSet` was returned from `preProcess()`, the original statement was still executed. (Bug #51666)

• Objects created by `ConnectionImpl`, such as prepared statements, hold a reference to the `ConnectionImpl` that created them. However, when the load balancer picked a new connection, it did not update the reference contained in, for example, the `PreparedStatement`. This resulted in inserts and updates being directed to invalid connections, while commits were directed to the new connection. This resulted in silent data loss. (Bug #51643)

• `jdbc:mysql:loadbalance://` would connect to the same host, even though `loadBalanceStrategy` was set to a value of `random`, and multiple hosts were specified. (Bug #51266)

• An unexpected exception when trying to register OUT parameters in `CallableStatement`. Sometimes Connector/J was not able to register OUT parameters for `CallableStatements`. (Bug #43576)

Changes in MySQL Connector/J 5.1.12 (2010-02-18)

Fixes bugs found since release 5.1.11.

Bugs Fixed

• The catalog parameter was ignored in the `DatabaseMetaData.getProcedure()` method. It returned all procedures in all databases. (Bug #51022)

• A call to `DatabaseMetaData.getDriverVersion()` returned the revision as `mysql-connector-java-5.1.11 { Revision: ${svn.Revision} }`. The variable `${svn.Revision}` was not replaced by the SVN revision number. (Bug #50288)

Changes in MySQL Connector/J 5.1.11 (2010-01-21)

Fixes bugs found since release 5.1.10.

• **Functionality Added or Changed**

• **Bugs Fixed**

Functionality Added or Changed

• Replication connections, those with URLs that start with `jdbc:mysql:replication`, now use a `jdbc:mysql:loadbalance` connection for the slave pool. This means that it is possible to set load balancing properties such as `loadBalanceBlacklistTimeout` and `loadBalanceStrategy` to choose a mechanism for balancing the load, and failover or fault tolerance strategy for the slave pool. (Bug #49537)

Bugs Fixed

• `NullPointerException` sometimes occurred in `invalidateCurrentConnection()` for load-balanced connections. (Bug #50288)

• The `deleteRow` method caused a full table scan, when using an updatable cursor and a multibyte character set. (Bug #49745)

• For pooled connections, Connector/J did not process the session variable `time_zone` when set using the URL, resulting in incorrect timestamp values being stored. (Bug #49700)

• The `ExceptionInterceptor` class did not provide a `Connection` context. (Bug #49607)
• Ping left closed connections in the liveConnections map, causing subsequent Exceptions when that connection was used. (Bug #48605)

• Using MysqlConnectionPoolDataSource with a load-balanced URL generated exceptions of type ClassCastException:

```java
ClassCastException in MysqlConnectionPoolDataSource
Caused by: java.lang.ClassCastException: $Proxy0
  at com.mysql.jdbc.jdbc2.optional.MysqlConnectionPoolDataSource.getPooledConnection(MysqlConnectionPoolDataSource.java:80)
java.lang.ClassCastException: $Proxy2
  at com.mysql.jdbc.jdbc2.optional.StatementWrapper.executeQuery(StatementWrapper.java:744)
```

(Bug #48486)

• The implementation for load-balanced Connection used a proxy, which delegated method calls, including equals() and hashCode(), to underlying Connection objects. This meant that successive calls to hashCode() on the same object potentially returned different values, if the proxy state had changed such that it was utilizing a different underlying connection. (Bug #48442)

• The batch rewrite functionality attempted to identify the start of the VALUES list by looking for “VALUES ” (with trailing space). However, valid MySQL syntax permits VALUES to be followed by whitespace or an opening parenthesis:

```sql
INSERT INTO tbl VALUES (1);
```

Queries written with the above formats did not therefore gain the performance benefits of the batch rewrite. (Bug #48172)

• A PermGen memory leaked was caused by the Connector/J statement cancellation timer (java.util.Timer). When the application was unloaded the cancellation timer did not terminate, preventing the ClassLoader from being garbage collected. (Bug #36565)

• With the connection string option noDatetimeStringSync set to true, and server-side prepared statements enabled, the following exception was generated if an attempt was made to obtain, using ResultSet.getString(), a datetime value containing all zero components:

```java
java.sql.SQLException: Value '0000-00-00' can not be represented as java.sql.Date
```

(Bug #32525)

### Changes in MySQL Connector/J 5.1.10 (2009-09-23)

Fixes bugs found since release 5.1.9.

**Bugs Fixed**

• The DriverManager.getConnection() method ignored a non-standard port if it was specified in the JDBC connection string. Connector/J always used the standard port 3306 for connection creation. For example, if the string was jdbc:mysql://localhost:6777, Connector/J would attempt to connect to port 3306, rather than 6777. (Bug #47494)

### Changes in MySQL Connector/J 5.1.9 (2009-09-21)

**Bugs Fixed**

• In the class com.mysql.jdbc.jdbc2.optional.SuspendableXAConnection, which is used when pinGlobalTxToPhysicalConnection=true, there is a static map (XIDS_TO_PHYSICAL_CONNECTIONS) that tracks the Xid with the XAConnection, however this...
map was not populated. The effect was that the `SuspendableXAConnection` was never pinned to the real XA connection. Instead it created new connections on calls to `start`, `end`, `resume`, and `prepare`. (Bug #46925)

- When using the ON DUPLICATE KEY UPDATE functionality together with the `rewriteBatchedStatements` option set to true, an exception was generated when trying to execute the prepared statement:

  ```sql
  INSERT INTO config_table (modified, id_) VALUES (?, ?) ON DUPLICATE KEY UPDATE modified=?
  ```

  The exception generated was:

  ```java
  SQLException: Parameter index out of range (3 > number of parameters, which is 2).
  ...
  Caused by: java.sql.SQLException: Parameter index out of range (3 > number of parameters, which is 2).
  ...
  ```

  (Bug #46788)

- When Connector/J encountered an error condition that caused it to create a `CommunicationsException`, it tried to build a friendly error message that helped diagnose what was wrong. However, if there had been no network packets received from the server, the error message contained the following incorrect text:

  ```text
  The last packet successfully received from the server was 1,249,932,468,916 milliseconds ago. The last packet sent successfully to the server was 0 milliseconds ago.
  ```

  (Bug #46637)

- The `getSuperTypes` method returned a result set with incorrect names for the first two columns. The name of the first column in the result set was expected to be `TYPE_CAT` and that of the second column `TABLE_CAT`. The method however returned the names as `TABLE_CAT` and `TABLE_SCHEM` for first and second column respectively. (Bug #44508)

- `SQLException` for data truncation error gave the error code as 0 instead of 1265. (Bug #44324)

- Calling `ResultSet.deleteRow()` on a table with a primary key of type `BINARY(8)` silently failed to delete the row, but only in some repeatable cases. The generated `DELETE` statement generated corrupted part of the primary key data. Specifically, one of the bytes was changed from 0x90 to 0x9D, although the corruption appeared to be different depending on whether the application was run on Windows or Linux. (Bug #43759)

- Accessing result set columns by name after the result set had been closed resulted in a `NullPointerException` instead of a `SQLException`. (Bug #41484)

- `QueryTimeout` did not work for batch statements waiting on a locked table.

  When a batch statement was issued to the server and was forced to wait because of a locked table, Connector/J only terminated the first statement in the batch when the timeout was exceeded, leaving the rest hanging. (Bug #34555)
The `parseURL` method in class `com.mysql.jdbc.Driver` did not work as expected. When given a URL such as “jdbc:mysql://www.mysql.com:12345/my_database” to parse, the property `PORT_PROPERTY_KEY` was found to be `null` and the `HOST_PROPERTY_KEY` property was found to be “www.mysql.com:12345”.

Note
Connector/J has been fixed so that it will now always fill in the `PORT` property (using 3306 if not specified), and the `HOST` property (using `localhost` if not specified) when `parseURL()` is called. The driver also parses a list of hosts into `HOST.n` and `PORT.n` properties as well as adding a property `NUM_HOSTS` for the number of hosts it has found. If a list of hosts is passed to the driver, `HOST` and `PORT` will be set to the values given by `HOST.1` and `PORT.1` respectively. This change has centralized and cleaned up a large section of code used to generate lists of hosts, both for load-balanced and fault tolerant connections and their tests.

(Bug #32216)

• Attempting to delete rows using `ResultSet.deleteRow()` did not delete rows correctly. (Bug #27431)

• The `setDate` method silently ignored the Calendar parameter. The code was implemented as follows:

```java
public void setDate(int parameterIndex, java.sql.Date x, Calendar cal) throws SQLException {
    setDate(parameterIndex, x);
}
```

From reviewing the code it was apparent that the Calendar parameter `cal` was ignored. (Bug #23584)

Changes in MySQL Connector/J 5.1.8 (2009-07-16)

Bugs Fixed

• The reported milliseconds since the last server packets were received/sent was incorrect by a factor of 1000. For example, the following method call:

```java
SQLException.createLinkFailureMessageBasedOnHeuristics(
    (ConnectionImpl) this.conn,
    System.currentTimeMillis() - 1000,
    System.currentTimeMillis() - 2000,
    e,
    false);
```

returned the following string:

The last packet successfully received from the server was 2 milliseconds ago. The last packet sent successfully to the server was 1 milliseconds ago.

(Bug #45419)

• Calling `Connection.serverPreparedStatement()` variants that do not take result set type or concurrency arguments returned statements that produced result sets with incorrect defaults, namely `TYPE_SCROLL_SENSITIVE`. (Bug #45171)

• The result set returned by `getIndexInfo()` did not have the format defined in the JDBC API specifications. The fourth column, `DATA_TYPE`, of the result set should be of type `BOOLEAN`. Connector/J however returns `CHAR`. (Bug #44869)
• The result set returned by `getTypeInfo()` did not have the format defined in the JDBC API specifications. The second column, `DATA_TYPE`, of the result set should be of type `INTEGER`. Connector/J however returns `SMALLINT`. (Bug #44868)

• The `DEFERRABILITY` column in database metadata result sets was expected to be of type `SHORT`. However, Connector/J returned it as `INTEGER`. This affected the following methods: `getImportedKeys()`, `getExportedKeys()`, `getCrossReference()`. (Bug #44867)

• The result set returned by `getColumns()` did not have the format defined in the JDBC API specifications. The fifth column, `DATA_TYPE`, of the result set should be of type `INTEGER`. Connector/J however returns `SMALLINT`. (Bug #44865)

• The result set returned by `getVersionColumns()` did not have the format defined in the JDBC API specifications. The third column, `DATA_TYPE`, of the result set should be of type `INTEGER`. Connector/J however returns `SMALLINT`. (Bug #44863)

• The result set returned by `getBestRowIdentifier()` did not have the format defined in the JDBC API specifications. The third column, `DATA_TYPE`, of the result set should be of type `INTEGER`. Connector/J however returns `SMALLINT`. (Bug #44862)

• Connector/J contains logic to generate a message text specifically for streaming result sets when there are `CommunicationsException` exceptions generated. However, this code was never reached.

In the `CommunicationsException` code:

```java
private boolean streamingResultSetInPlay = false;

public CommunicationsException(ConnectionImpl conn, long lastPacketSentTimeMs,
long lastPacketReceivedTimeMs, Exception underlyingException) {
    this.exceptionMessage = SQLError.createLinkFailureMessageBasedOnHeuristics(conn,
    lastPacketSentTimeMs, lastPacketReceivedTimeMs, underlyingException,
    this.streamingResultSetInPlay);
}
```

`streamingResultSetInPlay` was always false, which in the following code in `SQLError.createLinkFailureMessageBasedOnHeuristics()` never being executed:

```java
if (streamingResultSetInPlay) {
    exceptionMessageBuf.append(
        Messages.getString("CommunicationsException.ClientWasStreaming")); //\$NON-NLS-1$
} else {
    ...
}
```

(Bug #44588)

• The `SQLError.createLinkFailureMessageBasedOnHeuristics()` method created a message text for communication link failures. When certain conditions were met, this message included both “last packet sent” and “last packet received” information, but when those conditions were not met, only “last packet sent” information was provided.

Information about when the last packet was successfully received should be provided in all cases. (Bug #44587)

• `Statement.getGeneratedKeys()` retained result set instances until the statement was closed. This caused memory leaks for long-lived statements, or statements used in tight loops. (Bug #44056)

• Using `useInformationSchema` with `DatabaseMetaData.getExportedKeys()` generated the following exception:

```java
com.mysql.jdbc.exceptions.MySQLIntegrityConstraintViolationException: Column 'REFERENCED_TABLE_NAME' in where clause is ambiguous
```

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• **LoadBalancingConnectionProxy.doPing()** did not have blacklist awareness.
  
  LoadBalancingConnectionProxy implemented doPing() to ping all underlying connections, but it threw any exceptions it encountered during this process.
  
  With the global blacklist enabled, it catches these exceptions, adds the host to the global blacklist, and only throws an exception if all hosts are down. (Bug #43421)

• The method **Statement.getGeneratedKeys()** did not return values for **UNSIGNED BIGINTS** with values greater than **Long.MAX_VALUE**.
  
  Unfortunately, because the server does not tell clients what TYPE the auto increment value is, the driver cannot consistently return BigIntegers for the result set returned from getGeneratedKeys(), it will only return them if the value is greater than Long.MAX_VALUE. If your application needs this consistency, it will need to check the class of the return value from .getObject() on the ResultSet returned by Statement.getGeneratedKeys() and if it is not a BigInteger, create one based on the java.lang.Long that is returned. (Bug #43196)

• When the MySQL Server was upgraded from 4.0 to 5.0, the Connector/J application then failed to connect to the server. This was because authentication failed when the application ran from EBCDIC platforms such as z/OS. (Bug #43071)

• When connecting with **traceProtocol=true**, no trace data was generated for the server greeting or login request. (Bug #43070)

• Connector/J generated an unhandled **StringIndexOutOfBoundsException**:
  
  java.lang.StringIndexOutOfBoundsException: String index out of range: -1
  at java.lang.String.substring(String.java:1938)
  at com.mysql.jdbc.EscapeProcessor.processTimeToken(EscapeProcessor.java:353)
  at com.mysql.jdbc.EscapeProcessor.escapeSQL(EscapeProcessor.java:257)
  at com.mysql.jdbc.StatementImpl.executeUpdate(StatementImpl.java:1546)
  at com.mysql.jdbc.StatementImpl.executeUpdate(StatementImpl.java:1524)

(Bug #42253)

• A **ConcurrentModificationException** was generated in LoadBalancingConnectionProxy:
  
  java.util.ConcurrentModificationException
  at java.util.HashMap$HashIterator.nextEntry(Unknown Source)
  at java.util.HashMap$KeyIterator.next(Unknown Source)
  at com.mysql.jdbc.LoadBalancingConnectionProxy.getGlobalBlacklist(LoadBalancingConnectionProxy.java:520)
  at com.mysql.jdbc.LoadBalancingConnectionProxy.pickNewConnection(LoadBalancingConnectionProxy.java:414)
  at com.mysql.jdbc.LoadBalancingConnectionProxy.invoke(LoadBalancingConnectionProxy.java:390)

(Bug #42055)

• SQL injection was possible when using a string containing U+00A5 in a client-side prepared statement, and the character set being used was SJIS/Windows-31J. (Bug #41730)
• If there was an apostrophe in a comment in a statement that was being sent through Connector/J, the apostrophe was still recognized as a quote and put the state machine in `EscapeTokenizer` into the `inQuotes` state. This led to further parse errors.

For example, consider the following statement:

```java
String sql = "-- Customer's zip code will be fixed
" +
"update address set zip_code = 99999
" +
"where not regexp '^[0-9]{5}([-.\d]{4})?';"
```

When passed through Connector/J, the `EscapeTokenizer` did not recognize that the first apostrophe was in a comment and thus set `inQuotes` to true. When that happened, the quote count was incorrect and thus the regular expression did not appear to be in quotation marks. With the parser not detecting that the regular expression was in quotation marks, the curly braces were recognized as escape sequences and were removed from the regular expression, breaking it. The server thus received SQL such as:

```sql
-- Customer's zip code will be fixed
update address set zip_code = '99999'
where not regexp '^[0-9]\d{4}?'
```

(Bug #41566)

• MySQL Connector/J 5.1.7 was slower than previous versions when the `rewriteBatchedStatements` option was set to `true`.

```
Note
The performance regression in `indexOfIgnoreCaseRespectMarker()` has been fixed. It has also been made possible for the driver to rewrite `INSERT` statements with `ON DUPLICATE KEY UPDATE` clauses in them, as long as the `UPDATE` clause contains no reference to `LAST_INSERT_ID()`, as that would cause the driver to return bogus values for `getGeneratedKeys()` invocations. This has resulted in improved performance over version 5.1.7.
```

(Bug #41532)

• When accessing a result set column by name using `ResultSetImpl.findColumn()` an exception was generated:

```java
java.lang.NullPointerException
at com.mysql.jdbc.ResultSetImpl.findColumn(ResultSetImpl.java:1103)
at com.mysql.jdbc.ResultSetImpl.getShort(ResultSetImpl.java:5415)
at org.apache.commons.dbcp.DelegatingResultSet.getShort(DelegatingResultSet.java:219)
at com.zimbra.cs.db.DbVolume.constructVolume(DbVolume.java:297)
at com.zimbra.cs.db.DbVolume.get(DbVolume.java:197)
```

(Bug #41484)

• The `RETURN_GENERATED_KEYS` flag was being ignored. For example, in the following code the `RETURN_GENERATED_KEYS` flag was ignored:

```java
PreparedStatement ps = connection.prepareStatement("INSERT INTO table
values(?,?,?)",PreparedStatement.RETURN_GENERATED_KEYS);
```

(Bug #41448)
MySQL Connector/J 5.1 Release Notes

- When using Connector/J 5.1.7 to connect to MySQL Server 4.1.18 the following error message was generated:

  Thu Dec 11 17:38:21 PST 2008 WARN: Invalid value {1} for server variable named {0}, falling back to sane default of {2}

  This occurred with MySQL Server version that did not support auto_increment_increment. The error message should not have been generated. (Bug #41416)

- When DatabaseMetaData.getProcedureColumns() was called, the value for LENGTH was always returned as 65535, regardless of the column type (fixed or variable) or the actual length of the column.

  However, if you obtained the PRECISION value, this was correct for both fixed and variable length columns. (Bug #41269)

- PreparedStatement.addBatch() did not check for all parameters being set, which led to inconsistent behavior in executeBatch(), especially when rewriting batched statements into multivalue INSERTS. (Bug #41161)

- Error message strings contained variable values that were not expanded. For example:

  Mon Nov 17 11:43:18 JST 2008 WARN: Invalid value {1} for server variable named {0}, falling back to sane default of {2}

  (Bug #40772)

- When using rewriteBatchedStatements=true with:

  INSERT INTO table_name_values (...) VALUES (...)

  Query rewriting failed because “values” at the end of the table name was mistaken for the reserved keyword. The error generated was as follows:

  testBug40439(testsuite.simple.TestBug40439).java.sql.BatchUpdateException: You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'values (2,'toto',2),(id,data, ordr) values
  (3,'toto',3),(id,data, ordr) values (' at line 1
  at testsuite.simple.TestBug40439.testBug40439(TestBug40439.java:42)
  at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
  at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:39)
  at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:25)
  at testsuite.simple.TestBug40439.main(TestBug40439.java:57)

  (Bug #40439)

- A statement interceptor received the incorrect parameters when used with a batched statement. (Bug #39426)

- Using Connector/J 5.1.6 the method ResultSet.getObject returned a BYTE[] for following:

  SELECT TRIM(rowid) FROM tbl

  Where rowid had a type of INT(11) PRIMARY KEY AUTO_INCREMENT.

  The expected return type was one of CHAR, VARCHAR, CLOB, however, a BYTE[] was returned.

  Further, adding functionsNeverReturnBlobs=true to the connection string did not have any effect on the return type. (Bug #38387)

Changes in MySQL Connector/J 5.1.7 (2008-10-21)

- Functionality Added or Changed
• Bugs Fixed

Functionality Added or Changed

• When statements include ON DUPLICATE UPDATE, and rewriteBatchedStatements is set to true, batched statements are not rewritten into the form INSERT INTO table VALUES (), (), (), instead the statements are executed sequentially.

Bugs Fixed

• When an application using Connector/J ran into an error, the SQLException.getMessage() method was returning null instead of an error description. This has been fixed by calling the setRowPositionValidity() method in the ResultSetImpl constructor. (Bug #11749413, Bug #38943)

• When using trustCertificateKeyStoreUrl or clientCertificateKeyStoreUrl, an IllegalStateException was caused by an uninitialized TrustManagerFactoryImpl object. (Bug #11748637, Bug #36948, Bug #38192)

• Statement.getGeneratedKeys() returned two keys when using ON DUPLICATE KEY UPDATE and the row was updated, not inserted. (Bug #42309)

• When using the replication driver with autoReconnect=true, Connector/J checks in PreparedStatement.execute (also called by CallableStatement.execute) to determine if the first character of the statement is an “S”, in an attempt to block all statements that are not read-only-safe, for example non-SELECT statements. However, this also blocked CALLs to stored procedures, even if the stored procedures were defined as SQL READ DATA or NO SQL. (Bug #40031)

• When configuring the Java Replication Driver the last slave specified was never used. (Bug #39611)

• When an INSERT ON DUPLICATE KEY UPDATE was performed, and the key already existed, the affected-rows value was returned as 1 instead of 0. (Bug #39352)

• When using loadbalancing, Connector/J might not cycle through the whole list of configured hosts in its attempt to make a connection. This fix corrects the implementation of the configuration parameter retriesAllDown, making sure that Connector/J cycles through the whole list of hosts for each of its attempt to connect. (Bug #38785, Bug #11749331)

• When using the random load balancing strategy and starting with two servers that were both unavailable, an IndexOutOfBoundsException was generated when removing a server from the whiteList. (Bug #38782)
• Connector/J threw the following exception when using a read-only connection:

```
java.sql.SQLException: Connection is read-only. Queries leading to data modification are not allowed.
```

(Bug #38747)

• Connector/J was unable to connect when using a non-latin1 password. (Bug #37570)

• The useOldAliasMetadataBehavior connection property was ignored. (Bug #35753)

• Incorrect result is returned from isAfterLast() in streaming ResultSet when using setFetchSize(Integer.MIN_VALUE). (Bug #35170)

• When getGeneratedKeys() was called on a statement that had not been created with RETURN_GENERATED_KEYS, no exception was thrown, and batched executions then returned erroneous values. (Bug #34185)

• The loadBalance bestResponseTime blacklists did not have a global state. (Bug #33861)

Changes in MySQL Connector/J 5.1.6 (2008-03-07)

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• Multiple result sets were not supported when using streaming mode to return data. Both normal statements and the result sets from stored procedures now return multiple results sets, with the exception of result sets using registered OUTPUT parameters. (Bug #33678)

• XAConnections and datasources have been updated to the JDBC-4.0 standard.

• The profiler event handling has been made extensible using the profilerEventHandler connection property.

• Add the verifyServerCertificate property. If set to "false" the driver will not verify the server's certificate when useSSL is set to "true"

When using this feature, the keystore parameters should be specified by the clientCertificateKeyStore* properties, rather than system properties, as the JSSE doesn't it straightforward to have a nonverifying trust store and the "default" key store.

Bugs Fixed

• When nullCatalogMeansCurrent was set to false, calls to getColumns() with null catalog and schema returned all tables in all catalogs, instead of all columns from every matching table from any database. (Bug #11747185, Bug #31187)

• Compiling in Eclipse could produce a compilation warning for line 814 in the file com.mysql.jdbc.DatabaseMetaData.java. (Bug #11746221, Bug #24595)

• DatabaseMetaData.getColumns() returns incorrect COLUMN_SIZE value for SET column. (Bug #36830)

• When trying to read Time values like “00:00:00“ with ResultSet.getTime(int) an exception is thrown. (Bug #36051)

• JDBC connection URL parameters is ignored when using MysqlConnectionPoolDataSource. (Bug #35810)

• When useServerPrepStmts=true and slow query logging is enabled, the connector throws a NullPointerException when it encounters a slow query. (Bug #35666)
• When using the keyword “loadbalance” in the connection string and trying to perform load balancing between two databases, the driver appears to hang. (Bug #35660)

• JDBC data type getter method was changed to accept only column name, whereas previously it accepted column label. (Bug #35610)

• Prepared statements from pooled connections caused a NullPointerException when closed() under JDBC-4.0. (Bug #35489)

• In calling a stored function returning a bigint, an exception is encountered beginning:

```
java.sql.SQLException: java.lang.NumberFormatException: For input string:
```

followed by the text of the stored function starting after the argument list. (Bug #35199)

• The JDBC driver uses a different method for evaluating column names in

`resultsetmetadata.getColumnName()` and when looking for a column in

`resultset.getObject(columnName)`. This causes Hibernate to fail in queries where the two methods yield different results, for example in queries that use alias names:

```
SELECT column AS aliasName from table
```

(Bug #35150)

• `MysqlConnectionPoolDataSource` does not support `ReplicationConnection`. Notice that we implemented `com.mysql.jdbc.Connection` for `ReplicationConnection`, however, only accessors from `ConnectionProperties` are implemented (not the mutators), and they return values from the currently active connection. All other methods from `com.mysql.jdbc.Connection` are implemented, and operate on the currently active connection, with the exception of `resetServerState()` and `changeUser()`. (Bug #34937)

• `ResultSet.getTimestamp()` returns incorrect values for month/day of TIMESTAMPs when using server-side prepared statements (not enabled by default). (Bug #34913)

• `RowDataStatic` doesn’t always set the metadata in `ResultSetRow`, which can lead to failures when unpacking `DATE`, `TIME`, `DATETIME` and `TIMESTAMP` types when using absolute, relative, and previous result set navigation methods. (Bug #34762)

• When calling `isValid()` on an active connection, if the timeout is nonzero then the `Connection` is invalidated even if the `Connection` is valid. (Bug #34703)

• It was not possible to truncate a BLOB using `Blob.truncate()` when using 0 as an argument. (Bug #34677)

• When using a cursor fetch for a statement, the internal prepared statement could cause a memory leak until the connection was closed. The internal prepared statement is now deleted when the corresponding result set is closed. (Bug #34518)

• When retrieving the column type name of a geometry field, the driver would return `UNKNOWN` instead of `GEOMETRY`. (Bug #34194)

• Statements with batched values do not return correct values for `getGeneratedKeys()` when `rewriteBatchedStatements` is set to true, and the statement has an ON DUPLICATE KEY UPDATE clause. (Bug #34093)

• The internal class `ResultSetInternalMethods` referenced the nonpublic class `com.mysql.jdbc CachedResultSetMetaData`. (Bug #33823)

• A NullPointerException could be raised when using client-side prepared statements and enabled the prepared statement cache using the `cachePrepStmts`. (Bug #33734)

• Using server side cursors and cursor fetch, the table metadata information would return the data type name instead of the column name. (Bug #33594)
MySQL Connector/J 5.1 Release Notes

- **ResultSet.getTimestamp()** would throw a `NullPointerException` instead of a `SQLException` when called on an empty ResultSet. (Bug #33162)

- Load balancing connection using best response time would incorrectly "stick" to hosts that were down when the connection was first created.

  We solve this problem with a black list that is used during the picking of new hosts. If the black list ends up including all configured hosts, the driver will retry for a configurable number of times (the `retriesAllDown` configuration property, with a default of 120 times), sleeping 250ms between attempts to pick a new connection.

  We've also went ahead and made the balancing strategy extensible. To create a new strategy, implement the interface `com.mysql.jdbc.BalanceStrategy` (which also includes our standard "extension" interface), and tell the driver to use it by passing in the class name using the `loadBalanceStrategy` configuration property. (Bug #32877)

- During a Daylight Savings Time (DST) switchover, there was no way to store two timestamp/datetime values, as the hours end up being the same when sent as the literal that MySQL requires. Note that to get this scenario to work with MySQL (since it doesn't support per-value timezones), you need to configure your server (or session) to be in UTC, and tell the driver not to use the legacy date/time code by setting `useLegacyDatetimeCode` to "false". This will cause the driver to always convert to/from the server and client timezone consistently.

  This bug fix also fixes Bug #15604, by adding entirely new date/time handling code that can be switched on by `useLegacyDatetimeCode` being set to "false" as a JDBC configuration property. For Connector/J 5.1.x, the default is "true", in trunk and beyond it will be "false" (that is, the old date/time handling code will be deprecated) (Bug #32577, Bug #15604)

- When unpacking rows directly, we don't hand off error message packets to the internal method which decodes them correctly, so no exception is raised, and the driver than hangs trying to read rows that aren't there. This tends to happen when calling stored procedures, as normal SELECTs won't have an error in this spot in the protocol unless an I/O error occurs. (Bug #32246)

- When using a connection from `ConnectionPoolDataSource`, some `Connection.prepareStatement()` methods would return null instead of the prepared statement. (Bug #32101)

- Using `CallableStatement.setNull()` on a stored function would throw an `ArrayIndexOutOfBoundsException` exception when setting the last parameter to null. (Bug #31823)

- MysqlValidConnectionChecker doesn't properly handle connections created using `ReplicationConnection`. (Bug #31790)

- Retrieving the server version information for an active connection could return invalid information if the default character encoding on the host was not ASCII compatible. (Bug #31192)

- Further fixes have been made to this bug in the event that a node is nonresponsive. Connector/J will now try a different random node instead of waiting for the node to recover before continuing. (Bug #31053)

- **ResultSet** returned by `Statement.getGeneratedKeys()` is not closed automatically when statement that created it is closed. (Bug #30508)

- **DatabaseMetadata.getColumns()** doesn't return the correct column names if the connection character isn't UTF-8. A bug in MySQL server compounded the issue, but was fixed within the MySQL 5.0 release cycle. The fix includes changes to all the sections of the code that access the server metadata. (Bug #20491)

- Fixed `ResultSetMetadata.getColumnName()` for result sets returned from `Statement.getGeneratedKeys()` - it was returning null instead of "GENERATED_KEY" as in 5.0.x.
Changes in MySQL Connector/J 5.1.5 (2007-10-09)

- New Features, Compared to the 5.0 Series of Connector/J
- Functionality Added or Changed
- Bugs Fixed

New Features, Compared to the 5.0 Series of Connector/J

- Support for JDBC-4.0 NCHAR, NVARCHAR and NCLOB types.
- JDBC-4.0 support for setting per-connection client information (which can be viewed in the comments section of a query using SHOW PROCESSLIST on a MySQL server, or can be extended to support custom persistence of the information using a public interface).
- Support for JDBC-4.0 XML processing using JAXP interfaces to DOM, SAX and StAX.
- JDBC-4.0 standardized unwrapping to interfaces that include vendor extensions.

Functionality Added or Changed

- Added autoSlowLog configuration property, overrides slowQueryThreshold* properties, driver determines slow queries by those that are slower than 5 * stddev of the mean query time (outside the 96% percentile).

Bugs Fixed

- When a connection is in read-only mode, queries that are wrapped in parentheses were incorrectly identified DML statements. (Bug #28256)
- When calling setTimestamp on a prepared statement, the timezone information stored in the calendar object was ignored. This resulted in the incorrect DATETIME information being stored. The following example illustrates this:

```java
Timestamp t = new Timestamp( cal.getTimeInMillis() );
ps.setTimestamp( N, t, cal );
```

(Bug #15604)

Changes in MySQL Connector/J 5.1.4 (Not Released)

Only released internally.

Changes in MySQL Connector/J 5.1.3 (2007-09-10)

- New Features, Compared to the 5.0 Series of Connector/J
- Functionality Added or Changed
- Bugs Fixed

New Features, Compared to the 5.0 Series of Connector/J

- Support for JDBC-4.0 NCHAR, NVARCHAR and NCLOB types.
- JDBC-4.0 support for setting per-connection client information (which can be viewed in the comments section of a query using SHOW PROCESSLIST on a MySQL server, or can be extended to support custom persistence of the information using a public interface).
- Support for JDBC-4.0 XML processing using JAXP interfaces to DOM, SAX and StAX.
**Functionality Added or Changed**

- Connector/J now connects using an initial character set of utf-8 solely for the purpose of authentication to permit user names or database names in any character set to be used in the JDBC connection URL. (Bug #29853)

- Added two configuration parameters:
  - blobsAreStrings: Should the driver always treat BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for GROUP BY clauses. Defaults to false.
  - functionsNeverReturnBlobs: Should the driver always treat data from functions returning BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for GROUP BY clauses. Defaults to false.

- Setting rewriteBatchedStatements to true now causes CallableStatements with batched arguments to be re-written in the form "CALL (...); CALL (...); ..." to send the batch in as few client/server round trips as possible.

- The driver now picks appropriate internal row representation (whole row in one buffer, or individual byte[] for each column value) depending on heuristics, including whether or not the row has BLOB or TEXT types and the overall row-size. The threshold for row size that will cause the driver to use a buffer rather than individual byte[] is configured by the configuration property largeRowSizeThreshold, which has a default value of 2KB.

- The data (and how it is stored) for ResultSet rows are now behind an interface which enables us (in some cases) to allocate less memory per row, in that for "streaming" result sets, we re-use the packet used to read rows, since only one row at a time is ever active.

- Added experimental support for statement "interceptors" through the com.mysql.jdbc.StatementInterceptor interface, examples are in com/mysql/jdbc/interceptors. Implement this interface to be placed "in between" query execution, so that it can be influenced (currently experimental).

- The driver will automatically adjust the server session variable net_write_timeout when it determines its been asked for a "streaming" result, and resets it to the previous value when the result set has been consumed. (The configuration property is named netTimeoutForStreamingResults, with a unit of seconds, the value '0' means the driver will not try and adjust this value).

- JDBC-4.0 ease-of-development features including auto-registration with the DriverManager through the service provider mechanism, standardized Connection validity checks and categorized SQLExceptions based on recoverability/retry-ability and class of the underlying error.

- Statement.setQueryTimeout()s now affect the entire batch for batched statements, rather than the individual statements that make up the batch.

- Errors encountered during Statement/PreparedStatement/CallableStatement.executeBatch() when rewriteBatchedStatements has been set to true now return BatchUpdateExceptions according to the setting of continueBatchOnError.

  If continueBatchOnError is set to true, the update counts for the "chunk" that were sent as one unit will all be set to EXECUTE_FAILED, but the driver will attempt to process the remainder of the batch. You can determine which "chunk" failed by looking at the update counts returned in the BatchUpdateException.

  If continueBatchOnError is set to "false", the update counts returned will contain all updates up-to and including the failed "chunk", with all counts for the failed "chunk" set to EXECUTE_FAILED.
Since MySQL doesn't return multiple error codes for multiple-statements, or for multi-value
\texttt{INSERT/REPLACE}, it is the application's responsibility to handle determining which item(s) in the
"chunk" actually failed.

- New methods on \texttt{com.mysql.jdbc.Statement}: \texttt{setLocalInfileInputStream()} and
\texttt{getLocalInfileInputStream()}:

  \begin{itemize}
  \item \texttt{setLocalInfileInputStream()} sets an \texttt{InputStream} instance that will be used to send
data to the MySQL server for a \texttt{LOAD DATA LOCAL} statement rather than a \texttt{FileInputStream}
or \texttt{URLInputStream} that represents the path given as an argument to the statement.

  This stream will be read to completion upon execution of a \texttt{LOAD DATA LOCAL} statement, and will
automatically be closed by the driver, so it needs to be reset before each call to \texttt{execute*()} that
would cause the MySQL server to request data to fulfill the request for \texttt{LOAD DATA LOCAL}.

  If this value is set to \texttt{NULL}, the driver will revert to using a \texttt{FileInputStream} or
\texttt{URLInputStream} as required.

  \item \texttt{getLocalInfileInputStream()} returns the \texttt{InputStream} instance that will be used to send
data in response to a \texttt{LOAD DATA LOCAL} statement.

  This method returns \texttt{NULL} if no such stream has been set using
\texttt{setLocalInfileInputStream()}.
  \end{itemize}

- Setting \texttt{useBlobToStoreUTF8OutsideBMP} to \texttt{true} tells the driver to treat \texttt{[MEDIUM/LONG]BLOB}
columns as \texttt{[LONG]VARCHAR} columns holding text encoded in UTF-8 that has characters outside
the BMP (4-byte encodings), which MySQL server can't handle natively.

  Set \texttt{utf8OutsideBmpExcludedColumnNamePattern} to a regex so that column names matching
the given regex will still be treated as \texttt{BLOBs}. The regex must follow the patterns used for the
\texttt{java.util.regex} package. The default is to exclude no columns, and include all columns.

  Set \texttt{utf8OutsideBmpIncludedColumnNamePattern} to specify exclusion rules to
\texttt{utf8OutsideBmpExcludedColumnNamePattern}”. The regex must follow the patterns used for the
\texttt{java.util.regex} package.

**Bugs Fixed**

- \texttt{setObject(int, Object, int, int)} delegate in \texttt{PreparedStatementWrapper} delegates to
wrong method. (Bug #30892)

- NPE with null column values when \texttt{padCharsWithSpace} is set to \texttt{true}. (Bug #30851)

- Collation on \texttt{VARBINARY} column types would be misidentified. A fix has been added, but this fix only
works for MySQL server versions 5.0.25 and newer, since earlier versions didn't consistently return
correct metadata for functions, and thus results from subqueries and functions were indistinguishable
from each other, leading to type-related bugs. (Bug #30664)

- An \texttt{ArithmeticException} or \texttt{NullPointerException} would be raised when the batch had
zero members and \texttt{rewriteBatchedStatements=true} when \texttt{addBatch()} was never called, or
\texttt{executeBatch()} was called immediately after \texttt{clearBatch()}. (Bug #30550)

- Closing a load-balanced connection would cause a \texttt{ClassCastException}. (Bug #29852)

- Connection checker for JBoss didn't use same method parameters using reflection, causing
connections to always seem "bad". (Bug #29106)

- \texttt{DatabaseMetaData.getTypeInfo()} for the types \texttt{DECIMAL} and \texttt{NUMERIC} will return a precision
of 254 for server versions older than 5.0.3, 64 for versions 5.0.3 to 5.0.5 and 65 for versions newer
than 5.0.5. (Bug #28972)
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• **CallableStatement.executeBatch()** doesn't work when connection property `noAccessToProcedureBodies` has been set to `true`.

  The fix involves changing the behavior of `noAccessToProcedureBodies`, in that the driver will now report all parameters as `IN` parameters but permit callers to call `registerOutParameter()` on them without throwing an exception. (Bug #28689)

• **DatabaseMetaData.getColumns()** doesn't contain `SCOPE_` or `IS_AUTOINCREMENT` columns. (Bug #27915)

• Schema objects with identifiers other than the connection character aren't retrieved correctly in `ResultSetMetadata`. (Bug #27867)

• **Connection.getServerCharacterEncoding()** doesn't work for servers with version >= 4.1. (Bug #27182)

• The automated SVN revisions in `DBMD.getDriverVersion()`. The SVN revision of the directory is now inserted into the version information during the build. (Bug #21116)

• Specifying a "validation query" in your connection pool that starts with "/* ping */" _exactly_ will cause the driver to instead send a ping to the server and return a fake result set (much lighter weight), and when using a ReplicationConnection or a LoadBalancedConnection, will send the ping across all active connections.

**Changes in MySQL Connector/J 5.1.2 (2007-06-29)**

This is a new Beta development release, fixing recently discovered bugs.

**Functionality Added or Changed**

• Setting the configuration property `rewriteBatchedStatements` to `true` will now cause the driver to rewrite batched prepared statements with more than 3 parameter sets in a batch into multi-statements (separated by `;`) if they are not plain (that is, without `SELECT` or `ON DUPLICATE KEY UPDATE` clauses) `INSERT` or `REPLACE` statements.

**Changes in MySQL Connector/J 5.1.1 (2007-06-22)**

This is a new Alpha development release, adding new features and fixing recently discovered bugs.

**Functionality Added or Changed**

• **Incompatible Change:** Pulled vendor-extension methods of `Connection` implementation out into an interface to support `java.sql.Wrapper` functionality from `ConnectionPoolDataSource`. The vendor extensions are javadoc'd in the `com.mysql.jdbc.Connection` interface.

  For those looking further into the driver implementation, it is not an API that is used for pluggability of implementations inside our driver (which is why there are still references to `ConnectionImpl` throughout the code).

  We've also added server and client `prepareStatement()` methods that cover all of the variants in the JDBC API.

  `Connection.serverPrepare(String)` has been re-named to `Connection.serverPrepareStatement()` for consistency with `Connection.clientPrepareStatement()`.

• Row navigation now causes any streams/readers open on the result set to be closed, as in some cases we're reading directly from a shared network packet and it will be overwritten by the "next" row.

• Made it possible to retrieve prepared statement parameter bindings (to be used in `StatementInterceptors`, primarily).
• Externalized the descriptions of connection properties.

• The data (and how it is stored) for ResultSet rows are now behind an interface which enables us (in some cases) to allocate less memory per row, in that for "streaming" result sets, we re-use the packet used to read rows, since only one row at a time is ever active.

• Similar to Connection, we pulled out vendor extensions to Statement into an interface named com.mysql.Statement, and moved the Statement class into com.mysql.StatementImpl. The two methods (javadoc'd in com.mysql.Statement are enableStreamingResults(), which already existed, and disableStreamingResults() which sets the statement instance back to the fetch size and result set type it had before enableStreamingResults() was called.

• Driver now picks appropriate internal row representation (whole row in one buffer, or individual byte[]s for each column value) depending on heuristics, including whether or not the row has BLOB or TEXT types and the overall row-size. The threshold for row size that will cause the driver to use a buffer rather than individual byte[]s is configured by the configuration property largeRowSizeThreshold, which has a default value of 2KB.

• Added experimental support for statement "interceptors" through the com.mysql.jdbc.StatementInterceptor interface, examples are in com/mysql/jdbc/interceptors. Implement this interface to be placed "in between” query execution, so that you can influence it. (currently experimental).

  StatementInterceptors are “chainable” when configured by the user, the results returned by the "current" interceptor will be passed on to the next on in the chain, from left-to-right order, as specified by the user in the JDBC configuration property statementInterceptors.

• See the sources (fully javadoc'd) for com.mysql.jdbc.StatementInterceptor for more details until we iron out the API and get it documented in the manual.

• Setting rewriteBatchedStatements to true now causes CallableStatements with batched arguments to be re-written in the form CALL (...) CALL (...) ... to send the batch in as few client/server round trips as possible.

Changes in MySQL Connector/J 5.1.0 (2007-04-11)

This is the first public alpha release of the current Connector/J 5.1 development branch, providing an insight to upcoming features. Although some of these are still under development, this release includes the following new features and changes (in comparison to the current Connector/J 5.0 production release):

Important change: Due to a number of issues with the use of server-side prepared statements, Connector/J 5.0.5 has disabled their use by default. The disabling of server-side prepared statements does not affect the operation of the connector in any way.

To enable server-side prepared statements you must add the following configuration property to your connector string:

```text
useServerPrepStmts=true
```

The default value of this property is false (that is, Connector/J does not use server-side prepared statements).

Note

The disabling of server-side prepared statements does not affect the operation of the connector. However, if you use the useTimezone=true connection option and use client-side prepared statements (instead of server-side prepared statements) you should also set useSSPSCompatibleTimezoneShift=true.
Functionality Added or Changed

• Refactored `CommunicationsException` into a JDBC-3.0 version, and a JDBC-4.0 version (which extends `SQLRecoverableException`, now that it exists).

  **Note**
  This change means that if you were catching `com.mysql.jdbc.CommunicationsException` in your applications instead of looking at the SQLState class of 08, and are moving to Java 6 (or newer), you need to change your imports to that exception to be `com.mysql.jdbc.exceptions.jdbc4.CommunicationsException`, as the old class will not be instantiated for communications link-related errors under Java 6.

• Added support for JDBC-4.0 categorized `SQLExceptions`.

• Added support for JDBC-4.0's `NCLOB`, and `NCHAR/NVARCHAR` types.

• `com.mysql.jdbc.java6.javac`: Full path to your Java-6 `javac` executable

• Added support for JDBC-4.0's SQLXML interfaces.

• Re-worked Ant buildfile to build JDBC-4.0 classes separately, as well as support building under Eclipse (since Eclipse can't mix/match JDKs).

  To build, you must set `JAVA_HOME` to J2SDK-1.4.2 or Java-5, and set the following properties on your Ant command line:

  • `com.mysql.jdbc.java6.javac`: Full path to your Java-6 `javac` executable
  • `com.mysql.jdbc.java6.rtjar`: Full path to your Java-6 `rt.jar` file

• New feature—driver will automatically adjust session variable `net_write_timeout` when it determines it has been asked for a “streaming” result, and resets it to the previous value when the result set has been consumed. (configuration property is named `netTimeoutForStreamingResults` value and has a unit of seconds, the value 0 means the driver will not try and adjust this value).

• Added support for JDBC-4.0's client information. The back-end storage of information provided using `Connection.setClientInfo()` and retrieved by `Connection.getClientInfo()` is pluggable by any class that implements the `com.mysql.jdbc.JDBC4ClientInfoProvider` interface and has a no-args constructor.

  The implementation used by the driver is configured using the `clientInfoProvider` configuration property (with a default of value of `com.mysql.jdbc.JDBC4CommentClientInfoProvider`, an implementation which lists the client information as a comment prepended to every query sent to the server).

  This functionality is only available when using Java-6 or newer.

• `com.mysql.jdbc.java6.rtjar`: Full path to your Java-6 `rt.jar` file

• Added support for JDBC-4.0's `Wrapper` interface.

Changes in MySQL Connector/J 5.0

Changes in MySQL Connector/J 5.0.8 (2007-10-09)

• Functionality Added or Changed
MySQL Connector/J 5.1 Release Notes

• Bugs Fixed

Functionality Added or Changed

• **blobsAreStrings**: Should the driver always treat BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for `GROUP BY` clauses. Defaults to false.

• Added two configuration parameters:

  • **blobsAreStrings**: Should the driver always treat BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for `GROUP BY` clauses. Defaults to false.

  • **functionsNeverReturnBlobs**: Should the driver always treat data from functions returning BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for `GROUP BY` clauses. Defaults to false.

  • **functionsNeverReturnBlobs**: Should the driver always treat data from functions returning BLOBs as Strings. Added specifically to work around dubious metadata returned by the server for `GROUP BY` clauses. Defaults to false.

• XAConnections now start in auto-commit mode (as per JDBC-4.0 specification clarification).

• Driver will now fall back to sane defaults for `max_allowed_packet` and `net_buffer_length` if the server reports them incorrectly (and will log this situation at `WARN` level, since it is actually an error condition).

Bugs Fixed

• Connections established using URLs of the form `jdbc:mysql:loadbalance://` weren't doing failover if they tried to connect to a MySQL server that was down. The driver now attempts connections to the next “best” (depending on the load balance strategy in use) server, and continues to attempt connecting to the next “best” server every 250 milliseconds until one is found that is up and running or 5 minutes has passed.

  If the driver gives up, it will throw the last-received `SQLException`. (Bug #31053)

• **setObject(int, Object, int, int)** delegate in `PreparedStatementWrapper` delegates to wrong method. (Bug #30892)

• NPE with null column values when `padCharsWithSpace` is set to true. (Bug #30851)

• Collation on `VARBINARY` column types would be misidentified. A fix has been added, but this fix only works for MySQL server versions 5.0.25 and newer, since earlier versions didn't consistently return correct metadata for functions, and thus results from subqueries and functions were indistinguishable from each other, leading to type-related bugs. (Bug #30664)

• An `ArithmeticException` or `NullPointerException` would be raised when the batch had zero members and `rewriteBatchedStatements=true` when `addBatch()` was never called, or `executeBatch()` was called immediately after `clearBatch()` . (Bug #30550)

• Closing a load-balanced connection would cause a `ClassCastException`. (Bug #29852)

• Connection checker for JBoss didn't use same method parameters using reflection, causing connections to always seem “bad”. (Bug #29106)

• `DatabaseMetaData.getTypeInfo()` for the types `DECIMAL` and `NUMERIC` will return a precision of 254 for server versions older than 5.0.3, 64 for versions 5.0.3 to 5.0.5 and 65 for versions newer than 5.0.5. (Bug #28972)

• `CallableStatement.executeBatch()` doesn't work when connection property `noAccessToProcedureBodies` has been set to true.
The fix involves changing the behavior of noAccessToProcedureBodies in that the driver will now report all parameters as IN parameters but permit callers to call registerOutParameter() on them without throwing an exception. (Bug #28689)

- When a connection is in read-only mode, queries that are wrapped in parentheses were incorrectly identified as DML statements. (Bug #28256)

- UNSIGNED types not reported using DBMD.getTypeInfo(), and capitalization of type names is not consistent between DBMD.getColumns(), RSMD.getColumnTypeName() and DBMD.getTypeInfo().

This fix also ensures that the precision of UNSIGNED MEDIUMINT and UNSIGNED BIGINT is reported correctly using DBMD.getColumns(). (Bug #27916)

- DatabaseMetaData.getColumns() doesn’t contain SCOPE_* or IS_AUTO_INCREMENT columns. (Bug #27915)

- Schema objects with identifiers other than the connection character aren’t retrieved correctly in ResultSetMetadata. (Bug #27867)

- Cached metadata with PreparedStatement.executeUpdate() throws NullPointerException. (Bug #27412)

- Connection.getServerCharacterEncoding() doesn’t work for servers with version >= 4.1. (Bug #27182)

- The automated SVN revisions in DBMD.getDriverVersion(). The SVN revision of the directory is now inserted into the version information during the build. (Bug #21116)

- Specifying a "validation query" in your connection pool that starts with "/* ping */" exactly will cause the driver to instead send a ping to the server and return a fake result set (much lighter weight), and when using a ReplicationConnection or a LoadBalancedConnection, will send the ping across all active connections.

Changes in MySQL Connector/J 5.0.7 (2007-07-20)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- The driver will now automatically set useServerPrepStmts to true when useCursorFetch has been set to true, since the feature requires server-side prepared statements to function.

- tcpKeepAlive - Should the driver set SO_KEEPALIVE (default true)?

- Give more information in EOFExceptions thrown out of MysqlIO (how many bytes the driver expected to read, how many it actually read, say that communications with the server were unexpectedly lost).

- Driver detects when it is running in a ColdFusion MX server (tested with version 7), and uses the configuration bundle coldFusion, which sets useDynamicCharsetInfo to false (see previous entry), and sets useLocalSessionState and autoReconnect to true.

- tcpNoDelay - Should the driver set SO_TCP_NODELAY (disabling the Nagle Algorithm, default true)?

- Added configuration property slowQueryThresholdNanos - if useNanosForElapsedTime is set to true, and this property is set to a nonzero value the driver will use this threshold (in nanosecond units) to determine if a query was slow, instead of using millisecond units.
- tcpRcvBuf - Should the driver set SO_RCV_BUF to the given value? The default value of '0', means use the platform default value for this property.

- Setting useDynamicCharsetInfo to false now causes driver to use static lookups for collations as well (makes ResultSet_METADATA.isCaseSensitive() much more efficient, which leads to performance increase for ColdFusion, which calls this method for every column on every table it sees, it appears).

- Added configuration properties to enable tuning of TCP/IP socket parameters:
  - tcpNoDelay - Should the driver set SO_TCP_NODELAY (disabling the Nagle Algorithm, default true)?
  - tcpKeepAlive - Should the driver set SO_KEEPALIVE (default true)?
  - tcpRcvBuf - Should the driver set SO_RCV_BUF to the given value? The default value of '0', means use the platform default value for this property.
  - tcpSndBuf - Should the driver set SO_SND_BUF to the given value? The default value of '0', means use the platform default value for this property.
  - tcpTrafficClass - Should the driver set traffic class or type-of-service fields? See the documentation for java.net.Socket.setTrafficClass() for more information.

- Setting the configuration parameter useCursorFetch to true for MySQL-5.0+ enables the use of cursors that enable Connector/J to save memory by fetching result set rows in chunks (where the chunk size is set by calling setFetchSize() on a Statement or ResultSet) by using fully materialized cursors on the server.

- tcpSndBuf - Should the driver set SO_SND_BUF to the given value? The default value of '0', means use the platform default value for this property.

- tcpTrafficClass - Should the driver set traffic class or type-of-service fields? See the documentation for java.net.Socket.setTrafficClass() for more information.

- Added new debugging functionality - Setting configuration property includeInnodbStatusInDeadlockExceptions to true will cause the driver to append the output of SHOW ENGINE INNODB STATUS to deadlock-related exceptions, which will enumerate the current locks held inside InnoDB.

- Added configuration property useNanosForElapsedTime - for profiling/debugging functionality that measures elapsed time, should the driver try to use nanoseconds resolution if available (requires JDK >= 1.5)?

  **Note**

  If useNanosForElapsedTime is set to true, and this property is set to "0" (or left default), then elapsed times will still be measured in nanoseconds (if possible), but the slow query threshold will be converted from milliseconds to nanoseconds, and thus have an upper bound of approximately 2000 milliseconds (as that threshold is represented as an integer, not a long).

**Bugs Fixed**

- Do not send any file data in response to LOAD DATA LOCAL if the feature is disabled at the client side. This is to prevent a malicious server or man-in-the-middle from asking the client for data that the client is not expecting. Thanks to Jan Kneschke for discovering the exploit and Andrey "Poohie" Hristov, Konstantin Osipov and Sergei Golubchik for discussions about implications and possible fixes. (Bug #29605)

- Parser in client-side prepared statements runs to end of statement, rather than end-of-line for '#' comments. Also added support for '--' single-line comments. (Bug #28956)
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• Parser in client-side prepared statements eats character following '/' if it is not a multi-line comment. (Bug #28851)

• PreparedStatement.getMetaData() for statements containing leading one-line comments is not returned correctly.

As part of this fix, we also overhauled detection of DML for executeQuery() and SELECTs for executeUpdate() in plain and prepared statements to be aware of the same types of comments. (Bug #28469)

Changes in MySQL Connector/J 5.0.6 (2007-05-15)

• Functionality Added or Changed
• Bugs Fixed

Functionality Added or Changed

• Added an experimental load-balanced connection designed for use with SQL nodes in a MySQL Cluster/NDB environment (This is not for master-slave replication. For that, we suggest you look at ReplicationConnection or lbpool).

If the JDBC URL starts with jdbc:mysql:loadbalance://host-1,host-2,...host-n, the driver will create an implementation of java.sql.Connection that load balances requests across a series of MySQL JDBC connections to the given hosts, where the balancing takes place after transaction commit.

Therefore, for this to work (at all), you must use transactions, even if only reading data.

Physical connections to the given hosts will not be created until needed.

The driver will invalidate connections that it detects have had communication errors when processing a request. A new connection to the problematic host will be attempted the next time it is selected by the load balancing algorithm.

There are two choices for load balancing algorithms, which may be specified by the loadBalanceStrategy JDBC URL configuration property:

• random: The driver will pick a random host for each request. This tends to work better than round-robin, as the randomness will somewhat account for spreading loads where requests vary in response time, while round-robin can sometimes lead to overloaded nodes if there are variations in response times across the workload.

• bestResponseTime: The driver will route the request to the host that had the best response time for the previous transaction.

• bestResponseTime: The driver will route the request to the host that had the best response time for the previous transaction.

• Added configuration property padCharsWithSpace (defaults to false). If set to true, and a result set column has the CHAR type and the value does not fill the amount of characters specified in the DDL for the column, the driver will pad the remaining characters with space (for ANSI compliance).

• When useLocalSessionState is set to true and connected to a MySQL-5.0 or later server, the JDBC driver will now determine whether an actual commit or rollback statement needs to be sent to the database when Connection.commit() or Connection.rollback() is called.

This is especially helpful for high-load situations with connection pools that always call Connection.rollback() on connection check-in/check-out because it avoids a round-trip to the server.
• Added configuration property useDynamicCharsetInfo. If set to false (the default), the driver will use a per-connection cache of character set information queried from the server when necessary, or when set to true, use a built-in static mapping that is more efficient, but isn't aware of custom character sets or character sets implemented after the release of the JDBC driver.

Note
This only affects the padCharsWithSpace configuration property and the ResultSetMetaData.getColumnDisplayWidth() method.

• New configuration property, enableQueryTimeouts (default true).

When enabled, query timeouts set with Statement.setQueryTimeout() use a shared java.util.Timer instance for scheduling. Even if the timeout doesn't expire before the query is processed, there will be memory used by the TimerTask for the given timeout which won't be reclaimed until the time the timeout would have expired if it hadn't been cancelled by the driver. High-load environments might want to consider disabling this functionality. (this configuration property is part of the maxPerformance configuration bundle).

• Give better error message when "streaming" result sets, and the connection gets clobbered because of exceeding net_write_timeout on the server.

• random: The driver will pick a random host for each request. This tends to work better than round-robin, as the randomness will somewhat account for spreading loads where requests vary in response time, while round-robin can sometimes lead to overloaded nodes if there are variations in response times across the workload.

• com.mysql.jdbc.[NonRegistering]Driver now understands URLs of the format jdbc:mysql:replication:// and jdbc:mysql:loadbalance:// which will create a ReplicationConnection (exactly like when using [NonRegistering]ReplicationDriver) and an experimental load-balanced connection designed for use with SQL nodes in a MySQL Cluster/NDB environment, respectively.

In an effort to simplify things, we're working on deprecating multiple drivers, and instead specifying different core behavior based upon JDBC URL prefixes, so watch for [NonRegistering]ReplicationDriver to eventually disappear, to be replaced with com.mysql.jdbc[NonRegistering]Driver with the new URL prefix.

• Fixed issue where a failed-over connection would let an application call setReadOnly(false), when that call should be ignored until the connection is reconnected to a writable master unless failoverReadOnly had been set to false.

• Driver will now use INSERT INTO ... VALUES (DEFAULT) form of statement for updatable result sets for ResultSet.insertRow(), rather than pre-populating the insert row with values from DatabaseMetaData.getColumns() (which results in a SHOW FULL COLUMNS on the server for every result set). If an application requires access to the default values before insertRow() has been called, the JDBC URL should be configured with populateInsertRowWithDefaultValues set to true.

This fix specifically targets performance issues with ColdFusion and the fact that it seems to ask for updatable result sets no matter what the application does with them.

• More intelligent initial packet sizes for the "shared" packets are used (512 bytes, rather than 16K), and initial packets used during handshake are now sized appropriately as to not require reallocation.

Bugs Fixed

• More useful error messages are generated when the driver thinks a result set is not updatable. (Thanks to Ashley Martens for the patch). (Bug #28085)

• Fixed issue where calling getGeneratedKeys() on a prepared statement after calling execute() didn't always return the generated keys (executeUpdate() worked fine however). (Bug #27655)
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- \texttt{Connection.getTransactionIsolation()} uses "SHOW VARIABLES LIKE" which is very inefficient on MySQL-5.0+ servers. (Bug #27655)

- CALL /* ... */ some\_proc() doesn't work. As a side effect of this fix, you can now use /* */ and # comments when preparing statements using client-side prepared statement emulation.

If the comments happen to contain parameter markers (?), they will be treated as belonging to the comment (that is, not recognized) rather than being a parameter of the statement.

\begin{quote}
\textbf{Note}

The statement when sent to the server will contain the comments as-is, they're not stripped during the process of preparing the \texttt{PreparedStatement} or \texttt{CallableStatement}.

(Bug #27400)
\end{quote}

- Using \texttt{ResultSet.get*()} with a column index less than 1 returns a misleading error message. (Bug #27317)

- \texttt{ResultSet.get*()} with a column index < 1 returns misleading error message. (Bug #27317)

- Comments in DDL of stored procedures/functions confuse procedure parser, and thus metadata about them can not be created, leading to inability to retrieve said metadata, or execute procedures that have certain comments in them. (Bug #26959)

- Fast date/time parsing doesn't take into account 00:00:00 as a legal value. (Bug #26789)

- \texttt{PreparedStatement} is not closed in \texttt{BlobFromLocator.getBytes()}. (Bug #26592)

- When the configuration property \texttt{useCursorFetch} was set to true, sometimes server would return new, more exact metadata during the execution of the server-side prepared statement that enables this functionality, which the driver ignored (using the original metadata returned during \texttt{prepare()}), causing corrupt reading of data due to type mismatch when the actual rows were returned. (Bug #26173)

- \texttt{CallableStatements} with OUT/INOUT parameters that are "binary" (BLOB, BIT, (VAR)BINARY, JAVA\_OBJECT) have extra 7 bytes. (Bug #25715)

- Whitespace surrounding storage/size specifiers in stored procedure parameters declaration causes \texttt{NumberFormatException} to be thrown when calling stored procedure on JDK-1.5 or newer, as the Number classes in JDK-1.5+ are whitespace intolerant. (Bug #25624)

- Client options not sent correctly when using SSL, leading to stored procedures not being able to return results. Thanks to Don Cohen for the bug report, testcase and patch. (Bug #25545)

- \texttt{Statement.setMaxRows()} is not effective on result sets materialized from cursors. (Bug #25517)

- \texttt{BIT(> 1)} is returned as \texttt{java.lang.String} from \texttt{ResultSet.getObject()} rather than \texttt{byte[]}.. (Bug #25328)

**Changes in MySQL Connector/J 5.0.5 (2007-03-02)**

- Functionality Added or Changed

- Bugs Fixed

- Other Changes

**Functionality Added or Changed**

- Usage Advisor will now issue warnings for result sets with large numbers of rows. You can configure the trigger value by using the \texttt{resultSetSizeThreshold} parameter, which has a default value of 100.
The `rewriteBatchedStatements` feature can now be used with server-side prepared statements.

**Important change:** Due to a number of issues with the use of server-side prepared statements, Connector/J 5.0.5 has disabled their use by default. The disabling of server-side prepared statements does not affect the operation of the connector in any way.

To enable server-side prepared statements, add the following configuration property to your connector string:

```
useServerPrepStmts=true
```

The default value of this property is `false` (that is, Connector/J does not use server-side prepared statements).

Improved speed of `datetime` parsing for ResultSets that come from plain or nonserver-side prepared statements. You can enable old implementation with `useFastDateParsing=false` as a configuration parameter.

Usage Advisor now detects empty result sets and does not report on columns not referenced in those empty sets.

Fixed logging of XA commands sent to server, it is now configurable using `logXaCommands` property (defaults to `false`).

Added configuration property `localSocketAddress`, which is the host name or IP address given to explicitly configure the interface that the driver will bind the client side of the TCP/IP connection to when connecting.

We've added a new configuration option `treatUtilDateAsTimestamp`, which is `false` by default, as (1) We already had specific behavior to treat `java.util.Date` as a `java.sql.Timestamp` because it is useful to many folks, and (2) that behavior will very likely be required for drivers JDBC-post-4.0.

### Bugs Fixed

- Connection property `socketFactory` wasn't exposed using correctly named mutator/accessor, causing data source implementations that use JavaBean naming conventions to set properties to fail to set the property (and in the case of SJAS, fail silently when trying to set this parameter). (Bug #26326)

- A query execution which timed out did not always throw a `MySQLTimeoutException`. (Bug #25836)

- Storing a `java.util.Date` object in a `BLOB` column would not be serialized correctly during `setObject`. (Bug #25787)

- Timer instance used for `Statement.setQueryTimeout()` created per-connection, rather than per-VM, causing memory leak. (Bug #25514)

- `EscapeProcessor` gets confused by multiple backslashes. We now push the responsibility of syntax errors back on to the server for most escape sequences. (Bug #25399)

- `INOUT` parameters in `CallableStatements` get doubly escaped. (Bug #25379)

- When using the `rewriteBatchedStatements` connection option with `PreparedStatement.executeUpdate()` an internal memory leak would occur. (Bug #25073)

- Fixed issue where field-level for metadata from `DatabaseMetaData` when using `INFORMATION_SCHEMA` didn't have references to current connections, sometimes leading to Null Pointer Exceptions (NPEs) when introspecting them using `ResultSetMetaData`. (Bug #25073)

- `StringUtils.indexOfIgnoreCaseRespectQuotes()` isn't case-insensitive on the first character of the target. This bug also affected `rewriteBatchedStatements` functionality when prepared statements did not use uppercase for the `VALUES` clause. (Bug #25047)
• Client-side prepared statement parser gets confused by in-line comments /*...*/ and therefore cannot rewrite batch statements or reliably detect the type of statements when they are used. (Bug #25025)

• Results sets from UPDATE statements that are part of multi-statement queries would cause an SQLException error, "Result is from UPDATE". (Bug #25009)

• Specifying US-ASCII as the character set in a connection to a MySQL 4.1 or newer server does not map correctly. (Bug #24840)

• Using DatabaseMetaData.getSQLKeywords() does not return all of the of the reserved keywords for the current MySQL version. Current implementation returns the list of reserved words for MySQL 5.1, and does not distinguish between versions. (Bug #24794)

• Calling Statement.cancel() could result in a Null Pointer Exception (NPE). (Bug #24721)

• Using setFetchSize() breaks prepared SHOW and other commands. (Bug #24360)

• Calendars and timezones are now lazily instantiated when required. (Bug #24351)

• Using DATETIME columns would result in time shifts when useServerPrepStmts was true. This occurred due to different behavior when using client-side compared to server-side prepared statements and the useJDBCCompliantTimezoneShift option. This is now fixed if moving from server-side prepared statements to client-side prepared statements by setting useSSPSCompatibleTimezoneShift to true, as the driver can't tell if this is a new deployment that never used server-side prepared statements, or if it is an existing deployment that is switching to client-side prepared statements from server-side prepared statements. (Bug #24344)

• Connector/J now returns a better error message when server doesn't return enough information to determine stored procedure/function parameter types. (Bug #24065)

• A connection error would occur when connecting to a MySQL server with certain character sets. Some collations/character sets reported as "unknown" (specifically cias variants of existing character sets), and inability to override the detected server character set. (Bug #23645)

• Inconsistency between getSchemas and INFORMATION_SCHEMA. (Bug #23304)

• DatabaseMetaData.getSchemas() doesn't return a TABLE_CATALOG column. (Bug #23303)

• When using a JDBC connection URL that is malformed, the NonRegisteringDriver.getPropertyInfo method will throw a Null Pointer Exception (NPE). (Bug #22628)

• Some exceptions thrown out of StandardSocketFactory were needlessly wrapped, obscuring their true cause, especially when using socket timeouts. (Bug #21480)

• When using server-side prepared statements and timestamp columns, value would be incorrectly populated (with nanoseconds, not microseconds). (Bug #21438)

• When using a server-side prepared statement the driver would send timestamps to the server using nanoseconds instead of milliseconds. (Bug #21438)

• ParameterMetaData throws NullPointerException when prepared SQL has a syntax error. Added generateSimpleParameterMetadata configuration property, which when set to true will generate metadata reflecting VARCHAR for every parameter (the default is false, which will cause an exception to be thrown if no parameter metadata for the statement is actually available). (Bug #21267)

• The manifest file in the Connector/J JAR package was incorrect. (Bug #15641, Bug #11745464)

• Fixed an issue where XADataSource couldn't be bound into JNDI, as the DataSourceFactory didn't know how to create instances of them.
Other Changes

- Avoid static synchronized code in JVM class libraries for dealing with default timezones.
- Performance enhancement of initial character set configuration, driver will only send commands required to configure connection character set session variables if the current values on the server do not match what is required.
- Re-worked stored procedure parameter parser to be more robust. Driver no longer requires `BEGIN` in stored procedure definition, but does have requirement that if a stored function begins with a label directly after the "returns" clause, that the label is not a quoted identifier.
- Throw exceptions encountered during timeout to thread calling `Statement.execute*()`, rather than `RuntimeException`.
- Changed cached result set metadata (when using `cacheResultSetMetadata=true`) to be cached per-connection rather than per-statement as previously implemented.
- Reverted back to internal character conversion routines for single-byte character sets, as the ones internal to the JVM are using much more CPU time than our internal implementation.
- When extracting foreign key information from `SHOW CREATE TABLE` in `DatabaseMetaData`, ignore exceptions relating to tables being missing (which could happen for cross-reference or imported-key requests, as the list of tables is generated first, then iterated).
- Fixed some Null Pointer Exceptions (NPEs) when cached metadata was used with `UpdatableResultSets`.
- Take `localSocketAddress` property into account when creating instances of `CommunicationsException` when the underlying exception is a `java.net.BindException`, so that a friendlier error message is given with a little internal diagnostics.
- Fixed cases where `ServerPreparedStatements` weren't using cached metadata when `cacheResultSetMetadata=true` was used.
- Use a `java.util.TreeMap` to map column names to ordinal indexes for `ResultSet.findColumn()` instead of a `HashMap`. This enables us to have case-insensitive lookups (required by the JDBC specification) without resorting to the many transient object instances needed to support this requirement with a normal `HashMap` with either case-adjusted keys, or case-insensitive keys. (In the worst case scenario for lookups of a 1000 column result set, TreeMaps are about half as fast wall-clock time as a `HashMap`, however in normal applications their use gives many orders of magnitude reduction in transient object instance creation which pays off later for CPU usage in garbage collection).
- When using cached metadata, skip field-level metadata packets coming from the server, rather than reading them and discarding them without creating `com.mysql.jdbc.Field` instances.

Changes in MySQL Connector/J 5.0.4 (2006-10-20)

Bugs Fixed

- `DBMD.getColumns()` does not return expected `COLUMN_SIZE` for the SET type, now returns length of largest possible set disregarding whitespace or the ","," delimiters to be consistent with the ODBC driver. (Bug #22613)
- Added new `_ci` collations to `CharsetMapping` - `utf8_unicode_ci` not working. (Bug #22456)
- Driver was using milliseconds for `Statement.setQueryTimeout()` when specification says argument is to be in seconds. (Bug #22359)
- Workaround for server crash when calling stored procedures using a server-side prepared statement (driver now detects `prepare(stored procedure)` and substitutes client-side prepared statement). (Bug #22297)
• Driver issues truncation on write exception when it shouldn’t (due to sending big decimal incorrectly to server with server-side prepared statement). (Bug #22290)

• Newlines causing whitespace to span confuse procedure parser when getting parameter metadata for stored procedures. (Bug #22024)

• When using information_schema for metadata, COLUMN_SIZE for getColumns() is not clamped to range of java.lang.Integer as is the case when not using information_schema, thus leading to a truncation exception that isn’t present when not using information_schema. (Bug #21544)

• Column names don’t match metadata in cases where server doesn’t return original column names (column functions) thus breaking compatibility with applications that expect 1-to-1 mappings between findColumn() and rsmd.getColumnName(), usually manifests itself as “Can’t find column (‘”) exceptions. (Bug #21379)

• Driver now sends numeric 1 or 0 for client-prepared statement setBoolean() calls instead of ‘1’ or ’0’.

• Fixed configuration property jdbcCompliantTruncation was not being used for reads of result set values.

• DatabaseMetaData correctly reports true for supportsCatalog*() methods.

• Driver now supports {call sp} (without "()" if procedure has no arguments).

Changes in MySQL Connector/J 5.0.3 (2006-07-26, Beta)

• Functionality Added or Changed

• Bugs Fixed

Functionality Added or Changed

• Added configuration option noAccessToProcedureBodies which will cause the driver to create basic parameter metadata for CallableStatements when the user does not have access to procedure bodies using SHOW CREATE PROCEDURE or selecting from mysql.proc instead of throwing an exception. The default value for this option is false.

Bugs Fixed

• If the connection to the server has been closed due to a server failure, then the cleanup process will call Statement.cancel(), triggering a NullPointerException, even though there is no active connection. (Bug #20650)

• Fixed Statement.cancel() causes NullPointerException if underlying connection has been closed due to server failure. (Bug #20650)

Changes in MySQL Connector/J 5.0.2 (2006-07-11)

Bugs Fixed

• Fixed MysqlValidConnectionChecker for JBoss doesn’t work with MySQLXADatasources. (Bug #20242)

• Better caching of character set converters (per-connection) to remove a bottleneck for multibyte character sets. (Bug #20242)

• Added connection/datasource property pinGlobalTxToPhysicalConnection (defaults to false). When set to true, when using XAConnections, the driver ensures that operations on a given XID are always routed to the same physical connection. This enables the XAConnection to support XA START ... JOIN after XA END has been called, and is also a workaround for
transaction managers that don't maintain thread affinity for a global transaction (most either always maintain thread affinity, or have it as a configuration option). (Bug #20242)

- `MysqlXaConnection.recover(int flags)` now permits combinations of `XAResource.TMSTARTRSCAN` and `TMENDRSCAN`. To simulate the “scanning” nature of the interface, we return all prepared XIDs for `TMSTARTRSCAN`, and no new XIDs for calls with `TMNOFLAGS`, or `TMENDRSCAN` when not in combination with `TMSTARTRSCAN`. This change was made for API compliance, as well as integration with IBM WebSphere’s transaction manager. (Bug #20242)

- Fixed `ConnectionProperties` (and thus some subclasses) are not serializable, even though some J2EE containers expect them to be. (Bug #19169)

- Fixed driver fails on non-ASCII platforms. The driver was assuming that the platform character set would be a superset of the MySQL `latin1` character set when doing the handshake for authentication, and when reading error messages. We now use Cp1252 for all strings sent to the server during the handshake phase, and a hard-coded mapping of the `language` system variable to the character set that is used for error messages. (Bug #18086)

- Fixed can’t use `XAConnection` for local transactions when no global transaction is in progress. (Bug #17401)

**Changes in MySQL Connector/J 5.0.1 (Not Released)**

Not released due to a packaging error

**Changes in MySQL Connector/J 5.0.0 (2005-12-22)**

**Bugs Fixed**

- When fix for Bug #14562 was merged from 3.1.12, added functionality for `CallableStatement`'s parameter metadata to return correct information for `.getParameterClassName()`. (Bug #14729)

- Return "VARBINARY" for `RSMD.getColumnTypeName()` when that is actually the type, and it can be distinguished (MySQL-4.1 and newer). (Bug #14729)

- Removed Java5-specific calls to `BigDecimal` constructor (when result set value is '', (int)0 was being used as an argument indirectly using method return value. This signature doesn’t exist prior to Java5.) (Bug #14729)

- Moved all `SQLException` constructor usage to a factory in `SQLException` (ground-work for JDBC-4.0 SQLState-based exception classes). (Bug #14729)

- Implementation of `Statement.cancel()` and `Statement.setQueryTimeout()`. Both require MySQL-5.0.0 or newer server, require a separate connection to issue the `KILL QUERY` statement, and in the case of `setQueryTimeout()` creates an additional thread to handle the timeout functionality.

Note: Failures to cancel the statement for `setQueryTimeout()` may manifest themselves as `RuntimeExceptions` rather than failing silently, as there is currently no way to unblock the thread that is executing the query being cancelled due to timeout expiration and have it throw the exception instead. (Bug #14729)

- Idle timeouts cause `XAConnections` to whine about rolling themselves back. (Bug #14729)

- Fuller synchronization of `Connection` to avoid deadlocks when using multithreaded frameworks that multithread a single connection (usually not recommended, but the JDBC spec permits it anyways), part of fix to Bug #14972. (Bug #14729)

- Added support for Connector/MXJ integration using url subprotocol `jdbc:mysql:mxj://...`. (Bug #14729)
• Added service-provider entry to META-INF/services/java.sql.Driver for JDBC-4.0 support. (Bug #14729)

• Attempt detection of the MySQL type BINARY (it is an alias, so this isn't always reliable), and use the java.sql.Types.BINARY type mapping for it.

• Added unit tests for XADatasource, as well as friendlier exceptions for XA failures compared to the "stock" XAException (which has no messages).

• If the connection useTimezone is set to true, then also respect time zone conversions in escape-processed string literals (for example, "(ts ...)" and "(t ...)").

• Do not permit .setAutoCommit(true), or .commit() or .rollback() on an XA-managed connection as per the JDBC specification.

• XADatasource implemented (ported from 3.2 branch which won't be released as a product). Use com.mysql.jdbc.jdbc2.optional.MysqlXADataSource as your datasource class name in your application server to utilize XA transactions in MySQL-5.0.10 and newer.

• Moved -bin-g.jar file into separate debug subdirectory to avoid confusion.

• Return original column name for RSMD.getColumnName() if the column was aliased, alias name for .getColumnLabel() (if aliased), and original table name for .getTableName(). Note this only works for MySQL-4.1 and newer, as older servers don't make this information available to clients.

• Setting useJDBCCompliantTimezoneShift=true (it is not the default) causes the driver to use GMT for all TIMESTAMP/DATETIME time zones, and the current VM time zone for any other type that refers to time zones. This feature can not be used when useTimeZone=true to convert between server and client time zones.

• PreparedStatement.setString() didn't work correctly when sql_mode on server contained NO_BACKSLASH_ESCAPES and no characters that needed escaping were present in the string.

• Add one level of indirection of internal representation of CallableStatement parameter metadata to avoid class not found issues on JDK-1.3 for ParameterMetadata interface (which doesn't exist prior to JDBC-3.0).

Changes in MySQL Connector/J 3.1

Changes in MySQL Connector/J 3.1.15 (Not released)

Important change: Due to a number of issues with the use of server-side prepared statements, Connector/J 5.0.5 has disabled their use by default. The disabling of server-side prepared statements does not affect the operation of the connector in any way.

To enable server-side prepared statements you must add the following configuration property to your connector string:

useServerPrepStmts=true

The default value of this property is false (that is, Connector/J does not use server-side prepared statements).

Bugs Fixed

• Specifying US-ASCII as the character set in a connection to a MySQL 4.1 or newer server does not map correctly. (Bug #24840)

• The manifest file in the Connector/J JAR package was incorrect. (Bug #15641, Bug #11745464)
Changes in MySQL Connector/J 3.1.14 (2006-10-19)

Bugs Fixed

- Fixed bug where driver would not advance to next host if roundRobinLoadBalance=true and the last host in the list is down. (Bug #22290)
- Fixed bug when calling stored functions, where parameters weren't numbered correctly (first parameter is now the return value, subsequent parameters if specified start at index “2”). (Bug #22290)
- Driver now sends numeric 1 or 0 for client-prepared statement setBoolean() calls instead of ‘1’ or ‘0’. (Bug #22290)
- Driver issues truncation on write exception when it shouldn't (due to sending big decimal incorrectly to server with server-side prepared statement). (Bug #22290)
- Check and store value for continueBatchOnError property in constructor of Statements, rather than when executing batches, so that Connections closed out from underneath statements don't cause NullPointerExceptions when it is required to check this property. (Bug #22290)
- Removed logger autodetection altogether, must now specify logger explicitly if you want to use a logger other than one that logs to STDERR. (Bug #21207)
- Driver throws NPE when tracing prepared statements that have been closed (in asSQL()). (Bug #21207)
- ResultSet.getSomeInteger() doesn't work for BIT(>1). (Bug #21062)
- Escape of quotation marks in client-side prepared statements parsing not respected. Patch covers more than bug report, including NO_BACKSLASH_ESCAPES being set, and stacked quote characters forms of escaping (that is, " or "). (Bug #20888)
- Fixed can't pool server-side prepared statements, exception raised when re-using them. (Bug #20687)
- Fixed Updatable result set that contains a BIT column fails when server-side prepared statements are used. (Bug #20485)
- Fixed updatable result set throws ClassCastException when there is row data and moveToInsertRow() is called. (Bug #20479)
- Fixed ResultSet.getShort() for UNSIGNED TINYINT returns incorrect values when using server-side prepared statements. (Bug #20306)
- ReplicationDriver does not always round-robin load balance depending on URL used for slaves list. (Bug #19993)
- Fixed calling toString() on ResultSetMetaData for driver-generated (that is, from DatabaseMetaData method calls, or from getGeneratedKeys()) result sets would raise a NullPointerException. (Bug #19993)
- Connection fails to localhost when using timeout and IPv6 is configured. (Bug #19726)
- ResultSet.getFloatFromString() can't retrieve values near Float.MIN/MAX_VALUE. (Bug #18880)
- DatabaseMetaData.getTables() or getColumns() with a bad catalog parameter threw an exception rather than return an empty result set (as required by the specification). (Bug #18258)
- Fixed memory leak with profileSQL=true. (Bug #16987)
- Fixed NullPointerException in MysqlDataSourceFactory due to Reference containing RefAddrs with null content. (Bug #16791)
Changes in MySQL Connector/J 3.1.13 (2006-05-26)

Bugs Fixed

- **Fixed PreparedStatement.setObject(int, Object, int)** doesn't respect scale of BigDecimals. (Bug #19615)
- Fixed invalid classname returned for ResultSetMetaData.getColumnClassName() for BIGINT type. (Bug #19282)
- Fixed case where driver wasn't reading server status correctly when fetching server-side prepared statement rows, which in some cases could cause warning counts to be off, or multiple result sets to not be read off the wire. (Bug #19282)
- Fixed ResultSet.wasNull() returns incorrect value when extracting native string from server-side prepared statement generated result set. (Bug #19282)
- Fixed data truncation and getWarnings() only returns last warning in set. (Bug #18740)
- Fixed aliased column names where length of name > 251 are corrupted. (Bug #18554)
- Improved performance of retrieving BigDecimal, Time, Timestamp and Date values from server-side prepared statements by creating fewer short-lived instances of Strings when the native type is not an exact match for the requested type. (Bug #18496)
- Fixed issue where server-side prepared statements don't cause truncation exceptions to be thrown when truncation happens. (Bug #18041)
- Added performance feature, re-writing of batched executes for Statement.executeBatch() (for all DML statements) and PreparedStatement.executeBatch() (for INSERTs with VALUE clauses only). Enable by using "rewriteBatchedStatements=true" in your JDBC URL. (Bug #18041)
- Fixed CallableStatement.registerOutParameter() not working when some parameters pre-populated. Still waiting for feedback from JDBC experts group to determine what correct parameter count from getMetaData() should be, however. (Bug #17898)
- Map "latin1" on MySQL server to CP1252 for MySQL > 4.1.0. (Bug #17587)
- Fixed calling clearParameters() on a closed prepared statement causes NPE. (Bug #17587)
- Added additional accessor and mutator methods on ConnectionProperties so that DataSource users can use same naming as regular URL properties. (Bug #17587)
- Fixed ResultSet.wasNull() not always reset correctly for booleans when done using conversion for server-side prepared statements. (Bug #17450)
- Fixed Statement.getGeneratedKeys() throws NullPointerException when no query has been processed. (Bug #17099)
- Fixed updatable result set doesn't return AUTO_INCREMENT values for insertRow() when multiple column primary keys are used. (the driver was checking for the existence of single-column primary keys and an autoincrement value > 0 instead of a straightforward isAutoIncrement() check). (Bug #16841)
- **DBMD.getColumns()** returns wrong type for BIT. (Bug #15854)
- **lib-nodist** directory missing from package breaks out-of-box build. (Bug #15676)
- Fixed issue with ReplicationConnection incorrectly copying state, doesn't transfer connection context correctly when transitioning between the same read-only states. (Bug #15570)
- No "dos" character set in MySQL > 4.1.0. (Bug #15544)
- **INOUT** parameter does not store IN value. (Bug #15464)
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- **PreparedStatement.setObject()** serializes `BigInteger` as object, rather than sending as numeric value (and is thus not complementary to `.getObject()` on an `UNSIGNED_LONG` type). (Bug #15383)

- Fixed issue where driver was unable to initialize character set mapping tables. Removed reliance on `.properties` files to hold this information, as it turns out to be too problematic to code around class loader hierarchies that change depending on how an application is deployed. Moved information back into the `CharsetMapping` class. (Bug #14938)

- Exception thrown for new decimal type when using updatable result sets. (Bug #14609)

- Driver now aware of fix for `BIT` type metadata that went into MySQL-5.0.21 for server not reporting length consistently. (Bug #13601)

- LogFactory now prepends `com.mysql.jdbc.log` to the log class name if it cannot be found as specified. This enables you to use "short names" for the built-in log factories, for example, `logger=CommonsLogger` instead of `logger=com.mysql.jdbc.log.CommonsLogger`. (Bug #13469)

- Fixed driver trying to call methods that don't exist on older and newer versions of Log4j. The fix is not trying to auto-detect presence of log4j, too many different incompatible versions out there in the wild to do this reliably.

  If you relied on autodetection before, you will need to add "logger=com.mysql.jdbc.log.Log4JLogger" to your JDBC URL to enable Log4J usage, or alternatively use the new "CommonsLogger" class to take care of this. (Bug #13469)

- Added support for Apache Commons logging, use "com.mysql.jdbc.log.CommonsLogger" as the value for the "logger" configuration property. (Bug #13469)

- `ResultSet.getShort()` for `UNSIGNED_TINYINT` returned wrong values. (Bug #11874)

### Changes in MySQL Connector/J 3.1.12 (2005-11-30)

#### Bugs Fixed

- Process escape tokens in `Connection.prepareStatement(...)`. You can disable this behavior by setting the JDBC URL configuration property `processEscapeCodesForPrePStmts` to `false`. (Bug #15141)

- Usage advisor complains about unreferenced columns, even though they've been referenced. (Bug #15065)

- Driver incorrectly closes streams passed as arguments to `PreparedStatements`. Reverts to legacy behavior by setting the JDBC configuration property `autoClosePStmtStreams` to `true` (also included in the 3-0-Compat configuration "bundle"). (Bug #15024)

- Deadlock while closing server-side prepared statements from multiple threads sharing one connection. (Bug #14972)

- Unable to initialize character set mapping tables (due to J2EE classloader differences). (Bug #14938)

- Escape processor replaces quote character in quoted string with string delimiter. (Bug #14909)

- `DatabaseMetaData.getColumns()` doesn't return `TABLE_NAME` correctly. (Bug #14815)

- Java type conversion may be incorrect for `MEDIUMINT`. (Bug #14562)

- If `lower_case_table_names=1` (on server):
  - `storesLowerCaseIdentifiers()` returns `true`
  - `storesLowerCaseQuotedIdentifiers()` returns `true`
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• storesMixedCaseIdentifiers() returns false
• storesMixedCaseQuotedIdentifiers() returns false
• storesUpperCaseIdentifiers() returns false
• storesUpperCaseQuotedIdentifiers() returns true

(Bug #14562)

• If lower_case_table_names=0 (on server):
  • storesLowerCaseIdentifiers() returns false
  • storesLowerCaseQuotedIdentifiers() returns false
  • storesMixedCaseIdentifiers() returns true
  • storesMixedCaseQuotedIdentifiers() returns true
  • storesUpperCaseIdentifiers() returns false
  • storesUpperCaseQuotedIdentifiers() returns true

(Bug #14562)

• Fixed DatabaseMetaData.stores*Identifiers():
  • If lower_case_table_names=0 (on server):
    • storesLowerCaseIdentifiers() returns false
    • storesLowerCaseQuotedIdentifiers() returns false
    • storesMixedCaseIdentifiers() returns true
    • storesMixedCaseQuotedIdentifiers() returns true
    • storesUpperCaseIdentifiers() returns false
    • storesUpperCaseQuotedIdentifiers() returns true
  
  • If lower_case_table_names=1 (on server):
    • storesLowerCaseIdentifiers() returns true
    • storesLowerCaseQuotedIdentifiers() returns true
    • storesMixedCaseIdentifiers() returns false
    • storesMixedCaseQuotedIdentifiers() returns false
    • storesUpperCaseIdentifiers() returns false
    • storesUpperCaseQuotedIdentifiers() returns true

(Bug #14562)

• Added configuration property useGmtMillisForDatetimes which when set to true causes ResultSet.getDate(), .getTimestamp() to return correct millis-since GMT when .getTime() is called on the return value (currently default is false for legacy behavior). (Bug #14562)
• storesUpperCaseQuotedIdentifiers() returns true (Bug #14562)
• storesUpperCaseIdentifiers() returns false (Bug #14562)
• storesMixedCaseQuotedIdentifiers() returns true (Bug #14562)
• storesMixedCaseQuotedIdentifiers() returns false (Bug #14562)
• storesMixedCaseIdentifiers() returns true (Bug #14562)
• storesMixedCaseIdentifiers() returns false (Bug #14562)
• storesLowerCaseQuotedIdentifiers() returns true (Bug #14562)
• storesLowerCaseQuotedIdentifiers() returns false (Bug #14562)
• storesLowerCaseIdentifiers() returns true (Bug #14562)
• storesLowerCaseIdentifiers() returns false (Bug #14562)
• Extraneous sleep on autoReconnect. (Bug #13775)
• Reconnect during middle of executeBatch() should not occur if autoReconnect is enabled. (Bug #13255)
• maxQuerySizeToLog is not respected. Added logging of bound values for execute() phase of server-side prepared statements when profileSQL=true as well. (Bug #13048)
• OpenOffice expects DBMD.supportsIntegrityEnhancementFacility() to return true if foreign keys are supported by the datasource, even though this method also covers support for check constraints, which MySQL doesn't have. Setting the configuration property overrideSupportsIntegrityEnhancementFacility to true causes the driver to return true for this method. (Bug #12975)
• Added com.mysql.jdbc.testsuite.url.default system property to set default JDBC url for testsuite (to speed up bug resolution when I'm working in Eclipse). (Bug #12975)
• logSlowQueries should give better info. (Bug #12230)
• Don't increase timeout for failover/reconnect. (Bug #6577)
• Fixed client-side prepared statement bug with embedded ? characters inside quoted identifiers (it was recognized as a placeholder, when it was not).
• Do not permit executeBatch() for CallableStatements with registered OUT/INOUT parameters (JDBC compliance).
• Fall back to platform-encoding for URLDecoder.decode() when parsing driver URL properties if the platform doesn't have a two-argument version of this method.

Changes in MySQL Connector/J 3.1.11 (2005-10-07)

Bugs Fixed

• URL configuration parameters do not permit "&" or "=" in their values. The JDBC driver now parses configuration parameters as if they are encoded using the application/x-www-form-urlencoded format as specified by java.net.URLDecoder (http://java.sun.com/j2se/1.5.0/docs/api/java/net/URLDecoder.html).

If the "&" character is present in a configuration property, it must now be represented as %25, which is the encoded form of "&" when using application/x-www-form-urlencoded encoding. (Bug #13453)

• The configuration property sessionVariables now permits you to specify variables that start with the "@" sign. (Bug #13453)
• Workaround for Bug #13374: `ResultSet.getStatement()` on closed result set returns `NULL` (as per JDBC 4.0 spec, but not backward-compatible). Set the connection property `retainStatementAfterResultSetClose` to `true` to be able to retrieve a `ResultSet`'s statement after the `ResultSet` has been closed using `.getStatement()` (the default is `false`, to be JDBC-compliant and to reduce the chance that code using JDBC leaks `Statement` instances). (Bug #13277)

• Read response in `MysqlIO.sendFileToServer()`, even if the local file can't be opened, otherwise next query issued will fail, because it is reading the response to the empty `LOAD DATA` packet sent to the server. (Bug #13277)

• Fixed `NullPointerException` when converting `catalog` parameter in many `DatabaseMetaDataMethods` to `byte[]`s (for the result set) when the parameter is `null`. (`null` is not technically permitted by the JDBC specification, but we have historically permitted it). (Bug #13277)

• Backport of `VAR[BINARY|CHAR] [BINARY]` types detection from 5.0 branch. (Bug #13277)

• Backport of `Field` class, `ResultSetMetaData.getColumnClassName()`, and `ResultSet.getObject(int)` changes from 5.0 branch to fix behavior surrounding `VARCHAR BINARY/VARBINARY` and related types. (Bug #13277)

• `ResultSetMetaData` from `Statement.getGeneratedKeys()` caused a `NullPointerException` to be thrown whenever a method that required a connection reference was called. (Bug #13277)

• When `gatherPerfMetrics` is enabled for servers older than 4.1.0, a `NullPointerException` is thrown from the constructor of `ResultSet` if the query doesn't use any tables. (Bug #13043)

• `java.sql.Types.OTHER` returned for `BINARY` and `VARBINARY` columns when using `DatabaseMetaData.getColumns()` . (Bug #12970)

• `ServerPreparedStatement.getBinding()` now checks if the statement is closed before attempting to reference the list of parameter bindings, to avoid throwing a `NullPointerException`. (Bug #12970)

• Tokenizer for `=` in URL properties was causing `sessionVariables=...` to be parameterized incorrectly. (Bug #12753)

• `cp1251` incorrectly mapped to `win1251` for servers newer than 4.0.x. (Bug #12752)

• Specifying a catalog works as stated in the API docs. (Bug #12541)

• Specifying `NULL` means that catalog will not be used to filter the results (thus all databases will be searched), unless you've set `nullCatalogMeansCurrent=true` in your JDBC URL properties. (Bug #12541)

• Specifying `""` means “current” catalog, even though this isn't quite JDBC spec compliant, it is there for legacy users. (Bug #12541)

• Made `Connection.clientPrepare()` available from “wrapped” connections in the `jdbc2.optional` package (connections built by `ConnectionPoolDataSource` instances). (Bug #12541)

• Handling of catalog argument in `DatabaseMetaData.getIndexInfo()`, which also means changes to the following methods in `DatabaseMetaData`:
  - `getBestRowIdentifier()`
  - `getColumns()`
  - `getCrossReference()`
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• getExportedKeys()
• getImportedKeys()
• getIndexInfo()
• getPrimaryKeys()
• getProcedures() (and thus indirectly getProcedureColumns())
• getTables()

The catalog argument in all of these methods now behaves in the following way:

• Specifying NULL means that catalog will not be used to filter the results (thus all databases will be searched), unless you've set nullCatalogMeansCurrent=true in your JDBC URL properties.

• Specifying "" means “current” catalog, even though this isn't quite JDBC spec compliant, it is there for legacy users.

• Specifying a catalog works as stated in the API docs.

• Made Connection.clientPrepare() available from “wrapped” connections in the jdbc2.optional package (connections built by ConnectionPoolDataSource instances). (Bug #12541)

• Added Connection.isMasterConnection() for clients to be able to determine if a multi-host master/slave connection is connected to the first host in the list. (Bug #12541)
• getTables() (Bug #12541)
• getProcedures() (and thus indirectly getProcedureColumns()) (Bug #12541)
• getPrimaryKeys() (Bug #12541)
• getIndexInfo() (Bug #12541)
• getImportedKeys() (Bug #12541)
• getExportedKeys() (Bug #12541)
• getCrossReference() (Bug #12541)
• getColumns() (Bug #12541)
• getBestRowIdentifier() (Bug #12541)
• Connection.prepareCall() is database name case-sensitive (on Windows systems). (Bug #12417)
• explainSlowQueries hangs with server-side prepared statements. (Bug #12229)
• Properties shared between master and slave with replication connection. (Bug #12218)
• Geometry types not handled with server-side prepared statements. (Bug #12104)
• maxPerformance.properties mis-spells “elideSetAutoCommits”. (Bug #11976)
• ReplicationConnection won't switch to slave, throws “Catalog can't be null” exception. (Bug #11879)
• Pstmt.setObject(...., Types.BOOLEAN) throws exception. (Bug #11798)
• Escape tokenizer doesn't respect stacked single quotation marks for escapes. (Bug #11797)

• GEOMETRY type not recognized when using server-side prepared statements. (Bug #11797)

• The `sendBlobChunkSize` property is now clamped to `max_allowed_packet` with consideration of stream buffer size and packet headers to avoid `PacketTooBigExceptions` when `max_allowed_packet` is similar in size to the default `sendBlobChunkSize` which is 1M. (Bug #11781)

• Foreign key information that is quoted is parsed incorrectly when `DatabaseMetaData` methods use that information. (Bug #11781)

• `CallableStatement.clearParameters()` now clears resources associated with `INOUT/OUTPUT` parameters as well as `INPUT` parameters. (Bug #11781)

• Moved source code to Subversion repository. (Bug #11663)

• Incorrect generation of testcase scripts for server-side prepared statements. (Bug #11663)

• Fixed regression caused by fix for Bug #11552 that caused driver to return incorrect values for unsigned integers when those integers where within the range of the positive signed type. (Bug #11663)

• Spurious `!` on console when character encoding is `utf8`. (Bug #11629)

• Fixed statements generated for testcases missing `;` for “plain” statements. (Bug #11629)

• `StringUtils.getBytes()` doesn't work when using multibyte character encodings and a length in `characters` is specified. (Bug #11614)

• `DBMD.storesLower/Mixed/UpperIdentifiers()` reports incorrect values for servers deployed on Windows. (Bug #11575)

• Updated `DBMD.supportsCorrelatedQueries()` to return `true` for versions > 4.1, `supportsGroupByUnrelated()` to return `true` and `getResultSetHoldability()` to return `HOLD_CURSORS_OVER_COMMIT`. (Bug #11498)

• Reworked `Field` class, `*Buffer`, and `MysqlIO` to be aware of field lengths > `Integer.MAX_VALUE`. (Bug #11498)

• Lifted restriction of changing streaming parameters with server-side prepared statements. As long as all streaming parameters were set before execution, `.clearParameters()` does not have to be called. (due to limitation of client/server protocol, prepared statements can not reset individual stream data on the server side). (Bug #11498)

• Escape processor didn't honor strings demarcated with double quotation marks. (Bug #11498)

• `ResultSet.moveToCurrentRow()` fails to work when preceded by a call to `ResultSet.moveToInsertRow()`. (Bug #11190)

• `VARBINARY` data corrupted when using server-side prepared statements and `.setBytes()`. (Bug #11115)

• Only get `char[]` from SQL in `PreparedStatement.ParseInfo()` when needed. (Bug #10630)

• `Statement.getWarnings()` fails with NPE if statement has been closed. (Bug #10630)

Changes in MySQL Connector/J 3.1.10 (2005-06-23)

Bugs Fixed

• Initial implementation of `ParameterMetadata` for `PreparedStatement.getParameterMetadata()`. Only works fully for `CallableStatements`, as current server-side prepared statements return every parameter as a `VARCHAR` type.
Changes in MySQL Connector/J 3.1.9 (2005-06-22)

Bugs Fixed

- Removed nonsensical “costly type conversion” warnings when using usage advisor. (Bug #11411)
- Production package doesn't include JBoss integration classes. (Bug #11411)
- Fixed PreparedStatement.setClob() not accepting null as a parameter. (Bug #11360)
- Connector/J dumping query into SQLException twice. (Bug #11360)
- autoReconnect ping causes exception on connection startup. (Bug #11259)
- Added the following configuration bundles, use one or many using the useConfigs configuration property:
  - maxPerformance: Maximum performance without being reckless
  - solarisMaxPerformance: Maximum performance for Solaris, avoids syscalls where it can
  - 3-0-Compat: Compatibility with Connector/J 3.0.x functionality
  (Bug #11115)
- Added maintainTimeStats configuration property (defaults to true), which tells the driver whether or not to keep track of the last query time and the last successful packet sent to the server's time. If set to false, removes two syscalls per query. (Bug #11115)
- solarisMaxPerformance: Maximum performance for Solaris, avoids syscalls where it can (Bug #11115)
- maxPerformance: Maximum performance without being reckless (Bug #11115)
- Connection.setCatalog() is now aware of the useLocalSessionState configuration property, which when set to true will prevent the driver from sending USE ... to the server if the requested catalog is the same as the current catalog. (Bug #11115)
- 3-0-Compat: Compatibility with Connector/J 3.0.x functionality (Bug #11115)
- VARBINARY data corrupted when using server-side prepared statements and ResultSet.getBytes(). (Bug #11115)
- Try to handle OutOfMemoryErrors more gracefully. Although not much can be done, they will in most cases close the connection they happened on so that further operations don't run into a connection in some unknown state. When an OOM has happened, any further operations on the connection will fail with a “Connection closed” exception that will also list the OOM exception as the reason for the implicit connection close event. (Bug #10850)
- Setting cachePrepStmts=true now causes the Connection to also cache the check the driver performs to determine if a prepared statement can be server-side or not, as well as caches server-side prepared statements for the lifetime of a connection. As before, the prepStmtCacheSize parameter controls the size of these caches. (Bug #10850)
- Driver detects if you're running MySQL-5.0.7 or later, and does not scan for LIMIT ?,? in statements being prepared, as the server supports those types of queries now. (Bug #10850)
- Don't send COM_RESET_STMT for each execution of a server-side prepared statement if it isn't required. (Bug #10850)
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- 0-length streams not sent to server when using server-side prepared statements. (Bug #10850)

- Reorganized directory layout. Sources now are in src folder. Don't pollute parent directory when building, now output goes to ./build, distribution goes to ./dist. (Bug #10496)

- Added support/bug hunting feature that generates .sql test scripts to STDERR when autoGenerateTestcaseScript is set to true. (Bug #10496)

- SQLException is thrown when using property characterSetResults with cp932 or eucjpms. (Bug #10496)

- The data type returned for TINYINT(1) columns when tinyIntIsBit=true (the default) can be switched between Types.BOOLEAN and Types.BIT using the new configuration property transformedBitIsBoolean, which defaults to false. If set to false (the default), DatabaseMetaData.getColumns() and ResultSetMetaData.getColumnType() will return Types.BOOLEAN for TINYINT(1) columns. If true, Types.BOOLEAN will be returned instead. Regardless of this configuration property, if tinyIntIsBit is enabled, columns with the type TINYINT(1) will be returned as java.lang.Boolean instances from ResultSet.getObject(...), and ResultSetMetaData.getColumnClassName() will return java.lang.Boolean. (Bug #10485)

- SQLException thrown when retrieving YEAR(2) with ResultSet.getString(). The driver will now always treat YEAR types as java.sql.Dates and return the correct values for getString(). Alternatively, the yearIsDateType connection property can be set to false and the values will be treated as SHORTS. (Bug #10485)

- Driver doesn't support {?=CALL(...)} for calling stored functions. This involved adding support for function retrieval to DatabaseMetaData.getProcedures() and getProcedureColumns() as well. (Bug #10310)

- Unsigned SMALLINT treated as signed for ResultSet.getInt(), fixed all cases for UNSIGNED integer values and server-side prepared statements, as well as ResultSet.getObject() for UNSIGNED TINYINT. (Bug #10156)

- Made JDBC2-compliant wrappers public to enable access to vendor extensions. (Bug #10155)

- Made enableStreamingResults() visible on com.mysql.jdbc.jdbc2.optional.StatementWrapper. (Bug #10155)

- Made ServerPreparedStatement.asSql() work correctly so auto-explain functionality would work with server-side prepared statements. (Bug #10155)

- Double quotation marks not recognized when parsing client-side prepared statements. (Bug #10155)

- Cleaned up logging of profiler events, moved code to dump a profiler event as a string to com.mysql.jdbc.log.LogUtils so that third parties can use it. (Bug #10155)

- DatabaseMetaData.supportsMultipleOpenResults() now returns true. The driver has supported this for some time, DBMD just missed that fact. (Bug #10155)

- Memory leak in ServerPreparedStatement if serverPrepare() fails. (Bug #10144)

- Added createDatabaseIfNotExist property (default is false), which will cause the driver to ask the server to create the database specified in the URL if it doesn't exist. You must have the appropriate privileges for database creation for this to work. (Bug #10144)

- Actually write manifest file to correct place so it ends up in the binary jar file. (Bug #10144)

- com.mysql.jdbc.PreparedStatement.ParseInfo does unnecessary call to toCharArray(). (Bug #9064)

- Driver now correctly uses CP932 if available on the server for Windows-31J, CP932 and MS932 java encoding names, otherwise it resorts to SJIS, which is only a close approximation. Currently
only MySQL-5.0.3 and newer (and MySQL-4.1.12 or .13, depending on when the character set gets backported) can reliably support any variant of CP932.

- Overhaul of character set configuration, everything now lives in a properties file.

Changes in MySQL Connector/J 3.1.8 (2005-04-14)

**Bugs Fixed**

- Should accept `null` for catalog (meaning use current) in DBMD methods, even though it is not JDBC-compliant for legacy's sake. Disable by setting connection property `nullCatalogMeansCurrent` to `false` (which will be the default value in C/J 3.2.x). (Bug #9917)

- More tests in `Field.isOpaqueBinary()` to distinguish opaque binary (that is, fields with type `CHAR(n)` and `CHARACTER SET BINARY`) from output of various scalar and aggregate functions that return strings. (Bug #9778)

- Fixed driver not returning `true` for `-1` when `ResultSet.getBoolean()` was called on result sets returned from server-side prepared statements. (Bug #9778)

- Added a `Manifest.MF` file with implementation information to the `.jar` file. (Bug #9778)

- `DBMD.getTables()` shouldn't return tables if views are asked for, even if the database version doesn't support views. (Bug #9778)

- Should accept `null` for name patterns in DBMD (meaning “%”), even though it isn't JDBC compliant, for legacy's sake. Disable by setting connection property `nullNamePatternMatchesAll` to `false` (which will be the default value in C/J 3.2.x). (Bug #9769)

- The performance metrics feature now gathers information about number of tables referenced in a `SELECT`. (Bug #9704)

- The logging system is now automatically configured. If the value has been set by the user, using the URL property `logger` or the system property `com.mysql.jdbc.logger`, then use that, otherwise, autodetect it using the following steps:
  1. Log4j, if it is available,
  2. Then JDK1.4 logging,
  3. Then fallback to our `STDERR` logging. (Bug #9704)

- `PreparedStatement.setObject(int, Object, int type, int scale)` now uses scale value for `BigDecimal` instances. (Bug #9682)

- Stored procedures with `DECIMAL` parameters with storage specifications that contained “,” in them failed. (Bug #9682)

- `PreparedStatement.setObject(int, Object, int type, int scale)` now uses scale value for `BigDecimal` instances. (Bug #9682)

- Fixed `build.xml` to not compile `log4j` logging if `log4j` not available. (Bug #9320)

- Better detection of `LIMIT` inside/outside of quoted strings so that the driver can more correctly determine whether a prepared statement can be prepared on the server or not. (Bug #9320)

- Added support for the c3p0 connection pool's (http://c3p0.sf.net/) validation/connection checker interface which uses the lightweight `COM_PING` call to the server if available. To use it, configure your c3p0 connection pool's `connectionTesterClassName` property to use `com.mysql.jdbc.integration.c3p0.MysqlConnectionTester`. (Bug #9320)
• PreparedStatement.getMetaData() inserts blank row in database under certain conditions when not using server-side prepared statements. (Bug #9320)

• Connection.canHandleAsPreparedStatement() now makes “best effort” to distinguish LIMIT clauses with placeholders in them from ones without to have fewer false positives when generating work-arounds for statements the server cannot currently handle as server-side prepared statements. (Bug #9320)

• Stored procedures with same name in different databases confuse the driver when it tries to determine parameter counts/types. (Bug #9319)

• Added finalizers to ResultSet and Statement implementations to be JDBC spec-compliant, which requires that if not explicitly closed, these resources should be closed upon garbage collection. (Bug #9319)

• A continuation of Bug #8868, where functions used in queries that should return nonstring types when resolved by temporary tables suddenly become opaque binary strings (work-around for server limitation). Also fixed fields with type of CHAR(n) CHARACTER SET BINARY to return correct/matching classes for RSMD.getColumnClassName() and ResultSet.getObject(). (Bug #9236)

• Cannot use UTF-8 for characterSetResults configuration property. (Bug #9206)

• PreparedStatement.addBatch() doesn’t work with server-side prepared statements and streaming BINARY data. (Bug #9040)

• Server-side session variables can be preset at connection time by passing them as a comma-delimited list for the connection property sessionVariables. (Bug #8868)

• Fixed regression in ping() for users using autoReconnect=true. (Bug #8868)

• ServerPreparedStatements now correctly “stream” BLOB/CLOB data to the server. You can configure the threshold chunk size using the JDBC URL property blobSendChunkSize (the default is 1MB). (Bug #8868)

• BlobFromLocator now uses correct identifier quoting when generating prepared statements. (Bug #8868)

• DATE_FORMAT() queries returned as BLOBs from getObject(). (Bug #8868)

• Check for empty strings (‘’) when converting CHAR/VARCHAR column data to numbers, throw exception if emptyStringsConvertToZero configuration property is set to false (for backward-compatibility with 3.0, it is now set to true by default, but will most likely default to false in 3.2). (Bug #8803)

• DATA_TYPE column from DBMD.getBestRowIdentifier() causes ArrayIndexOutOfBoundsException when accessed (and in fact, didn’t return any value). (Bug #8803)

• DBMD.supportsMixedCase*Identifiers() returns wrong value on servers running on case-sensitive file systems. (Bug #8800)

• DBMD.supportsResultSetConcurrency() not returning true for forward-only/read-only result sets (we obviously support this). (Bug #8792)

• Fixed ResultSet.getTime() on a NULL value for server-side prepared statements throws NPE.

• Made Connection.ping() a public method.

• Added support for new precision-math DECIMAL type in MySQL 5.0.3 and up.

• Fixed DatabaseMetaData.getTables() returning views when they were not asked for as one of the requested table types.
Changes in MySQL Connector/J 3.1.7 (2005-02-18)

Bugs Fixed

- Don’t pass `NULL` to `String.valueOf()` in `ResultSet.getNativeConvertToString()`, as it stringifies it (that is, returns `null`), which is not correct for the method in question. (Bug #8487)

- `PreparedStatements` not creating streaming result sets. (Bug #8487)

- Fixed NPE in `ResultSet.realClose()` when using usage advisor and result set was already closed. (Bug #8428)

- `ResultSet.getString()` doesn’t maintain format stored on server, bug fix only enabled when `noDatetimeStringSync` property is set to `true` (the default is `false`). (Bug #8428)

- Added support for `BIT` type in MySQL-5.0.3. The driver will treat `BIT(1-8)` as the JDBC standard `BIT` type (which maps to `java.lang.Boolean`), as the server does not currently send enough information to determine the size of a bitfield when < 9 bits are declared. `BIT(>9)` will be treated as `VARBINARY`, and will return `byte[]` when `getObject()` is called. (Bug #8424)

- Added `useLocalSessionState` configuration property, when set to `true` the JDBC driver trusts that the application is well-behaved and only sets autocommit and transaction isolation levels using the methods provided on `java.sql.Connection`, and therefore can manipulate these values in many cases without incurring round-trips to the database server. (Bug #8424)

- Added `enableStreamingResults()` to `Statement` for connection pool implementations that check `Statement.setFetchSize()` for specification-compliant values. Call `Statement.setFetchSize(>=0)` to disable the streaming results for that statement. (Bug #8424)

- `ResultSet.getBigDecimal()` throws exception when rounding would need to occur to set scale. The driver now chooses a rounding mode of “half up” if nonrounding `BigDecimal.setScale()` fails. (Bug #8424)

- Fixed synchronization issue with `ServerPreparedStatement.serverPrepare()` that could cause deadlocks/crashes if connection was shared between threads. (Bug #8096)

- Emulated locators corrupt binary data when using server-side prepared statements. (Bug #8096)

- Removed `dontUnpackBinaryResults` functionality, the driver now always stores results from server-side prepared statements as is from the server and unpacks them on demand. (Bug #7952)

- Infinite recursion when “falling back” to master in failover configuration. (Bug #7952)

- Fixed duplicated code in `configureClientCharset()` that prevented `useOldUTF8Behavior=true` from working properly. (Bug #7952)

- Disable multi-statements (if enabled) for MySQL-4.1 versions prior to version 4.1.10 if the query cache is enabled, as the server returns wrong results in this configuration. (Bug #7952)

- Timestamps converted incorrectly to strings with server-side prepared statements and updatable result sets. (Bug #7715)

- Detect new `sql_mode` variable in string form (it used to be integer) and adjust quoting method for strings appropriately. (Bug #7715)

- Added `holdResultsOpenOverStatementClose` property (default is `false`), that keeps result sets open over statement.close() or new execution on same statement (suggested by Kevin Burton). (Bug #7715)

- Timestamp key column data needed `_binary` stripped for `UpdatableResultSet.refreshRow()`. (Bug #7686)
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- Connector/J now supports the **NO_BACKSLASH_ESCAPES** server SQL mode. (Bug #7374, Bug #16730296)

- Send correct value for “boolean” **true** to server for `PreparedStatement.setObject(n, "true", Types.BIT)`. (Bug #4718)

- Remove **_binary** introducer from parameters used as in/out parameters in `CallableStatement`. (Bug #4718)

- Fixed bug with `Connection` not caching statements from `prepareStatement()` when the statement wasn’t a server-side prepared statement. (Bug #4718)

- Choose correct “direction” to apply time adjustments when both client and server are in GMT time zone when using `ResultSet.get(..., cal)` and `PreparedStatement.set(...., cal)`. (Bug #4718)

- By default, the driver now scans SQL you are preparing using all variants of `Connection.prepareStatement()` to determine if it is a supported type of statement to prepare on the server side, and if it is not supported by the server, it instead prepares it as a client-side emulated prepared statement. You can disable this by passing `emulateUnsupportedPstmts=false` in your JDBC URL. (Bug #4718)

- Always return `byte[]`s for output parameters registered as `*BINARY`. (Bug #4718)

- Added `dontTrackOpenResources` option (default is `false`, to be JDBC compliant), which helps with memory use for nonwell-behaved apps (that is, applications that don’t close `Statement` objects when they should). (Bug #4718)

Changes in MySQL Connector/J 3.1.6 (2004-12-23)

**Bugs Fixed**

- `DBMD.getProcedures()` doesn’t respect catalog parameter. (Bug #7026)

- Fixed hang on `SocketInputStream.read()` with `Statement.setMaxRows()` and multiple result sets when driver has to truncate result set directly, rather than tacking a `LIMIT n` on the end of it.

Changes in MySQL Connector/J 3.1.5 (2004-12-02)

**Bugs Fixed**

- Use 1MB packet for sending file for `LOAD DATA LOCAL` if that is `< max_allowed_packet` on server. (Bug #6537)

- Use `DatabaseMetaData.getIdentifierQuoteString()` when building `DBMD` queries. (Bug #6537)

- `SUM()` on `DECIMAL` with server-side prepared statement ignores scale if zero-padding is needed (this ends up being due to conversion to `DOUBLE` by server, which when converted to a string to parse into `BigDecimal`, loses all “padding” zeros). (Bug #6537)

- Use our own implementation of buffered input streams to get around blocking behavior of `java.io.BufferedInputStream`. Disable this with `useReadAheadInput=false`. (Bug #6399)

- Re-work `Field.isOpaqueBinary()` to detect `CHAR(n) CHARACTER SET BINARY` to support fixed-length binary fields for `ResultSet.getObject()`. (Bug #6399)

- Make auto-deserialization of `java.lang.Objects` stored in `BLOB` columns configurable using `autoDeserialize` property (defaults to `false`). (Bug #6399)

- `ResultSetMetaData.getColumnDisplaySize()` returns incorrect values for multibyte charsets. (Bug #6399)
- Failing to connect to the server when one of the addresses for the given host name is IPV6 (which the server does not yet bind on). The driver now loops through all IP addresses for a given host, and stops on the first one that accepts(). a socket.connect(). (Bug #6348)

- Use null-safe-equals for key comparisons in updatable result sets. (Bug #6225)

- Removed unwanted new Throwable() in ResultSet constructor due to bad merge (caused a new object instance that was never used for every result set created). Found while profiling for Bug #6359. (Bug #6225)

- Fixed too-early creation of StringBuffer in EscapeProcessor.escapeSQL(), also return String when escaping not needed (to avoid unnecessary object allocations). Found while profiling for Bug #6359. (Bug #6225)

- ServerSidePreparedStatement allocating short-lived objects unnecessarily. (Bug #6225)

- UNSIGNED BIGINT unpacked incorrectly from server-side prepared statement result sets. (Bug #5729)

- Use a per-session Calendar instance by default when decoding dates from ServerPreparedStatements (set to old, less performant behavior by setting property dynamicCalendars=true). (Bug #5706)

- Inefficient detection of pre-existing string instances in ResultSet.getNativeString(). (Bug #5706)

- Don't throw exceptions for Connection.releaseSavepoint(). (Bug #5706)

- Added experimental configuration property dontUnpackBinaryResults, which delays unpacking binary result set values until they're asked for, and only creates object instances for nonnumeric values (it is set to false by default). For some usecase/jvm combinations, this is friendlier on the garbage collector. (Bug #5706)

- Server-side prepared statements did not honor zeroDateTimeBehavior property, and would cause class-cast exceptions when using ResultSet.getObject(), as the all-zero string was always returned. (Bug #5235)

- Handle case when string representation of timestamp contains trailing "." with no numbers following it. (Bug #5235)

- Fixed batched updates with server prepared statements weren't looking if the types had changed for a given batched set of parameters compared to the previous set, causing the server to return the error "Wrong arguments to mysql_stmt_execute()". (Bug #5235)

- Fix comparisons made between string constants and dynamic strings that are converted with either toUpperCase() or toLowerCase() to use Locale.ENGLISH, as some locales "override" case rules for English. Also use StringUtils.indexOfIgnoreCase() instead of .toUpperCase().indexOf(), avoids creating a very short-lived transient String instance.

Changes in MySQL Connector/J 3.1.4 (2004-09-04)

Bugs Fixed

- You can now use URLs in LOAD DATA LOCAL statements, and the driver will use Java's built-in handlers for retrieving the data and sending it to the server. This feature is not enabled by default, you must set the allowUrlInLocalInfile Connection property to true. (Bug #5032)

- Use com.mysql.jdbc.Message's classloader when loading resource bundle, should fix sporadic issues when the caller's classloader can't locate the resource bundle. (Bug #5032)

- The driver is more strict about truncation of numerics on ResultSet.get*(), and will throw an SQLException when truncation is detected. You can disable this by setting
jdbcCompliantTruncation to false (it is enabled by default, as this functionality is required for JDBC compliance). (Bug #5032)

- Fixed ServerPreparedStatement to read prepared statement metadata off the wire, even though it is currently a placeholder instead of using MysqlIO.clearInputStream() which didn't work at various times because data wasn't available to read from the server yet. This fixes sporadic errors users were having with ServerPreparedStatements throwing ArrayIndexOutOfBoundsException. (Bug #5032)

- Added three ways to deal with all-zero datetimes when reading them from a ResultSet: exception (the default), which throws an SQLException with an SQLState of S1009; convertToNull, which returns NULL instead of the date; and round, which rounds the date to the nearest closest value which is '0001-01-01'. (Bug #5032)

- ResultSet.getObject() doesn't return type Boolean for pseudo-bit types from prepared statements on 4.1.x (shortcut for avoiding extra type conversion when using binary-encoded result sets obscured test in getObject() for “pseudo” bit type). (Bug #5032)

- ServerPreparedStatements dealing with return of DECIMAL type don't work. (Bug #5012)

- Track packet sequence numbers if enablePacketDebug=true, and throw an exception if packets received out-of-order. (Bug #4689)

- ResultSet.wasNull() does not work for primitives if a previous null was returned. (Bug #4689)

- Optimized integer number parsing, enable “old” slower integer parsing using JDK classes using useFastIntParsing=false property. (Bug #4642)

- Added useOnlyServerErrorMessage property, which causes message text in exceptions generated by the server to only contain the text sent by the server (as opposed to the SQLState's “standard” description, followed by the server's error message). This property is set to true by default. (Bug #4642)

- ServerPreparedStatement.executeUpdate() sometimes threw ArrayIndexOutOfBoundsException when unpacking field metadata. (Bug #4642)

- Connector/J 3.1.3 beta does not handle integers correctly (caused by changes to support unsigned reads in Buffer.readInt() -> Buffer.readShort()). (Bug #4510)

- Added support in DatabaseMetaData.getTables() and getTableTypes() for views, which are now available in MySQL server 5.0.x. (Bug #4510)

- Calling MysqlPooledConnection.close() twice (even though an application error), caused NPE. Fixed. (Bug #4482)

- ResultSet.getObject() returns wrong type for strings when using prepared statements. (Bug #4482)

### Changes in MySQL Connector/J 3.1.3 (2004-07-07)

#### Bugs Fixed

- Support new time zone variables in MySQL-4.1.3 when useTimezone=true. (Bug #4311)

- Support for unsigned numerics as return types from prepared statements. This also causes a change in ResultSet.getObject() for the bigint unsigned type, which used to return BigDecimal instances, it now returns instances of java.lang.BigInteger. (Bug #4311)

- Error in retrieval of mediumint column with prepared statements and binary protocol. (Bug #4311)

- Use SQL Standard SQL states by default, unless useSqlStateCodes property is set to false. (Bug #4119)
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- Null bitmask sent for server-side prepared statements was incorrect. (Bug #4119)
- Externalized more messages (on-going effort). (Bug #4119)
- Added packet debugging code (see the enablePacketDebug property documentation). (Bug #4119)
- Added constants for MySQL error numbers (publicly accessible, see com.mysql.jdbc.MysqlErrorNumbers), and the ability to generate the mappings of vendor error codes to SQLStates that the driver uses (for documentation purposes). (Bug #4119)
- Mangle output parameter names for CallableStatements so they will not clash with user variable names.
- Added support for INOUT parameters in CallableStatements.

Changes in MySQL Connector/J 3.1.2 (2004-06-09)

Bugs Fixed

- Don't enable server-side prepared statements for server version 5.0.0 or 5.0.1, as they aren't compatible with the '4.1.2+' style that the driver uses (the driver expects information to come back that isn't there, so it hangs). (Bug #3804)
- getWarnings() returns SQLWarning instead of DataTruncation. (Bug #3804)
- getProcedureColumns() doesn't work with wildcards for procedure name. (Bug #3540)
- getProcedures() does not return any procedures in result set. (Bug #3539)
- Fixed DatabaseMetaData.getProcedures() when run on MySQL-5.0.0 (output of SHOW PROCEDURE STATUS changed between 5.0.0 and 5.0.1. (Bug #3520)
- Added connectionCollation property to cause driver to issue set collation_connection=... query on connection init if default collation for given charset is not appropriate. (Bug #3520)
- DBMD.getSQLStateType() returns incorrect value. (Bug #3520)
- Support placeholder for parameter metadata for server >= 4.1.2. (Bug #3146)
- Correctly map output parameters to position given in prepareCall() versus. order implied during registerOutParameter(). (Bug #3146)
- Correctly detect initial character set for servers >= 4.1.0. (Bug #3146)
- Cleaned up detection of server properties. (Bug #3146)
- Added gatherPerformanceMetrics property, along with properties to control when/where this info gets logged (see docs for more info).
- Fixed case when no parameters could cause a NullPointerException in CallableStatement.setOutputParameters().
- Enabled callable statement caching using cacheCallableStmts property.
- Fixed sending of split packets for large queries, enabled nio ability to send large packets as well.
- Added .toString() functionality to ServerPreparedStatement, which should help if you're trying to debug a query that is a prepared statement (it shows SQL as the server would process).
- Added logSlowQueries property, along with slowQueriesThresholdMillis property to control when a query should be considered "slow."
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- Removed wrapping of exceptions in `MysqlIO.changeUser()`.
- Fixed stored procedure parameter parsing info when size was specified for a parameter (for example, `char()`, `varchar()`).
- `ServerPreparedStatements` weren't actually de-allocating server-side resources when `.close()` was called.
- Fixed case when no output parameters specified for a stored procedure caused a bogus query to be issued to retrieve out parameters, leading to a syntax error from the server.

Changes in MySQL Connector/J 3.1.1 (2004-02-14)

Bugs Fixed

- Use DocBook version of docs for shipped versions of drivers. (Bug #2671)
- Fixed rare buffer underflow when writing numbers into buffers for sending prepared statement execution requests. (Bug #2671)
- `NULL` fields were not being encoded correctly in all cases in server-side prepared statements. (Bug #2671)
- Merged unbuffered input code from 3.0. (Bug #2623)
- Fixed `ConnectionProperties` that weren't properly exposed through accessors, cleaned up `ConnectionProperties` code. (Bug #2623)
- Class-cast exception when using scrolling result sets and server-side prepared statements. (Bug #2623)
- Server-side prepared statements were not returning data type `YEAR` correctly. (Bug #2606)
- Enabled streaming of result sets from server-side prepared statements. (Bug #2606)
- Implemented multiple result sets returned from a statement or stored procedure. (Bug #2502)
- Fixed charset conversion issue in `.getTables()`. (Bug #2502)
- Reset `long binary` parameters in `ServerPreparedStatement` when `.clearParameters()` is called, by sending `COM_RESET_STMT` to the server. (Bug #2359)
- Merged prepared statement caching, and `.getMetaData()` support from 3.0 branch. (Bug #2359)
- Implemented `Connection.prepareCall()`, and `DatabaseMetaData.getProcedures()` and `.getProcedureColumns()`. (Bug #2359)
- Fixed off-by-1900 error in some cases for years in `TimeUtil.fastDate/TimeCreate()` when unpacking results from server-side prepared statements. (Bug #2359)
- `NULL` values for numeric types in binary encoded result sets causing `NullPointerExceptions`. (Bug #2359)
- Merged fix of data type mapping from MySQL type `FLOAT` to `java.sql.Types.REAL` from 3.0 branch. (Bug #1673)
- Fixed sending of queries larger than 16M. (Bug #1673)
- Fixed NPE and year/month bad conversions when accessing some datetime functionality in `ServerPreparedStatements` and their resultant result sets. (Bug #1673)
- Fixed `NullPointerException` in `ServerPreparedStatement.setTimestamp()`, as well as year and month discrepancies in `ServerPreparedStatement.setTimestamp()`, `setDate()`. (Bug #1673)
• Display where/why a connection was implicitly closed (to aid debugging). (Bug #1673)

• Detect collation of column for `RSMD.isCaseSensitive()` (Bug #1673)

• Added named and indexed input/output parameter support to `CallableStatement`. MySQL-5.0.x or newer. (Bug #1673)

• Added ability to have multiple database/JVM targets for compliance and regression/unit tests in `build.xml`. (Bug #1673)

• `DatabaseMetaData.getColumns()` is not returning correct column ordinal info for non-`'%'` column name patterns. (Bug #1673)

• `CommunicationsException` implemented, that tries to determine why communications was lost with a server, and displays possible reasons when `.getMessage()` is called. (Bug #1673)

• Optimized `Buffer.readLenByteArray()` to return shared empty byte array when length is 0.

• Fix support for table aliases when checking for all primary keys in `UpdatableResultSet`.

• Unpack “unknown” data types from server prepared statements as `Strings`.

• Implemented `Statement.getWarnings()` for MySQL-4.1 and newer (using `SHOW WARNINGS`).

• Ensure that warnings are cleared before executing queries on prepared statements, as-per JDBC spec (now that we support warnings).

• Correctly initialize datasource properties from JNDI Refs, including explicitly specified URLs.

• Implemented long data (Blobs, Clobs, InputStreams, Readers) for server prepared statements.

• Deal with 0-length tokens in `EscapeProcessor` (caused by callable statement escape syntax).

• `DatabaseMetaData` now reports `supportsStoredProcedures()` for MySQL versions >= 5.0.0

• Support for `mysql_change_user()`. See the `changeUser()` method in `com.mysql.jdbc.Connection`.

• Removed `useFastDates` connection property.

• Support for NIO. Use `useNIO=true` on platforms that support NIO.

• Check for closed connection on delete/update/insert row operations in `UpdatableResultSet`.

• Support for transaction savepoints (MySQL >= 4.0.14 or 4.1.1).

• Support “old” `profileSql` capitalization in `ConnectionProperties`. This property is deprecated, you should use `profileSQL` if possible.

• Fixed character encoding issues when converting bytes to ASCII when MySQL doesn't provide the character set, and the JVM is set to a multibyte encoding (usually affecting retrieval of numeric values).

• Centralized setting of result set type and concurrency.

• Fixed bug with `UpdatableResultSets` not using client-side prepared statements.

• Default result set type changed to `TYPE_FORWARD_ONLY` (JDBC compliance).

• Fixed `IllegalAccessError` to `Calendar.getTimeInMillis()` in `DateTimeValue` (for JDK < 1.4).

• Allow contents of `PreparedStatement.setBlob()` to be retained between calls to `.execute*()`.
• Fixed stack overflow in `Connection.prepareCall()` (bad merge).

• Refactored how connection properties are set and exposed as `DriverPropertyInfo` as well as `Connection` and `DataSource` properties.

• Reduced number of methods called in average query to be more efficient.

• Prepared `Statements` will be re-prepared on auto-reconnect. Any errors encountered are postponed until first attempt to re-execute the re-prepared statement.

Changes in MySQL Connector/J 3.1.0 (2003-02-18, Alpha)

Bugs Fixed

• Added `useServerPrepStmts` property (default `false`). The driver will use server-side prepared statements when the server version supports them (4.1 and newer) when this property is set to `true`. It is currently set to `false` by default until all bind/fetch functionality has been implemented. Currently only DML prepared statements are implemented for 4.1 server-side prepared statements.

• Added `requireSSL` property.

• Track open `Statements`, close all when `Connection.close()` is called (JDBC compliance).

Changes in MySQL Connector/J 3.0

Changes in MySQL Connector/J 3.0.17 (2005-06-23)

Bugs Fixed

• Workaround for server Bug #9098: Default values of `CURRENT_*` for `DATE`, `TIME`, `DATETIME`, and `TIMESTAMP` columns can’t be distinguished from `string` values, so `UpdatableResultSet.moveToInsertRow()` generates bad SQL for inserting default values. (Bug #8812)

• `NON_UNIQUE` column from `DBMD.getIndexInfo()` returned inverted value. (Bug #8812)

• Use hex escapes for `PreparedStatement.setBytes()` for double-byte charsets including “aliases” Windows-31J, CP934, MS932. (Bug #8629)

• Added support for the EUC_JP_Solaris character encoding, which maps to a MySQL encoding of `eucjpms` (backported from 3.1 branch). This only works on servers that support `eucjpms`, namely 5.0.3 or later. (Bug #8629)

• EUCKR charset is sent as `SET NAMES euc_kr` which MySQL-4.1 and newer doesn’t understand. (Bug #8629)

• `DatabaseMetaData.supportsSelectForUpdate()` returns correct value based on server version. (Bug #8629)

• Which requires hex escaping of binary data when using multibyte charsets with prepared statements. (Bug #8064)

• Fixed duplicated code in `configureClientCharset()` that prevented `useOldUTF8Behavior=true` from working properly. (Bug #7952)

• Timestamp key column data needed `_binary` stripped for `UpdatableResultSet.refreshRow()`. (Bug #7686)

• Backported SQLState codes mapping from Connector/J 3.1, enable with `useSqlStateCodes=true` as a connection property, it defaults to `false` in this release, so that we don’t break legacy applications (it defaults to `true` starting with Connector/J 3.1). (Bug #7686)
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• MS932, SHIFT_JIS, and Windows_31J not recognized as aliases for sjis. (Bug #7607)

• Handle streaming result sets with more than 2 billion rows properly by fixing wraparound of row number counter. (Bug #7601)

• Escape sequence {fn convert(..., type)} now supports ODBC-style types that are prepended by SQL_. (Bug #7601)

• PreparedStatement.fixDecimalExponent() adding extra +, making number unparseable by MySQL server. (Bug #7601)

• Statements created from a pooled connection were returning physical connection instead of logical connection when getConnection() was called. (Bug #7316)

• Support new protocol type MYSQL_TYPE_VARCHAR. (Bug #7081)

• Added useOldUTF8Behavior' configuration property, which causes JDBC driver to act like it did with MySQL-4.0.x and earlier when the character encoding is utf-8 when connected to MySQL-4.1 or newer. (Bug #7081)

• DatabaseMetaData.getIndexInfo() ignored unique parameter. (Bug #7081)

• PreparedStatement.fixDecimalExponent() adding extra +, making number unparseable by MySQL server. (Bug #7061)

• PreparedStatement don't encode Big5 (and other multibyte) character sets correctly in static SQL strings. (Bug #7033)

• Connections starting up failed-over (due to down master) never retry master. (Bug #6966)

• Adding CP943 to aliases for sjis. (Bug #6549, Bug #7607)

• Timestamp/Time conversion goes in the wrong “direction” when useTimeZone=true and server time zone differs from client time zone. (Bug #5874)

Changes in MySQL Connector/J 3.0.16 (2004-11-15)

Bugs Fixed

• Only set character_set_results during connection establishment if server version >= 4.1.1. (Bug #5664)

• Off-by-one bug in Buffer.readString(string). (Bug #5664)

• Made TINYINT(1) -> BIT/Boolean conversion configurable using tinyInt1isBit property (default true to be JDBC compliant out of the box). (Bug #5664)

• Fixed regression where useUnbufferedInput was defaulting to false. (Bug #5664)

• Fixed DatabaseMetaData.getTypes() returning incorrect (this is, nonnegative) scale for the NUMERIC type. (Bug #5664)

• ResultSet.updateByte() when on insert row throws ArrayOutOfBoundsException. (Bug #5664)

• ResultSet.getTimestamp() on a column with TIME in it fails. (Bug #5664)

• Fixed ResultSetMetaData.isReadOnly() to detect nonwritable columns when connected to MySQL-4.1 or newer, based on existence of “original” table and column names.

• Re-issue character set configuration commands when re-using pooled connections or Connection.changeUser() when connected to MySQL-4.1 or newer.
Changes in MySQL Connector/J 3.0.15 (2004-09-04)

Bugs Fixed

- Use `_binary` introducer for `PreparedStatement.setBytes()` and `set*Stream()` when connected to MySQL-4.1.x or newer to avoid misinterpretation during character conversion. (Bug #5069)

- Parse new time zone variables from 4.1.x servers. (Bug #5069)

- `ResultSet.getMetaData()` should not return incorrectly initialized metadata if the result set has been closed, but should instead throw an `SQLException`. Also fixed for `getRow()` and `getWarnings()` and traversal methods by calling `checkClosed()` before operating on instance-level fields that are nullified during `.close()`. (Bug #5069)

- `ResultSet` should release `Field[]` instance in `.close()`. (Bug #5022)

- `RSMD.getPrecision()` returning 0 for nonnumeric types (should return max length in chars for nonbinary types, max length in bytes for binary types). This fix also fixes mapping of `RSMD.getColumnType()` and `RSMD.getColumnTypeName()` for the `BLOB` types based on the length sent from the server (the server doesn't distinguish between `TINYBLOB`, `BLOB`, `MEDIUMBLOB` or `LONGBLOB` at the network protocol level). (Bug #4880)

- "Production" is now “GA” (General Availability) in naming scheme of distributions. (Bug #4860, Bug #4138)

- `DBMD.getColumns()` returns incorrect JDBC type for unsigned columns. This affects type mappings for all numeric types in the `RSMD.getColumnType()` and `RSMD.getColumnTypeName()` methods as well, to ensure that "like" types from `DBMD.getColumns()` match up with what `RSMD.getColumnType()` and `getColumnTypeNames()` return. (Bug #4860, Bug #4138)

- Calling `.close()` twice on a `PooledConnection` causes NPE. (Bug #4808)

- Added FLOSS license exemption. (Bug #4742)

- `DOUBLE` mapped twice in `DBMD.getTypeInfo()`. (Bug #4742)

- Removed redundant calls to `checkRowPos()` in `ResultSet`. (Bug #4334)

- Logical connections created by `MysqlConnectionPoolDataSource` will now issue a `rollback()` when they are closed and sent back to the pool. If your application server/connection pool already does this for you, you can set the `rollbackOnPooledClose` property to `false` to avoid the overhead of an extra `rollback()`. (Bug #4334)

- Failover for `autoReconnect` not using port numbers for any hosts, and not retrying all hosts.

  **Warning**
  
  This required a change to the `SocketFactory.connect()` method signature, which is now `public Socket connect(String host, int portNumber, Properties props)`, therefore, any third-party socket factories will have to be changed to support this signature.

  (Bug #4334)

- `StringUtils.escapeEasternUnicodeByteStream` was still broken for GBK. (Bug #4010)


Bugs Fixed

- Fixed URL parsing error.

Bugs Fixed

- No Database Selected when using MysqlConnectionPoolDataSource. (Bug #3920)
- PreparedStatement.getGeneratedKeys() method returns only 1 result for batched insertions. (Bug #3873)
- Using a MySQLDatasource without server name fails. (Bug #3848)

Changes in MySQL Connector/J 3.0.12 (2004-05-18)

Bugs Fixed

- Inconsistent reporting of data type. The server still doesn't return all types for *BLOBs *TEXT correctly, so the driver won't return those correctly. (Bug #3570)
- UpdatableResultSet not picking up default values for moveToInsertRow(). (Bug #3557)
- Use junit.textui.TestRunner for all unit tests (to enable them to be run from the command line outside of Ant or Eclipse). (Bug #3554)
- Not specifying database in URL caused MalformedURLException exception. (Bug #3554)
- Auto-convert MySQL encoding names to Java encoding names if used for characterEncoding property. (Bug #3554)
- Added encoding names that are recognized on some JVMs to fix case where they were reverse-mapped to MySQL encoding names incorrectly. (Bug #3554)
- Made StringRegressionTest 4.1-unicode aware. (Bug #3520)
- Fixed regression in PreparedStatement.setString() and eastern character encodings. (Bug #3520)
- DBMD.getSQLStateType() returns incorrect value. (Bug #3520)
- Renamed StringUtils.escapeSJISByteStream() to more appropriate escapeEasternUnicodeByteStream(). (Bug #3511)
- StringUtils.escapeSJISByteStream() not covering all eastern double-byte charsets correctly. (Bug #3511)
- Return creating statement for ResultSets created by getGeneratedKeys(). (Bug #2957)
- Use charsetnr returned during connect to encode queries before issuing SET NAMES on MySQL >= 4.1.0. (Bug #2670)
- Use SET character_set_results during initialization to enable any charset to be returned to the driver for result sets. (Bug #2670)
- Only set character_set_results for MySQL >= 4.1.0. (Bug #2670)
- Map binary character set to US-ASCII to support DATETIME charset recognition for servers >= 4.1.2. (Bug #2670)
- Dynamically configure character set mappings for field-level character sets on MySQL-4.1.0 and newer using SHOW COLLATION when connecting. (Bug #2670)
- Don't truncate BLOB or CLOB values when using setBytes() and setBinary/CharacterStream(). (Bug #2670)
• Add helper methods to ResultSetMetaData (getColumnCharacterEncoding() and getColumnCharacterSet()) to permit end users to see what charset the driver thinks it should be using for the column. (Bug #2670)

• Allow url parameter for MysqlDataSource and MysqlConnectionPoolDataSource so that passing of other properties is possible from inside appservers.

• Don’t escape SJIS/GBK/BIG5 when using MySQL-4.1 or newer.

• Backport documentation tooling from 3.1 branch.

• Added failOverReadOnly property, to enable the user to configure the state of the connection (read-only/writable) when failed over.

• Add unsigned attribute to DatabaseMetaData.getColumns() output in the TYPE_NAME column.

• Map duplicate key and foreign key errors to SQLState of 23000.

• Backport “change user” and “reset server state” functionality from 3.1 branch, to enable clients of MysqlConnectionPoolDataSource to reset server state on getConnection() on a pooled connection.

• Allow java.util.Date to be sent in as parameter to PreparedStatement setObject(), converting it to a Timestamp to maintain full precision. (Bug #103)

Changes in MySQL Connector/J 3.0.11 (2004-02-19)

Bugs Fixed

• Return java.lang.Double for FLOAT type from ResultSetMetaData.getColumnClassName(). (Bug #2855)

• Return [B instead of java.lang.Object for BINARY, VARBINARY and LONGVARBINARY types from ResultSetMetaData.getColumnClassName() (JDBC compliance). (Bug #2855)

• Issue connection events on all instances created from a ConnectionPoolDataSource. (Bug #2855)

• Return java.lang.Integer for TINYINT and SMALLINT types from ResultSetMetaData.getColumnClassName(). (Bug #2852)

• Fixed failover always going to last host in list. (Bug #2578)

• Detect on/off or 1, 2, 3 form of lower_case_table_names value on server. (Bug #2578)

• Added useUnbufferedInput parameter, and now use it by default (due to JVM issue http://developer.java.sun.com/developer/bugParade/bugs/4401235.html) (Bug #2578)

• AutoReconnect time was growing faster than exponentially. (Bug #2447)

• Trigger a SET NAMES utf8 when encoding is forced to utf8 or utf-8 using the characterEncoding property. Previously, only the Java-style encoding name of utf-8 would trigger this.

Changes in MySQL Connector/J 3.0.10 (2004-01-13)

Bugs Fixed

• Use constants for SQLStates. (Bug #2006)

• Speed up parsing of PreparedStatements, try to use one-pass whenever possible. (Bug #2006)
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- Removed static synchronization bottleneck from instance factory method of SingleByteCharsetConverter. (Bug #2006)
- Removed static synchronization bottleneck from PreparedStatement.setTimestamp(). (Bug #2006)
- Map charset \texttt{ko18\_ru} to \texttt{ko18r} when connected to MySQL-4.1.0 or newer. (Bug #2006)
- Fixed security exception when used in Applets (applets can't read the system property file.encoding which is needed for LOAD DATA LOCAL). (Bug #2006)
- Fixed mappings in SQLError to report deadlocks with SQLStates of \texttt{41000}. (Bug #2006)
- Fixed exception \texttt{Unknown character set 'danish'} on connect with JDK-1.4.0 (Bug #2006)
- Ensure that Buffer.writeString() saves room for the \texttt{\0}. (Bug #2006)
- Enable caching of the parsing stage of prepared statements using the cachePrepStmts, prepStmtCacheSize, and prepStmtCacheSqlLimit properties (disabled by default). (Bug #2006)
- maxRows property would affect internal statements, so check it for all statement creation internal to the driver, and set to 0 when it is not. (Bug #2006)
- ResultSet.findColumn() should use first matching column name when there are duplicate column names in SELECT query (JDBC-compliance). (Bug #2006)
- ArrayIndexOutOfBoundsException when parameter number == number of parameters + 1. (Bug #1958)
- Connection property maxRows not honored. (Bug #1933)
- Statements being created too many times in DBMD.extractForeignKeyFromCreateTable(). (Bug #1925)
- Support escape sequence \{fn convert ...\}. (Bug #1914)
- Implement ResultSet.updateClob(). (Bug #1913)
- Autoreconnect code didn't set catalog upon reconnect if it had been changed. (Bug #1913)
- Added more descriptive error message Server Configuration Denies Access to DataSource, as well as retrieval of message from server. (Bug #1913)
- Added alwaysClearStream connection property, which causes the driver to always empty any remaining data on the input stream before each query. (Bug #1913)
- ResultSetMetaData.isCaseSensitive() returned wrong value for CHAR/VARCHAR columns. (Bug #1913)
- ResultSet.getObject() on TINYINT and SMALLINT columns should return Java type Integer. (Bug #1913)
- DatabaseMetaData.getSystemFunction() returning bad function VResultsSion. (Bug #1775)
- Foreign Keys column sequence is not consistent in DatabaseMetaData.getImported/Exported/CrossReference(). (Bug #1731)
- Fix for ArrayIndexOutOfBoundsException exception when using Statement.setMaxRows(). (Bug #1695)
- Subsequent call to ResultSet.updateFoo() causes NPE if result set is not updatable. (Bug #1630)
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• Fix for 4.1.1-style authentication with no password. (Bug #1630)
• Cross-database updatable result sets are not checked for updatability correctly. (Bug #1592)
• DatabaseMetaData.getColumns() should return Types.LONGVARCHAR for MySQL LONGTEXT type. (Bug #1592)
• Fixed regression of Statement.getGeneratedKeys() and REPLACE statements. (Bug #1576)
• Barge blobs and split packets not being read correctly. (Bug #1576)
• Backported fix for aliased tables and UpdatableResultSets in checkUpdatability() method from 3.1 branch. (Bug #1534)
• “Friendlier” exception message for PacketTooLargeException. (Bug #1534)
• Don’t count quoted IDs when inside a ‘string’ in PreparedStatement parsing. (Bug #1511)

Changes in MySQL Connector/J 3.0.9 (2003-10-07)

Bugs Fixed

• Backported authentication changes for 4.1.1 and newer from 3.1 branch. (Bug #1247)
• Added property to “clobber” streaming results, by setting the clobberStreamingResults property
to true (the default is false). This will cause a “streaming” ResultSet to be automatically closed,
and any outstanding data still streaming from the server to be discarded if another query is executed
before all the data has been read from the server. (Bug #1247)
• Added com.mysql.jdbc.util.BaseBugReport to help creation of testcases for bug reports.
(Bug #1247)
• ResultSet.get/setString mashing char 127. (Bug #1247)
• Made databaseName, portNumber, and serverName optional parameters for
MysqlDataSourceFactory. (Bug #1246)
• Optimized CLOB.setCharacterStream(). (Bug #1131)
• Fixed CLOB.truncate(). (Bug #1130)
• Faster date handling code in ResultSet and PreparedStatement (no longer uses Date methods
that synchronize on static calendars).
• Fixed deadlock issue with Statement.setMaxRows(). (Bug #1099)
• DatabaseMetaData.getColumns() getting confused about the keyword “set” in character
columns. (Bug #1099)
• Don’t fire connection closed events when closing pooled connections, or on
PooledConnection.getConnection() with already open connections. (Bug #884)
• Clip +/- INF (to smallest and largest representative values for the type in MySQL) and NaN (to 0) for
setDouble/setFloat(), and issue a warning on the statement when the server does not support
+/- INF or NaN. (Bug #884)
• When emptying input stream of unused rows for “streaming” result sets, have the current thread
yield() every 100 rows to not monopolize CPU time. (Bug #879)
• Double-escaping of ‘\’ when charset is SJIS or GBK and ‘\’ appears in unescaped input. (Bug
#879)
• Issue exception on ResultSet.getXXX() on empty result set (wasn’t caught in some cases). (Bug
#848)
- Fixed regression in large split-packet handling. (Bug #848)
- Don't hide messages from exceptions thrown in I/O layers. (Bug #848)
- Better diagnostic error messages in exceptions for “streaming” result sets. (Bug #848)
- Don't change timestamp TZ twice if useTimezone==true. (Bug #774)
- Fixed test for end of buffer in Buffer.readString().
- The insertRow in an UpdatableResultset is now loaded with the default column values when moveToInsertRow() is called. (Bug #688)
- Don't wrap SQLExceptions in RowDataDynamic. (Bug #688)
- Don't try and reset isolation level on reconnect if MySQL doesn't support them. (Bug #688)
- Change default statement type/concurrency to TYPE_FORWARD_ONLY and CONCUR_READ_ONLY (spec compliance). (Bug #688)
- DatabaseMetaData.getColumns() wasn't returning NULL for default values that are specified as NULL. (Bug #688)
- Fix UpdatableResultset to return values for getXXX() when on insert row. (Bug #675)
- Support InnoDB constraint names when extracting foreign key information in DatabaseMetaData (implementing ideas from Parwinder Sekhon). (Bug #664, Bug #517)
- Backported 4.1 protocol changes from 3.1 branch (server-side SQL states, new field information, larger client capability flags, connect-with-database, and so forth). (Bug #664, Bug #517)
- refreshRow didn't work when primary key values contained values that needed to be escaped (they ended up being doubly escaped). (Bug #661)
- Fixed Statement and PreparedStatement issuing bogus queries when setMaxRows() had been used and a LIMIT clause was present in the query. (Bug #496)
- Fixed ResultSet.previous() behavior to move current position to before result set when on first row of result set. (Bug #496)

Changes in MySQL Connector/J 3.0.8 (2003-05-23)

Bugs Fixed

- Use JVM charset with file names and LOAD DATA [LOCAL].
- Fix infinite loop with Connection.cleanup().
- Changed Ant target compile-core to compile-driver, and made testsuite compilation a separate target.
- Fixed result set not getting set for Statement.executeUpdate(), which affected getGeneratedKeys() and getUpdateCount() in some cases.
- Return list of generated keys when using multi-value INSERTS with Statement.getGeneratedKeys().
- Unicode character 0xFFFF in a string would cause the driver to throw an ArrayOutOfBoundsException. (Bug #378)
- Return correct number of generated keys when using REPLACE statements. (Bug #378)
- Optimized usage of EscapeProcessor. (Bug #378)
• Optimized row data decoding. (Bug #378)
• Issue exception when operating on an already closed prepared statement. (Bug #378)
• Fixed SJIS encoding bug, thanks to Naoto Sato. (Bug #378)
• Fix row data decoding error when using very large packets. (Bug #378)
• Fix problem detecting server character set in some cases. (Bug #378)
• Allow multiple calls to Statement.close(). (Bug #378)
• Allow bogus URLs in Driver.getPropertyInfo().

Changes in MySQL Connector/J 3.0.7 (2003-04-08)

Bugs Fixed

• Fixed charset issues with database metadata (charset was not getting set correctly).
• You can now toggle profiling on/off using Connection.setProfileSql(boolean).
• 4.1 Column Metadata fixes.
• Fixed MysqlPooledConnection.close() calling wrong event type.
• Fixed StringIndexOutOfBoundsException in PreparedStatement.setClob().
• IOExceptions during a transaction now cause the Connection to be closed.
• Remove synchronization from Driver.connect() and Driver.acceptsUrl().
• Fixed missing conversion for YEAR type in ResultSetMetaData.getColumnTypeName().
• Updatable ResultSets can now be created for aliased tables/columns when connected to MySQL-4.1 or newer.
• Fixed LOAD DATA LOCAL bug when file > max_allowed_packet.
• Don't pick up indexes that start with pri as primary keys for DBMD.getPrimaryKeys().
• Ensure that packet size from alignPacketSize() does not exceed max_allowed_packet (JVM bug)
• Don't reset Connection.isReadOnly() when autoReconnecting.
• Fixed escaping of 0x5c ('\') character for GBK and Big5 charsets.
• Fixed ResultSet.getTimestamp() when underlying field is of type DATE.
• Throw SQLExceptions when trying to do operations on a forcefully closed Connection (that is, when a communication link failure occurs).

Changes in MySQL Connector/J 3.0.6 (2003-02-18)

Bugs Fixed

• Backported 4.1 charset field info changes from Connector/J 3.1.
• Fixed Statement.setMaxRows() to stop sending LIMIT type queries when not needed (performance).
• Fixed DBMD.getTypeInfo() and DBMD.getColumns() returning different value for precision in TEXT and BLOB types.
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• Fixed SQLExceptions getting swallowed on initial connect.
• Fixed ResultSetMetaData to return "" when catalog not known. Fixes
  NullPointerExceptions with Sun's CachedRowSet.
• Allow ignoring of warning for "non transactional tables" during rollback (compliance/usability) by
  setting ignoreNonTxTables property to true.
• Clean up Statement query/method mismatch tests (that is, INSERT not permitted with
  .executeQuery()).
• Fixed ResultSetMetaData.isWritable() to return correct value.
• More checks added in ResultSet traversal method to catch when in closed state.
• Implemented Blob.setBytes(). You still need to pass the resultant Blob back into an updatable
  ResultSet or PreparedStatement to persist the changes, because MySQL does not support
  “locators”.
• Add “window” of different NULL sorting behavior to DBMD.nullsAreSortedAtStart (4.0.2 to
  4.0.10, true; otherwise, no).

Changes in MySQL Connector/J 3.0.5 (2003-01-22)

Bugs Fixed

• Fixed ResultSet.isBeforeFirst() for empty result sets.
• Added missing LONGTEXT type to DBMD.getColumns().
• Implemented an empty TypeMap for Connection.getTypeMap() so that some third-party apps
  work with MySQL (IBM WebSphere 5.0 Connection pool).
• Added update options for foreign key metadata.
• Fixed Buffer.fastSkipLenString() causing ArrayIndexOutOfBoundsException exceptions with
  some queries when unpacking fields.
• Quote table names in DatabaseMetaData.getColumns(), getPrimaryKeys(),
  getIndexInfo(), getBestRowIdentifier().
• Retrieve TX_ISOLATION from database for Connection.getTransactionIsolation() when
  the MySQL version supports it, instead of an instance variable.
• Greatly reduce memory required for setBinaryStream() in PreparedStatement.

Changes in MySQL Connector/J 3.0.4 (2003-01-06)

Bugs Fixed

• Streamlined character conversion and byte[] handling in PreparedStatement for setByte().
• Fixed PreparedStatement.executeUpdate() parameter overwriting.
• Added quoted identifiers to database names for Connection.setCatalog.
• Added support for 4.0.8-style large packets.
• Reduce memory footprint of PreparedStatement by sharing outbound packet with MysqlIO.
• Added strictUpdates property to enable control of amount of checking for “correctness” of
  updatable result sets. Set this to false if you want faster updatable result sets and you know that
  you create them from SELECT statements on tables with primary keys and that you have selected all
  primary keys in your query.
• Added support for quoted identifiers in PreparedStatement parser.

Changes in MySQL Connector/J 3.0.3 (2002-12-17)

Bugs Fixed

• Allow user to alter behavior of Statement/PreparedStatement.executeBatch() using continueBatchOnError property (defaults to true).

• More robust escape tokenizer: Recognize -- comments, and permit nested escape sequences (see testsuite.EscapeProcessingTest).

• Fixed Buffer.isLastDataPacket() for 4.1 and newer servers.

• NamedPipeSocketFactory now works (only intended for Windows), see README for instructions.

• Changed charsToByte in SingleByteCharConverter to be nonstatic.

• Use nonalised table/column names and database names to fully qualify tables and columns in UpdatableResultSet (requires MySQL-4.1 or newer).

• LOAD DATA LOCAL now works, if your server is configured to permit it. Can be turned off with the allowLoadLocalInfile property (see the README).

• Implemented Connection.nativeSQL().

• Fixed ResultSetMetaData.getColumnTypeName() returning BLOB for TEXT and TEXT for BLOB types.

• Fixed charset handling in Fields.java.

• Because of above, implemented ResultSetMetaData.isAutoIncrement() to use Field.isAutoIncrement().

• Substitute '?' for unknown character conversions in single-byte character sets instead of '\0'.

• Added CLIENT_LONG_FLAG to be able to get more column flags (isAutoIncrement() being the most important).

• Honor lower_case_table_names when enabled in the server when doing table name comparisons in DatabaseMetaData methods.

• DBMD.getImported/ExportedKeys() now handles multiple foreign keys per table.

• More robust implementation of updatable result sets. Checks that all primary keys of the table have been selected.

• Some MySQL-4.1 protocol support (extended field info from selects).

• Check for connection closed in more Connection methods (createStatement, prepareStatement, setTransactionIsolation, setAutoCommit).

• Fixed ResultSetMetaData.getPrecision() returning incorrect values for some floating-point types.

• Changed SingleByteCharConverter to use lazy initialization of each converter.

Changes in MySQL Connector/J 3.0.2 (2002-11-08)

Bugs Fixed

• Implemented Clob.setString().
• Added `com.mysql.jdbc.MiniAdmin` class, which enables you to send `shutdown` command to MySQL server. This is intended to be used when “embedding” Java and MySQL server together in an end-user application.

• Added SSL support. See README for information on how to use it.

• All DBMD result set columns describing schemas now return `NULL` to be more compliant with the behavior of other JDBC drivers for other database systems (MySQL does not support schemas).

• Use `SHOW CREATE TABLE` when possible for determining foreign key information for `DatabaseMetaData`. Also enables cascade options for `DELETE` information to be returned.

• Implemented `Clob.setCharacterStream()`.

• Failover and `autoReconnect` work only when the connection is in an `autoCommit(false)` state, to stay transaction-safe.

• Fixed `DBMD.supportsResultSetConcurrency()` so that it returns `true` for `ResultSet.TYPE_SCROLL_INSENSITIVE` and `ResultSet.CONCUR_READ_ONLY` or `ResultSet.CONCUR_UPDATABLE`.

• Implemented `Clob.setAsciiStream()`.

• Removed duplicate code from `UpdatableResultSet` (it can be inherited from `ResultSet`, the extra code for each method to handle updatability I thought might someday be necessary has not been needed).

• Fixed `UnsupportedEncodingException` thrown when “forcing” a character encoding using properties.

• Fixed incorrect conversion in `ResultSet.getLong()`.

• Implemented `ResultSet.updateBlob()`.

• Removed some not-needed temporary object creation by smarter use of `Strings` in `EscapeProcessor`, `Connection` and `DatabaseMetaData` classes.

• Escape `0x5c` character in strings for the SJIS charset.

• `PreparedStatement` now honors stream lengths in `setBinary/Ascii/Character Stream()` unless you set the connection property `useStreamLengthsInPrepStmts` to `false`.

• Fixed issue with updatable result sets and `PreparedStatement`s not working.

• Fixed start position off-by-1 error in `Clob.getSubString()`.

• Added `connectTimeout` parameter that enables users of JDK-1.4 and newer to specify a maximum time to wait to establish a connection.

• Fixed various non-ASCII character encoding issues.

• Fixed `ResultSet.isLast()` for empty result sets (should return `false`).

• Added driver property `useHostsInPrivileges`. Defaults to `true`. Affects whether or not `@hostname` will be used in `DBMD.getColumn/TablePrivileges`.

• Fixed `ResultSet.setFetchDirection(FETCH_UNKNOWN)`.

• Added `queriesBeforeRetryMaster` property that specifies how many queries to issue when failed over before attempting to reconnect to the master (defaults to 50).

• Fixed issue when calling `Statement.setFetchSize()` when using arbitrary values.
• Properly restore connection properties when autoReconnecting or failing-over, including `autoCommit` state, and isolation level.

• Implemented `Clob.truncate()`.

Changes in MySQL Connector/J 3.0.1 (2002-09-21)

Bugs Fixed

• Charsets now automatically detected. Optimized code for single-byte character set conversion.

• Fixed `ResultSetMetaData.isSigned()` for `TINYINT` and `BIGINT`.

• Fixed `RowDataStatic.getAt()` off-by-one bug.

• Fixed `ResultSet.getRow()` off-by-one bug.

• Massive code clean-up to follow Java coding conventions (the time had come).

• Implemented `ResultSet.getCharacterStream()`.

• Added limited `Clob` functionality (`ResultSet.getClob()`, `PreparedStatement.setClob()`, `PreparedStatement.setObject(Clob)`).

• Connection.isClosed() no longer “pings” the server.

• Connection.close() issues rollback() when `getAutoCommit()` is false.

• Added `socketTimeout` parameter to URL.

• Added `LOCAL TEMPORARY` to table types in `DatabaseMetaData.getTableTypes()`.

• Added paranoid parameter, which sanitizes error messages by removing “sensitive” information from them (such as host names, ports, or user names), as well as clearing “sensitive” data structures when possible.

Changes in MySQL Connector/J 3.0.0 (2002-07-31)

Bugs Fixed

• General source-code cleanup.

• The driver now only works with JDK-1.2 or newer.

• Fix and sort primary key names in `DBMetaData` (SF bugs 582086 and 582086).

• `ResultSet.getTimestamp()` now works for `DATE` types (SF bug 559134).

• Float types now reported as `java.sql.Types.FLOAT` (SF bug 579573).

• Support for streaming (row-by-row) result sets (see `README`) Thanks to Doron.

• Testsuite now uses Junit (which you can get from `http://www.junit.org`.

• JDBC Compliance: Passes all tests besides stored procedure tests.

• `ResultSet.getDate/Time/Timestamp` now recognizes all forms of invalid values that have been set to all zeros by MySQL (SF bug 586058).

• Added multi-host failover support (see `README`).

• Repackaging: New driver name is `com.mysql.jdbc.Driver`, old name still works, though (the driver is now provided by MySQL-AB).
• Support for large packets (new addition to MySQL-4.0 protocol), see README for more information.

• Better checking for closed connections in Statement and PreparedStatement.

• Performance improvements in string handling and field metadata creation (lazily instantiated) contributed by Alex Twisleton-Wykeham-Fiennes.

• JDBC-3.0 functionality including Statement/PreparedStatement.getGeneratedKeys() and ResultSet.getURL().

• Overall speed improvements using controlling transient object creation in MysqlIO class when reading packets.

• !!! LICENSE CHANGE !!! The driver is now GPL.

• Performance enhancements: Driver is now 50–100% faster in most situations, and creates fewer temporary objects.

Changes in MySQL Connector/J 2.0

Changes in MySQL Connector/J 2.0.14 (2002-05-16)

Bugs Fixed

• ResultSet.getDouble() now uses code built into JDK to be more precise (but slower).

• Fixed typo for relaxAutoCommit parameter.

• LogicalHandle.isClosed() calls through to physical connection.

• Added SQL profiling (to STDERR). Set profileSql=true in your JDBC URL. See README for more information.

• PreparedStatement now releases resources on .close(). (SF bug 553268)

• More code cleanup.

• Quoted identifiers not used if server version does not support them. Also, if server started with --ansi or --sql-mode=ANSI_QUOTES, "" will be used as an identifier quote character, otherwise "" will be used.

Changes in MySQL Connector/J 2.0.13 (2002-04-24)

Bugs Fixed

• Fixed unicode chars being read incorrectly. (SF bug 541088)

• Faster blob escaping for PrepStmt.

• Added setURL() to MySQLXADatasource. (SF bug 546019)

• Added set/getPortNumber() to DataSource(s). (SF bug 548167)

• PreparedStatement.toString() fixed. (SF bug 534026)

• More code cleanup.

• Rudimentary version of Statement.getGeneratedKeys() from JDBC-3.0 now implemented (you need to be using JDK-1.4 for this to work, I believe).

• DBMetaData.getIndexInfo() - bad PAGES fixed. (SF BUG 542201)
MySQL Connector/J 5.1 Release Notes

• ResultSetMetaData.getColumnClassName() now implemented.

Changes in MySQL Connector/J 2.0.12 (2002-04-07)

Bugs Fixed

• Fixed testsuite.Traversal afterLast() bug, thanks to Igor Lastric.
• Added new types to getTypeInfo(), fixed existing types thanks to Al Davis and Kid Kalanon.
• Fixed time zone off-by-1-hour bug in PreparedStatement (538286, 528785).
• Added identifier quoting to all DatabaseMetaData methods that need them (should fix 518108).
• Added support for BIT types (51870) to PreparedStatement.
• ResultSet.insertRow() should now detect auto_increment fields in most cases and use that value in the new row. This detection will not work in multi-valued keys, however, due to the fact that the classic MySQL protocol does not return this information.
• Relaxed synchronization in all classes, should fix 520615 and 520393.
• DataSources - fixed setUrl bug (511614, 525565), wrong datasource class name (532816, 528767).
• Added support for YEAR type (533556).
• Fixes for ResultSet updatability in PreparedStatement.
• ResultSet: Fixed updatability (values being set to null if not updated).
• Added getTable/ColumnPrivileges() to DBMD (fixes 484502).
• Added getIdleFor() method to Connection and MysqlLogicalHandle.
• ResultSet.refreshRow() implemented.
• Fixed getRow() bug (527165) in ResultSet.
• General code cleanup.

Changes in MySQL Connector/J 2.0.11 (2002-01-27)

Bugs Fixed

• Full synchronization of Statement.java.
• Fixed missing DELETE_RULE value in DBMD.getImported/ExportedKeys() and getCrossReference().
• More changes to fix Unexpected end of input stream errors when reading BLOB values. This should be the last fix.

Changes in MySQL Connector/J 2.0.10 (2002-01-24)

Bugs Fixed

• Fixed null-pointer-exceptions when using MysqlConnectionPoolDataSource with Websphere 4 (bug 505839).
• Fixed spurious Unexpected end of input stream errors in MysqlIO (bug 507456).
Changes in MySQL Connector/J 2.0.9 (2002-01-13)

Bugs Fixed

- Fixed extra memory allocation in MysqlIO.readPacket() (bug 488663).
- Added detection of network connection being closed when reading packets (thanks to Todd Lizambr).
- Fixed casting bug in PreparedStatement (bug 488663).
- DataSource implementations moved to org.gjt.mm.mysql.jdbc2.optional package, and (initial) implementations of PooledConnectionDataSource and XADataSource are in place (thanks to Todd Wolff for the implementation and testing of PooledConnectionDataSource with IBM WebSphere 4).
- Fixed quoting error with escape processor (bug 486265).
- Removed concatenation support from driver (the || operator), as older versions of VisualAge seem to be the only thing that use it, and it conflicts with the logical || operator. You will need to start mysqld with the --ansi flag to use the || operator as concatenation (bug 491680).
- Ant build was corrupting included jar files, fixed (bug 487669).
- Report batch update support through DatabaseMetaData (bug 495101).
- Implementation of DatabaseMetaData.getExported/ImportedKeys() and getCrossReference().
- Full synchronization on methods modifying instance and class-shared references, driver should be entirely thread-safe now (please let me know if you have problems).

Changes in MySQL Connector/J 2.0.8 (2001-11-25)

Bugs Fixed

- XADataSource/ConnectionPoolDataSource code (experimental)
- DatabaseMetaData.getPrimaryKeys() and getBestRowIdentifier() are now more robust in identifying primary keys (matches regardless of case or abbreviation/full spelling of Primary Key in Key_type column).
- Batch updates now supported (thanks to some inspiration from Daniel Rall).
- PreparedStatement.setAnyNumericType() now handles positive exponents correctly (adds + so MySQL can understand it).

Changes in MySQL Connector/J 2.0.7 (2001-10-24)

Bugs Fixed

- Character sets read from database if useUnicode=true and characterEncoding is not set. (thanks to Dmitry Vereshchagin)
- Initial transaction isolation level read from database (if available). (thanks to Dmitry Vereshchagin)
- Fixed PreparedStatement generating SQL that would end up with syntax errors for some queries.
- PreparedStatement.setCharacterStream() now implemented
• Capitalize type names when `capitalizeTypeNames=true` is passed in URL or properties (for WebObjects. (thanks to Anjo Krank)

• `ResultSet.getBlob()` now returns `null` if column value was `null`.

• Fixed `ResultSetMetaData.getPrecision()` returning one less than actual on newer versions of MySQL.

• Fixed dangling socket problem when in high availability (`autoReconnect=true`) mode, and finalizer for `Connection` will close any dangling sockets on GC.

• Fixed time zone issue in `PreparedStatement.setTimestamp()`.(thanks to Erik Olofsson)

• `PreparedStatement.setDouble()` now uses full-precision doubles (reverting a fix made earlier to truncate them).

• Fixed `DatabaseMetaData.supportsTransactions()`, and `supportsTransactionIsolationLevel()` and `getTypeInfo()` SQL_DATETIME_SUB and SQL_DATA_TYPE fields not being readable.

• Updatable result sets now correctly handle `NULL` values in fields.

• `PreparedStatement.setBoolean()` will use 1/0 for values if your MySQL version is 3.21.23 or higher.

• Fixed `ResultSet.isAfterLast()` always returning `false`.

### Changes in MySQL Connector/J 2.0.6 (2001-06-16)

#### Bugs Fixed

• Fixed `PreparedStatement` parameter checking.

• Fixed case-sensitive column names in `ResultSet.java`.

### Changes in MySQL Connector/J 2.0.5 (2001-06-13)

#### Bugs Fixed

• `ResultSet.insertRow()` works now, even if not all columns are set (they will be set to `NULL`).

• Added `Byte` to `PreparedStatement.setObject()`.

• Fixed data parsing of `TIMESTAMP` values with 2-digit years.

• Added `ISOLATION` level support to `Connection.setIsolationLevel()`

• `DataBaseMetaData.getCrossReference()` no longer `ArrayIndexOOB`.

• `ResultSet.getBoolean()` now recognizes `-1` as `true`.

• `ResultSet` has +/-Inf/inf support.

• `getObject()` on `ResultSet` correctly does `TINYINT->Byte` and `SMALLINT->Short`.

• Fixed `ResultSetMetaData.getColumnTypeName` for `TEXT/BLOB`.

• Fixed `ArrayIndexOutOfBoundsException` when sending large `BLOB` queries. (Max size packet was not being set)

• Fixed NPE on `PreparedStatement.executeUpdate()` when all columns have not been set.

• Fixed `ResultSet.getBlob()` `ArrayIndex out-of-bounds`. 
Changes in MySQL Connector/J 2.0.3 (2000-12-03)

Bugs Fixed

- Fixed composite key problem with updatable result sets.
- Faster ASCII string operations.
- Fixed off-by-one error in `java.sql.Blob` implementation code.
- Fixed incorrect detection of `MAX_ALLOWED_PACKET`, so sending large blobs should work now.
- Added detection of `-/+INF` for doubles.
- Added `ultraDevHack` URL parameter, set to `true` to enable (broken) Macromedia UltraDev to use the driver.
- Implemented `getBigDecimal()` without scale component for JDBC2.

Changes in MySQL Connector/J 2.0.1 (2000-04-06)

Bugs Fixed

- Columns that are of type `TEXT` now return as `Strings` when you use `getObject()`.
- Cleaned up exception handling when driver connects.
- Fixed `RSMD.isWritable()` returning wrong value. Thanks to Moritz Maass.
- `DatabaseMetaData.getPrimaryKeys()` now works correctly with respect to `key_seq`. Thanks to Brian Slesinsky.
- Fixed many JDBC-2.0 traversal, positioning bugs, especially with respect to empty result sets. Thanks to Ron Smits, Nick Brook, Cesar Garcia and Carlos Martinez.
- No escape processing is done on `PreparedStatements` anymore per JDBC spec.
- Fixed some issues with updatability support in `ResultSet` when using multiple primary keys.

Changes in MySQL Connector/J 2.0.0pre5 (21 February 2000)

- Fixed Bad Handshake problem.

Changes in MySQL Connector/J 2.0.0pre4 (10 January 2000)

- Fixes to ResultSet for `insertRow()` - Thanks to Cesar Garcia
- Fix to Driver to recognize JDBC-2.0 by loading a JDBC-2.0 class, instead of relying on JDK version numbers. Thanks to John Baker.
- Fixed ResultSet to return correct row numbers
- `Statement.getUpdateCount()` now returns rows matched, instead of rows actually updated, which is more SQL-92 like.

10-29-99

- `Statement/PreparedStatement.getMoreResults()` bug fixed. Thanks to Noel J. Bergman.
- Added Short as a type to `PreparedStatement setObject()`. Thanks to Jeff Crowder
- Driver now automagically configures maximum/preferred packet sizes by querying server.
- Autoreconnect code uses fast ping command if server supports it.
- Fixed various bugs with respect to packet sizing when reading from the server and when allocating to write to the server.

**Changes in MySQL Connector/J 2.0.0pre (17 August 1999)**

- Now compiles under JDK-1.2. The driver supports both JDK-1.1 and JDK-1.2 at the same time through a core set of classes. The driver will load the appropriate interface classes at runtime by figuring out which JVM version you are using.
- Fixes for result sets with all nulls in the first row. (Pointed out by Tim Endres)
- Fixes to column numbers in SQLExceptions in ResultSet (Thanks to Blas Rodriguez Somoza)
- The database no longer needs to specified to connect. (Thanks to Christian Motschke)

**Changes in MySQL Connector/J 1.2 and lower**

**Changes in MySQL Connector/J 1.2b (04 July 1999)**

- Better Documentation (in progress), in doc/mm.doc/book1.html
- DBMD now permits null for a column name pattern (not in spec), which it changes to '%'.
- DBMD now has correct types/lengths for getXXX().
- ResultSet.getDate(), getTime(), and getTimestamp() fixes. (contributed by Alan Wilken)
- EscapeProcessor now handles \{ \} and { or } inside quotation marks correctly. (thanks to Alik for some ideas on how to fix it)
- Fixes to properties handling in Connection. (contributed by Juho Tikkala)
- ResultSet.getObject() now returns null for NULL columns in the table, rather than bombing out. (thanks to Ben Grosman)
- ResultSet.getObject() now returns Strings for types from MySQL that it doesn't know about. (Suggested by Chris Perdue)
- Removed DataInput/Output streams, not needed, 1/2 number of method calls per IO operation.
- Use default character encoding if one is not specified. This is a work-around for broken JVMs, because according to spec, EVERY JVM must support "ISO8859_1", but they do not.
- Fixed Connection to use the platform character encoding instead of "ISO8859_1" if one isn't explicitly set. This fixes problems people were having loading the character- converter classes that didn't always exist (JVM bug). (thanks to Fritz Effert for pointing out this problem)
- Changed MysqlIO to re-use packets where possible to reduce memory usage.
- Fixed escape-processor bugs pertaining to {} inside quotation marks.

**Changes in MySQL Connector/J 1.2a (14 April 1999)**

- Fixed character-set support for non-Javasoft JVMs (thanks to many people for pointing it out)
- Fixed ResultSet.getBoolean() to recognize 'y' & 'n' as well as '1' & '0' as boolean flags. (thanks to Tim Pizey)
- Fixed ResultSet.getTimestamp() to give better performance. (thanks to Richard Swift)
• Fixed getByte() for numeric types. (thanks to Ray Bellis)
• Fixed DatabaseMetaData.getTypeInfo() for DATE type. (thanks to Paul Johnston)
• Fixed EscapeProcessor for "fn" calls. (thanks to Piyush Shah at locomotive.org)
• Fixed EscapeProcessor to not do extraneous work if there are no escape codes. (thanks to Ryan Gustafson)
• Fixed Driver to parse URLs of the form "jdbc:mysql://host:port" (thanks to Richard Lobb)

Changes in MySQL Connector/J 1.1i (24 March 1999)

• Fixed Timestamps for PreparedStatement
• Fixed null pointer exceptions in RSMD and RS
• Re-compiled with jikes for valid class files (thanks ms!)

Changes in MySQL Connector/J 1.1h (08 March 1999)

• Fixed escape processor to deal with unmatched { and } (thanks to Craig Coles)
• Fixed escape processor to create more portable (between DATETIME and TIMESTAMP types) representations so that it will work with BETWEEN clauses. (thanks to Craig Longman)
• MysqlIO.quit() now closes the socket connection. Before, after many failed connections some OS’s would run out of file descriptors. (thanks to Michael Brinkman)
• Fixed NullPointerException in Driver.getPropertyInfo. (thanks to Dave Potts)
• Fixes to MysqlDefs to allow all *text fields to be retrieved as Strings. (thanks to Chris at Leverage)
• Fixed setDouble in PreparedStatement for large numbers to avoid sending scientific notation to the database. (thanks to J.S. Ferguson)
• Fixed getScale() and getPrecision() in RSMD. (contrib’d by James Klicman)
• Fixed getObject() when field was DECIMAL or NUMERIC (thanks to Bert Hobbs)
• DBMD.getTables() bombed when passed a null table-name pattern. Fixed. (thanks to Richard Lobb)
• Added check for "client not authorized" errors during connect. (thanks to Hannes Wallnoefer)

Changes in MySQL Connector/J 1.1g (19 February 1999)

• Result set rows are now byte arrays. Blobs and Unicode work bidirectionally now. The useUnicode and encoding options are implemented now.
• Fixes to PreparedStatement to send binary set by setXXXStream to be sent untouched to the MySQL server.
• Fixes to getDriverPropertyInfo().

Changes in MySQL Connector/J 1.1f (31 December 1998)

• Changed all ResultSet fields to Strings, this should allow Unicode to work, but your JVM must be able to convert between the character sets. This should also make reading data from the server be a bit quicker, because there is now no conversion from StringBuffer to String.
• Changed PreparedStatement.streamToString() to be more efficient (code from Uwe Schaefer).
• URL parsing is more robust (throws SQL exceptions on errors rather than NullPointerExceptions)
• PreparedStatement now can convert Strings to Time/Date values using setObject() (code from Robert Currey).

• IO no longer hangs in Buffer.readInt(), that bug was introduced in 1.1d when changing to all byte-arrays for result sets. (Pointed out by Samo Login)

**Changes in MySQL Connector/J 1.1b (03 November 1998)**

• Fixes to DatabaseMetaData to allow both IBM VA and J-Builder to work. Let me know how it goes. (thanks to Jac Kersing)

• Fix to ResultSet.getBoolean() for NULL strings (thanks to Barry Lagerweij)

• Beginning of code cleanup, and formatting. Getting ready to branch this off to a parallel JDBC-2.0 source tree.

• Added "final" modifier to critical sections in MysqlIO and Buffer to allow compiler to inline methods for speed.

9-29-98

• If object references passed to setXXX() in PreparedStatement are null, setNull() is automatically called for you. (Thanks for the suggestion goes to Erik Ostrom)

• setObject() in PreparedStatement will now attempt to write a serialized representation of the object to the database for objects of Types.OTHER and objects of unknown type.

• Util now has a static method readObject() which given a ResultSet and a column index will re-instantiate an object serialized in the above manner.

**Changes in MySQL Connector/J 1.1 (02 September 1998)**

• Got rid of "ugly hack" in MysqlIO.nextRow(). Rather than catch an exception, Buffer.isLastDataPacket() was fixed.

• Connection.getCatalog() and Connection.setCatalog() should work now.

• Statement.setMaxRows() works, as well as setting by property maxRows. Statement.setMaxRows() overrides maxRows set using properties or url parameters.

• Automatic re-connection is available. Because it has to "ping" the database before each query, it is turned off by default. To use it, pass in "autoReconnect=true" in the connection URL. You may also change the number of reconnect tries, and the initial timeout value using "maxReconnects=n" (default 3) and "initialTimeout=n" (seconds, default 2) parameters. The timeout is an exponential backoff type of timeout; for example, if you have initial timeout of 2 seconds, and maxReconnects of 3, then the driver will timeout 2 seconds, 4 seconds, then 16 seconds between each re-connection attempt.

**Changes in MySQL Connector/J 1.0 (24 August 1998)**

• Fixed handling of blob data in Buffer.java

• Fixed bug with authentication packet being sized too small.

• The JDBC Driver is now under the LGPL

8-14-98

• Fixed Buffer.readLenString() to correctly read data for BLOBS.

• Fixed PreparedStatement.stringToStream to correctly read data for BLOBS.
• Fixed PreparedStatement.setDate() to not add a day. (above fixes thanks to Vincent Partington)
• Added URL parameter parsing (?user=... and so forth).

Changes in MySQL Connector/J 0.9d (04 August 1998)

• Big news! New package name. Tim Endres from ICE Engineering is starting a new source tree for GNU GPL’d Java software. He's graciously given me the org.gjt.mm package directory to use, so now the driver is in the org.gjt.mm.mysql package scheme. I'm "legal" now. Look for more information on Tim's project soon.
• Now using dynamically sized packets to reduce memory usage when sending commands to the DB.
• Small fixes to getTipoInfo() for parameters, and so forth.
• DatabaseMetaData is now fully implemented. Let me know if these drivers work with the various IDEs out there. I've heard that they're working with JBuilder right now.
• Added JavaDoc documentation to the package.
• Package now available in .zip or .tar.gz.

Changes in MySQL Connector/J 0.9 (28 July 1998)

• Implemented getTypeInfo(). Connection.rollback() now throws an SQLException per the JDBC spec.
• Added PreparedStatement that supports all JDBC API methods for PreparedStatement including InputStreams. Please check this out and let me know if anything is broken.
• Fixed a bug in ResultSet that would break some queries that only returned 1 row.
• Fixed bugs in DatabaseMetaData.getTables(), DatabaseMetaData.getColumns() and DatabaseMetaData.getCatalogs().
• Added functionality to Statement that enables executeUpdate() to store values for IDs that are automatically generated for AUTO_INCREMENT fields. Basically, after an executeUpdate(), look at the SQLWarnings for warnings like "LAST_INSERTED_ID = 'some number', COMMAND = 'your SQL query'". If you are using AUTO_INCREMENT fields in your tables and are executing a lot of executeUpdate()s on one Statement, be sure to clearWarnings() every so often to save memory.

Changes in MySQL Connector/J 0.8 (06 July 1998)

• Split MysqlIO and Buffer to separate classes. Some ClassLoaders gave an IllegalAccess error for some fields in those two classes. Now mm.mysql works in applets and all classloaders. Thanks to Joe Ennis <jce@mail.boone.com> for pointing out the problem and working on a fix with me.

Changes in MySQL Connector/J 0.7 (01 July 1998)

• Fixed DatabaseMetadata problems in getColumns() and bug in switch statement in the Field constructor. Thanks to Costin Manolache <costin@tdiinc.com> for pointing out the problem and working on a fix with me.

Changes in MySQL Connector/J 0.6 (21 May 1998)

• Incorporated efficiency changes from Richard Swift <Richard.Swift@kanatek.ca> in MysqlIO.java and ResultSet.java:
• We're now 15% faster than gwe's driver.
• Started working on DatabaseMetaData.
• The following methods are implemented:
- `getTables()`
- `getTableTypes()`
- `getColumns()`
- `getCatalogs()`

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