MySQL Utilities Release Notes

Abstract

This document contains release notes for the changes in each release of MySQL Utilities.

For additional MySQL Utilities documentation, see http://dev.mysql.com/doc/.

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

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

For help with using MySQL, please visit either the MySQL Forums or MySQL Mailing Lists, 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 Utilities.

Legal Notices

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Changes in Release 1.6

Changes in MySQL Utilities 1.6.5 (2017-01-25, General Availability)

Bugs Fixed

- Corrected a problem when using a `--exec-before` script that failed causing the `mysqlfailover` utility to fail silently. (Bug #25030151)
- Added corrections to the message text of some utilities to eliminate typographical errors. (Bug #24742356, Bug #83173)
- The `mysqldbcopy` utility failed to copy views that refer other views in the list of databases to be copied. (Bug #24657793)
- Corrected an issue when using anonymous hosts. (Bug #24624716, Bug #82636)
- The `mysqlfrm` utility failed to parse some `.frm` files properly. This fix ensures that the utility can parse tables with many columns in the field list. (Bug #24613794, Bug #82907)
- The `mysqldbcopy` utility failed to copy tables with a primary key set to zero and with `AUTO_INCREMENT` applied. This fix enables the copy and export of auto-increment columns with an initial value of zero. For export, the user is warned to turn on the `NO_AUTO_VALUE_ON_ZERO` mode

for the import and suggested SQL statements to enable the mode are provided. For copy, the mode is turned on automatically and turned off after the copy. (Bug #23598948, Bug #81866)

- Permits IPv4 address parsing to include values of 0-255 rather than 0-254. Thanks to Erol Guven for the patch. (Bug #23578714, Bug #81834)
- Tables with `BLOB` data in fields marked `NOT NULL` restricted the operation of the `mysqldbcopy` utility. This fix enables the utility to copy these tables by temporarily altering the columns on the destination to remove the `NOT NULL` option and then to restore it after the copy. (Bug #23335753, Bug #81553)
- Corrected an issue with reading strings from configuration files when run with Python 2.6. (Bug #22738248)
- Corrected the error message stating the `--discover-slaves-login` option is not used with the **failover** command for the `mysqlrpladmin` utility. (Bug #22616847, Bug #80082)
- Corrected the problem when socket files are used in replication utilities. Previously, the port defaulted to 3306 instead of the actual port for the servers. The code now retrieves the port from the connected servers so that connections of slaves are directed to the correct port. (Bug #22543116)
- Added context to errors resulting from server startup for the `mysqlserverclone` utility. Messages recommend using the `-vvv` option to find the actual error from the server startup sequence. (Bug #22457829)
- The `mysqlfrm` utility failed when the `--verbosity` option was used. This fix replaces the `--verbosity` option with `--verbose`, the correct option name, and uses it consistently in error messages and code. (Bug #22254445, Bug #79382)
- The `mysqlserverinfo` utility required connection parameters to show all MySQL servers running on the local host. This fix removes that restriction when the `--show-servers` option is specified. (Bug #22215626, Bug #79135)
- Corrected a problem in the `mysqldbimport` utility where specifying the `--skip` option with a valid type failed to skip the intended object or objects during the operation. (Bug #22155217, Bug #79128)
- The `mysqldbcopy` utility failed to copy grants for anonymous users. (Bug #22093518, Bug #78940)
- Improved the `--quiet` option to silence all informational messages for the `mysqldbcompare` utility. (Bug #22093453, Bug #78938)
- Corrected a problem using a single database name in the `mysqldiff` utility when comparing the same database on two servers. (Bug #21764003)
- The `DEB` packages did not create the required `/usr/share/pyshared/mysql` directory. (Bug #21626041, Bug #78054)
- Added error handling to ensure only one slave is specified for the `--slave` option for the `mysqlreplicate`, `mysqlrplcheck`, and `mysqlrplms` utilities. (Bug #21497923)
- Enabled the use of the `--exclude` option for the `mysqlrplsync` utility. (Bug #21270853, Bug #77359)
- Corrected a logic error when detecting and setting READ_ONLY mode on the candidate server during promotion for failover. (Bug #21201454, Bug #76522)
- When the `mysqldiff` utility compared columns for indexes, it failed to take into account cardinality changes. That is, if the cardinality of one column differed from the corresponding column in the compared table, the index was considered different. This fix eliminates unnecessarily changes to indexes by the utility when cardinality differences are detected. (Bug #20857151, Bug #76619)
- Removed `password()` function usage in the MySQL Utilities library for MySQL 5.7.6 or later. (Bug #20807296)

- The `mysqlfailover` utility did not remove the failover_console table correctly on exit when run with the `--daemon=start` option. (Bug #20524886)
- Improved the `--force` option for the `mysqldiff` utility to allow checks to continue when missing objects are detected. (Bug #20511130, Bug #75822)
- Removed an extraneous difference in GRID format output of the `mysqldbcompare` utility when column sizes differ. (Bug #18763591)
- Corrected PEP8 warnings and errors on the utilities code base. (Bug #18755438)
- Corrected an issue in which the `mysqldbexport` utility produced output with inconsistent table and database names. (Bug #18733683)

Changes in MySQL Utilities 1.6.4 (2016-08-05, General Availability)

Functionality Added or Changed

- Added a new `--master-fail-retry` option to the `mysqlfailover` utility that allows the user to specify an additional delay for detecting when the master has failed. The new option allows scenarios where the network may have severe latency issues, the server is busy, or the server is being rebooted, thereby reducing the possibility of false positive failover events. (Bug #22878052)

Bugs Fixed

- Starting with MySQL 5.7.13, some platform distributions display a different version string for the command, "mysqld --version". For example, "5.7.13-0ubuntu0.16.04.2" versus "5.7.13". The utilities now correctly identify the version for these server versions, or any server with a version string containing more than two periods. Without this fix, some utilities would incorrectly identify the server version and produce warnings, errors, or fail. (Bug #24348569)
- Corrects an exception thrown for hostname aliases that had more than (2) segments. For example, *local.mydomain* contains 2, *localhost.mydomain.local* contains (3), which would result in a catastrophic error "too many values" causing the utility to crash. (Bug #23300260)
- Corrects a problem found when copying tables that contained `NOT NULL` blob fields. When blob fields are marked NOT NULL, the copy process would fail with an SQL error when inserting data into the target table.

  Copying NOT NULL blob fields is not supported. The utility now checks all tables in the list of databases for NOT NULL blob fields. If any are found, the database and table names are printed along with an error message.

  A workaround is to drop the NOT NULL definition on blob fields before the copy and add it after the copy completes. (Bug #23111808, Bug #78084)
- Specifying the `--testdir` option resulted in unexpected behavior when verifying results because the path of the directory expected to contain the test results was not modified accordingly. (Bug #22934469, Bug #80754)
- Adds the ability to specify a connection timeout value passed to *Connector/Python* (the connection to MySQL) for the `mysqlfailover` utility. More specifically, it allows a user to override Connector/Python's `connection_timeout` default value of 10. (Bug #22932375, Bug #80747)
- Adds checks for the `--exclude` option to the `mysqldbcompare`, `mysqldbcopy`, and `mysqldbexport` utilities to determine if the pattern supplied has any special characters (such as an asterisk) which may indicate that the pattern could be a regex pattern. If there are special

non-SQL LIKE pattern characters, and the user has not specified the `--regexp` option, a warning is presented to suggest the user may want to check the pattern using the --regexp option. (Bug #22905132)

- Corrects an issue with the `--rpl-user` and `--discover-slaves-login` options where special symbols or improperly quoted strings could cause a crash instead of an error message. Tests were also added to ensure the utilities report an error should the user:password values fail to parse correctly. (Bug #22780854)
- Corrects a problem using special characters with the `--rpl-user` option. More specifically, if the user attempted to use a ":" (colon) in the password, the utility failed with an error stating that there are too many values to unpack. The utility will now attempt to use the first colon encountered for the parse (split). Thus, user names should not contain colons, but passwords may use any valid symbol (if properly quoted) including the colon. (Bug #22619159)
- Corrects a problem when running `mysqlbinlogpurge` on a 5.7.6 or later replication topology setup for multi-source replication, which could fail to detect that the slave is connected to the master specified if that master was not on the primary (first) replication channel. The utility now iterates through the slave status to check for the requested master in the list. If not found, the original error(s) are generated, otherwise the master is matched to one of the replication channels, and progress continues. (Bug #22543517, Bug #79971)
- Corrects an issue when exporting tables with bit fields in SQL format, where bit fields were being exported as strings instead of being encoded, like b'???'. Export now correctly formats the SQL statements in the output to properly handle bit fields. (Bug #22495193, Bug #79837)
- Installation packaging code was modified to function with OS X 10.11 (El Capitan). Installation no longer fails, and users can now install MySQL Utilities on El Capitan. (Bug #22393353, Bug #79700)
- Corrects a problem with `mysqluc` where pressing the **delete** key failed to position the cursor in the correct location. The cursor location is now fixed, and the delete and arrow keys work properly. (Bug #22076859, Bug #78893)
- Removed the "CREATE database" statement from the diff output for `mysqldiff` and `mysqldbcompare` for cases where the database name is the only difference. That is, the different output should not show a difference when comparing db1 to db2 when the only difference is the name of the database. However, the difference is shown for differences in quote usage and if decorators differ, such as the character set. (Bug #21222808, Bug #77058)
- Corrected an issue when copying users that were created with the "IDENTIFIED WITH" authentication plugin option. The utility would copy the user, but not copy the authentication plugin setting, making it impossible to copy users with the plugin. The utility now captures the plugin name and assigns it to the new user. An error is thrown if the plugin is not on the destination machine or is inactive. A warning is also issued if the user attempts to assign a password to a new user when the source user has an authentication plugin. In this case, the utility will use the password and not the authentication plugin for the new user. (Bug #17666275, Bug #70745)

Changes in MySQL Utilities 1.6.3 (2016-03-22, Beta)

Bugs Fixed

- The `--exclude` option for the `mysqldbexport` command did not function. (Bug #22781266)
- The `mysqlfailover` and `mysqlrpladmin` utilities did not function with MySQL 5.7 Servers. During the failover process, they failed with the following error: "Errors: Missing gtid_executed system variable." (Bug #22617526, Bug #80189)
- The `mysqlrplsync` and `mysqldbcopy` utilities did not function with MySQL 5.7 when used in a topology with a master. The problem was due to table locking, and began occurring when *session_variables* was moved to PERFORMANCE_SCHEMA in MySQL 5.7.6. The master UUID is now retrieved before locking the tables. (Bug #22608528, Bug #22628187, Bug #80200)

- Several man pages were missing from the RPM package. (Bug #21905774, Bug #78580)
- The `mysqldbcompare` utility now checks if MySQL servers are aliases. (Bug #21845449, Bug #78446)
- Using the `mysqlauditgrep` utility with the `--format` option would throw an exception when the audit log file contained Unicode characters, and when the format was changed to something other than the default RAW. The error looked similar to "UnicodeEncodeError: 'ascii' codec can't encode characters in position". (Bug #21841353)
- With the `mysqldbcompare` utility, using the same connection information for both `--server1` and `--server2` with the `--all` option would raise an AttributeError error. (Bug #21839348, Bug #78439)
- The `mysqldbexport` utility's `--exclude` option was ignored for data when passing in either the `data` or `both` value. (Bug #21784538)
- Several utilities (the daemon utilities, mysqlfailover, and mysqlrplms) created pid files with the default permissions on *nix systems (0777). The permissions are now more restrictive. (Bug #21653496)
- MySQL Utilities failed to execute when the sql_mode option included "ANSI_QUOTES". (Bug #21653352, Bug #78132)
- Executing the `mysqldbcompare` utility to find differences between two databases on different hosts could fail with an error similar to "Unread result found". (Bug #21572065, Bug #73841)
- The MySQL utilities did not function with `.mylogin.cnf` as of MySQL Server 5.6.25 and 5.7.8 due to my_print_defaults masking passwords by default. (Bug #21343759, Bug #77550)
- The Windows MSI 64-bit package, by default, installed in "*Program Files (x86)*\" on a 64-bit system, instead of "*Program Files*\". (Bug #20876820)
- The `mysqldiskusage` utility incorrectly calculated disk usage, leading to an inaccurate result. (Bug #76703)

Changes in MySQL Utilities 1.6.2 (2015-08-31)

Starting with MySQL Utilities 1.6.2, MySQL Fabric is no longer included as part of the MySQL Utilities release. They are now separate MySQL products with separate release cycles.

Functionality Added or Changed

- A new optional `--inherit-level` parameter was added to the `mysqlgrants` utility. It specifies the inheritance level of the grants shown, and is set to either global (default), database, or object. (Bug #20302446)
- Starting with MySQL Utilities 1.6.2, MySQL Fabric is no longer included as part of the MySQL Utilities release. They are now separate MySQL products with separate release cycles.

Bugs Fixed

- The `mysqldbcompare` utility's `--all` option now ignores the internal *sys* schema. (Bug #21415893)
- The `mysqlimport` utility would fail with an "Invalid Statement" error (errno 1694), when executed against MySQL server 5.7.7. (Bug #21327864)
- The `mysqluserclone` utility did not properly copy global privileges with `--include-global-privileges` enabled, as it attempted to grant privileges to the source user instead of the destination user. (Bug #21031993, Bug #76938)

- The `mysqlrplsync` and `mysqldbcompare` utilities now function correctly when the **sys** schema is present; a schema that is added by default as of MySQL server 5.7.7. In other words, the **sys** schema is no longer compared/synced as it is unique to each host. (Bug #20979041, Bug #76878)

- The `mysqldbcopy` utility failed to copy a database that contained permissions to a user not present on the destination server when `NO_AUTO_CREATE_USER` was enabled. This is because `mysqldbcopy` attempted to create the user implicitly using the `GRANT` statement, an operation that does not work with `NO_AUTO_CREATE_USER`. Users are now explicitly created before the `GRANT` statement.

  Related, the NO_AUTO_CREATE_USER sql_mode is enabled by default as of MySQL server 5.7.7, and will become default behavior in a future release. (Bug #20972389, Bug #76866)

- The `mysqlindexcheck` utility would accept options and execute when an invalid `--server` option was passed. A valid server connection is now required. Also, the utility would report "Using a password on the command line interface can be insecure." even when a password was not used. (Bug #20960564, Bug #76839)

- The `mysqldbexport` utility required `SELECT` privileges to the `mysql` database when such permissions were not needed, even when passing in *--skip=procedures,functions*. (Bug #20953870, Bug #76815)

- When using the `mysqluc` console, pressing **Home** would print the 'H' character instead of moving the cursor to the beginning of the line, and pressing **End** would print the 'F' character instead of moving to the end of the line. (Bug #20817994, Bug #76569)

- Pylint tests were failing with the latest versions of pylint and pep8. (Bug #20812836)

- Several MUT tests were failing with MySQL server 5.7.6. (Bug #20756920)

- MySQL Utilities would hang when a long query using Connector/Python 2.1.2 was killed before completion. The underlying bug was fixed in Connector/Python 2.1.3. (Bug #20519892)

  References: See also: Bug #76156.

- The MySQL Utilities test suite now tests the strict SQL mode. (Bug #20411304, Bug #75612)

- The maximum length of `mysql.failover_console.host` was set to 30 characters. The `mysqlfailover` utility failed to start when host names were longer than this. The new maximum length is 255. (Bug #20380999, Bug #75544)

- Some replication utilities, such as `mysqlfailover` and `mysqlrpladmin`, would crash with MySQL server 5.7.6 (and above) because a new column (Channel_name) was added to the mysql.slave_master_info table.

  The utilities were updated to not fail when additional columns are added in the future. (Bug #20344064)

- The `mysqldbexport` and `mysqldbimport` utilities failed to correctly export/import databases using non-SQL formats like CSV, if the database contained a table with compound keys. This issue did not happen for the SQL format (default), it only occurred for the other available formats, such as CSV and TAB. (Bug #20191865)

- A rpl_admin_gtid test set the gtid_purged variable on the master server to create a controllable scenario where a slave server was missing GTIDs from the server. However, this was a faulty behavior from the server that was fixed in 5.6.22 and 5.7.6 via Bug #19012085. (Bug #20161135)

  References: See also: Bug #19012085.

- The `mysqldbimport` utility was unable to import multiple databases from a single file if the file format was not SQL, such as CSV. (Bug #20070400)

- Under some conditions, some commands that manipulates privileges can now be executed/invoked remotely. (Bug #18353517)
- The `mysqldiff` failed to generate correct `ALTER` statements that differentiated between DEFAULT NULL and DEFAULT ''. (Bug #75236, Bug #20227070)

Changes in MySQL Utilities 1.6.1 (2015-03-04, Alpha)

Functionality Added or Changed

- The following utilities were added: `mysqlbinlogpurge`, `mysqlbinlogrotate`, and `mysqlslavetrx`.

Bugs Fixed

- Generally, the code was improved to be more MySQL 5.7 compliant. (Bug #20078072)
- All CREATE or ALTER TABLE commands in the Utilities, and Utilities that generate them, were updated to use fully qualified table names with foreign keys.

  As of MySQL 5.5.41 / 5.6.22, there is a new behavior with foreign keys. You must now explicitly state the schema of the table that the foreign key points to. Previously, if missing, it was assumed that the schema of the table pointed to by the foreign key was the schema of the table being defined, but this is no longer true as of MySQL 5.5.41 / 5.6.22. (Bug #20035380)
- The `_parse_grant_statement` method from the `common/user.py` module incorrectly parsed MySQL 5.7 GRANT statements if they were after 'IDENTIFIED BY PASSWORD' and followed by a hash of the password. The hash is now seen as optional. (Bug #19943104)
- The MySQL Utilities did not correctly handle spaces in the PATH to the MySQL server, which is common on Windows. These paths are now surrounded by quotes. (Bug #19942512)
- The `mysqlserverclone` utility did not function properly with MySQL 5.7. It would bootstrap the server, load the SQL files, and relaunch the server, but it would not connect afterwards. (Bug #19804151)
- The MUT test named binlogmove_privileges failed on some servers due to the unexpected rotation of relay log files on the slave. All slaves are now stopped as soon as the test relay log files are created, as to prevent log rotation. (Bug #19781888, Bug #74284)
- The argument parser validation and error handling was improved for the `mysqluc` utility. (Bug #19781304)
- The results regarding index redundancy shown by the `mysqlindexcheck` utility were not correct for FULLTEXT nor HASH type indexes.

  For FULLTEXT indexes, the order is not relevant, nor is the number of columns. A FULLTEXT index i(a,b) is redundant of a FULLTEXT index i2(b,a), and is also redundant of a FULLTEXT index i3(a) or FULLTEXT index i4(b). In other words, a FULLTEXT index is redundant if its columns are a subset of another FULLTEXT index.

  As for HASH type indexes, one index in considered redundant of another index if it contains the exact same columns with the exact same order. In other words, two HASH type indexes are redundant only if they are duplicates. (Bug #19720715)
- Generated logs now contain the version of the MySQL Utilities and connected MySQL server. (Bug #19614037)

- On Windows, the test suite (MUT) failed to kill the spawned servers after running the tests, if the path for the base MySQL server included spaces. (Bug #19348330)
- When a table contained a composite Primary Key, the `mysqldbcompare` utility generated INSERT/UPDATE/DELETE statements that omitted the "AND" clause between each field. (Bug #19340701, Bug #73449)
- When comparing databases with the `mysqldbcompare` utility, quote characters within resulting SQL transformation statements were not escaped. As a result, the statements were not valid and could not be executed directly in a client tool, as intended. (Bug #19313139, Bug #73415)
- MySQL Utilities now reflects the SSL behavior introduced for the MySQL client in MySQL 5.7.3. Setting `--ssl=1` now causes the MySQL connection to fail if an encrypted connection can not be established. (Bug #19031182)
- The `mysqldbcopy` utility was not able to copy table rows that contained single quotes in text columns. (Bug #18955235, Bug #72951)
- The conversion to CSV performed with the `--format=CSV` option for several utilities was applying an incorrect line terminator on POSIX (non-Windows) systems. In particular, "\r\n" was used instead of "\n". (Bug #18792076)
- The `mysqldbcompare` utility failed to execute when a large invalid value was passed into the `--span-key-size` option. (Bug #18763262)
- In MySQL, a BTREE index A is considered redundant of a BTREE index B if and only if index A is a leftmost prefix of index B. Having a common partial prefix is not enough. The `mysqlindexcheck` utility had an issue and was considering two BTREE indexes as redundant if they had a common partial prefix. `mysqlindexcheck` now correctly checks if a BTREE index is a leftmost prefix of the other index. (Bug #18718660, Bug #71688)
- The `mysqldbcompare` utility executed the full algorithm twice to search for data differences when the `--show-reverse` option was used, instead of only repeating the part that generated the differences in the reverse direction. This had a notable performance impact for larger databases. (Bug #18717843)
- The `mysqldbimport` utility did not issue an error when a non-existing file was specified while multiprocessing support was enabled. Also, without concurrency (the multiprocess option enabled), a verbose Traceback was printed instead of a more readable error message. Now, a friendly error message is generated for both cases. (Bug #18042411)

Changes in MySQL Utilities 1.6.0 (2014-09-26, Alpha)

Functionality Added or Changed

- The `mysqlprocgrep` utility now displays the processes and connections killed during a `--kill` operation. The displayed rows come from the appropriate `SHOW PROCESSLIST` entries. (Bug #14163181)
- The `mysqlgrants` utility was added. It displays grants per object, and produces reports by user, user with grants, and `GRANT` statement.
- The `mysqlbinlogmove` utility was added. It relocates binary log files, and moves files based on their sequence number or modified date.

Bugs Fixed

- Health reports can now be generated for a list of slaves without a master specified. In this case, "No master specified" appears for connection status for each slave, instead of an error. (Bug #18543913)

Changes in Release 1.5

Changes in MySQL Utilities 1.5.6 (2015-09-18, General Availability)

Bugs Fixed

- The 1.5.5 release contained empty manual (man) pages. (Bug #21811225, Bug #78384)

Changes in MySQL Utilities 1.5.5 (2015-08-31, General Availability)

Functionality Added or Changed

- In the Fabric configuration file, the **backup_user** and **restore_user** MySQL user accounts were added to the **[servers]** section, and the **[client]** section (along with its **user** option) was removed altogether. The Fabric configuration file is no longer used by MySQL client programs. (Formerly the file was used as the defaults file for the MySQL clients via the `--defaults-extra-file` option.) (Bug #19682075)
- For Fabric, an example script was added to the source packages to help provide an HA solution using a single Fabric node. For related documentation, see http://dev.mysql.com/doc/mysql-utilities/1.5/en/fabric-pacemaker.html.

Bugs Fixed

- The `mysqldbcompare` utility's `--all` option now ignores the internal *sys* schema. (Bug #21415893)
- The `mysqlimport` utility would fail with an "Invalid Statement" error (errno 1694), when executed against MySQL server 5.7.7. (Bug #21327864)
- For Fabric, executing "server clone" would throw the following error; "'NoneType' object has no attribute 'user'". (Bug #21270905)
- For Fabric, executing *>build_docs* without *sphinx* installed would emit an unclear error message. (Bug #21242697)
- For Fabric, errors were emitted for commands executed locally using the dispatch method that also contained compulsory arguments. (Bug #21214069)
- With Fabric, MySQL server 5.7.8 and newer would not function as a state store, and would instead emit an error similar to "Unknown column 'group_id' in 'where clause'." (Bug #21120391)

  References: This issue is a regression of: Bug #19823076.
- For Fabric, the default MySQL port is now passed in with the server_address when the port number is not explicitly defined. (Bug #21043598)
- In the MySQL RPC protocol, the MySQL Fabric process would spin in the "recv" after a connector closed the connection, which caused excessive (100%) CPU use. The code now detects when an empty chunk is returned from "recv", meaning that nothing else will be transferred from the client and that the socket is closed.

  In addition, possible header fragmentation is now avoided when the process would hang when attempting to read 4 bytes. (Bug #21042726)
- The `mysqluserclone` utility did not properly copy global privileges with `--include-global-privileges` enabled, as it attempted to grant privileges to the source user instead of the destination user. (Bug #21031993, Bug #76938)

- The `mysqlrplsync` and `mysqldbcompare` utilities now function correctly when the **sys** schema is present; a schema that is added by default as of MySQL server 5.7.7. In other words, the **sys** schema is no longer compared/synced as it is unique to each host. (Bug #20979041, Bug #76878)

- The `mysqldbcopy` utility failed to copy a database that contained permissions to a user not present on the destination server when `NO_AUTO_CREATE_USER` was enabled. This is because `mysqldbcopy` attempted to create the user implicitly using the `GRANT` statement, an operation that does not work with `NO_AUTO_CREATE_USER`. Users are now explicitly created before the `GRANT` statement.

  Related, the NO_AUTO_CREATE_USER sql_mode is enabled by default as of MySQL server 5.7.7, and will become default behavior in a future release. (Bug #20972389, Bug #76866)

- The minimum Connector/Python version increased to 2.0.4 or 2.1.2. (Bug #20766081)

  References: See also: Bug #74933, Bug #76579.

- The `mysqlfabric` client would exit with a "Connection reset by peer" error if a thread was not available when using the XML-RPC protocol, although subsequent commands would typically succeed. (Bug #20697968)

- MySQL Utilities would hang when a long query using Connector/Python 2.1.2 was killed before completion. The underlying bug was fixed in Connector/Python 2.1.3. (Bug #20519892)

  References: See also: Bug #76156.

- With Fabric, programming errors could leave some results unread and, by consequence, the associated connection cannot be used to process other requests until the result was read. This issue could break threads that had an associated connection as they could not process further requests after the first "unread results found" error. (Bug #20415833, Bug #75589)

- Some replication utilities, such as `mysqlfailover` and `mysqlrpladmin`, would crash with MySQL server 5.7.6 (and above) because a new column (Channel_name) was added to the mysql.slave_master_info table.

  The utilities were updated to not fail when additional columns are added in the future. (Bug #20344064)

- A SIGUSR1 handler was added to MySQL Fabric. If a SIGUSR1 signal is sent to the MySQL Fabric process, the stack trace of all threads are now sent to the current logger, if there is one, otherwise to the **stderr** stream.

  An empty handler for the SIGINT signal was added just in case the MySQL Fabric process is killed by mistake after pressing **Control** + **C**. To stop the MySQL Fabric process, you can either execute "`mysqlfabric` manage stop", or send it the SIGKILL signal.

  Also, **stderr** was not redirected when the MySQL Fabric process was daemonized, so the process would die if someone tried to dump a stack trace. Now, 'stderr' is redirected to 'os.devnull' (i.e. '`/dev/null`' for POSIX). (Bug #20230459)

- With Fabric, an interrupted test suite caused future executions of the test suite to fail due to test database remnants. The test suite now drops existing test databases and test users before creating new ones. (Bug #20215134, Bug #75217)

- With Fabric, the test suite now checks if the required environment variables, such as MYSQLDUMP and MYSQLCLIENT, are set before proceeding. (Bug #20215029, Bug #75215)

- The **[client]** section of the Fabric configuration file was removed, to avoid confusion with the related **[servers]** section. (Bug #19787441, Bug #74296)

  References: See also: Bug #19682075.

Changes in MySQL Utilities 1.5.4 (2015-03-04, General Availability)

Bugs Fixed

- Triggering a network down on a master or slave in a MySQL Fabric group would hang Fabric for an extended amount of time before it failed over and promoted a slave to a new master. (Bug #19949241, Bug #74555)
- The number of session threads was not properly configured, thus making MySQL only accept one request at a time. (Bug #19875584, Bug #74509)
- The `mysqlfabric` event trigger did not properly handle arguments. (Bug #19644057, Bug #73968)
- MySQL Utilities now reflects the SSL behavior introduced for the MySQL client in MySQL 5.7.3. Setting `--ssl=1` now causes the MySQL connection to fail if an encrypted connection can not be established. (Bug #19031182)
- An exception was thrown after executing "mysqlfabric dump sharding_information" commands when no shards were inside a definition / setup. (Bug #18412096, Bug #72044)
- Fabric would emit a generic "No such file or directory" error when the `mysqldump_program` option in `fabric.cfg` was set to an invalid path. This error now refers to "MySQLDump". (Bug #18370927)
- `mysqlfabric` would print a JSON-like output as a result, but this was potentially confusing as it was not JSON. Valid JSON is now used. (Bug #18110179, Bug #71445)
- The exit code of "`mysqlfabric` group create ..." was 0 for both the success and the error cases. Now, 0 is only returned on success. (Bug #18110165, Bug #71444)

Changes in MySQL Utilities 1.5.3 (2014-11-04, General Availability)

Bugs Fixed

- The MySQL Fabric installer failed to properly check for the required Connector/Python version. (Bug #19807933, Bug #74339)
- Setting up a MySQL Fabric backing store would fail when the target MySQL instance used a unicode character set as the default. (Bug #19785686, Bug #74192)
- The MySQLServer object created connections with "use_unicode=False", and as a consequence some statements returned fields in the bytearray format, as opposed to the expected strings or unicode fields. This unexpected field data type would sometimes cause problems with several modules, such as replication and high availability. (Bug #19774543, Bug #74255)
- MySQL Fabric was improved to support AWS and Trove. Changes include no longer assuming that hosts have UUIDs, and plugin support was also added. (Bug #19589254)
- The `mysqldbcompare` utility options related to comparing all databases on two servers were accidentally removed (e.g., `--all`, `--exclude`, and `--regexp` in a previous release, and they have since been restored.

  Additionally, the error handling and validation routines were improved. (Bug #19430737, Bug #73551)

Changes in MySQL Utilities 1.5.2 (2014-09-26, General Availability)

Bugs Fixed

- Added the missing `README` and `LICENSE` text for the commercial packages. (Bug #19675930)

- For Windows, the Utilities MSI distribution package was setting the wrong permissions for the generated installation directory, which included all permissions granted for the 'Users' group. Now, the only permission set here for the 'Users' group is read-only. (Bug #19611879)

- The failure detector was specifying a set of groups as lockable objects, and a failover operation could potentially run while a group was being updated by another operation which could lead to unpredictable results. (Bug #19594070, Bug #73873)

- A debugging message was being sent through the Fabric RPC protocol. (Bug #19588383, Bug #73864)

- Due to licensing conflicts between OpenSSL and GPL, SSL support is not included in the community edition for Windows. (Bug #19487002)

- Fabric behaved inconsistently with respect to sharding and nonexistent tables. (Bug #19450843, Bug #73599)

- For Fabric, Connectors inserting large amount of data before the TTL expires, after a resharding metadata update, could cause inconsistencies between the sharding definition and the data on the shard. (Bug #19427027, Bug #73546)

- Separate `CHANGES` and `README` files were added to the commercial distribution. (Bug #19380635)

- Fabric could return an incorrect "lower_bound" length, depending on the character set. (Bug #19352961, Bug #73218)

- The `--disable-binary-logging` flag of the `mysqldbcompare` utility did not function properly. It always required SUPER privileges in cases where the server had binary logging enabled, it was enabled internally even when not in use, and it threw an error when attempting to generate SQL statements for the differences between tables if one of the rows had columns with NULL values.

  Also, the ability to call the to_sql method for each column was added, which is enabled by default for the CSV output type. (Bug #19320164, Bug #73426)

- The `mysqlserverclone` utility did not check for a low amount of free space before it created a new instance of the server. It now errors out if 120+ MB of free space is unavailable, but this check can be ignored by also passing in the `--force` option.

  Additionally, the error handling for failed new data directory creation was improved to show additional details about the failure. (Bug #19303700, Bug #73366)

- When copying views that depended on sub-views that were not yet copied, some utilities such as `mysqldbcopy` failed. The dependency related code was fixed to solve this problem. (Bug #19302898, Bug #73383)

- The policy command for the `mysqlauditadmin` utility failed when applied to recent MySQL server versions (such as MySQL 5.6.20 and 5.7.5). This is because `audit_log_policy` is now a READONLY variable (Bug #19259597)

- The utilities did not parse all types of GRANT statements, such as those with PROXY privileges and stored routines. The utilities could also fail when objects contained backticks. (Bug #19238432)

- The `mysqldbcompare` utility failed when comparing two databases while using the SQL difftype. (Bug #19174364, Bug #72181)

- Commands accept either a UUID or an address (i.e. host:port) to specify a server. The code was ignoring that a wrong address could be provided, and in consequence the execution could hang. The address is now validated before it is used.

  If the server belongs to a group, the address is checked against the information stored in the state store.

If the server is not part of a group, Fabric will try to access the server until a timeout is reached. The default value for this timeout is defined through the option "unreachable_timeout" in the "servers" section in the configuration file, and it affects the following commands:

- server lookup_uuid address [--timeout=NONE] ...
- server clone group_id destn_address [--timeout=NONE] ...
- group add group_id address [--timeout=NONE] ...

(Bug #19172889, Bug #73233)

- Some of try/exception blocks were catching the DatabaseError exception and raising a new exception without propagating information from the original problem.

  The error messages were improved by adding information about the server where the error originated, and the caught DatabaseError information is merged into the appropriate objects. (Bug #18999358, Bug #18370950, Bug #73019)

- The `--force` option was removed from the `mysqlfabric` utility. It was removed to help alleviate confusion about its purpose. Its functionality was replaced by clearer status messages that are always printed out. (Bug #18991971, Bug #72931)

- The `--skip-innodb` option is used by the utilities, but this option is ignored in MySQL 5.7+. A warning is now issued for this scenario. (Bug #18753983, Bug #72633)

- The `mysqldiff` utility's `--skip-table-options` option would fail when comparing two tables with different column ordering, or when also setting the `--difftype` option to SQL. (Bug #18632836, Bug #72178)

- The RPM installation failed to check for the required Connector/Python version, and having the incorrect version installed caused "mysqlfabric manage setup" to fail. (Bug #18450008)

Changes in MySQL Utilities 1.5.1 (2014-08-20, Release Candidate)

MySQL Utilities is now its own product, and is no longer a sub-product of MySQL Workbench.

Known limitation:

This RC release is not available on Microsoft Windows.

Functionality Added or Changed

- Provisioning support was added to Fabric, by supporting the Nova Interface, which is responsible for managing compute instances to easily expand and shrink the number of servers in a group when MySQL Fabric is deployed within an OpenStack Cloud Provider. This introduces commands for the provider, machine, and snapshot groups.

- Fabric now supports DATETIME and UTF-8 strings as sharding keys in range-based sharding.

- The internal interface between the protocol classes and the Fabric core was improved to be more consistent.

- Fabric now supports the MySQL Client-Server Protocol. Only connectors and clients supporting PROTOCOL41 and MULTI_RESULTSET are allowed. This preferred interface is an alternative to the current XML-RPC interface.

Bugs Fixed

- The specification and control files were updated to reflect the Connector/Python 2.0.0+ dependency. (Bug #19380554)
- Added support for Connector/Python 2.0.0 and higher. (Bug #19215979)
- The `mysqlreplicate` and `mysqlrplms` utilities would generate an exception when the optional `--rpl-user` was not passed in. (Bug #19178471)
- The check for an errant transaction was not performed for `mysqlrpladmin`'s switchover command, it only performed for the failover command. Both commands now check for errant transactions.

  The errant transaction check requires all servers in the topology to have GTID enabled, otherwise a warning is issued indicating that the check cannot be performed for the switchover command. (Bug #19076488, Bug #73110)
- When a login-path (or config-path) was used for server connection values, and the `.mylogin.cnf` file was not found, an AttributeError was issued instead of a missing file error. (Bug #19009690)
- On OS X Mavericks, the testing suite (MUT) failed to kill mysqld processes as MUT could not identify the MySQL server ports. (Bug #18958536)
- On Windows, the `mysqlfabric` utility searched for the fabric configuration file outside of the installation folder.

  The default configuration file location is `C:\Program Files (x86)\MySQL\MySQL Utilities 1.4.4\etc\mysql\fabric.cfg`.

  Additionally, the **MySQL Utilities** section in the Windows **Start** menu now contains a link to the fabric configuration file. (Bug #18904014)
- With fabric, the `--daemonize` parameter was not recognized when passed in with `manage start`. (Bug #18874603, Bug #72818)
- In the `mysqluc` environment, pressing **tab** after typing a "q" would incorrectly suggest the term "qxit" instead of "quit". This now returns "quit", which is an alias for "exit". (Bug #18852960, Bug #72776)
- On Linux, the **backspace** key was not functioning in the `mysqluc` environment, therefore the entered text could not be changed. (Bug #18852933, Bug #72777)
- The Debian packages checked for a Connector/Python 1.0.9+ prerequisite instead of requiring Connector/Python 1.2.1+. (Bug #18838462)
- Failed MySQL server connection error messages now return the actual error returned from the failed connection, instead of a custom (and more generic) error. This new behavior is more standard with how other MySQL client applications behave. (Bug #18815545, Bug #72670)
- With the `--discover-slaves-login` option, if there were connection or configuration problems with some of the slaves, then those slaves were skipped with only a generic error message being issued. This behavior did not change when also passing in `--verbose`.

  A simple warning about the connection/configuration problems is now generated during the discovery process, and it references including `--verbose` to see additional information. The `--verbose` option generates specific information for each slave, and includes their respective errors. (Bug #18815523, Bug #72706)
- When running the `mysqlserverinfo` utility as root against an offline MySQL server, it failed to start a read-only instance of the server and emitted the fatal error "Please read "Security" section of the manual to find out how to run mysqld as root!". This occurred because the mysqld option "--user=root" was not passed in, which is mandatory when starting mysqld as root. The *`user_name`* that executes the utility is now detected and added as `--user=`*`user_name`* when starting the read-only MySQL server.

Additionally, error checks were added that validate the `--basedir` and `--datadir` options to check for their existence and accessibility. (Bug #18790361, Bug #72658)

- Descriptive text for the `--no-headers` option was improved to clearly indicate which formats it supports. For example, it does not support the "vertical" format. (Bug #18790134, Bug #72659)
- The minimum required Connector/Python version in the source code was defined as 1.0.9 instead of 1.2.1. (Bug #18777318, Bug #72664)
- When cloning a user, the `mysqluserclone` utility did not check if the user of the destination server had the required privileges for a successful operation. (Bug #18768780, Bug #72655)
- The `mysqluserclone` utility was throwing an unhandled exception when the `--list` option was used with incorrect login credentials. The error message is now emitted. (Bug #18768487, Bug #72656)
- The `mysqluc` utility would suddenly exit when a command was wrongly formatted, like when a closing quote was missing. This action now generates a warning instead of exiting from the console, which allows the command to be edited. (Bug #18730815, Bug #72569)
- When passing in the `--dump` option to the `mysqluserclone` utility on a user with the hostname '%', the output (each grant) would be printed twice. (Bug #18730720, Bug #72570)
- Error messages for the `mysqluserclone` utility were improved by making them more explicit in terms of what might be missing. (Bug #18730656, Bug #72572)
- With fabric, `sharding prune_shard` operations would hang when performed on a very large number of records. (Bug #18669231, Bug #19177860, Bug #73238)
- The default value was removed from the `--rpl-user` option for the `mysqlreplicate` and `mysqlrplms` utilities. Before, the default user/pass value was "rpl:rpl". (Bug #18603715)
- A warning is now emitted whenever a password is entered into the command line. When testing, this warning can be disabled by setting `self.mask_global` to false. (Bug #18603598)
- The `mysqlfailover` utility caused excessive CPU load when executed in the console without passing in `--daemon`. This high CPU usage was due to the process waiting for user input. (Bug #18379971, Bug #72002)

Changes in MySQL Utilities 1.5.0 (2014-06-23, Alpha)

Functionality Added or Changed

- All MySQL Utilities that connect to a MySQL server now support SSL certificates for creating an encrypted connection. Configured certificates can be set by the MySQL Configuration Utility (using `mysql_config_editor` to generate `.mylogin.cnf`), or from the following new MySQL Utility options:
  - `--ssl-ca=file_name` -- The path to a file that contains a list of trusted SSL CAs.
  - `--ssl-cert=file_name` -- The name of the SSL certificate file in PEM format to use for establishing an encrypted connection.
  - `--ssl-key=file_name` -- The name of the SSL key file in PEM format to use for establishing an encrypted connection.

  An error is emitted if attempts to use an SSL connection fails, when an option is missing, or if the provided files cannot be read.

Bugs Fixed

- When running some MySQL Utilities using Python v2.6 (the minimum supported version), an import error was thrown because OrderedDict was used. The options_parser module used this collection, but OrderedDict was introduced in Python v2.7. To continue supporting Python v2.6, the OrderedDict dependency was removed from the module, and replaced with a regular dictionary. (Bug #18914270)
- With Fabric, hash based shard mapping would return non-ASCII characters in the result. (Bug #17832848, Bug #71129)

Changes in Release 1.4

Changes in MySQL Utilities 1.4.4 (2014-07-31, General Availability)

Bugs Fixed

- The `mysqlreplicate` and `mysqlrplms` utilities would generate an exception when the optional `--rpl-user` was not passed in. (Bug #19178471)
- The check for an errant transaction was not performed for `mysqlrpladmin`'s switchover command, it only performed for the failover command. Both commands now check for errant transactions.

  The errant transaction check requires all servers in the topology to have GTID enabled, otherwise a warning is issued indicating that the check cannot be performed for the switchover command. (Bug #19076488, Bug #73110)
- On OS X Mavericks, the testing suite (MUT) failed to kill mysqld processes as MUT could not identify the MySQL server ports. (Bug #18958536)
- On Windows, the `mysqlfabric` utility searched for the fabric configuration file outside of the installation folder.

  The default configuration file location is `C:\Program Files (x86)\MySQL\MySQL Utilities 1.4.4\etc\mysql\fabric.cfg`.

  Additionally, the **MySQL Utilities** section in the Windows **Start** menu now contains a link to the fabric configuration file. (Bug #18904014)
- With fabric, the `--daemonize` parameter was not recognized when passed in with `manage start`. (Bug #18874603, Bug #72818)
- In the `mysqluc` environment, pressing **tab** after typing a "q" would incorrectly suggest the term "qxit" instead of "quit". This now returns "quit", which is an alias for "exit". (Bug #18852960, Bug #72776)
- On Linux, the **backspace** key was not functioning in the `mysqluc` environment, therefore the entered text could not be changed. (Bug #18852933, Bug #72777)
- The Debian packages checked for a Connector/Python 1.0.9+ prerequisite instead of requiring Connector/Python 1.2.1+. (Bug #18838462)
- Failed MySQL server connection error messages now return the actual error returned from the failed connection, instead of a custom (and more generic) error. This new behavior is more standard with how other MySQL client applications behave. (Bug #18815545, Bug #72670)
- With the `--discover-slaves-login` option, if there were connection or configuration problems with some of the slaves, then those slaves were skipped with only a generic error message being issued. This behavior did not change when also passing in `--verbose`.

  A simple warning about the connection/configuration problems is now generated during the discovery process, and it references including `--verbose` to see additional information. The `--verbose`

option generates specific information for each slave, and includes their respective errors. (Bug #18815523, Bug #72706)

- When running the `mysqlserverinfo` utility as root against an offline MySQL server, it failed to start a read-only instance of the server and emitted the fatal error "Please read "Security" section of the manual to find out how to run mysqld as root!". This occurred because the mysqld option "--user=root" was not passed in, which is mandatory when starting mysqld as root. The *`user_name`* that executes the utility is now detected and added as `--user=`*`user_name`* when starting the read-only MySQL server.

  Additionally, error checks were added that validate the `--basedir` and `--datadir` options to check for their existence and accessibility. (Bug #18790361, Bug #72658)

- Descriptive text for the `--no-headers` option was improved to clearly indicate which formats it supports. For example, it does not support the "vertical" format. (Bug #18790134, Bug #72659)

- The minimum required Connector/Python version in the source code was defined as 1.0.9 instead of 1.2.1. (Bug #18777318, Bug #72664)

- When cloning a user, the `mysqluserclone` utility did not check if the user of the destination server had the required privileges for a successful operation. (Bug #18768780, Bug #72655)

- The `mysqluserclone` utility was throwing an unhandled exception when the `--list` option was used with incorrect login credentials. The error message is now emitted. (Bug #18768487, Bug #72656)

- The `mysqluc` utility would suddenly exit when a command was wrongly formatted, like when a closing quote was missing. This action now generates a warning instead of exiting from the console, which allows the command to be edited. (Bug #18730815, Bug #72569)

- When passing in the `--dump` option to the `mysqluserclone` utility on a user with the hostname '%', the output (each grant) would be printed twice. (Bug #18730720, Bug #72570)

- Error messages for the `mysqluserclone` utility were improved by making them more explicit in terms of what might be missing. (Bug #18730656, Bug #72572)

- With fabric, `sharding prune_shard` operations would hang when performed on a very large number of records. (Bug #18669231, Bug #19177860, Bug #73238)

- The default value was removed from the `--rpl-user` option for the `mysqlreplicate` and `mysqlrplms` utilities. Before, the default user/pass value was "rpl:rpl". (Bug #18603715)

- A warning is now emitted whenever a password is entered into the command line. When testing, this warning can be disabled by setting `self.mask_global` to false. (Bug #18603598)

- The `mysqlfailover` utility caused excessive CPU load when executed in the console without passing in `--daemon`. This high CPU usage was due to the process waiting for user input. (Bug #18379971, Bug #72002)

Changes in MySQL Utilities 1.4.3 (2014-05-27, General Availability)

This section documents all changes and bug fixes applied since the release of 1.4.2, and is the first General Availability (GA) release of the 1.4.x branch.

Bugs Fixed

- With fabric, a move_shard operation failed if the client password was defined in `fabric.cfg`. (Bug #18824565)

- Due to the several changes in the high-availability and sharding sub-systems, the automatic routine to automatically find the lockable objects for a given procedure was not always valid. The consequence was that some procedures may have tried to update the same group concurrently when they should have been serialized. (Bug #18712020, Bug #72553)

- When executing "mysqlfabric manage setup", some of the generated "CREATE TABLE" statements were explicitly requesting the InnoDB engine and ignoring the `default-storage-engine` option, thus preventing use of NDB as a state store. (Bug #18648779)
- The `FailoverDaemon` class from the failover_daemon module was refactored to extend the `Daemon` class, so that the duplicated code was removed. (Bug #18546744)
- Any empty password definition ("`password =` ") in the configuration file would emit errors. (Bug #18524482, Bug #72149)
- Optimizations to the `mysqldbcompare` utility include:
  - A new step was added to the data consistency check, now executing a `CHECKSUM TABLE` first (which is faster when no differences are expected). The current comparison algorithm is only execute if this preliminary full table checksum fails. A new `--skip-checksum-table` option was added to skip this new step that otherwise is executed by default.
  - The `BINARY` type is used instead of `CHAR` to store hash values in a more optimized way.
  - Unnecessary keys were removed from the temporary table (including the primary key).
  - `ENGINE=MyISAM` is now used for the temporary compare table.

  (Bug #18483844)
- The temporary table created by the `mysqldbcompare` utility was missing an index for the 'span' column, meaning that the "_COMPARE_SUM" and "_COMPARE_DIFF" queries were doing full table scans. (Bug #18483844)
- The `mysqldbcompare` utility was not correctly checking differences for different rows internally associated to the same span key. Only the first difference was displayed. (Bug #18477410)
- Remote commands were authenticating the request twice, both before and after the command was sent to Fabric. This meant unnecessary requests were made to the state store. (Bug #18477189)
- Commands failed if the "protocol.xmlrpc.user" option was not provided in the configuration file or from the command-line. Now, the user "admin" is the default. (Bug #18459012)
- Executing "mysqlfabric manage setup" would sometimes halt with a connection error due to a short timeout. (Bug #18458461)
- A "group add" with a server as "localhost:32274" caused Fabric to hang, as 32274 is the port used by Fabric. (Bug #18454737, Bug #72119)
- A "PROMOTE" after "RESET MASTER" would cause Fabric to hang. Now, "SHOW SLAVE STATUS" is used to check whether the slave has processed all of the entries in the relay log. (Bug #18454679, Bug #72118)
- Some Fabric commands, such as "server.set_status" and "group.promote", accepted a reference to a MySQL server's uuid but not a reference to an address and port. (Bug #18440617, Bug #72094)
- The `mysqlrplms` utility did check the MySQL server version when executed on MySQL server 5.7. (Bug #18434209)
- With fabric, the `pylint_tests` script mixed the output from both pep8 and pylint results. A new `--tester` option was added that allows the tester to be chosen, which can be either "pylint", "pep8", or "all" (the default). (Bug #18383839)
- The `mysqlrplsync` utility was allowing the `--exclude` option to take an empty value, and the user was not notified. This now generates an error. (Bug #18381748)
- The "__name__ == '__main__'" attribute check was added to all scripts that can be executed as a standalone program. (Bug #18376793)

- The `mysqldbcopy`, `mysqldbimport` and `mysqldbexport` utilities were not fully functional for all possible data types. Prefixes such as TINY, SMALL, MEDIUM, and BIG were not being taken into account when verifying the column data type.

  This issue was only present when the source server did not equal the destination server. In other words, when copied and not cloned. (Bug #18373190, Bug #71890)

- The `mysqldbexport` utility would export BLOB rows using two statements; an INSERT followed by an UPDATE. This did not function if the exported table did not have at least one "UNIQUE NOT NULL INDEX", since UPDATE statements cannot uniquely identify each row. Now, they are exported using a single INSERT statement. (Bug #18373190, Bug #71890)

- Invoking the `mysqlfabric` utility with the wrong number of parameters would display general usage help for the utility, but it now shows help for the specified command. (Bug #18370958)

- The `mysqldbcopy` utility threw an internal Python exception when `--rpl=slave` was passed in without specifying `--rpl-user`. (Bug #18338321)

- The `mysqlauditgrep` utility did not support changes made to the audit log format in the "NEW" format. Both "NEW" and "OLD" formats are now supported.

  The `audit_log_format` option defaults to "OLD" in MySQL server 5.6, and "NEW" in MySQL server 5.7. (Bug #18314951, Bug #71838)

- The `mysqslindexcheck` utility was considering a PRIMARY key as redundant when this key was compared to a unique index with more columns than the PRIMARY key, which caused the DROP statement to be displayed as "None;" with the `--show-drops` option. In this scenario, the index key is now marked as redundant instead of the PRIMARY key. (Bug #18281513, Bug #71745)

- The `mysqlserverinfo` utility threw an internal Python exception when passing a nonexistent server to `--server`. (Bug #18262507)

- `dump.shard_*` did not take into account disabled shards, and therefore reported disabled shards through the dump interface. (Bug #18259479, Bug #71701)

- An `indexcheck` option was added to the `mysqlindexcheck` utility. It reports on tables without a PRIMARY or UNIQUE key. Previously, this information was only available with a high verbosity level (`-vv`). (Bug #18241174, Bug #71690)

- `mysqldbcompare` failed to properly compare the same views on different schemas. This caused the objects to be seen differently. (Bug #17864081, Bug #71022)

- Because each xmlrpc session requires a database connection, it is possible to exceed the maximum number of connections in the backing store. The failure detector did not function properly when the number of connections was exceeded, and as such it could not promote a new server to the master. This scenario now generates an exception when fabric starts with the built-in failure detector is enabled. (Bug #17747197)

- The `mysql/utilities/common/parser.py` script would stop processing when a blank line was encountered. However, the General Query Log may include multi-line statements that include blank lines. (Bug #71851)

- In MySQL Utilities v1.3.x, the second call to the `mysqlfailover` utility could fail. (Bug #71724)

Changes in MySQL Utilities 1.4.2 (2014-03-31, Release Candidate)

This section documents all changes and bug fixes applied since the release of 1.4.1, and is the first Release Candidate release.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- The `mysqlrplms` utility was added, which provides round-robin multi-source replication (a slave server continually cycles through multiple masters in order to store a consolidated data set).
- The `mysqlrplsync` utility was added, which checks data consistency between servers in a replicated setup.

Bugs Fixed

- With fabric, the scheduler did not check and determine which procedures needed to be notified after releasing the procedure that was blocking them. (Bug #18454582, Bug #72117)
- Using MySQL Utilities with an old and unsupported version of Connector/Python could emit unhandled exceptions during import. The `check_connector_python` function was improved and now checks for the minimum required Connector/Python version before continuing. (Bug #18413200)
- With fabric, failover was not handled properly when both the global and shard groups had a failed master. (Bug #18403885, Bug #72016)
- The `mysqlrplsync` utility would crash when the `--exclude` option was used, and at least one database was available to be checked. This issue was due to an incomplete check when determining which tables to exclude from the slaves. (Bug #18388846)
- The MySQL Utilities testing suite (mut) now tests if ports are available before assigning them to a test. (Bug #18339351)
- The `mysqlfabric` utility returned wrong messages for `dump` commands when no shards exist. (Bug #18296589, Bug #71793)
- The `mysqlfabric` command help usage examples showed some parameters in uppercase, but they (`--synchronous` and `--split-value`) are lowercase options. (Bug #18295761, Bug #71792)
- With Fabric, attempting to destroy a group when the group was used in the shard sub-system would output an unfriendly and unclear error. Fabric now checks if the group is used in the shard sub-system before trying to destroy (remove) it, and a clearer error is emitted if it is in use. (Bug #18280004, Bug #71766)
- MySQL Server UUIDs are now handled in a case-insensitive way, more precisely when checking if GTIDs belong to the master. This helps accommodate MySQL Server 5.6.9, which could change the case for the `server_uuid` variable. (Bug #18275566)
- A typo was fixed in the `mysqldbcopy` utility's help text. (Bug #18206923, Bug #71627)
- The mut `rpl_admin_gtid` test result varied from host to host, due to using the `RESET MASTER` statement without first stopping all the slaves. This resulted in undefined behavior, which led to inconsistent rest results. (Bug #18203946)
- With Fabric, group definitions now use a single (global) username and password, instead of requiring a username/password for each MySQL server when they were added to the group. (Bug #18153823, Bug #71512)
- When checking for proper permissions, Fabric would execute several `SELECT` statements against the '`mysql`' database, which caused the login mechanism to fail if the user lacked access. This mechanism now uses '`SHOW GRANTS`' statements instead, and now prints out a detailed error message when access is unavailable. (Bug #18138545, Bug #71448)
- The `server.set_status()` function's status parameter now accepts an integer, to better coincide with the integer value provided by `dump_servers()`. The strings "PRIMARY", "SECONDARY", "SPARE" and "FAULTY" also remain as acceptable values. (Bug #18124108, Bug #71428)

- On Linux, the `mysqlserverclone` utility failed to spawn a MySQL server if the path passed to the `--new-data` option was too long, as determined by the MySQL server. A check was added that limits the datadir length to 200 characters, which helps coincide with the maximum socket length (107) set by the MySQL server. This check can be bypassed with the `--force` option. (Bug #18117930)
- The Installer (`setup.py`) was not able to install the fabric configuration file (`fabric.cfg`) to the user's home directory even though the `--user` or `--home` options were used. It would instead attempt to install it in `/etc/mysql/`. (Bug #18109179, Bug #71442)
- The text for the `store.dump_*` commands was updated to better reflect how these commands are for retrieving information, instead of writing it. (Bug #18087356, Bug #71370)
- The `mysqlrpladmin` utility did not correctly account for consecutive transactions reported in a single string. The utility would only consider the transaction or transaction range that appeared after the last ':'. (Bug #18083550)
- When cloning a database with foreign key dependencies on the same MySQL server, and while using the multiprocessing option (with a value greater than one), the `mysqldbcopy` utility issued an error about foreign key constraint failures. The foreign key checks are now disabled before cloning the tables. (Bug #18041743)
- The internal `gtid_enabled()` function would only check a single MySQL server, and returned TRUE if the checked MySQL server had GTID enabled. It now only returns TRUE if all MySQL servers in the topology have GTIDs enabled. (Bug #17890455)
- The privilege check for the `mysqlfailover` utility was performed after the instance registration process, which would lead to query errors (instead of privilege errors) if some privileges, such as `DROP` or `CREATE`, were not available.

  Additionally, a check for the `INSERT` privilege was added to all slaves, as it might be required for them to become the new master, in order to successfully perform the failover instance registration on the new master. (Bug #17878705)
- The default TCP port set for MySQL Fabric was changed from 8080 to 32274. (Bug #17820905, Bug #70954)
- The is_connected() fabric function was executed every time a statement was executed, which reduced overall performance. (Bug #17702237)
- Exported or copied/cloned databases from the `mysqldbcopy` and `mysqldbexport` utilities failed to function with the `mysqldbimport` utility if dependencies between views were present. These dependencies are now sorted in the appropriate order before copy, clone, or export. (Bug #17694651)
- Some MUT tests were failing with Connector/Python 1.1.x due to format changes in the returned error messages by the Connector. (Bug #17655980)
- The commercial version of the MySQL Utilities contained a hard-coded path to the Python directory, so the MySQL Utilities installation would fail. The Fabric and Doctrine projects were also updated. (Bug #17647498)
- The `mysqldiff` and `mysqldbcompare` utilities print all of the control lines for each difference, even for unnecessary lines which is especially true of the grid format and unified types. A new `--compact` option was added, which reduces output from the diff. (Bug #14725008)
- When executing the `mysqldiskusage` utility on a remote MySQL server, the utility would report information about the local datadir if the remote and local datadir paths were identical. (Bug #13572814)
- The `--force` option was renamed to `--drop-first` for the `mysqldbcopy` utility. (Bug #13563798)

- When using the `mysqldbimport` utility without the `--drop-first` option, importing a valid SQL import file that included a `CREATE DATABASE` statement for a database that already existed did not yield a related error message. The associated error message was updated, and it also refers to the optional `--drop-first` option. (Bug #13563798)

- A new `--use-indexes` option was added to the `mysqldbcompare` utility. Before, this utility did not compare tables that lacked a primary key. The new `--use-indexes` option allows nonunique indexes to be used, although only indexes with columns not allowing null values are permitted.

  Use `--use-indexes` to specify the unique index to be used for the Table comparative. If the specified index allows null values, then a warning is generated, and the next unique index will be used if one exists as otherwise the utility will stop with an error. (Bug #13492195)

- The `--login-path` handling (via `mysql_config_editor`) with the `mysqlserverinfo` utility did not always behave consistently, nor did it always generate helpful information for the reported errors. (Bug #71654)

- On Microsoft Windows, the `mysqlserverclone` utility with the `--write-command` option would generate a script using surrounding Python subprocess.call style square [brackets]. (Bug #71628)

Changes in MySQL Utilities 1.4.1 (2013-12-17, Alpha)

This section documents all changes and bug fixes applied since the release of 1.4.0. It is also the first non-labs release of the 1.4.x branch.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- A new `--license` parameter was added to display the license text, and the `--version` parameter was updated to show the license type. (Bug #17634676)

- An Installer package (DMG) was added for OS X.

  A workaround was to compile the MySQL Utilities from source. (Bug #17347424, Bug #70123)

- The `mysqlfrm` utility now has the ability to produce a valid `.frm` file with the storage engine changed for any table that can be read by the `.frm` Reader in default mode. This ability requires you to specify `--new-storage-engine` and `--frmdir` (used to create and place .frm files, and the directory must exist). (Bug #17242369)

- Performance improvements, including multiprocessing support, was added to the `mysqldbexport`, `mysqldbimport` and `mysqldbcopy` utilities. Performance improvements include:

  `mysqldbexport`:

  - Multiprocessing by database for non-POSIX systems (Microsoft Windows) and by table for POSIX systems, using the new `--multiprocess` option.

  - A new `--output-file` parameter was added to store the export results instead of using the (slower) standard output. Export results are now always sent to a file, and only to stdout and the end if required.

  `mysqldbimport`:

  - Multiprocessing by file (independent of the operating system), using the new `--multiprocess` option.

  - Perform only a single COMMIT at the end of importing each file, by default. A new `--autocommit` option was added to allow each statement to be committed upon its execution.

- The bulk insert feature was improved (supports SQL statements). If the `--bulk-insert` option is enabled, then all INSERT statements are parsed and their data aggregated (if possible) in order to be executed as a single query.
- A new `--max-bulk-insert` option was added to control the maximum size of the bulk insert, in order to avoid broken pipe errors. When the maximum number of INSERT statements is reached, then a new bulk insert is created.

`mysqldbcopy`:

- Multiprocessing by database for non POSIX systems (Microsoft Windows) and by table for POSIX systems, using the new `--multiprocess` option.
- Remove/disable the previous thread feature.

(Bug #14725390)

Bugs Fixed

- Checks are now made to force that a MySQL server belongs to a single group. (Bug #17929077, Bug #71125)
- The **Backspace** key did not function in the `mysqluc` utility. (Bug #17909223)
- The `mysqlmetagrep` utility now emits an informative notice if an unsupported object type is passed in, such as "--search-objects=function" or "--object-types=function", when before it threw an unhandled exception. (Bug #17908146)
- The `mysqlfailover` utility threw an unexpected exception when a nonexistent slave was specified in the slaves list. (Bug #17903944)
- The required version of Connector/Python is now v1.0.8 or greater. (Bug #17864266)
- Attempting to use the `mysqldbcopy` utility to copy a database with one or more blob fields failed, and emit an error such as "TypeError: not all arguments converted during string formatting". (Bug #17722274)
- On Microsoft Windows, the `mysqlfabric` script would not execute easily due to it missing a file extension. The file is now named `mysqlfabric.py`.

  A workaround was to pass the script to a python executable, such as `python scripts \mysqlfabric`. (Bug #17639666, Bug #70694)
- With Fabric, the checkpoint routine could cause deadlocks. (Bug #17633546, Bug #71127)
- The help for the `--rpl` `mysqldbexport` utility parameter was improved to clarify that a destination/slave server cannot be specified for export. (Bug #17633465)
- The `mysqldbcopy` and `mysqldbexport` utilities were creating views before user-defined functions or procedures. As result, the copy or export failed if at least one of the views was using user-defined functions or procedures. Now, the functions and procedures are processed before the views. (Bug #17622298, Bug #70648)
- On Microsoft Windows, starting Fabric could hang due to insufficient resources when used with a 32-bit build of Python on a 64-bit Windows system. Error handling was also improved for related use cases. (Bug #17592301, Bug #71128)
- On Microsoft Windows, attempting to install the MySQL Utilities from source failed, as `setup.py` required a "/etc" directory. (Bug #17555531, Bug #70512)
- Improvements were made to the `mysqldbcopy` MUT tests. (Bug #17548335)

- Error reporting in the `mysqluc` utility was improved to clarify which utilities are generating the errors. (Bug #17510350)
- The `mysqlauditadmin` utility would unnecessarily set "audit_log_flush = ON" during a rotate operation. (Bug #17475780)
- The `mysqldbcopy` utility could emit an error and exit when cloning a database with foreign key constraints that pointed to multiple tables. (Bug #17474810)
- The `mysqlindexcheck` utility now informs the user when there was not enough data collected to produce a list of "best" and "worst" queries, when before it would seemingly ignore the table. (Bug #17457402, Bug #70339)
- On Microsoft Windows, the `list-commands` parameter of the `mysqlfabric` utility did not function. (Bug #17454423, Bug #71126)
- In MUT, the 'drop database' functionality is now centralized and reused throughout MUT, when before it was defined in multiple files. (Bug #17423074)
- On Microsoft Windows, the `mysqluc` utility would crash after clicking the home button in MySQL Workbench. (Bug #17415167)
- The Debian MySQL Utilities packages could not be installed if the installed Connector/Python package had a different license type, as the license type of both packages had to be identical. It is now possible to install a commercial version of Connector/Python with a GPL version of MySQL Utilities, or vice-versa. (Bug #17393742)
- When MySQL Utilities was installed using the RPM package, it was not possible to upgrade with a newer version, or change the license type from another RPM package to another without manually removing the installed package. (Bug #17393523)
- After executing the `mysqluserclone` utility without the optional `--source` parameter, which then attempted to use the default credentials, an unhandled exception would be thrown if the default credentials were invalid. The `--source` parameter is now required. (Bug #17217461)
- The `login-path` feature, as set in `.mylogin.cnf`, did not allow for login paths with special characters, such as dashes. (Bug #17214291)
- When the `mysqlfailover` connection to the master was killed, occasionally it caused an automatic fail over. `mysqlfailover` will now attempt to reconnect to the master, and after 3 attempts it will assume that the master is down. The connection to the master is not maintained between the reporting intervals. (Bug #17066910, Bug #69213)
- The `mysqlserverinfo` utility parsed error messages raised during the server connection, which could suggest actions that the user could take to fix the errors, such as using the start option when the server was offline. The error numbers are now used for the same purpose instead of parsing the error messages. (Bug #16386941)
- The `server_info_errors` test was unable to execute successfully on Microsoft Windows, and was temporary disabled. It is now enabled again, and was adjusted to function properly. (Bug #16226348)
- The `mysqlserverinfo` utility output did not display information about the error, general, slow query. and audit log files. (Bug #14181681)
- The `mysqlserverclone` utility did not check if the server passed to the `--server` parameter was local to the machine that `mysqlserverclone` was being executed on. (Bug #13773247)
- The `mysqlprocgrep` utility did not provide an option to search and kill processes by ID. The `--match-id` parameter was added, which searches processes by ID and allows them to be killed by ID. (Bug #13572964)
- The `--body` parameter of the `mysqlmetagrep` utility now supports views. (Bug #13563921)

- The `--character-set` option was added to utilities that allow the user to define the client character set used for the MySQL connection, such as `mysqldbexport` and `mysqldbimport`. If this option is not provided, then the character set retrieved from the MySQL Server variable `character_set_client` is used. (Bug #13417229)

Changes in MySQL Utilities 1.4.0 (Labs only, Alpha)

This section documents changes in the initial labs release of the new 1.4.x branch, and also includes the Fabric.

Version 1.4.0 has no changelog entries, or they have not been published because the product version has not been released.

Changes in Release 1.3

Changes in MySQL Utilities 1.3.6 (2013-12-18)

This section documents all changes and bug fixes applied since the release of 1.3.5. It is the final release of the 1.3.x branch.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- A new `--license` parameter was added to display the license text, and the `--version` parameter was updated to show the license type. (Bug #17634676)
- An Installer package (DMG) was added for OS X.

  A workaround was to compile the MySQL Utilities from source. (Bug #17347424, Bug #70123)
- The `mysqlfrm` utility now has the ability to produce a valid `.frm` file with the storage engine changed for any table that can be read by the `.frm` Reader in default mode. This ability requires you to specify `--new-storage-engine` and `--frmdir` (used to create and place .frm files, and the directory must exist). (Bug #17242369)
- Performance improvements, including multiprocessing support, was added to the `mysqldbexport`, `mysqldbimport` and `mysqldbcopy` utilities. Performance improvements include:

  `mysqldbexport`:

  - Multiprocessing by database for non-POSIX systems (Microsoft Windows) and by table for POSIX systems, using the new `--multiprocess` option.
  - A new `--output-file` parameter was added to store the export results instead of using the (slower) standard output. Export results are now always sent to a file, and only to stdout and the end if required.

  `mysqldbimport`:

  - Multiprocessing by file (independent of the operating system), using the new `--multiprocess` option.
  - Perform only a single COMMIT at the end of importing each file, by default. A new `--autocommit` option was added to allow each statement to be committed upon its execution.
  - The bulk insert feature was improved (supports SQL statements). If the `--bulk-insert` option is enabled, then all INSERT statements are parsed and their data aggregated (if possible) in order to be executed as a single query.

- A new `--max-bulk-insert` option was added to control the maximum size of the bulk insert, in order to avoid broken pipe errors. When the maximum number of INSERT statements is reached, then a new bulk insert is created.

`mysqldbcopy`:

- Multiprocessing by database for non POSIX systems (Microsoft Windows) and by table for POSIX systems, using the new `--multiprocess` option.
- Remove/disable the previous thread feature.

(Bug #14725390)

Bugs Fixed

- The **Backspace** key did not function in the `mysqluc` utility. (Bug #17909223)
- The `mysqlmetagrep` utility now emits an informative notice if an unsupported object type is passed in, such as "--search-objects=function" or "--object-types=function", when before it threw an unhandled exception. (Bug #17908146)
- The `mysqlfailover` utility threw an unexpected exception when a nonexistent slave was specified in the slaves list. (Bug #17903944)
- The required version of Connector/Python is now v1.0.8 or greater. (Bug #17864266)
- `mysqldbcompare` failed to properly compare the same views on different schemas. This caused the objects to be seen differently. (Bug #17864081, Bug #71022)
- Attempting to use the `mysqldbcopy` utility to copy a database with one or more blob fields failed, and emit an error such as "TypeError: not all arguments converted during string formatting". (Bug #17722274)
- The help for the `--rpl` `mysqldbexport` utility parameter was improved to clarify that a destination/slave server cannot be specified for export. (Bug #17633465)
- The `mysqldbcopy` and `mysqldbexport` utilities were creating views before user-defined functions or procedures. As result, the copy or export failed if at least one of the views was using user-defined functions or procedures. Now, the functions and procedures are processed before the views. (Bug #17622298, Bug #70648)
- On Microsoft Windows, attempting to install the MySQL Utilities from source failed, as `setup.py` required a "/etc" directory. (Bug #17555531, Bug #70512)
- Improvements were made to the `mysqldbcopy` MUT tests. (Bug #17548335)
- Error reporting in the `mysqluc` utility was improved to clarify which utilities are generating the errors. (Bug #17510350)
- The `mysqlauditadmin` utility would unnecessarily set "audit_log_flush = ON" during a rotate operation. (Bug #17475780)
- The `mysqldbcopy` utility could emit an error and exit when cloning a database with foreign key constraints that pointed to multiple tables. (Bug #17474810)
- The `mysqlindexcheck` utility now informs the user when there was not enough data collected to produce a list of "best" and "worst" queries, when before it would seemingly ignore the table. (Bug #17457402, Bug #70339)
- In MUT, the 'drop database' functionality is now centralized and reused throughout MUT, when before it was defined in multiple files. (Bug #17423074)

- On Microsoft Windows, the `mysqluc` utility would crash after clicking the home button in MySQL Workbench. (Bug #17415167)
- The Debian MySQL Utilities packages could not be installed if the installed Connector/Python package had a different license type, as the license type of both packages had to be identical. It is now possible to install a commercial version of Connector/Python with a GPL version of MySQL Utilities, or vice-versa. (Bug #17393742)
- When MySQL Utilities was installed using the RPM package, it was not possible to upgrade with a newer version, or change the license type from another RPM package to another without manually removing the installed package. (Bug #17393523)
- After executing the `mysqluserclone` utility without the optional `--source` parameter, which then attempted to use the default credentials, an unhandled exception would be thrown if the default credentials were invalid. The `--source` parameter is now required. (Bug #17217461)
- The `login-path` feature, as set in `.mylogin.cnf`, did not allow for login paths with special characters, such as dashes. (Bug #17214291)
- When the `mysqlfailover` connection to the master was killed, occasionally it caused an automatic fail over. `mysqlfailover` will now attempt to reconnect to the master, and after 3 attempts it will assume that the master is down. The connection to the master is not maintained between the reporting intervals. (Bug #17066910, Bug #69213)
- The `mysqlserverinfo` utility parsed error messages raised during the server connection, which could suggest actions that the user could take to fix the errors, such as using the start option when the server was offline. The error numbers are now used for the same purpose instead of parsing the error messages. (Bug #16386941)
- The `server_info_errors` test was unable to execute successfully on Microsoft Windows, and was temporary disabled. It is now enabled again, and was adjusted to function properly. (Bug #16226348)
- The `mysqlserverinfo` utility output did not display information about the error, general, slow query. and audit log files. (Bug #14181681)
- The `mysqlserverclone` utility did not check if the server passed to the `--server` parameter was local to the machine that `mysqlserverclone` was being executed on. (Bug #13773247)
- The `mysqlprocgrep` utility did not provide an option to search and kill processes by ID. The `--match-id` parameter was added, which searches processes by ID and allows them to be killed by ID. (Bug #13572964)
- The `--body` parameter of the `mysqlmetagrep` utility now supports views. (Bug #13563921)
- The `--character-set` option was added to utilities that allow the user to define the client character set used for the MySQL connection, such as `mysqldbexport` and `mysqldbimport`. If this option is not provided, then the character set retrieved from the MySQL Server variable `character_set_client` is used. (Bug #13417229)

Changes in MySQL Utilities 1.3.5 (2013-09-03, General Availability)

This section documents all changes and bug fixes applied since the release of 1.3.4.

Bugs Fixed

- On Microsoft Windows, the Community and Commercial installers would create separate installations and registry entries for each. Each installer will now completely uninstall the other edition first, so that only one MySQL Utilities edition is installed at a time. (Bug #17353571)
- The source packages of Utilities 1.3.4 were repackaged with only the GPL-referencing LICENSE and README files, signed and posted as 1.3.4a on dev.mysql.com for download. These source

packages were identical to the original 1.3.4 community source packages, except README_com.txt and LICENSE_com.txt have been removed. (Bug #17316515, Bug #70050)

- When running an export with the `mysqldbexport` utility, the foreign key check disable/enable statements were not being generated. The foreign key constraint settings are now generated in the form of SQL commands embedded in the output. (Bug #17271100)
- On Microsoft Windows, the community and commercial build descriptors were being shared, which caused the Uninstall option in the `Control Panel` to list two installations with the same name. The commercial edition is now listed as "MySQL Utilities Commercial". (Bug #17256821)
- The rpl_admin MUT tests were improved. (Bug #17205680)
- The `mysqldiff` utility now has a new `--skip-table-options` option to ignore the differences between all table options, such as AUTO_INCREMENT, ENGINE, CHARSET, etc.). A warning is issued if the `--skip-table-options` option is used and table option differences are found. (Bug #17061126, Bug #69669, Bug #73895)

Changes in MySQL Utilities 1.3.4 (2013-08-02, General Availability)

This is the first GA release of the 1.3.x branch, and this section documents all changes and bug fixes applied since the release of 1.3.3.

Functionality Added or Changed

- The `mysqlfailover` utility may now run as a POSIX daemon. This daemon may be controlled using the `--daemon` option with either start, stop, or restart. Running the failover daemon in the foreground is also possible by using 'nodetach' with the --daemon option.

  This does now apply to Microsoft Windows. (Bug #16918106)

Bugs Fixed

- The commercial .deb packages now only bundle ".pyc" files, when before the source ".py" files were also bundled. (Bug #17256924)
- The MUT test suite was improved. MUT was trying to save the current tty settings without checking if it was running inside a tty, which for example did not allow MUT to run in `Jenkins`. Also, MUT would sometimes fail on Microsoft Windows. (Bug #17086766)
- It was possible to install the 64-bit Debian build on a 32-bit system. The platform name and version is now available to the MySQL Utilities Debian package. (Bug #17064771)
- The `mysqldiff` utility failed to identify differences correctly when tables were encountered with non-standard characters in their names, such as "-", so backticks are now added to all table names before executing the compare. (Bug #17062943, Bug #69681)
- For the `mysqluc` console utility, if the string "error" resulted from a `--help` call from another utility, an unexpected error would be generated. This utility now determines if `--help` was used.

  A new `show errors` (shows all error codes and output from stderr, which are now saved), `show last error` (shows the last error that occurred), and `clear errors` (erases the list of errors) commands were added to the `mysqluc` utility. (Bug #17019115)
- The `README` file was updated to reflect the Python version 2.6 or 2.7 requirement. (Bug #16917767, Bug #68614)
- The `GRANT` privelege check for the `mysqlfailover` utility did not validate against `SHOW GRANTS` output like `WITH GRANT OPTION`. (Bug #16904385)

- The `mysqlindexcheck` utility failed to identify clustered index redundancies for secondary keys, such as secondary indexes that included the clustered index (primary key). These are now identified, and appropriate `ALTER TABLE` statements (to remove the clustered index columns from the index) are now generated when the `--show-drops` option is used.

  

  Note

  This kind of index redundancy is engine specific, and only applies to InnoDB storage engines.

  (Bug #16900862)

- The failover tests would not run on Microsoft Windows. The test was not waiting for a proper start of the failover console before killing the master server. It now waits for the failover console to start its monitoring process before allowing the master server to be killed. (Bug #16005010)

- The RPL import tests had timing issues, and were disabled on Microsoft Windows. These issues were fixed, and these tests are now executed on all platforms. (Bug #16003529)

- The `mysqlserverclone` utility now generates a readable error when a remote host is passed to its `--server` option, and now checks if the host provided is an alias of the localhost. The `is_alias()` method from the server module was also improved to more accurately detect aliases of 'localhost', and it now handles local domain names ending with '.lan'. (Bug #13773197)

- For the `mysqluserclone` utility, when either `--dump` or `--list` was passed in, along with `--destination`, the utility silently ignored the destination connection. A warning is now emitted when `--destination` is passed in but not needed. (Bug #13577018)

- For the `mysqldbimport` utility, delimiters and multi-line query handling was fixed, which allows the Sakila sample database to be imported. (Bug #13103450, Bug #62494)

- For the `mysqldbcopy` and `mysqldbexport` utilities, the default search behavior changed from `SQL REGEXP` to `SQL LIKE`. The `--exclude` option already allowed the use of `SQL LIKE` patterns, and now passing in `--regexp` will switch the search to `SQL REGEXP`. (Bug #12889758)

Changes in MySQL Utilities 1.3.3 (2013-07-08)

This section documents all changes and bug fixes applied since the release of 1.3.2.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- The required Python version changed from 2.7 to 2.6, to better accommodate a wider range of operating systems. (Bug #16953933)

Bugs Fixed

- The `START SLAVE` statement failed when a MySQL server was started with the `--master-info-repository=TABLE` and `--relay-log-info-repository=TABLE` options, and with autocommit mode disabled. This fix provides a workaround by enabling autocommit ("SET autocommit=1") before executing a `START SLAVE` statement. This allows the utility to function with past and future versions of MySQL server. (Bug #17029968, Bug #16745357, Bug #68657)

- The MUT test suite failed or run slowly on systems with a low amount of memory. This was improved by now killing MySQL instances that are no longer required to execute other tests. (Bug #16991428)

- The `mysqldiskusage` utility crashed when used on servers with strangely named databases, such as "foo`bar". The encoding was updated so the proper database directory is now referenced. (Bug #16920452)

- When executing `mysqldbcompare` with `--difftype=sql` on a table without a primary key, the uncommented text "No primary key found." was added to the generated SQL. This text is now commented. (Bug #16920156, Bug #69227)
- The help text for the `mysqluc` utility contained outdated copyright information. (Bug #16860031, Bug #16832071, Bug #69281)
- Using long variables names in `mysqluc` would throw an unhandled exception when executing `SHOW variables`. The variable names are now truncated if their width exceeds the maximum allowable width.

  Support for passing in multiple variables to the `mysqluc` utility was also fixed. (Bug #16832161, Bug #69284)
- The `mysqlindexcheck` utility was not quoting objects identifiers with backticks in the generated SQL. (Bug #16832125, Bug #69283)
- The `mysqldiskusage` utility's `innodb_file` listing did not use the system's localization for displaying digits. (Bug #16832089, Bug #69282)
- The `mysqlfailover` utility was incorrectly recognizing the `GRANT OPTION` privilege. It now checks if slaves have `SELECT` and `RELOAD` privileges, which are now required to successfully execute failover due to recent improvements. (Bug #16820207)
- Termination of the master connection for the `mysqlfailover` utility caused an ungraceful failure. (Bug #16805721, Bug #69210)
- While performing a switchover, some errors were printed but not saved to the log file. (Bug #16800645, Bug #69195)
- The `mysqlserverinfo` utility displayed misleading error information when accessing a remote MySQL server. The utility would attempt to retrieve the configuration defaults of the specified remote MySQL server, but they can only be retrieved locally. A proper warning is now emitted. (Bug #16799550, Bug #69197)
- The `--start-timeout` option was added to the `mysqlserverinfo` utility. It determines the number of seconds to wait for the server to be online when started in read-only mode using the `--start` option. The default value is 10 seconds. (Bug #16799550, Bug #69197)
- The `mysqldiskusage` utility did not display the binary log usage data when used from a remote host. It is now displayed using `SHOW BINARY LOGS` when the utility is executed from a remote host. Now, the required privileges (to execute required queries) are also checked before retrieving the logs usage, and an appropriate error is issued when appropriate.

  The list of relay log files was not displayed properly if `relay_log_basename` was empty. The default prefix is now used in this case. (Bug #16799466, Bug #69198)
- On Microsoft Windows, a shortcut was added to the Start Menu named **MySQL Utilities Console**, an option to launch the utilities immediately after installing them was added, and exiting the installer now notifies the user of this shortcut. (Bug #16748143)
- The `--status=STATUS` option was added to the `mysqlauditgrep` utility. It accepts a comma-separated list of MySQL error codes (integers). (Bug #16703480, Bug #69034)
- The `mysqlauditgrep` utility option `--query-type` was improved to avoid false positives. (Bug #16617624, Bug #68891)
- The utilities console (`mysqluc`) now reads the help and options information from other utilities on-demand, rather than at startup. (Bug #16344168)
- The replication utilities would halt operations with a "Not enough permissions" error even with `--skip-grant-tables` enabled. The user privileges check is now disabled if the MySQL server has grants disabled. (Bug #14348434)

- The `mysqldbcopy` utility did not copy the default charset from the original database. `mysqldbcopy` will now query the default charset and collation from the original database and set these values (if they exist) on the destination database. (Bug #13893128)
- The `mysqldbcopy` utility failed to copy foreign key constraints while it cloned databases, and the `--new-storage-engine` and `--default-storage-engine` options did not function correctly while cloning databases. (Bug #13519748, Bug #63783)
- The default charset for MySQL connections is now set to "utf8" instead of latin1, in order to support non-latin data. (Bug #13417229, Bug #14383887, Bug #65273)

Changes in MySQL Utilities 1.3.2 (2013-06-14)

This section documents all changes and bug fixes applied since the release of 1.3.1.

Bugs Fixed

- The file name of the source RPM distribution (src.rpm) contained the Linux distribution tag. Source RPMs will now be created without this tag and have a more generic name. (Bug #16806001)
- The `mysqlserverclone` and `mysqlfrm` utilities now accept a timeout to wait option (`--timeout`) for the cloned server to start. This helps situations where the mysqld process takes a long time to start. The default `--timeout` value is 10 seconds. (Bug #16625962, Bug #68905)
- The `mysqlfrm` utility now respects the `--user` option. (Bug #16625961, Bug #68906)
- The `mysqlfrm` utility was missing from the `mysqluc` interface. (Bug #16605696)
- The `mysqlfrm` utility can now read tables (`.frm` files) that contain special characters in the table names. (Bug #16499681)
- The calculation of column sizes has been fixed for the default mode.

  For diagnostic mode, this change allows for the correct adjustment of columns widths for INTEGER and related field types, identification of TEXT versus BINARY fields, and correct field length for VARCHAR fields. The column size in diagnostic mode requires the `--server` value to be accurate. (Bug #16459749)

Changes in MySQL Utilities 1.3.1 (2013-04-26)

This section documents all changes and bug fixes applied since the release of 1.3.0, which only includes all changes that were applied to versions 1.2.1 and 1.2.2.

Functionality Added or Changed

- Support was added for reading port and socket associated with authentication credentials stored in an option file named `.mylogin.cnf`. See `mysql_config_editor` — MySQL Configuration Utility. (Bug #16290692)
- The failover operation was improved and now searches for any transactions on the slaves that have not been read from the relay log. Failover will now gather all of these events to the candidate slave before failover is complete. (Bug #16283330)
- The switchover and failover external scripts now accept parameters from the utility. This permits custom scripts to execute application-specific operations during the process. The data passed is as follows:

`SWITCHOVER`

- `exec_before` : old master host, old master port, new master host, new master port
- `exec_after` : new master host, new master port

`FAILOVER`

- `exec_fail` : old master host, old master port
- `exec_before` : old master host, old master port, new master host, new master port
- `exec_post_failover` : old master host, old master port, new master host, new master port
- `exec_after` : old master host, old master port, new master host, new master port

(Bug #14157692)

Bugs Fixed

- On Microsoft Windows, the `mysqluc` utility failed to list the MySQL Utilities because the `.exe` extension was not being scanned. (Bug #16714425)
- The `mysqlrpladmin` command switchover routine would hang when configured with an invalid master. (Bug #16597814)
- A utility would emit a generic error and halt execution if the utility was executed with an unsupported Python version, and if the utility did not have a file extension. (Bug #16587341)
- When using the `mysqlrpladmin` utility, the slaves specified with the `--slaves` option now verify if they are configured for the specified master as per the `--master` option when the switchover command is executed. By default, the switchover will output an error and halt execution unless the `--force` option is used.

  Also, errors are now reported when offline servers are included in the `--slaves` list. (Bug #16584598)
- The `mysqlrpladmin` utility now properly handles the way aliases are searched, compared, and handled. (Bug #16571812)
- The `mysqlrpladmin` utility will now emit an error and halt execution if the new master specified is the original master (when the `--master` and `--new-master` options are the same). (Bug #16565502)
- The `mysqlrpladmin` utility now uses the `--ping` value (default of 3) instead of `--timeout` (default of 300) as the time for the retry when checking slaves for errors after executing a switchover (or failover) command. (Bug #16520505)
- The `mysqlrpladmin` would crash while executing the failover command when GTID mode was disabled on one of the slaves. It now emits an error and identifies the slaves with GTID_MODE = OFF, and the slaves that do not support GTID. (Bug #16489494)
- The `mysqlfailover` utility ignored the `--interval` option. (Bug #16327743)
- A `--no-keyboard` was added to the `mysqlfailover` utility, and it defaults to false. When enabled, pressing **Control** + **C** will terminate the program. This new option allows this utility to function without a terminal, so that it can be invoked from external programs such as a Java based framework. (Bug #16327406)
- Some source files were missing license and/or copyright information. (Bug #16283254)
- The following changes were made to the MySQL Utilities:

- The `mysqlrpladmin --master` option is no longer required for the start, stop and reset operations. Without `--master`, this utility will not check if the specified slaves are configured for the specified master.
- The `--discover-slaves-login` and `--slaves` options cannot be used simultaneously for any command, otherwise an error will be generated and the utility will exit.
- The output from when a slave is discovered (when `--discover-slaves-login` is passed in) was improved, and skipped slaves with I/O threads not running are now identified.
- The verbosity option was added to `mysqlrplshow`. When the `--verbose` option is passed in, the utility shows if the I/O threads of the slaves are running.

(Bug #16268060)

- Messages and handling of stop, start, and reset slaves has been improved for the `mysqlrpladmin` utility.

  The `--discover-slave-login` option is no longer allowed for stop, start, and reset operations, as instead the `--slave` option is required. (Bug #16243584)

- Utilities were enhanced to check the Python version required for each utility. (Bug #16238348)
- Errors for connection failures have been improved, as more details about the type of failure is presented. (Bug #16237986)
- The `mysqlserverclone` utility did not expand to the user's home directory when using the tilde ("~") while specifying a path for the `--basedir` option. (Bug #16231372)
- The status for all slaves is now checked using `SHOW SLAVE STATUS` before a failover operation is started. Errors are now reported, and a warning indicates that the failover operation might result in an unstable replication topology.

  For `mysqlfailover`, the process will not stop if errors are found unless the `--pedantic` option is passed in. For `mysqlrpladmin`, the process will stop if errors are found unless the `--force` option is passed in, in which case the operation will emit a warning and continue.

  

  Note

  I/O errors on slaves are expected (prior to failover) since the master is down, therefore only SQL errors are checked.

  (Bug #16210447)

- When a switchover was performed with `--demote-master`, the old master would still show as a master to the new master (the promoted slave), in that the `--demote-master` failed to unlink with a new master in the topology. (Bug #16210246)
- A switchover operation failed due to a missing or incorrect password for the replication (`--rpl-user`) user.

  New behavior when a password is not specified: When `--force` is passed in, the password will be cleared for the specified user. If `--force` is not passed in, then an error will be generated.

  New behavior when a password is specified and invalid: When `--force` is passed in, the password will be overwritten and used for the specified user so the master server can be located. If `--force` is not passed in, then an error will be generated. (Bug #16210222)

- The replication utilities will now check the slaves for errant transactions (these are transactions that only exist on one slave) prior to executing failover. For `mysqlfailover` this means generating a warning and only stopping if the `--pedantic` option is passed in, and for `mysqlrpladmin` this

means generating an error, and halting execution unless the `--force` option is passed in. (Bug #16205200)

- The replication utilities can now handle the IPv4 (127.0.0.1) and IPv6 ([::1]) loopback IP addresses, instead of only localhost as the generic hostname. (Bug #16204732)
- `mysqlrpladmin` will now generate a warning if the `--master` option is passed to it but not required, when before it would sometimes generate an error, depending on other circumstances.

  Passing in `--discover-slaves-login` will generate an error, because the master information is not available.

  The `--slaves` option is now required. (Bug #16202902)
- The switchover operation with `--demote-master` now disconnects the new master from the old master to complete the move of the candidate slave to the new master. (Bug #16177167)
- All interactive-specific `exit()` calls were replaced with the standard `sys.exit()` method. This conforms to the current Python standards. (Bug #16167359)
- Error handling for the `mysqlreplicate` utility was improved to check all errors on the slaves. (Bug #16164767)
- The MySQL Utilities library only partially supported IPv6. Valid values starting with `::` were either parsed incorrectly or identified as invalid. (Bug #15903171)
- String quoting was improved for the `mysqldbcopy`, `mysqldbexport`, and `mysqldbimport` utilities. (Bug #14348501)
- The log parser was changed to accept host names with dots or hyphens. (Bug #14172941)
- `mysqldiff` and `mysqldbcompare` did not function on tables that contained a hyphen ("-") in their name, and these utilities would abort with unknown errors. (Bug #13650863)
- Copyright and version information was added to the `--help` output for each utility. (Bug #13383767)
- The unit tests were corrected to detect if the `mysql_config_editor` is present. If not, unit tests that require it are skipped. (Bug #68356)
- The `mysqluc` utility was optimized to locate the available MySQL Utilities more efficiently. Before it would scan the entire installation directory for available executables, but now it uses hardcoded values, and also scans for executables with the "mysql" prefix. (Bug #68322, Bug #16382195)
- The entire MySQL Utilities package was updated to facilitate RPM packaging. These changes include license updates, the removal of unnecessary shebang's, and the `mut` manual page was moved and is no longer listed with the other utilities. (Bug #68182, Bug #13956819)
- The `mysqldiff` utility would consider two tables as different if the columns or indexes were ordered differently. (Bug #65169, Bug #16410648)
- Connection strings would not accept usernames or passwords that contained a hyphen ("-"). Using single or double quotes is now supported. For example, passing in `--server="user:'pass@:-chars'@localhost"` as a connection string to a MySQL Utility is now valid. (Bug #65168, Bug #14383884, Bug #15836908)
- All fixes from the 1.2.1 and 1.2.2 MySQL Utilities releases were merged into the 1.3.x branch, and released as version 1.3.1.

Changes in MySQL Utilities 1.3.0 (2013-04-03)

This section documents changes in the initial release of the new 1.3.x branch, and includes all changes in version 1.2.0.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- By design, the `mysqlfrm` utility would not execute as root. This restriction was removed, and a new `--user` option was added that specifies the MySQL user account that will execute the MySQL Server. The `--user` option is required when executing the command as root, as either `su` or `sudo`. (Bug #16445510)
- The `mysqlfrm` utility failed to read `.frm` files with dotted names, such as `this.has.dots.frm`. A workaround was to rename the file. (Bug #16439679)
- The `mysqlfrm` utility was added. It is designed as a recovery tool that reads `.frm` files and produces `CREATE` statements from the table definition data found in the file.

Bugs Fixed

- On Microsoft Windows, the `README` file was incorrect, and was removed from the distribution. (Bug #16605748)
- On Microsoft Windows, and when sockets were not used, specifying a port that was already used on Microsoft Windows could cause the clone of a MySQL Server to fail when using the `mysqlfrm` utility. A workaround was to specify the `--root-password` option so that the cloned MySQL Server could change the password. The specified port is now checked to ensure that it is free, otherwise the clone will fail with an exception. This fix impacts all utilities that handle MySQL Server cloning. (Bug #16454212)
- The documentation is now bundled, and exists in the `doc/` folder. (Bug #68610)

Changes in Release 1.2

Changes in MySQL Utilities 1.2.4 (2013-07-08)

This section documents all changes and bug fixes applied since the release of 1.2.3.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- The required Python version changed from 2.7 to 2.6, to better accommodate a wider range of operating systems. (Bug #16953933)

Bugs Fixed

- The `START SLAVE` statement failed when a MySQL server was started with the `--master-info-repository=TABLE` and `--relay-log-info-repository=TABLE` options, and with autocommit mode disabled. This fix provides a workaround by enabling autocommit ("SET autocommit=1") before executing a `START SLAVE` statement. This allows the utility to function with past and future versions of MySQL server. (Bug #17029968, Bug #16745357, Bug #68657)
- The MUT test suite failed or run slowly on systems with a low amount of memory. This was improved by now killing MySQL instances that are no longer required to execute other tests. (Bug #16991428)
- The `mysqldiskusage` utility crashed when used on servers with strangely named databases, such as "foo`bar". The encoding was updated so the proper database directory is now referenced. (Bug #16920452)
- When executing `mysqldbcompare` with `--difftype=sql` on a table without a primary key, the uncommented text "No primary key found." was added to the generated SQL. This text is now commented. (Bug #16920156, Bug #69227)

- The help text for the `mysqluc` utility contained outdated copyright information. (Bug #16860031, Bug #16832071, Bug #69281)
- Using long variables names in `mysqluc` would throw an unhandled exception when executing `SHOW variables`. The variable names are now truncated if their width exceeds the maximum allowable width.

  Support for passing in multiple variables to the `mysqluc` utility was also fixed. (Bug #16832161, Bug #69284)
- The `mysqlindexcheck` utility was not quoting objects identifiers with backticks in the generated SQL. (Bug #16832125, Bug #69283)
- The `mysqldiskusage` utility's `innodb_file` listing did not use the system's localization for displaying digits. (Bug #16832089, Bug #69282)
- The `mysqlfailover` utility was incorrectly recognizing the `GRANT OPTION` privilege. It now checks if slaves have `SELECT` and `RELOAD` privileges, which are now required to successfully execute failover due to recent improvements. (Bug #16820207)
- Termination of the master connection for the `mysqlfailover` utility caused an ungraceful failure. (Bug #16805721, Bug #69210)
- While performing a switchover, some errors were printed but not saved to the log file. (Bug #16800645, Bug #69195)
- The `mysqlserverinfo` utility displayed misleading error information when accessing a remote MySQL server. The utility would attempt to retrieve the configuration defaults of the specified remote MySQL server, but they can only be retrieved locally. A proper warning is now emitted. (Bug #16799550, Bug #69197)
- The `--start-timeout` option was added to the `mysqlserverinfo` utility. It determines the number of seconds to wait for the server to be online when started in read-only mode using the `--start` option. The default value is 10 seconds. (Bug #16799550, Bug #69197)
- The `mysqldiskusage` utility did not display the binary log usage data when used from a remote host. It is now displayed using `SHOW BINARY LOGS` when the utility is executed from a remote host. Now, the required privileges (to execute required queries) are also checked before retrieving the logs usage, and an appropriate error is issued when appropriate.

  The list of relay log files was not displayed properly if `relay_log_basename` was empty. The default prefix is now used in this case. (Bug #16799466, Bug #69198)
- The `--status=STATUS` option was added to the `mysqlauditgrep` utility. It accepts a comma-separated list of MySQL error codes (integers). (Bug #16703480, Bug #69034)
- The `mysqlauditgrep` utility option `--query-type` was improved to avoid false positives. (Bug #16617624, Bug #68891)
- The utilities console (`mysqluc`) now reads the help and options information from other utilities on-demand, rather than at startup. (Bug #16344168)
- The replication utilities would halt operations with a "Not enough permissions" error even with `--skip-grant-tables` enabled. The user privileges check is now disabled if the MySQL server has grants disabled. (Bug #14348434)
- The `mysqldbcopy` utility did not copy the default charset from the original database. `mysqldbcopy` will now query the default charset and collation from the original database and set these values (if they exist) on the destination database. (Bug #13893128)
- The `mysqldbcopy` utility failed to copy foreign key constraints while it cloned databases, and the `--new-storage-engine` and `--default-storage-engine` options did not function correctly while cloning databases. (Bug #13519748, Bug #63783)

- The default charset for MySQL connections is now set to "utf8" instead of latin1, in order to support non-latin data. (Bug #13417229, Bug #14383887, Bug #65273)

Changes in MySQL Utilities 1.2.3 (2013-06-14)

This section documents all changes and bug fixes applied since the release of 1.2.2.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- A new return value threshold may be set using the `--script-threshold` option for switchover and failover operations with the `mysqlfailover` utility. You may specify a threshold for checking the return code for external scripts. If the return value is greater than or equal to the threshold, then the operation will fail.

  Default behavior is to report return codes for scripts, but to not fail. (Bug #16664899)

- The `mysqldbimport` utility can now import raw CSV files by passing in `--format=raw`.

  The first row in the CSV file is used for the columns names that are also used in the `INSERT` statement, so the presence of all columns and their order are not important. The `--table` option is required, and is defined as *`dbname.tablename`*. (Bug #12952424)

Bugs Fixed

- The `mysqluc` utility would ignore the Python binary that was used to call the utility, and instead it used the system's Python binary. `mysqluc` will now use the Python version that calls it. (Bug #16859970, Bug #16887937)

- The `mysqldbcompare` utility was not generating valid SQL queries for routines that included statements that ended with a semi-colon (;) in the body. This lead to errors when executing the generated SQL with the MySQL Client. Routines are now wrapped with a proper `DELIMITER` clause.

  The `DEFINER` user@host and routine names in `CREATE` statements are now correctly quoted with backticks. (Bug #16745042)

- The `mysqluc` utility will now emit a warning when a utility is called that cannot be loaded. It reveals that the utility will not appear in the 'help utilities' and that the utility is not accessible from the console. (Bug #16730148)

- The `mysqldbcompare` utility will now exit when an error is raised, rather than exit with a message reporting the status of the database compare. (Bug #16565538)

- The `session_id` attribute was added to the slow query log parser, which is present in logs that are generated by MySQL Server 5.6 and greater. (Bug #16553949)

- The `mysqlserverclone` utility now accepts paths with spaces, and `mysqldiskusage` now lists log files alphabetically. (Bug #16485689)

- The validation of required options for `mysqlrpladmin` was improved. Forgetting to pass in `--master` would generate an unexpected error but now yields an informative warning. (Bug #16465309)

- The `mysqlrpladmin` utility would create an incorrect topology. The new master was setting itself as master instead of clearing its replication configuration, and the new master configuration is now reset (i.e., it executes `RESET SLAVE ALL`) at the end of the failover process. (Bug #16461533)

- The `README` was updated to include information about how to manually remove the MySQL Utilities, since `setup.py` does not support an uninstall method. (Bug #16422080)

- The output of `mysqlrplshow` now includes the state of slaves, in addition to the state of their IO and SQL threads. The display for this output is controlled with the `--verbosity` option. Use `-vvv` to show all data. (Bug #16268281)

- Executing the `mysqldbimport` utility and passing in `--format=csv` and `--import=data` on a file that had SET statements would generate an error. The SET statements are now treated set as definitions and not as data.

  If there is not data in the file and the `--import=data` option is used, an appropriate error message is now displayed. (Bug #16227817)

- The `mysqldiskusage` utility would incorrectly calculate the size as it incorrectly rounded units by dividing using integers instead of floats. (Bug #16090525)

- The `mysqldbexport` utility was improved by removing the incorrect replacement of '%' by '%%' in `GRANT` statements, correctly identifying and quoting `VARCHAR` data types for export, generating SQL statements with `NULL` instead of `None` for columns without values, and converting all special characters in strings with the correct escape sequence. In addition, this also fixes a `mysqldbimport` issue that was duplicating the last data row from tables imported with files in the `GRID`, `CSV`, `TAB` and `VERTICAL` formats (but not the `SQL` format). (Bug #14799141)

- A check was added for finding if `Connector/Python` is missing or inaccessible. It should be accessible via the `PYTHONPATH` path variable. (Bug #14769351)

- The `mysqldiff` and `mysqldbcompare` utilities failed to find differences when database objects had the same name with different types. Both the type and name are now compared. The display messages were also improved. (Bug #14762202, Bug #67224)

- The `mysqldbcompare` utility could generate false hits for missing or changed data due to the algorithm using a small key to generate the checksum spans of the rows. The default key length was increased from 4 to 8 which allows increasingly accurate hits. A new option (`--span-key-size`) was also added to allow you to change this value to increase granularity of the key comparison.

  The new `--span-key-size` option changes the size of the key used for the comparison of table contents. A higher value can help generate more accurate results when comparing large databases, but larger values may decrease performance. The default value is 8. (Bug #14672819, Bug #16204629)

- Typos and inconsistencies were fixed in the `--help` screen. (Bug #14348411)

- `SHOW VARIABLES LIKE '_MAXALLOWED_PACKET'` was replaced by `@@session.max_allowed_packet variable` in the `mysqldbcompare` check for the maximum allowed packet. (Bug #14348238)

- The `mysqldbcompare`, `mysqlrpladmin`, `mysqlrplcheck`, and `mysqlreplicate` utilities now check for the required options. Failing to pass in the required options would cause a fatal error. (Bug #14348129, Bug #16589086, Bug #16584752, Bug #16793214, Bug #69193)

- The `mysqldbimport` utility can now import a database with multiple column keys. (Bug #14146713)

- The `mysqldbcompare` utility would yield inconsistent output when two databases did not share objects, or when two databases were empty (with no objects). It would print "Databases are consistent" even though the output showed that they were not consistent. (Bug #13846309)

- The vertical format output for all utilities will now show "1 row" when viewing a single row, or otherwise "n rows". Before it would always write "n rows", including "1 rows". (Bug #13573446)

- The `mysqlindexcheck` utility ignored the values specified via the `--best` and `--worst` options. (Bug #13559424)

- The algorithm to calculate the number of transactions behind the master was fixed for the health report of the replication utilities. (Bug #69209, Bug #16554609)

- The `mysqlauditgrep` utility now parses multi-line entries. (Bug #69033, Bug #16703482)
- `mysqldcopy` was failing to copy views if there was not a space before the database name for the selected fields. Support for spaces and parentheses before the database name was added. (Bug #64656, Bug #13864671)

Changes in MySQL Utilities 1.2.2 (2013-04-26)

This section documents all changes and bug fixes applied since the release of 1.2.1.

Bugs Fixed

- On Microsoft Windows, the `mysqluc` utility failed to list the MySQL Utilities because the `.exe` extension was not being scanned. (Bug #16714425)
- The `mysqlrpladmin` command switchover routine would hang when configured with an invalid master. (Bug #16597814)
- A utility would emit a generic error and halt execution if the utility was executed with an unsupported Python version, and if the utility did not have a file extension. (Bug #16587341)
- When using the `mysqlrpladmin` utility, the slaves specified with the `--slaves` option now verify if they are configured for the specified master as per the `--master` option when the switchover command is executed. By default, the switchover will output an error and halt execution unless the `--force` option is used.

  Also, errors are now reported when offline servers are included in the `--slaves` list. (Bug #16584598)
- The `mysqlrpladmin` utility now properly handles the way aliases are searched, compared, and handled. (Bug #16571812)
- The `mysqlrpladmin` utility will now emit an error and halt execution if the new master specified is the original master (when the `--master` and `--new-master` options are the same). (Bug #16565502)
- The `mysqlrpladmin` utility now uses the `--ping` value (default of 3) instead of `--timeout` (default of 300) as the time for the retry when checking slaves for errors after executing a switchover (or failover) command. (Bug #16520505)
- The `mysqlrpladmin` would crash while executing the failover command when GTID mode was disabled on one of the slaves. It now emits an error and identifies the slaves with GTID_MODE = OFF, and the slaves that do not support GTID. (Bug #16489494)
- The `mysqlfailover` utility ignored the `--interval` option. (Bug #16327743)
- A `--no-keyboard` was added to the `mysqlfailover` utility, and it defaults to false. When enabled, pressing **Control** + **C** will terminate the program. This new option allows this utility to function without a terminal, so that it can be invoked from external programs such as a Java based framework. (Bug #16327406)
- The following changes were made to the MySQL Utilities:
  - The `mysqlrpladmin --master` option is no longer required for the start, stop and reset operations. Without `--master`, this utility will not check if the specified slaves are configured for the specified master.
  - The `--discover-slaves-login` and `--slaves` options cannot be used simultaneously for any command, otherwise an error will be generated and the utility will exit.
  - The output from when a slave is discovered (when `--discover-slaves-login` is passed in) was improved, and skipped slaves with I/O threads not running are now identified.

- The verbosity option was added to `mysqlrplshow`. When the `--verbose` option is passed in, the utility shows if the I/O threads of the slaves are running.

(Bug #16268060)

- The `mysqlserverclone` utility did not expand to the user's home directory when using the tilde ("~") while specifying a path for the `--basedir` option. (Bug #16231372)

- The status for all slaves is now checked using `SHOW SLAVE STATUS` before a failover operation is started. Errors are now reported, and a warning indicates that the failover operation might result in an unstable replication topology.

  For `mysqlfailover`, the process will not stop if errors are found unless the `--pedantic` option is passed in. For `mysqlrpladmin`, the process will stop if errors are found unless the `--force` option is passed in, in which case the operation will emit a warning and continue.

  

  Note

  I/O errors on slaves are expected (prior to failover) since the master is down, therefore only SQL errors are checked.

  (Bug #16210447)

- When a switchover was performed with `--demote-master`, the old master would still show as a master to the new master (the promoted slave), in that the `--demote-master` failed to unlink with a new master in the topology. (Bug #16210246)

- A switchover operation failed due to a missing or incorrect password for the replication (`--rpl-user`) user.

  New behavior when a password is not specified: When `--force` is passed in, the password will be cleared for the specified user. If `--force` is not passed in, then an error will be generated.

  New behavior when a password is specified and invalid: When `--force` is passed in, the password will be overwritten and used for the specified user so the master server can be located. If `--force` is not passed in, then an error will be generated. (Bug #16210222)

- The replication utilities will now check the slaves for errant transactions (these are transactions that only exist on one slave) prior to executing failover. For `mysqlfailover` this means generating a warning and only stopping if the `--pedantic` option is passed in, and for `mysqlrpladmin` this means generating an error, and halting execution unless the `--force` option is passed in. (Bug #16205200)

- The replication utilities can now handle the IPv4 (127.0.0.1) and IPv6 ([::1]) loopback IP addresses, instead of only localhost as the generic hostname. (Bug #16204732)

- `mysqlrpladmin` will now generate a warning if the `--master` option is passed to it but not required, when before it would sometimes generate an error, depending on other circumstances.

  Passing in `--discover-slaves-login` will generate an error, because the master information is not available.

  The `--slaves` option is now required. (Bug #16202902)

- The MySQL Utilities library only partially supported IPv6. Valid values starting with `::` were either parsed incorrectly or identified as invalid. (Bug #15903171)

- `mysqldiff` and `mysqldbcompare` did not function on tables that contained a hyphen ("-") in their name, and these utilities would abort with unknown errors. (Bug #13650863)

- Copyright and version information was added to the `--help` output for each utility. (Bug #13383767)

- The `mysqluc` utility was optimized to locate the available MySQL Utilities more efficiently. Before it would scan the entire installation directory for available executables, but now it uses hardcoded values, and also scans for executables with the "mysql" prefix. (Bug #68322, Bug #16382195)
- The `mysqldiff` utility would consider two tables as different if the columns or indexes were ordered differently. (Bug #65169, Bug #16410648)
- Connection strings would not accept usernames or passwords that contained a hyphen ("-"). Using single or double quotes is now supported. For example, passing in `--server="user:'pass@:-chars'@localhost"` as a connection string to a MySQL Utility is now valid. (Bug #65168, Bug #14383884, Bug #15836908)

Changes in MySQL Utilities 1.2.1 (2013-02-28)

This section documents all changes and bug fixes applied since the release of 1.2.0.

Functionality Added or Changed

- Support was added for reading port and socket associated with authentication credentials stored in an option file named `.mylogin.cnf`. See `mysql_config_editor` — MySQL Configuration Utility. (Bug #16290692)
- The failover operation was improved and now searches for any transactions on the slaves that have not been read from the relay log. Failover will now gather all of these events to the candidate slave before failover is complete. (Bug #16283330)
- The switchover and failover external scripts now accept parameters from the utility. This permits custom scripts to execute application-specific operations during the process. The data passed is as follows:

  `SWITCHOVER`

  - `exec_before` : old master host, old master port, new master host, new master port
  - `exec_after` : new master host, new master port

  `FAILOVER`

  - `exec_fail` : old master host, old master port
  - `exec_before` : old master host, old master port, new master host, new master port
  - `exec_post_failover` : old master host, old master port, new master host, new master port
  - `exec_after` : old master host, old master port, new master host, new master port

  (Bug #14157692)

Bugs Fixed

- Some source files were missing license and/or copyright information. (Bug #16283254)
- Messages and handling of stop, start, and reset slaves has been improved for the `mysqlrpladmin` utility.

  The `--discover-slave-login` option is no longer allowed for stop, start, and reset operations, as instead the `--slave` option is required. (Bug #16243584)

- Utilities were enhanced to check the Python version required for each utility. (Bug #16238348)
- Errors for connection failures have been improved, as more details about the type of failure is presented. (Bug #16237986)
- The switchover operation with `--demote-master` now disconnects the new master from the old master to complete the move of the candidate slave to the new master. (Bug #16177167)
- All interactive-specific `exit()` calls were replaced with the standard `sys.exit()` method. This conforms to the current Python standards. (Bug #16167359)
- Error handling for the `mysqlreplicate` utility was improved to check all errors on the slaves. (Bug #16164767)
- String quoting was improved for the `mysqldbcopy`, `mysqldbexport`, and `mysqldbimport` utilities. (Bug #14348501)
- The log parser was changed to accept host names with dots or hyphens. (Bug #14172941)
- The unit tests were corrected to detect if the `mysql_config_editor` is present. If not, unit tests that require it are skipped. (Bug #68356)
- The entire MySQL Utilities package was updated to facilitate RPM packaging. These changes include license updates, the removal of unnecessary shebang's, and the `mut` manual page was moved and is no longer listed with the other utilities. (Bug #68182, Bug #13956819)

Changes in MySQL Utilities 1.2.0 (2013-01-26)

This section documents all changes and bug fixes applied since the release of 1.1.2.

Functionality Added or Changed

- The MySQL Utilities now supports the MySQL Server 5.6+ feature of storing authentication credentials encrypted in an option file named `.mylogin.cnf`. See `mysql_config_editor` — MySQL Configuration Utility.
- Support was added for the MySQL Enterprise Audit Log Plugin, which added the `mysqlauditadmin` and `mysqlauditgrep` utilities. See MySQL Enterprise Audit.

Changes in Release 1.1

Changes in MySQL Utilities 1.1.2 (2013-01-17)

This section documents all changes and bug fixes applied since the release of 1.1.1.

Bugs Fixed

- The gtid-enabled utilities (`mysqldbcopy`, `mysqldbexport`, and `mysqldbimport`) would crash if `gtid_executed` was empty on the source, or emit a generic error if `gtid_purged` was not empty on the target. (Bug #16072863)
- `mysqlrplshow` would silently suppress connection errors when it discovered slaves for a master using a user who did not have the correct privileges to connect to the slave. (Bug #16037123)
- The `mysqldbcompare` utility help text displayed a `--server` option that did not exist. (Bug #16035934)
- `mysqlrpladmin`'s switchover capability could fail to switch over all of the slaves if there was an error in the replication stream.

  Changes to prevent this include stopping the switchover process unless the `--force` option is passed in, require either the `--discover-slaves-login` or `--slave` options so that

`mysqlrpladmin` can obtain a list of slaves, and expand the error message to include this information. (Bug #16023781)

- Copying databases failed if the database included columns without values, or foreign keys. (Bug #16023646)
- The `mysqlfailover` utility would emit ambiguous timeout related errors. And a valid `--timeout` value (such as a float) is now converted to an integer. (Bug #16020953)
- The `mysqldiskusage` utility would always report the binary and relay logs as missing if they were not located in the `data` directory. For MySQL Server 5.6.2 and greater, `mysqldiskusage` also checks the `log_bin_basename` and `relay_log_basename` MySQL Server configuration options. (Bug #16016887)
- Utility features that depend on GTID functionality will now check if the MySQL Server version is 5.6.9 or greater, and that the `gtid_executed` variable is present. Otherwise, these utilities will gracefully exit with a helpful error message. (Bug #16010766)
- Added test cases for the `mysqldbcopy` and `mysqldbexport` commands (Bug #15867353)
- The `mysqluc` environment now looks for MySQL utilities both with or without the `.py` file extension. (Bug #14712211)
- `mysqlserverinfo` would report the MySQL Server as "server is offline" when the login lacked privileges to access status information, or if the login user did not exist. In this case, it would report "server is offline" even if the server was up and running. (Bug #14158371)
- The `--stop-test=`*`prefix`* option was added to the `mut` test suite. It will stop executing tests after executing the first test that begins with the *`prefix`* prefix. (Bug #13931340)
- The `mysqluserclone` utility will now include anonymous and root users in the output if the `--dump` option is passed to `mysqluserclone` along with the `--list` option. Otherwise, only passing in `--list` will continue to skip those user types. (Bug #13931340)

Changes in MySQL Utilities 1.1.1 (2012-12-27)

This section documents all changes and bug fixes applied since the release of 1.1.0.

Bugs Fixed

- The `mysqldbcopy` and `mysqldbexport` commands now support GTIDs. (Bug #15867353)
- The `mysqlrpladmin` failover and GTID features, and `mysqlfailover`, failed to function properly with MySQL Server 5.6.9+ due to renamed identifiers in MySQL. (Bug #14802229)
- The Utility commands failed to function when a database version contained non-numeric characters, such as 5.1.46sp1. (Bug #14735026)
- Exporting data with empty string fields could emit errors and cause `mysqldbexport` to not function. (Bug #14711624)
- Executing `mysqldbcompare` on a MySQL Server version lower than 5.1.30 would throw an unhandled exception. (Bug #14711565)
- Passing in file names instead of table names to the `mysqlfailover` option `--master-info-repository` is no longer supported. Doing so will halt operations. (Bug #14031924)
- `mysqlfailover` now reports GTID information for the master. (Bug #14021584)
- `mysqlfailover` would sometimes fail to promote a slave when the master was shut down. (Bug #14021584)

- `mysqldiskusage` failed to function on an installation without orphaned (empty) databases when passing in the `--empty` parameter. (Bug #13559593)

Changes in MySQL Utilities 1.1.0 (2012-09-27)

This section documents all changes and bug fixes applied since the release of 1.0.5. The version adds the `mysqluc` console.

Functionality Added or Changed

- Added the `mysqluc` command, which is a command line client for running MySQL Utilities.

Changes in Release 1.0

Changes in MySQL Utilities 1.0.5 (2012-04-10)

This section documents all changes and bug fixes applied since the release of 1.0.4.

Functionality Added or Changed

- It is now possible for the `mysqlserverclone` utility to clone a downed server. Before, it was only able to clone a running server. (Bug #13698224)
- Arguments for the utilities are no longer case-sensitive. And arguments now accept prefixed values, such as `g` or `gr` representing `grid` when passed to `--format`.

  The `--format` and `--help` arguments have been standardized across all utilities. And as such, `-h` no longer represents `--help`. (Bug #13554556)
- Added the `mysqlfailover` utility, which provides replication health monitoring. It relies on Global Transaction Identifiers (GTIDs) so requires MySQL Server 5.6.5 or greater.
- Added the `mysqlrpladmin` utility, which allows administration and recovery of the replication topology.
- Added replication support to the `mysqldbexport`, `mysqldbimport`, and `mysqldbcopy` utilities.

  This adds the following options to the `mysqldbexport` and `mysqldbcopy` utilities: `--rpl`, `--rpl-file`, `--rpl-user`, and `--comment-rpl`. And adds the `--skip-rpl` option to the `mysqldbimport` utility.

Bugs Fixed

- The `mysqlserverinfo` utility failed when used with an offline version of MySQL Server 5.6. (Bug #13916903)
- The following utilities would not always exit properly, when executed from within MySQL Workbench: `mysqlindexcheck`, `mysqlmetagrep`, `mysqlprocgrep`, `mysqlreplicate`, `mysqlrplcheck`, `mysqlrplshow`, `mysqlserverclone`. (Bug #13721467)
- The MySQL Utilities Testing tool (mut) `--sorted` option had no function. It now accepts either `asc` or `desc`, with `asc` remaining the default. (Bug #13592147)
- The `--copy-dir` option was removed from the `mysqluserclone` and `mysqldbcopy` utilities. (Bug #13576571)

- When executing a diff operation with the `mysqldiff` utility on a single server between two databases with missing objects, an invalid warning would be issued that did not show the correct servers involved. (Bug #13554750)

Changes in MySQL Utilities 1.0.4 (2011-12-22)

This section documents all changes and bug fixes applied since the release of 1.0.3.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added the `--write-command` option to the `mysqlserverclone` utility, which saves the command used to launch the new server instance. This command may also be shown while generated, depending on the `-verbose` level. (Bug #13082771)
- Added a parser for the slow and general logs, within the new `mysql.utilities.parser` module that contains the `SlowLog`, `SlowLogEntry`, `GeneralLog`, and `GeneralLogEntry` classes.
- The `mysqldbcompare` utility can now generate SQL statements for synchronizing the objects and data for the compared databases. This adds the `--difftype`, `--changes-for`, and `--show-reverse` options.

  Also, enabling the `--quiet` option will now only generate the diff output for runs when the `--difftype` option is set, but not as `=sql`. And only output the SQL statements when `--difftype` is set to `=sql`.
- Added the `--regexp` option, which changes the `--exclude` option behavior to use REGEXP instead of `LIKE` for its matching. This change affects the `mysqldbcopy` and `mysqldbexport` utilities.
- Added the `--locking` option to the `mysqldbcopy` and `mysqldbexport` utilities, which now allows for table locking.

Bugs Fixed

- Installation would alter the permissions of `/etc/profile.d/mysql-utilities.sh` before creating the file. The order of operations has been corrected. (Bug #13115052)
- Optimized the `mysqldbexport` utility performance, namely for the `_table.get_column_metadata()` and `table.get_column_string()` methods. (Bug #13082780)
- The `setup.py` command would not generate all manual pages. (Bug #12988064)
- Refactored conditions to use `list` within the `mysqldbexport` and `mysqldbimport` utilities. (Bug #12945167)
- The `mysqldbcopy` utility would crash when any of the data contained an apostrophe. (Bug #63145, Bug #13418634)

Changes in MySQL Utilities 1.0.3 (2011-10-10)

This section documents all changes and bug fixes applied since the release of 1.0.2.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added the `mysqlrplshow` utility, which is used to show replication slaves.
- Added the following options to the `mysqlreplicate` utility: `--start-from-beginning`, `--master-log-file`, and `--master-log-pos`

Bugs Fixed

- The `mysqlreplicate` utility no longer executes `FLUSH TABLE WITH READ LOCK` before obtaining the master's status. (Bug #12887948)
- Added the `--all` option to the `mysqldbcopy` and `mysqldbexport` utilities. (Bug #12885004)
- `server.connect_servers` would force the source and destination to be of the same type. (Bug #12871032)
- While using the `mysqldbcopy` utility, the `%` symbol within routines would be changed to `%%`. (Bug #12757358)

Changes in MySQL Utilities 1.0.2 (2011-08-12)

This section documents all changes and bug fixes applied since the release of 1.0.1.

Functionality Added or Changed

- Added the `--new-storage-engine` and `--default-storage-engine` options to the `mysqldbcopy` and `mysqldbimport` utilities. (Bug #12632010)
- Refactored the MySQL Utilities library to remove optional parameter lists, and replaced them with an options dictionary.
- Refactored the MySQL Utilities library to make the server connection use a variety of connection parameters.
- Refactored the exception handling in the python library for MySQL Utilities to be more granular, and divided them into classes and errors types.

Bugs Fixed

- Exporting a database with tables containing a single column and a mixed set of storage engines could result in the wrong storage engine being used. (Bug #12631924)
- Several parts of the code referred to the incorrect postal address of the `Free Software Foundation`. (Bug #12614037)
- Attempting to connect to a host name containing hyphens using any of the python based command line utilities would truncate the host name at the hyphen. (Bug #60252, Bug #11829755)
- Added the `mysqlrplcheck` utility, which is used to check replication prerequisites.
- Added the `mysqldbcompare` utility, which is used to compare two databases.
- Refactored the MySQL Utilities tree to remove extraneous files, fix test locations, and make `mut` resemble MTR's folder structure.

Changes in MySQL Utilities 1.0.1 (2011-05-11)

This section documents all changes and bug fixes applied since the release of 1.0.0.

Functionality Added or Changed

- With `mysqluserclone`, the `--destination` option is now optional, and defaults to the connection information provided by `--source`. Before, both options were required even when the values were identical. (Bug #59096)
- `mysqlserverclone` did not print out the connection information. (Bug #59095)
- Added the `mysqlserverinfo` utility, which is used to show MySQL server information.
- Added the `mysqldiskusage` utility, which is used to show disk usage information.
- Added the `mysqldiff` utility, which is used to check database definition differences.

Bugs Fixed

- Diff related `mut` unit tests failed with Python 2.7+. (Bug #11854512)
- Fixed a typo within the `mysqldiskusage` help page. (Bug #11854150)
- `mysqldiskusage` did not work. A workaround was to fix the hashbang. (Bug #60852)
- The MySQL utilities unit tests failed under MySQL 5.5, due to `INFORMATION_SCHEMA` changes. (Bug #60008)
- The `mysqldbexport`, `mysqlimport`, and `mysqldbcopy` utilities would not form correct user@host pairings with remote access privileges. (Bug #59478)
- `mysqlreplicate` failed when the two servers had the same port number. (Bug #59477, Bug #11766376)
- The `format_tabular_list()` method in `mysql.utilities.common.format.py` did not properly print a single-column list. (Bug #59265, Bug #11766207)
- There were several installation related problems, including: everything was installed under `/usr/local` on Ubuntu (scripts not found), setuptools is used by utilities but not for c/Python (library not found), not all files were written while using `--record` during installation, and the required dependencies were not clarified in the README. (Bug #59083)

Changes in MySQL Utilities 1.0.0 (2010-12-07)

First release of the MySQL Utilities.

Functionality Added or Changed

- Added the `mysqldbcopy` utility, which is used to copy databases.
- Added the `mysqldbimport` and `mysqldbexport` utilities, which are used to import and export data.
- Added the documentation build system, which is based on sphinx.
- Added the `mysqlmetagrep` utility, which is used to search database object definitions.
- Added the `mysqlserverclone` utility, which is used to clone server instances.
- Added the `mut` unit test framework.
- Added the `mysqluserclone` utility, which is used to clone users.

- Added the `mysqlprocgrep` utility, which is used to find and operate on processes.
- Added the `mysqlindexcheck` utility, which is used for index checking.
- Added the `mysqlreplicate` utility, which is used to quickly set up replication.