MySQL Router Release Notes

Abstract

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

For additional MySQL Router documentation, see https://dev.mysql.com/doc/mysql-router/en/.

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

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

For legal information, see the Legal Notices.

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

Document generated on: 2019-09-06 (revision: 18766)

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Preface and Legal Notices

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

Legal Notices

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Changes in Release 8.0

MySQL Router 8 fully supports MySQL 5.7 and MySQL 8, and it replaces the MySQL Router 2.x series. If you currently use Router 2.0 or 2.1 then we recommend upgrading your installation to MySQL Router 8.

Changes in MySQL Router 8.0.19 (Not yet released)

Version 8.0.19 has no release notes, or they have not been published because the product version has not been released.

Changes in MySQL Router 8.0.18 (Not yet released)

Version 8.0.18 has no release notes, or they have not been published because the product version has not been released.

Changes in MySQL Router 8.0.17 (2019-07-22, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Added the `use_gr_notifications` [metadata-cache] option to enable Group Replication notifications, which is disabled by default. It supports group_replication/membership/quorum_loss, group_replication/membership/view, group_replication/status/role_change, and group_replication/status/state_change.

  Optionally use the new `--conf-use-gr-notifications` bootstrap command-line to enable this option in the generated configuration file.

- Added a REST API that follows the OpenAPI 2.0 specification and is implemented as a plugin; load the plugin using `[rest_api]` in the configuration file. It also requires the *http_server* plugin. Use the optional `require_realm` configuration option (string) to define the authentication realm.

The base-path for all REST endpoints is "api" followed by a numeric API version that is defined as the release date, such as "/api/20190722/". The system follows camelCase naming rules and errors follow RFC 7807. The system exposes a `swagger.json` file as `/api/ {apiVersion}/swagger.json`.

Bugs Fixed

- Bootstrapping could misclassify a hostname as IPv6 and surround it with square brackets in the state (`state.json`) file; and this produced a "Configuration error: cluster-metadata-servers is incorrect" error. A workaround was to disable ipv6 support on the system. (Bug #29876948, Bug #95531)

- Starting the http_server plugin against a port that was already bound would yield a confusing error, such as "Error: bind('0.0.0.0:10100) failed: The operation completed successfully." (Bug #29823472)

- Improved the connection counter logic to prevent a potential unexpected halt before completing the shutdown process. (Bug #29820725)

- Requesting the metadata-cache health immediately after start up could cause an expected exit by get_destinations() if metadata_cache's cache-api was not yet initialized. (Bug #29820155)

- Bootstrapping would fail on hosts that defined multiple network interfaces. (Bug #29814629)

- Optimized logging mechanism; system generated log messages independent of the log level. Now log messages are only prepared if configured to do so. (Bug #29798420)

- Fixed potential blocking during shutdown by adding proper libmysqlclient deinitialisation where needed. This bug only affected DEBUG builds. (Bug #29635378)

- `harness/CMakeLists.txt` was renamed to `harness/src/CMakeLists.txt`. (Bug #29629788)

- The loaded plugin message level was changed from level "info" to "debug". (Bug #29616101)

- The bootstrap "invalid URI" error message was improved. (Bug #29609170)

- HTTPS connections with ECDHE ciphers to Router's http_server component failed if built against OpenSSL 1.0.1. (Bug #29609052)

- The file generated by `mysqlrouter_passwd` was world-readable, and is now user-readable (Bug #29589127)

- For the REST API, unsupported query parameters now return the 400 HTTP status code; and remain ignored. (Bug #29556935)

- Log lines above 512 characters were truncated. (Bug #29540910)

- For the REST API, OPTION, TRACE, and CONNECT requests now return the *application/problem+json* Content-Type and 405 HTTP status code. (Bug #29539557)

- The HTTP server component now supports .jpg/.jpeg image files, and file extension matches are now case-insensitive. (Bug #29508595)

- Added Visual Studio 2019 support. (Bug #29454252)

- An unknown [http_auth_realm] backend yielded an unclear error. (Bug #29421759)

- An uncaught exception was generated if a client socket was shutdown the client peer address was retrieved. (Bug #29382585)

- Misleading "*Potential changes detected in cluster*" warnings were added to Router's log file. Node order differences no longer cause these errors. (Bug #29264764, Bug #94060)

- Router would start if `bootstrap_server_addresses` was empty or not set. Now Router fails to start in this case if *cluster-metadata-servers* (a `dynamic-config` attribute) is also empty. (Bug #28352482)

- The `.ini` configuration file locations are now detected and displayed in *--help* output. (Bug #28261802)

- With Debian packages, the bootstrap process could fail when used with the `--directory` option. (Bug #27034449)

Changes in MySQL Router 8.0.16 (2019-04-25, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Before, bootstrapping would generate Read-Write (PRIMARY) and Read-Only (SECONDARY) configuration routing sections for multi-master mode, but only Read-Write sections for single-master mode. Now, both Read-Write and Read-Only sections are always generated.

- Bootstrapping now sets new `routing_strategy` values in the generated configuration file. Read-Write (PRIMARY) sections set routing_strategy to `first-available`; and Read-Only (SECONDARY) sections set it to `round-robin-with-fallback`. Previously, they were both set to `round-robin`.

  The default behavior (for example, if routing_strategy is not defined in `mysqlrouter.conf`) did not change and is still round-robin.

- Added ability to integrate external log-rotation applications by reopening the file-based logfile on SIGHUP. On Linux, this allows integrating the system-wide `logrotate` utility.

- On Windows, added the ability to report events to the Windows Application Events log.

- Added a new `sinks` configuration file option to define one or more logger sinks. For example, all level=debug messages can be sent to a file while only level=error are sent to an eventlog.

  The supported sinks are: *consolelog*, *filelog*, *eventlog* on Windows, and *syslog* on Unix-based systems.

- An HTTP interface was added based on libevent's HTTP library. It's configured using a new [http_server] configuration section that contains the following options:

  - `port`: The TCP port listening for HTTP requests; it defaults to 8011.

  - `bind_address`: IPv4 address bound to the `port`; it defaults to 0.0.0.0.

  - `static_folder`: Base directory for static file requests; it's empty by default. An empty value means no static files are served.

  - `require_realm`: Name of the [http_auth_realm] instance.

  - `ssl`: The value 1 enables SSL, and 0 disables it. TLS clients supporting TLSv1.2 or later are required.

  - `ssl_cert`: File name of the certificate and its chain certifications in PEM format; required if ssl=1.

  - `ssl_key`: File name of the key in PEM format; required if ssl=1.

  - `ssl_cipher`: The cipher-spec (see openssl's 'ciphers' list). Defaults to a comma-separated list of all approved ciphers. Unknown ciphers are silently ignored. Fails if list of ciphers is empty and ssl=1.

- `ssl_dh_param`: Read the DH parameter from this file in PEM format. Uses the dh-param from RFC 5114 by default if ssl=1.

- A `mysqlrouter_passwd` tool was added to manage password's for the HTTP server component.

  Two new HTTP configuration sections were added; [http_auth_backend] and [http_auth_realm]. Both are optional, and multiple definitions are allowed. There options are:

  [http_auth_backend]

  - `backend`: Name of the backend implementation; it defaults to file.

  - `filename`: Name of the backend storage file, relative to the `data_folder` directory.

  [http_auth_realm]

  - `backend`: Name of the [http_auth_backend] section.

  - `method`: The HTTP authentication method; defaults to basic.

  - `require`: Requires that the user validates with the authentication backend; defaults to valid-user, which enables this check.

  - `name`: Name of the realm presented to the authentication user.

- Colored text differentiation was added to MySQL Router's console output using the VT100 standard.

Bugs Fixed

- Apparmor is now given r/w access to `/var/lib/mysqlrouter/` rather than specific files within to allow additional dynamically generated files there. (Bug #29341853, Bug #94282)

- On Windows, building on a case-sensitive file system would not find the file named `MSG000001.bin`. (Bug #29278749)

- It was not possible to re-boostrap Router while it was running. Instead, stopping the service beforehand was required. (Bug #29271620, Bug #94015)

- The cached metadata information (`state.json`) would cache an empty list if all MySQL servers were shut down; and this caused restarting MySQL Router to fail. An empty list is no longer cached. (Bug #29264755, Bug #94057)

- On Debian, `apt-get purge` and `dpkg --purge` now remove the `/var/lib/mysqlrouter` and `/run/mysqlrouter` directories. (Bug #29171561)

- Installing from a *.deb* package would create an empty (and unused) log file named `mysqlrouter.log` in the `/` directory. (Bug #29170728)

- Added Clang 7 support for Windows, and fixed Clang 8 warnings. (Bug #29003649, Bug #29015491)

- The dynamic configuration file created during the bootstrap process was assigned the same permissions as the static configuration file, which is read-only. This meant that Router could not run as a service on Windows. The Windows Local Service user can now write to the file. (Bug #28930180)

- When running on Windows as a service, Router now reports errors to the Windows Eventlog that are encountered before the Router process opens the log file. Before they were sent to the non-existent console, so the messages were lost. (Bug #28261178)

Changes in MySQL Router 8.0.15 (2019-02-01, General Availability)

This release contains no functional changes and is published to align version number with the MySQL Server 8.0.15 release.

Changes in MySQL Router 8.0.14 (2019-01-21, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- A new dynamic configuration bootstrap feature was added that tracks the current MySQL InnoDB cluster Metadata servers. This replaces the existing `bootstrap_server_addresses` option with the new `dynamic_config` option in `mysqlrouter.conf`.

  MySQL Router now tracks and stores active MySQL InnoDB cluster Metadata server addresses and loads them if Router is restarted. Previously, metadata server information was defined during Router's initial bootstrap operation and stored statically as `bootstrap_server_addresses` in the configuration file.

  This new `dynamic_config` option is generated by `--bootstrap` and is defined under `mysqlrouter.conf`'s [DEFAULT] section. Its value points to a generated JSON file named `state.json` that's initialized with InnoDB cluster Metadata server addresses and the group replication ID; and additional information is added and updated while Router is running.

  The bootstrap process no longer defines `bootstrap_server_addresses` because `dynamic_config` replaces its functionality; and these two options cannot be set at the same time. For backwards compatibility, if only `bootstrap_server_addresses` is set then it functions as it did in previous Router versions and this new dynamic configuration functionality is not used. (Bug #28082857, Bug #27015184, Bug #91029)

- The `bootstrap_server_addresses` configuration option is deprecated in favor of the new `dynamic_config` option. (Bug #28082857, Bug #91029)

- MySQL Router now persistently tracks the metadata server addresses rather than only using the static list defined in the configuration file using the `destinations` option.

Bugs Fixed

- The standalone MySQL Router zip file did not include its own copy of the OpenSSL libraries, so the Router binary would not start unless the MySQL Server zip file was also installed on the host. (Bug #29132062)

- The `--version` output was aligned with MySQL Server's layout. (Bug #28899194)

- Router would unexpectedly halt upon receiving an unexpected packet; now an exception is thrown. (Bug #28793334)

- Solaris MySQL Router packages would not function with MySQL Server 8.0.13 due to an incorrect CMake rpath value. (Bug #28730189)

- Linking Router against libmsyqlclient that was built with DBUG enabled led to slow Router shutdown procedures. (Bug #28656618)

- Fixed a thread shutdown race condition. (Bug #28610484)

- Sending mysqlrouter a SIGTERM would take at least 100ms to shut down. Now a concurrent plugin shutdown queue was added to speed up the shutdown process. (Bug #28570122)

- A metadata-cache API method was added to check the initialization status. Routing plugins use this during initialization to safely register the callbacks after metadata-cache is initialized. (Bug #28569717)

- Installing MySQL Server with Router from source or building a tarball with "make package" would create a top level "data/" directory as part of the "Router" component. Due to possible collisions with MySQL Server, "data/" was changed to "var/lib/mysqlrouter". (Bug #28537733)

- The connection error counter that blocks clients after `max_connect_errors` connection errors did not reset after a successful connection. (Bug #27995042, Bug #90809)

- The MySQL metadata server's `connect_timeout` default value changed from 30 to 15 seconds. (Bug #27326466)

Changes in MySQL Router 8.0.13 (2018-10-22, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- To align package names with MySQL Server, the community package name prefix changed from "mysql-router-" to "mysql-router-community-". This change also allows upgrading from MySQL Router 2.1 to 8.0. Additionally, a "mysql-router" meta package was added that redirects "mysql-router" to "mysql-router-community".

- MySQL Router is now included in MySQL Server's source and monolithic binary packages. The MySQL Router standalone packages continue to exist, as before.

Bugs Fixed

- For SLES 12, MySQL binary distributions are now built using GCC 7. The lowest supported GCC version on this platform is now 5.3 (previously 4.8.5).

  Installing MySQL Router 8.0.13 or higher RPM packages on SLES 12 platforms requires that the GCC Devel repo is enabled, for example:

  ```
  shell> cd /etc/zypp/repos.d/
  shell> wget https://download.opensuse.org/repositories/devel:/gcc/SLE-12/devel:gcc.repo
  ...
  shell> zypper install ./mysql-router-community-8.0.*rpm
  ```

  (Bug #28685857)

  References: See also: Bug #92147.

- The log level was changed from INFO to DEBUG for the InnoDB cluster Metadata server and replicaset connections. Because MySQL Router's `ttl` configuration option defaults to *0.1*, these each generate 10 log entries per second. (Bug #28424243)

- Running MySQL Router against an invalid InnoDB cluster would report internal SQL errors, such as "Unknown database 'mysql_innodb_cluster_metadata'", rather than user-friendly information that the cluster is not set up as a metadata server. The generated error now clarifies the reason and points to related documentation. (Bug #28292073)

- The *--version* output was aligned across all binaries to include license related text. (Bug #28262453)

- On Windows, starting Router after uninstalling the Router service would cause Router to hang as it assumed the service was still enabled. (Bug #28261217)

- Passing in `--directory` to an unwritable empty directory would yield a generic error. (Bug #28228800)

- The error code ER_CON_COUNT_ERROR is now used instead of HY000 ("unknown") when the maximum number of allowed connections is exceeded. (Bug #28183810)

- The metadata version (*mysql_innodb_cluster_metadata.schema_version*) compatibility check is now checked at runtime, when before it only happened during the bootstrap process. (Bug #28147601)

- Bootstraping with `--user` set to the same user running the bootstrap operation would halt with a "setegid failed" error. (Bug #27698052)

- An error related to running out of available threads was only logged once until Router was restarted. (Bug #27577694)

Changes in MySQL Router 8.0.12 (2018-07-27, General Availability)

MySQL Router 8 fully supports MySQL 5.7 and MySQL 8, and it replaces the MySQL Router 2.x series. If you currently use Router 2.0 or 2.1 then we recommend upgrading your installation to MySQL Router 8.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- The following conditions now cause disconnections: Connections to a primary after the primary is downgraded to a secondary, and connections to a node that are no longer part of the cluster.

  Additionally, two new *metadata-cache* URI options were added: *disconnect_on_promoted_to_primary* controls whether existing client connections to a secondary are closed when the secondary is promoted as a primary (default=no), and *disconnect_on_metadata_unavailable* controls whether existing client connections are closed when the group is overloaded (default=no). See the `destinations` configuration option's documentation for additional information. (Bug #22817729, Bug #27148110, Bug #80491)

- Added the `--master-key-reader` and `--master-key-writer` options to decouple key (credentials) retrieval from daemon startup, as an alternative to using `master_key_path`.

- Added the optional `--account-host` command-line bootstrap option to configure the host pattern used for MySQL accounts. The default value is '%'.

- Added the optional `--report-host` command-line bootstrap option to configure Router's externally visible hostname that's registered to the MySQL InnoDB cluster metadata store.

- The `ttl` option now accepts floating point values. The default ttl value changed from 5 seconds to 0.5 seconds (500 milliseconds), and the maximum allowed value changed from 4294967295 to 3600.

- A *mysql-server-mock* tool was added to help make group replication testing more predictable. Execute *mysql-server-mock --help* for usage details.

- An RPM package for installing ARM 64-bit (aarch64) binaries of MySQL Router on Oracle Linux 7 is now available in the MySQL Yum Repository and for direct download.

Known Limitation for this ARM release: You must enable the Oracle Linux 7 Software Collections Repository (ol7_software_collections) to install this package, and must also adjust the libstdc++7 path. See Yum's Platform Specific Notes for additional details.

Bugs Fixed

- If querying the metadata server failed, then the metadata refresh process would fail and log an error. Now the system will attempt to use alternative metadata servers instead of only one. (Bug #28082473)

- When a primary or secondary node goes missing, the metadata cache refresh frequency increases to one second until the Group Replication status is confirmed. The log messages and code comments suggested that this mechanism only applies to missing primaries, so they were updated to clarify that missing secondaries also increase the frequency to one second. (Bug #28059228)

- Exiting a running router instance by issuing **Control + C** emitted an exception before quitting the process. (Bug #27802114)

- Support to compile with Visual Studio 15 2017 was added. (Bug #27691313)

- The optional `thread_stack_size` configuration option was added to define the allocated thread stack size for each thread. It is measured in kilobytes and defaults to 64 with a valid range of 1 to 65535. (Bug #27634367)

- On Windows, PDB files were added to the Zip download for debugging purposes. (Bug #27531828, Bug #89625)

Changes in MySQL Router 8.0.11 (2018-04-19, General Availability)

Bugs Fixed

- Some failed SQL queries executed during the bootstrap process resulted in a generic "Unknown error" message instead of reporting the original error message received from the MySQL server.

  As a workaround, setting level=DEBUG during bootstrap yielded these SQL errors. (Bug #27721898)

- Some unexpected errors from the MySQL server were not shown during the Router bootstrap process. (Bug #27721834)

- Router failed to compile on Alpine Linux 3.6, or on Raspberry Pi Zero or One (ARMV6). (Bug #27697883, Bug #27697767)

- Router's `max_connect_errors` option did not function in v8.0.4. (Bug #27564958)

- Bootstrapping would only function if `--bootstrap` was the first command-line argument. Now the argument order is irrelevant. (Bug #25054974)

Changes in MySQL Router 8.0.5 - 8.0.10 (Skipped version numbers)

There are no release notes for these skipped version numbers.

Changes in MySQL Router 8.0.4 (2018-02-07, Release Candidate)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Bootstrapping now accepts the `--config` option and reads the *[logger]* `level` option's definition. For example, to enable bootstrap's debugging mode:

```
[logger]
level = DEBUG
```

  (Bug #27158098)

- The default `ttl` metadata option (Time To Live, in seconds) changed from 300 to 5. (Bug #26990955, Bug #88140)

- The new `connect_timeout` and `read_timeout` options were added. These are defined under the `[DEFAULT]` namespace and affect internal operations, such as metadata server connections. (Bug #26877946)

- Bootstrap now accepts any member of an InnoDB cluster and automatically finds and reconnects to a writable primary. (Bug #25489509)

- The optional `routing_strategy` configuration option was added. The available values are `first-available`, `next-available`, `round-robin`, and `round-robin-with-fallback`.

  Previously, these strategies were described as scheduling modes by the `mode` configuration option where the read-write mode defaults to the first-available strategy, and the read-only mode defaults to the round-robin strategy. This preserves previous behavior for these modes. (Bug #86261, Bug #26045094, Bug #25852803)

Bugs Fixed

- With `logging_folder` undefined during bootstrap, all logs were written to STDERR. Now, normal bootstrap logs are written to STDOUT and debug bootstrap logs are written to STDERR. (Bug #27232410)

- Errors were changed to warnings for the following conditions: when Router could not connect to a particular metadata server, and when Router could not update the default metadata cache replicaset. Under these conditions, Router does not stop running because there are multiple metadata servers and replicasets. (Bug #27226627)

- Configuring MySQL Router with sockets would create a socket that was only accessible by the MySQL Router user. (Bug #27179456, Bug #88667)

- The commercial *.deb* packages were missing the *mysqlrouter_plugin_info* tool. (Bug #27122367)

- The apt purge process did not remove the `/var/{lib,log,run}/mysqlrouter` directories. (Bug #26955232)

- Bootstrapping would fail when connecting to a MySQL Server under high load if an associated bootstrap query took longer than 5 seconds. The 5 second read timeout was increased from 5 to 30. In addition, command line options were added to change the connect and read timeout values. (Bug #26877946)

- Improved error text when bootstrapping against a MySQL server 8.0 instance that was not part of InnoDB cluster. (Bug #26846040)

- Router assumed that a resulting socket from accept()ing a socket would be always blocking. On Solaris and Windows this assumption is not valid, and this resulted in broken connections with large result sets. (Bug #26834769)

- It was difficult to distinguish the "Too many connections" between MySQL Server and MySQL Router, so the Router variant now reads as "Too many connections to MySQL Router". (Bug #26593909)

- The bundled `README.txt` was missing Protobuf and Rapid JSON references. (Bug #25619654)

- Some builds were missing the sample configuration file, including the Solaris and Oracle Linux binaries. (Bug #25530691)

- Router would check IPv4 or IPv6 addresses, but not both. Now it goes through the list of addresses and first tries to bind to an IPv4 address and if it fails then it goes through the same address list and tries to bind to an IPv6 address. (Bug #25127667)

- The generated error message from passing in an empty file to `--master-key-file` (or using an empty `mysqlrouter.key`) was improved. (Bug #25111926)

- Defining multiple logger sections in the configuration file would emit an unclear error. Defining multiple logger sections is not allowed. (Bug #25095565)

- Where *destinations=metadata-cache*, the `role` attribute was not used or validated; only the `mode` configuration option was used. (Bug #25061854)

- Failed bootstrap commands would leave a generated `mysqlrouter.conf.tmp` file on the system. (Bug #24930442)

- On Ubuntu Linux, documentation related files were installed under both `/usr/share/mysql-router/docs` and `/usr/share/doc/mysql-router`. Now they are only installed under `/usr/share/doc/mysql-router` for community builds and `/usr/share/doc/mysql-router-commercial` for commercial builds. (Bug #24765509)

- The maximum number of concurrent client connections was increased from about 500 to over 5000, a limit now dependent on the operation system. To achieve this, select() based fd event calls were replaced by poll() (or WSAPoll() on Windows). (Bug #22661705, Bug #80260)

- The `--ssl-key` and `--ssl-cert` optional bootstrap command-line options were added. They directly use their MySQL client's counterparts, and specify the client-side certificate and private key to facilitate client-side authentication. This is useful when the root account used during bootstrap was created with REQUIRE X509, which requires the client to authenticate itself when logging in.

Changes in MySQL Router 8.0.3 (2017-09-29, Development Milestone)

MySQL Connectors and other MySQL client tools and applications now synchronize the first digit of their version number with the (highest) MySQL server version they support. This change makes it easy and intuitive to decide which client version to use for which server version. MySQL Router now uses the same version number as MySQL Server.

MySQL Router 8.0.3 is the first release to use the new numbering. It was branched from MySQL Router 2.1.4.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- The quorum calculation was adjusted to take into account the RECOVERING node status. In other words, the calculation was changed from have_quorum = (online_nodes > all_nodes/2) to have_quorum

= (online_nodes + recovering_nodes > all_nodes/2). For routing purposes, RECOVERING is still seen as UNREACHABLE.

- TERM and INT signal handlers were added.

- Graceful shutdown and restart support was improved. For example, if Router is being run from the console then **Control + C** will cleanly stop Router and its loaded plugins. Likewise, killing the process with SIGINT or SIGTERM (Linux) or stopping the service (Windows) will also gracefully shut down Router. The router also shuts down cleanly when shutdown is induced by an error.

- Some errors were not logged if MySQL Router exited unexpectedly early (before it could open its log file), and these errors were sent to *stderr* instead of the logging mechanism defined by Router's configuration file. As a consequence (especially on Windows), this made it difficult to diagnose the problem that caused Router's failure to run. These errors included failure to start because the PID file already exists, failure to write the PID file, if no Router plugins were configured, if *metadata_cache* was defined twice, and if a configured user did not exist.

- A new `mysqlrouter_plugin_info` utility was added to help debug MySQL Router plugins. It provides information such as the plugin version, description, ABI version, requirements, and function pointers.

Bugs Fixed

- On some Linux variants (such as Ubuntu), the Router installation would set the owner as *mysqlrouter:adm* instead of *mysqlrouter:mysqlrouter* for generated directories. (Bug #26530142)

- Defining a `[logger]` section in the configuration file was invalid because the logging mechanism is not a plugin as of Router 2.1. `[logger]` was used in MySQL Router 2.0, but now logging definitions are defined under the `[DEFAULT]` section. To provide backward compatibility, `[logger]` section support was added. (Bug #26441587)

- On Windows, if a plugin failed to load, Router would exit without unloading the plugin. (Bug #26434831)

- Removed the MySQL Connector specific "MySQL FOSS License Exception" from the README file. (Bug #26361093)

- To fall in line with other MySQL binaries, *-?* is now used instead of *-h* as a short form for the `--help` option. (Bug #25813290)

- To fall in line with other MySQL binaries, *-V* is now used instead of *-v* as a short form for the `--version` option. (Bug #25813190)

- Router would not exit after failing to bind to a port despite posting "Bind Address can not be part of destinations" to the error log. (Bug #23501906, Bug #81643)

Changes in Release 2.1

MySQL Router 8 fully supports MySQL 5.7 and MySQL 8, and it replaces the MySQL Router 2.x series. If you currently use Router 2.0 or 2.1 then we recommend upgrading your installation to MySQL Router 8.

Changes in MySQL Router 2.1.6 (2018-03-05, General Availability)

Bugs Fixed

- Router's `connect_timeout` configuration option was measured in milliseconds instead of seconds in v2.1.5. (Bug #27597561, Bug #89740)

- Router's `max_connect_errors` option did not function in v2.1.5. (Bug #27559218, Bug #89700)

- On Windows, the returned POLLHUP returned by WSAPoll() was not handed properly. This caused high CPU utilization after several opened/closed connections. (Bug #27532709)

Changes in MySQL Router 2.1.5 (2018-02-02, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Bootstrap now accepts any member of an InnoDB cluster and automatically finds and reconnects to a writable primary. (Bug #25489509)

Bugs Fixed

- Configuring MySQL Router with sockets would create a socket that was only accessible by the MySQL Router user. (Bug #27179456, Bug #88667)

- The apt purge process did not remove the `/var/{lib,log,run}/mysqlrouter` directories. (Bug #26955232)

- Router assumed that a resulting socket from accept()ing a socket would be always blocking. On Solaris and Windows this assumption is not valid, and this resulted in broken connections with large result sets. (Bug #26834769)

- Defining a `[logger]` section in the configuration file was invalid because the logging mechanism is not a plugin as of Router 2.1. `[logger]` was used in MySQL Router 2.0, but now logging definitions are defined under the `[DEFAULT]` section. To provide backward compatibility, `[logger]` section support was added. (Bug #26441587)

- The maximum number of concurrent client connections was increased from about 500 to over 5000, a limit now dependent on the operation system. To achieve this, select() based fd event calls were replaced by poll() (or WSAPoll() on Windows). (Bug #22661705, Bug #80260)

Changes in MySQL Router 2.1.4 (2017-07-24, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- MySQL passwords generated by MySQL Router during bootstrapping were not guarantied to work with the `validate_password` plugin, but now generate passwords to pass the `STRONG validate_password` level by checking the generated password against `VALIDATE_PASSWORD_STRENGTH`.

  Related to this are the new `--force-password-validation` and `--password-retries` command line options that were added in Router 2.1.4. (Bug #25858394)

- A new `--bootstrap-socket` command line option was added.

  Used in conjunction with the `--bootstrap` command line option, it's used to connect using a Unix domain socket instead of TCP/IP. (Bug #25450756)

- Added support to bootstrap the router using IPv6 addresses, along with support for RFC 3986. (Bug #25225260, Bug #25828663)

Bugs Fixed

- The sample configuration file defined keyring_path and master_key_path under a nonexistent "[keyring]" section instead of under the "[DEFAULT]" section. (Bug #26449960)

- Bootstrapping a MySQL Router instance did not work when DNS lookups were unsuccessful on the host where the bootstrap operation was performed. (Bug #26100966)

- After a primary failure within an InnoDB cluster, MySQL Router required an extended amount of time to reconnect. (Bug #26044181, Bug #86259)

- An incorrect profile setting produced permission-denied errors during MySQL Router bootstrap operations when AppArmor was enabled. (Bug #26041542)

- Stand-alone routing failed and produced errors when used with a valid URI. (Bug #25973199)

- The bootstrap procedure for the system-wide bootstrap now creates the proper directory ownership required to start the router, when before it failed to start in some cases. (Bug #25956532, Bug #86050)

- Difficulties observed when installing and starting MySQL Router on older Windows platforms due to missing libraries are now resolved. (Bug #25853059, Bug #25494942)

- Passing in a directory to the `--config` option instead of a MySQL Router configuration file now reports a more relevant error, when before it did not mention that a file is required. (Bug #25800863)

- Sample MySQL Router configuration files were generated with the `.ini` extension instead of with the `.conf` file extension as expected. (Bug #25616924)

- Specifying an invalid user account in the `metadata_cache` section of the MySQL Router configuration file after bootstrapping now issues an appropriate error message. (Bug #25460958)

- Omitting a MySQL Router configuration file when using the `--config` option now displays an error indicating an empty path instead of throwing an exception. (Bug #25449685)

- The commercial version of MySQL Router did not have the correct setting for the AppArmor profile configuration file `/etc/apparmor.d/usr.sbin.mysqlrouter`. (Bug #25253001, Bug #84074)

- Invalid configuration variables in the MySQL Router configuration file that expect numeric values, such as the expiration time (TTL), now report errors. (Bug #24756621)

- MySQL Router did not exit after failing to bind a port. (Bug #23501906, Bug #81643)

Changes in MySQL Router 2.1.3 (2017-04-12, General Availability)

A known limitation of this release:

Note

The `--bootstrap` command line option does not accept IPv6 addresses.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Added functionality to also scan for Router configuration files with the *.ini* extension, to provide backward compatibility with previous Router installations.

Router looks in the initial directory for the *.conf* version, then checks for a *.ini* version, and then repeats the process in the second directory that's typically the user's home directory. (Bug #25688333)

Bugs Fixed

- On Linux, *systemd* based distributions defaulted to *mysqlrouter.ini* instead of `mysqlrouter.conf`. (Bug #25688333)

- Bootstrapping as a super user (uid==0) without the `--user` option would generate files and directories that were owned by root an not accessible by others. Now, super users are required to pass in the `--user` option. Also while not recommended, the super user name can be passed in to force using the super user, such as `--user=root`. (Bug #25682736)

- Router would compile against yaSSL but not OpenSSL. (Bug #25672823, Bug #85068)

- On Solaris, MySQL Router would not start as it could not find the required `logger.so`. (Bug #25638708)

- On FreeBSD, a unit-test would always fail with "Bad Suki". (Bug #25549490)

- Executing bootstrap with "ssl-mode VERIFY_CA" would not report an error when the corresponding certificate was not passed through ssl-ca. (Bug #25511157)

  References: See also: Bug #24732452.

Changes in MySQL Router 2.1.2 (2017-03-06, Release Candidate)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- New *SSL* command line options: `--ssl-mode`, `--ssl-ca`, `--ssl-capath`, `--ssl-cipher`, `--ssl-crl`, `--ssl-crlpath`, and `--tls-version`. (Bug #25036324)

- Windows: downloads now require Visual C++ Redistributable for Visual Studio 2015, when before the 2013 version was required.

- MySQL Fabric support was removed.

- `mysqlrouter --help` output was improved to include the current default folder locations for the system, and also usage examples.

- X Protocol support was added.

  The new `protocol` configuration option was added to support the X Protocol. Setting `protocol` to `x` enables the X Protocol for connections, otherwise the default `classic` protocol is used.

- Keyring key management was added to securely manage passwords.

  With this, the new `master_key_path` and `keyring_path` configuration options were added.

- Bootstrapping support was added.

  New *bootstrapping* command line options: `--bootstrap`, `--conf-base-port`, `--conf-bind-address`, `--conf-use-sockets`, `--conf-skip-tcp`, `--directory`, `--force`, and `--name`

Bugs Fixed

- After starting a Router instance, starting a second Router instance using the same configuration file as the first, would cause the second Router instance to exit due to `bind_port` conflicts. (Bug #25493968)

- While bootstrapping router, the process to discover local interfaces had a memory leak. (Bug #25456674)

- Fixed "use of uninitialized bytes" issues as discovered by valgrind. (Bug #25455825)

- Bootstrapping did not throw errors when passing an empty string to any of the following options: `tls-version`, `ssl-cipher`, `ssl-ca`, `ssl-capath`, `ssl-crl`, `ssl-crlpath` succeeds, without throwing an proper error. In addition, `ssl-mode VERIFY_CA` would continue without requiring `ssl-ca`. (Bug #25436768)

- After bootstrapping router with the `--conf-use-sockets` and `--directory` options, the socket path configuration value defined in the generated configuration file was invalid. This was because it used the `socketsdir` value in the socket path, but the directory was not created as part of the bootstrap process or when router was started. (Bug #25391460)

- With SSL disabled on MySQL instances in a MySQL InnoDB cluster, passing in `--ssl-mode REQUIRED` along with a `--tls-version` version did not exit and emit an error. This now stops the bootstrap process and reports an error about requiring SSL. (Bug #25390144)

- On Windows, immediately starting a bootstrapped Router installation would fail to load the generated configuration file.

  In addition, the generated text for missing configuration files was improved to also include the paths that were checked. (Bug #25343904)

- On Windows, `--bootstrap` would not function if Router was compiled from source due to unresolved underlying paths. (Bug #25039423)

- On Windows, `--bootstrap` failed to function without also passing in `--directory`. (Bug #25038772)

- Bootstrapping with `--config` would overwrite an existing configuration file without warning. Now, if the generated configuration file is different, a backup file is created with the *.bak* file extension. (Bug #24763468)

- Fixed memory leaks that were observed while bootstrapping with metadata cache configured. (Bug #24733015)

- Improved group replication related error text. (Bug #24703342)

Changes in MySQL Router 2.1.1 (2016-12-15, Labs)

Published to labs.mysql.com as part of the **MySQL InnoDB Cluster 5.7.17 Preview 2** bundle.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- A `--user` command line option was added to define the user to run Router as. This option is required if Router is bootstrapped or started as a super user, such as root. This option is also defined as `user` under the `[DEFAULT]` namespace. This option is not available on Windows.

In addition, the packaging scripts (Debian and RPM packages) now create a Router-specific system user named *mysqlrouter* that Router runs as by default. This account does not have shell access, and its home directory points to the directory where the default Router configuration file is stored. Previously, the user named *mysql* was used by default. (Bug #25070949)

Bugs Fixed

- No quorum did not cause the connections to be blocked. (Bug #25134206)

- The `--help` text referred to a nonexistent option named "--master-key-path", instead of "--master-key-file". (Bug #25074305)

- After dissolving a MySQL InnoDB cluster that was bootstrapped, bootstrapping to the old primary server and port would not function. (Bug #25069674)

- On Linux, the default `keyring_path` path included `/var/run`, but because some Linux distributions mount `/var/run/` to `tmpfs`, this definition was lost when the host was restarted. Now, `/var/lib/` is used on most systems. (Bug #25045182)

- An existing configuration file with a missing *[metadata_cache]* section (including empty files) would cause *--bootstrap* to fail. (Bug #25045119)

- Having multiple `metadata_cache` definitions (with different section keys) would cause Router to unexpectedly exit. This error is now handled, and Router is closed with an error message. (Bug #24962552)

- Routing to the default destination port for the x protocol (33060) did not function for standalone routing. (Bug #24955339)

- X-Protocol routing treated errors from the server as handshake failures, which caused each invalid authentication request to increment the connect error counter. Now, it behaves like the classic protocol, so during the handshake when the server sends an error to the client (even if it Access Denied error), this is not considered a failed handshake. This is also how MySQL Server behaves. (Bug #24911725)

- Metadata cache section's did not allow the optional section keys definitions. (Bug #24909259)

- After performing a successful `--bootstrap` operation, immediately executing a second and failed bootstrap operation (against a different URI) could cause Router to not connect to the metadata cache for the first bootstrap configuration due to internal changes made by the second. (Bug #24902404)

- `--bootstrap` now sets `bind_address=0.0.0.0` for each route in the generated Router configuration file, when before it did not set it and relied upon the `bind_address` default value of 127.0.0.1. In addition, the `--conf-bind-address` command line option was added to modify the `bind_address` value set by bootstrap. (Bug #24846715)

- Bootstrapping router with the `--conf-use-sockets` option was not defining the `socket` option in the generated configuration file. (Bug #24842143)

- After bootstrapping Router with the `--conf-skip-tcp --conf-use-sockets` options, neither MySQL Shell or the MySQL client could connect to Router. (Bug #24841281)

- The keyring plugin is only loaded if either configured, or if there is a password involved in the configuration. Previously, Router would always load the plugin and then prompt for a password. (Bug #24840690)

- The `--name` option is now optional. (Bug #24807941)

- Configuring the router for using more than one routing rule with UNIX domain sockets and no TCP ports would fail with a "duplicate IP or name found" configuration error. This made it impossible to configure R/W splitting using Unix sockets. (Bug #24799417)

- Fixed compilation related warnings. (Bug #24701344)

- Router was not able to connect (function) after stopping group replication on the primary node. This affected both read-only and read-write routing sections. (Bug #24659690)

- Error logging for metadata connections and routed client connections were improved to be more descriptive, and they were changed to warnings instead of debug messages. (Bug #22010817)

Changes in MySQL Router 2.1.0 (2016-09-20, Labs)

Published to labs.mysql.com as part of the **MySQL InnoDB cluster** bundle.

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Implemented an interface to support iterating over the options of a configuration section. (Bug #23337654)

- The `logging_folder` configuration option now defaults to the MySQL Router base path instead of "". This also means that logs are no longer sent to *stdout* by default.

Bugs Fixed

- A get_options() function was added to iterate over all options in a configuration section. (Bug #23337654, Bug #81569)

- Fixed CMake compilation warnings that were generated when building Router with tests enabled. (Bug #22276210)

- Introduced support for Unix domain sockets for connections.

  This adds a new optional configuration option named `socket` that can be used with connection routing. The name `socket` was borrowed from MySQL Server.

  For example:

```
[routing:dev]
socket = /tmp/mysqlrouter_dev.sock
```

  The `socket` option does not have a default value, and this option will not be used if empty. Both the `bind_address` and `socket` options can be defined at the same time. (Bug #21874593)

Changes in Release 2.0

MySQL Router 8 fully supports MySQL 5.7 and MySQL 8, and it replaces the MySQL Router 2.x series. If you currently use Router 2.0 or 2.1 then we recommend upgrading your installation to MySQL Router 8.

Changes in MySQL Router 2.0.4 (2016-11-23, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- The unused ip_from_addrinfo() function was removed. (Bug #22811176)

- Windows support was added. Binaries are now available for download, and several Router command line options were added to configure a Windows service for MySQL Router.

  The new command line options on Windows are `--install-service` (service starts automatically), `--install-service-manual` (service can be started manually), `--remove-service` (removes a service), and `--service` (starts a service). The service name is *MySQLRouter*.

  For additional information about these options, see Starting MySQL Router.

Bugs Fixed

- The RPATH for executable and shared libraries did not contain both the router library path and the router plugin library path. (Bug #24763533)

- The RPATH was incorrect in the executable for RPM builds. The `plugin_folder` path cannot be set to a value not present in the executable, and the paths should be used for variable interpolation, not to control where plugins are found. The error was similar to "Error: mysql_protocol.so: cannot open shared object file: No such file or directory".

  Additionally, the INSTALL_LIBDIR was incorrectly used, which also resulted in path related errors. (Bug #24669798, Bug #24695503)

- When writing packets read from the sender (client or server) to the receiver, if a single write() call did not write all requested data, the whole buffer was written in another attempt. Now, only the remaining part of the buffer gets written. (Bug #24578638)

- The SO version for **libmysqlharness** was 0, which is usually reserved for pre-release versions. The SO version was changed to 1, so the library file name changed from `libmysqlharness.so.0` to `libmysqlharness.so.1`. (Bug #24557123)

- On OS X, linking Router to Fabric would fail to function by default due to linking problems. (Bug #24527866, Bug #80376)

- The following syntax programs were not caught: defining a key in the DEFAULT section, and using option or section names that contained non-identifier characters. For example, spaces are not allowed in option names or section keys. (Bug #24372338)

- The read-write mode (which uses the first-available mode schedule) could reconnect to the first listed server (destination) after failing to connect to all listed servers. Instead, it now always behaves as documented, which is to not reconnect after all destinations failed to connect. If a reconnection is desired, then use the read-only mode instead, which implements the round-robin schedule. (Bug #24367453)

- Backslashes in configuration definitions, such as file paths, could escape characters. (Bug #24360999)

- On OS X, Router could fail due to RPATH related issues. CMake now uses *-DWITH_STATIC=yes* for OS X when executing cmake for the binaries. (Bug #23507484)

- When handling large data sets, such as BLOBs, the connection routing plugin would terminate the connection with a write error. This is fixed by correctly setting the socket to blocking after it was set to nonblocking when requesting a connection from a MySQL server.

In addition, several related write calls now properly check for and report errors. (Bug #23183566)

- When the max_connect_errors variable was set to the maximum possible value (highest boundary value of 4294967295), connection errors would report the value as a negative value, such as -1. (Bug #22745790)

- There was inconsistent behavior with connection handling in relation to the max_connections setting. Now, the counter is incremented before the thread is spawned in the Routing plugin, because getting the server socket takes time and client connections could have been accepted after the max number of connections was reached. (Bug #22705168)

- An exception thrown inside a plugin would cause the process to be terminated unconditionally. (Bug #22546709, Bug #79983)

Changes in MySQL Router 2.0.3 (2016-03-03, General Availability)

- Functionality Added or Changed

- Bugs Fixed

Functionality Added or Changed

- Support was added for Solaris 11.2 and above, Fedora 22 and above, and OS X 10.10 and above. (Bug #22842993)

- Two new connection routing options were added:

  - `max_connect_errors`: similar to MySQL Server's `max_connect_errors` option, and defaults to 100

  - `client_connect_timeout`: similar to MySQL Server's `connect_timeout` option, and defaults to 9 (1 second less than MySQL Server's default)

  (Bug #22020088)

Bugs Fixed

- A configuration that contained empty destination values, such as "destinations=test,,,,", would cause Router to terminate with an uncaught exception. This condition now emits an error, such as "Configuration error: option destinations in [routing:foo]: empty address found in destination list". (Bug #22579989)

- When using non-alphanumeric characters in configuration variables, such as "destinations = {mysql@1}", Router would terminate with an uncaught exception. (Bug #22572346)

- In certain network setups, for example when connected to a VPN, routing could fail starting with the error "Operation not supported". Error handling was added when setting up the service, which raises or logs errors. (Bug #22531942, Bug #79933)

- Starting Router without plugins (or a defined strategic plan) now emits a descriptive error that references the lack of plugins. For example, loading an empty configuration file now exits with an error. (Bug #22195343)

- Plugins now have access to the URI class, and mysqlrouter::split_string was added. (Bug #22134596)

- A `destinations` configuration length of more than 256 characters would cause Router to hang. (Bug #22104451)

- In some cases, the IPv6 address missed the square brackets around the IP address. For example, "[::]:7002" could be reported as ":::7002"; (Bug #22084430, Bug #78921)

- The **--help** text now outputs the MySQL Router version number. (Bug #22074209)

- Added a lock_guard when checking whether a server is quarantined or not, to prevent changes to the quarantine vector with reads. (Bug #22071169)

- Starting Router with spaces between the `destination` server addresses would report a configuration error. Now, whitespace is trimmed from the server addresses. (Bug #22062859)

- Uninstalling MySQL Router (*dpkg -r mysql-router*) left extra files behind. Now, only the configuration files remain. (Bug #22025434)

- When MySQL clients connected to Router and the configured back ends were not available, the generated error (such as "*ERROR 2013 (HY000): Lost connection to MySQL server at 'reading initial communication packet', system error: 0*" was unclear.

  Now, when none of the back end servers are available, the client receives a message similar to those generated when MySQL clients connect to a host/port pair where MySQL Server is not running. For example, "*ERROR 2003 (HY000): Can't connect to MySQL server on '127.0.0.1' (61)*". (Bug #22020711, Bug #78836)

- When a client connected through Router, and it did not finish handshaking (or did it incorrectly), it would generate an error on the MySQL Server. For MySQL 5.6 and 5.7, after 100 times it would block the host where this clients came from. Because all clients appear as though they come from the same IP/Host in Router, one client misbehaving could have potentially blocked all other applications.

  This only affected connections coming from the network and not from localhost, because MySQL Server does not register connection errors when connections come from localhost.

  A workaround was to use localhost (meaning, MySQL Server on the same host as Router), or to set the max_connect_errors option to the highest possible value (on 64-bit this is 2^64). (Bug #22020088, Bug #78835)

- Several code improvements were made that were discovered from Valgrind generated reports. (Bug #21983406, Bug #78805)

- There was a memory leak in the fabric cache plugin. (Bug #21981758)

Changes in MySQL Router 2.0.2 (2015-10-23, General Availability)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Only one Fabric Cache section is allowed, when before multiple Fabric Cache sections were accepted. Specifying multiple Fabric Cache sections will now exit and display an error. (Bug #22069820)

- A sample configuration file and init script are now added to the `share/doc/` directory.

  The default configuration file (`mysqlrouter.ini`) location for the STANDALONE installation layout is now the current working directory. (Bug #22065149)

- Setting `bind_address` is no longer required, and it defaults to `127.0.0.1`. Also, if a port is not used in the definition, then `bind_port` is used. (Bug #22057234)

- A new `bind_port` configuration option was added. It is the default port used by `bind_address` if `bind_address` does not define a port. (Bug #22057234)

- The configuration file no longer accepts a password for the Fabric Cache plugin. Instead, MySQL Router prompts for the password at startup. (Bug #22024872, Bug #78842)

- The `wait_timeout` configuration option was removed. (Bug #22010993)

- Successful routes are now logged using the DEBUG level. Previously it was using the INFO log level. (Bug #22010923)

- For MySQL Harness, the CMake variable "HARNESS_INSTALL_LIBRARY_DIR" was introduced to specify where libraries are installed. The default value is "lib". It can be set by projects using the Harness, such as MySQL Router. (Bug #21931849)

- The `README` text was updated, the build instructions now refer to the online documentation. (Bug #21901927)

- The [DEFAULT] section of the MySQL Router configuration file is now optional. Settings for this section include config_folder, logging_folder, plugin_folder, and runtime_folder.

  The default values are relative to the installation prefix. Appended paths are etc/ for config, run/ for runtime, and lib/mysqlrouter for plugin. Logging defaults to an empty value, so messages are sent to the console. (Bug #21900022, Bug #21935219, Bug #78557)

- Logger levels were added: FATAL, ERROR, WARNING, DEBUG, and INFO. The default value is INFO.

  Also, adding [logger] to the configuration file is now optional. INFO is the default behavior. (Bug #21899753, Bug #78555)

Bugs Fixed

- The MySQL Router Fabric_Cache plugin failed to function if Router was started before MySQL Fabric. In addition to this fix, the number of Fabric reconnect attempts is now displayed. (Bug #22045940)

- Starting connection routing without an available destination server would quarantine the destination server and Router would incorrectly exit on the next connection. (Bug #22042842)

- The commercial edition variant of the packages now report the correct license information. (Bug #22024494)

- When the router was started without starting the destination servers, and clients were trying to connect to the bind port, memory leaks were observed. (Bug #21981890)

- A memory leak occurred in MySQL Router with the Fabric Cache plugin when Router was started without MySQL Fabric running. (Bug #21981787)

- The Nagle algorithm for MySQL client connections is now disabled the same way it is disable it for the server connections. (Bug #21973979, Bug #78781)

- When the list of available managed servers in Fabric Cache was decreased, and the current position pointed to a managed server that was no longer in the list, then an unhandled exception was thrown. This problem could have occurred when promoting and demoting an HA Group in MySQL Fabric. (Bug #21972632)

- Socket connections are now properly closed after calling *shutdown()*, as to reclaim resources. (Bug #21972344, Bug #78771)

- Fixed the removal of servers from quarantine. MySQL Router now properly exits when reaching the end of the list, when all servers are in quarantine. (Bug #21962350, Bug #78742)

- After installing MySQL Router to a non-default location (such as, using **DCMAKE_INSTALL_PREFIX**), setting **LD_LIBRARY_PATH** to the new location had no affect, thus causing plugin usage to fail. (Bug #21944649, Bug #78702)

- Starting the router with an empty string for the group section could cause a crash. (Bug #21916963)

- When multiple cache configurations were configured for the same fabric setup, connecting a client to a routing service that used this configuration would cause a crash. (Bug #21916830)

- Passing `allow_primary_reads` to Fabric is now only allowed in read-only mode, when before it was also allowed in read-write mode. (Bug #21881850)

- Once the group is demoted and then promoted, all new connections to the routing service fail, as further changes to the group were disregarded after reaching 0 available destinations. (Bug #21881131, Bug #21880676)

- The `connect_timeout` and `max_connections` configuration options always used the default values, and did not use values defined in the configuration files. (Bug #21873666)

- Fixed persistent connections with MySQL Fabric. When reconnecting to MySQL Fabric with the Fabric Cache plugin, mysql_ping() usage was corrected to allow a persistent connection with MySQL Fabric when using the MySQL-RPC protocol. (Bug #21864126)

- The `read-write` mode would always check the first MySQL connection destination, even if it was reachable. It now preserves the status information in memory to skip unreachable destinations. (Bug #21847015)

- Configuration errors now cause MySQL Router to terminate and return exit code 1, when before exit code 0 was returned.

  Previously, errors where directed to STDOUT instead of STDERR. (Bug #21771595)

Changes in MySQL Router 2.0.1 (2015-09-18, Labs)

Initial public MySQL Router release, and published to http://labs.mysql.com/.

Bugs Fixed

- Initial labs (alpha) release.

Changes in MySQL Router 2.0.0 (Internal, Alpha)

Bugs Fixed

- Initial internal release.