MySQL Router 26.7.0 Release Notes

Abstract

This document contains release notes for the changes in MySQL Router 26.7.0.

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.

Important. As of MySQL Router 26.7, MySQL Router moves to a single version release model. MySQL Router series 8.4 and 9.7 are now discontinued. The latest version of MySQL Router remains compatible with all supported MySQL Server versions. That is, MySQL Router 26.7 is compatible with MySQL Server 8.4, 9.7, and 26.7. It is recommended that you use the latest version of this software.

Document generated on: 2026-09-11 (revision: 31533)

Table of Contents

Preface and Legal Notices 2
Changes in MySQL Router 26.x 4
    Changes in MySQL Router 26.7.0 (2026-07-28) 4
Changes in MySQL Router 9.x 5
    Changes in MySQL Router 9.7.1 (2026-06-16) 5
    Changes in MySQL Router 9.7.0 (2026-04-21) 5
    Changes in MySQL Router 9.6.0 (2026-01-20) 6
    Changes in MySQL Router 9.5.0 (2025-10-21) 6
    Changes in MySQL Router 9.4.0 (2025-07-22) 7
    Changes in MySQL Router 9.3.0 (2025-04-15) 8
    Changes in MySQL Router 9.2.0 (2025-01-21) 9
    Changes in MySQL Router 9.1.0 (2024-10-15) 9
    Changes in MySQL Router 9.0.1 (2024-07-23) 10
    Changes in MySQL Router 9.0.0 (2024-07-01) 11
Changes in MySQL Router 8.4 11
    Changes in MySQL Router 8.4.10 (2026-06-16) 11
    Changes in MySQL Router 8.4.9 (2026-04-21) 11
    Changes in MySQL Router 8.4.8 (2026-01-20) 11
    Changes in MySQL Router 8.4.7 (2025-10-21) 11
    Changes in MySQL Router 8.4.6 (2025-07-22) 12
    Changes in MySQL Router 8.4.5 (2025-04-15) 13
    Changes in MySQL Router 8.4.4 (2025-01-21) 13
    Changes in MySQL Router 8.4.3 (2024-10-15) 14

Changes in MySQL Router 8.4.2 (2024-07-23) 14
Changes in MySQL Router 8.4.1 (2024-07-01) 14
Changes in MySQL Router 8.4.0 (2024-04-30) 15
Changes in MySQL Router 8.3.0 (2024-01-16) 17
Changes in MySQL Router 8.2.0 (2023-10-25) 18
Changes in MySQL Router 8.1.0 (2023-07-18) 21
Changes in MySQL Router 8.0 23
Changes in MySQL Router 8.0.46 (2026-04-21) 23
Changes in MySQL Router 8.0.45 (2026-01-20) 23
Changes in MySQL Router 8.0.44 (2025-10-21) 23
Changes in MySQL Router 8.0.43 (2025-07-22) 23
Changes in MySQL Router 8.0.42 (2025-04-15) 24
Changes in MySQL Router 8.0.41 (2025-01-21) 24
Changes in MySQL Router 8.0.40 (2024-10-15) 24
Changes in MySQL Router 8.0.39 (2024-07-23) 24
Changes in MySQL Router 8.0.38 (2024-07-01) 25
Changes in MySQL Router 8.0.37 (2024-04-30) 25
Changes in MySQL Router 8.0.36 (2024-01-16) 26
Changes in MySQL Router 8.0.35 (2023-10-25) 27
Changes in MySQL Router 8.0.34 (2023-07-18) 28
Changes in MySQL Router 8.0.33 (2023-04-18) 29
Changes in MySQL Router 8.0.32 (2023-01-17) 31
Changes in MySQL Router 8.0.31 (2022-10-11) 33
Changes in MySQL Router 8.0.30 (2022-07-26) 34
Changes in MySQL Router 8.0.29 (2022-04-26) 35
Changes in MySQL Router 8.0.28 (2022-01-18) 36
Changes in MySQL Router 8.0.27 (2021-10-19) 37
Changes in MySQL Router 8.0.26 (2021-07-20) 38
Changes in MySQL Router 8.0.25 (2021-05-11) 38
Changes in MySQL Router 8.0.24 (2021-04-20) 38
Changes in MySQL Router 8.0.23 (2021-01-18) 40
Changes in MySQL Router 8.0.22 (2020-10-19) 41
Changes in MySQL Router 8.0.21 (2020-07-13) 42
Changes in MySQL Router 8.0.20 (2020-04-27) 43
Changes in MySQL Router 8.0.19 (2020-01-13) 44
Changes in MySQL Router 8.0.18 (2019-10-14) 45
Changes in MySQL Router 8.0.17 (2019-07-22) 46
Changes in MySQL Router 8.0.16 (2019-04-25) 48
Changes in MySQL Router 8.0.15 (2019-02-01) 50
Changes in MySQL Router 8.0.14 (2019-01-21) 50
Changes in MySQL Router 8.0.13 (2018-10-22) 51
Changes in MySQL Router 8.0.12 (2018-07-27) 52
Changes in MySQL Router 8.0.11 (2018-04-19) 53
Changes in MySQL Router 8.0.5 - 8.0.10 (Skipped version numbers) 54
Changes in MySQL Router 8.0.4 (2018-02-07, Release Candidate) 54
Changes in MySQL Router 8.0.3 (2017-09-29, Development Milestone) 55

Preface and Legal Notices

This document contains release notes for the changes in MySQL Router 26.7.

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Changes in MySQL Router 26.x

Changes in MySQL Router 26.7.0 (2026-07-28)

Important

As of this release, MySQL Router moves to a single version release model. MySQL Router series 8.4 and 9.7 are now discontinued.

The latest version of MySQL Router remains compatible with all supported MySQL Server versions. That is, MySQL Router 26.7 is compatible with MySQL Server 8.4, 9.7, and 26.7.

It is recommended that you use the latest version of this software.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- MySQL Router can now enforce limits on HTTP connections, and request and response body sizes. The following `http_server` configuration parameters are introduced:

- `max_http_connections`: Maximum number of simultaneously active client connections the HTTP server will allow. Permitted range is 1 to 100000 connections. Default value is 1024.
- `max_request_body_size`: Maximum allowed size, in bytes, of a HTTP request body. Permitted range is 0 to 2147483648 (2 GiB). Default value is 16777216 (16MiB).
- `max_response_body_size`: Maximum allowed size, in bytes, of a HTTP response body sent by the HTTP server. Permitted range is 0 to 2147483648 (2 GiB). Default value is 16777216 (16MiB).

The options can be set in the `[http_server]` or `[DEFAULT]` configuration sections Values defined in `[http_server]` takes precedence. The defaults apply when neither section supplies a value and replace the previous unlimited behavior.

When the connection limit is reached, the HTTP server closes or refuses excess TCP connections without sending an HTTP response. An oversized request is rejected with `413 Payload Too Large`, followed by graceful shutdown of the connection. An oversized response is replaced with `500 Internal Server Error` without a response body, after which the connection is closed. Rejection logging is rate-limited to prevent log flooding. (Bug #39268619, WL #17288)

Bugs Fixed

- Trailing semi-colons following `START TRANSACTION`, `BEGIN`, and `BEGIN WORK`, resulted in rejection of those transactions when connection sharing was enabled. (Bug #39190243)
- Fixed an issue relating to shutdown sequences. (Bug #38537545)

Changes in MySQL Router 9.x

Changes in MySQL Router 9.7.1 (2026-06-16)

Note

This release is a Critical Security Patch Update. See Oracle Critical Security Patch Update Advisory - June 2026 for more information.

Changes in MySQL Router 9.7.0 (2026-04-21)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

Functionality Added or Changed

- MySQL Router `host_cache` is introduced in this release. This plugin is an in-process DNS and host cache which reduces resolver work, improves connection handling, and provides observability into problematic connection behaviour.

  The host_cache is enabled by default and can be configured using the following configuration parameters:

  - `enabled`:
  - `max_entries`:
  - `ttl_success_seconds`:

- `ttl_negative_seconds`:
- `ttl_jitter_ratio`:

Observability is provided by the REST API. See host_cache. (WL #17272)

Changes in MySQL Router 9.6.0 (2026-01-20)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

Functionality Added or Changed

- In previous releases, the periodic updates to the `last_check_in` field of the `mysql_innodb_cluster_metadata.routers` table generated very large binary logs. This was caused by MySQL Router storing full configuration details in the `attributes` field of the `mysql_innodb_cluster_metadata.routers` table and the entire row being copied to the binary log every time `last_check_in` was updated.

  As of this release, a new version of the Metadata Schema is added, v2.4.0. In this version, `last_check_in` is moved to a new table, `mysql_innodb_cluster_metadata.router_stats`.

  If the schema version is less than 2.4.0, MySQL Router carries on using `mysql_innodb_cluster_metadata.routers.last_check_in`.
  If the schema version is 2.4.0, or higher, MySQL Router uses `mysql_innodb_cluster_metadata.router_stats.last_check_in`. (Bug #37926324, WL #17027, WL #17028)

Changes in MySQL Router 9.5.0 (2025-10-21)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

Bugs Fixed

- Removed !SSLv3 from the default cipher list. SSLv3 support is disabled explicitly. The !SSLv3 filter incorrectly removed valid ciphers from the allowed cipher list. (Bug #38205463)
- It was not possible for MySQL Router to retriieve metadata if from a secondary node if it was lagging and had not yet received the `router_id` from the primary. Errors were returned similar to the following:

  ```
  Error reading router.options from v2_cs_router_options: did not
  find router entry for router_id, Unable to fetch live
  group_replication member data from any server in cluster
  ```

  As of this release, if a `router_id` is not found, MySQL Router proceeds to the next server on the list until it locates valid metadata. (Bug #38132603)
- IPv6 endpoints were logged as `::1:12435` instead of `[::1]:12345`. IPv6 addresses with ports are now properly escaped. (Bug #38122485)
- Under certain circumstances, restarting MySQL Router could result in an empty state.json file, leading to restart failures. Errors were returned similar to the following:

```
Error parsing file dynamic state file: Parsing JSON failed at
offset 0: The document is empty.
```

(Bug #38099912)

- The HTTP plugin misinterpreted the `bind_address=*` configuration and bound to the loopback address, only. (Bug #38084833)

Changes in MySQL Router 9.4.0 (2025-07-22)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

Important

MySQL Router now features full support for MySQL REST Service in on-premise configurations. See the announcement blog post HeatWave REST Service and the Quick Start Guide for details about MySQL REST Service.

- Deprecation and Removal Notes
- Functionality Added or Changed
- Bugs Fixed

Deprecation and Removal Notes

- As of this version, MySQL Router's HTTP/2 feature is disabled, to allow for future refactoring. (Bug #38055103)

Functionality Added or Changed

- Binary packages that include `curl` rather than linking to the system `curl` library have been upgraded to use `curl` 8.16.0. (Bug #38448034)
- MySQL Router now generates SSL certificates with a validity period of one year, aligning with best practices that recommend a validity period of no more than 397 days. This change affects the auto-generated certificates created during the bootstrap process. Error messages related to certificate validity may be encountered if using previously generated certificates with longer validity periods. (Bug #37936725)

Bugs Fixed

- MySQL Router's logger created a lock on every log call, even if logging was disabled.

  As of this release, the logger now acquires locks only when logging is enabled. (Bug #38044378)
- Fixed an issue related to debug logging. (Bug #38009073)
- Users created with a comment in their definition were unable to connect using MySQL Router. Error messages were returned similar to the following:

```
ERROR 1045 (28000): Access denied
```

(Bug #37903358)

- Routing Guidelines, introduced in 9.2.0, did not treat `bind_address=localhost` as a valid target when generated from the MySQL Router configuration. (Bug #37844427)
- It was not possible to build MySQL Router with GCC 15 on Fedora 42 due to missing includes. (Bug #37769606)
- After a DNS failure, the destination was not added to quarantine and could not be checked for availability after the connection was restored. Errors were returned similar to the following:

```
        resolve(host) failed: Name or service not known
```

(Bug #37617712)

- Under certain circumstances, with Connection Sharing enabled, MySQL Router could crash due to a race condition in the connection pool. MySQL Router tried to close a connection while also making that connection available to another thread. Errors were returned similar to the following:

```
Process Core Dump (PID XXXXXX/UID 0)
Resource limits disable core dumping for process XXXXXX (mysqlrouter)
```

(Bug #37303055)

Changes in MySQL Router 9.3.0 (2025-04-15)

Bugs Fixed

- The check for servers from a newer series and the lack of support for servers from a newer series, introduced in MySQL Router 9.2.0, is reverted in this release.

  As of this release, MySQL Router 9.3.0 can connect to MySQL Servers from a newer series. A warning is displayed, but the connection is supported. (Bug #37690477)

  References: See also: Bug #36041256.

- Dollar-quoted strings were not supported. A syntax error was returned. (Bug #37538219)
- The `http_server` plugin would throw an uncaught exception and terminate when given an invalid URL. Now the exception is caught with a 400 HTTP (Bad Request) error returned to the client. (Bug #37499075)
- Improved `close_connection_after_refresh=0` behavior for statements making an `UPDATE` statement, which would always create a new connection. Now cached connections to the `PRIMARY` are used for `UPDATE` queries, as otherwise a new connection is opened for each update. (Bug #37453301)
- It is no longer necessary to escape string values in Routing Guideline tags with `\"`. Such string values are still supported, but not necessary. (Bug #37408429, Bug #37408370)
- If a client without the SESSION TRACK capability, or without enabling `trackSessionState` (MySQL Connector/J), connected to the Read/Write splitting port of MySQL Router, updates could fail with an error similar to the following:

```
        Buffer length is less than expected payload length.
```

(Bug #36374232)

- Empty and commented out statements were not allowed with Read-Write splitting enabled. (Bug #116952, Bug #37391353)
- Enabling the `ANSI_QUOTES` `sql_mode` was not allowed with Read-Write splitting enabled, and queries with it enabled would log an 'Unknown column' warning. (Bug #116950, Bug #37391347)

Changes in MySQL Router 9.2.0 (2025-01-21)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added a new `close_connection_after_refresh` metadata_cache option to control whether a connection remains open for future metadata refresh operations. If set to 0 (default), the metadata_cache keeps the connection open if the refresh succeeded and if the next refresh is to the same MySQL server. Setting it to 1 is similar to previous behavior, in that the connection is closed after each metadata refresh operation. (WL #16652)
- The `destinations` option now supports Unix domain sockets. (WL #16582)
- This release introduces Routing Guidelines, a flexible and unified configuration interface enabling users to customize routing behavior. Routing Guidelines are defined as a JSON document, stored in the metadata schema.

  Use the MySQL Shell AdminAPI `RoutingGuideline` class to interact with these guidelines, and see the MySQL Shell 9.2.0 release notes for additional information. (WL #14119)

Bugs Fixed

- **Important Change:** MySQL Router no longer supports MySQL Server versions from a newer series. The metadata is checked and discarded for servers from a newer series, a check that executes during bootstrap and during periodic metadata refresh operations. A newer version in the same series is supported. For example, MySQL Router 8.4.4 supports MySQL Server 8.4.5 but not MySQL Server 9.0.0. (Bug #36041256)
- Because building with `CMAKE_BUILD_TYPE=Debug` disables optimizations, `std::vector.resize()` attempted to initialize every byte before each read from an encrypted socket. Memory usage was improved to account for this. (Bug #37385923)
- Accessing the `/routes/{name}/connections` REST API endpoint while also benchmarking queries through the router could cause the router to unexpectedly halt. (Bug #37251508)
- OpenID Connect authentication stopped functioning for a connection with the following scenario: the default authentication plugin was set to openid_connect, the MySQL Router connection pool was enabled, and the connection was in the pool ready for reuse. (Bug #37190332)
- When `stats_updates_frequency` was set to an unexpected value, MySQL Router would log a warning during each metadata refresh thus clogging the logs. Now the warning is logged just once, unless the value changed. (Bug #116951, Bug #37391164)

Changes in MySQL Router 9.1.0 (2024-10-15)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added *OpenID Connect* support, which is available as of MySQL Enterprise Edition Server 9.1.0. (WL #16466)

Bugs Fixed

- With connection sharing enabled, changing the password of an active connection yielded a vague "Lost connection" error instead of indicating that reauthentication failed. (Bug #36981282)
- Updated <cstring> and <iostream> header usage by adding or removing their inclusion as needed, and annotated the functions utilized from each. (Bug #36946579, Bug #36951336)
- Replaced most uses of `std::enable_if<>` and `std::enable_if_t<>` with the `requires` keyword introduced in C++20, to limit the visibility of methods. This improves the error messages and stack traces. (Bug #36939919)
- On macOS, AddressSanitizer (ASan) discovered a potential issue with connection pooling that could cause Router to unexpectedly halt. (Bug #36935988)
- Bootstrapping against a MySQL account that used the mysql_native_password authentication plugin with MySQL Router 9.0 from a standalone (zip or tar.gz) package would exit with an error indicating that the plugin was not available. (Bug #36915646)
- Improved the dependency injection mechanism (DIM) to increase performance in a multithreaded environment. DIM is no longer controlled by a single mutex. (Bug #36846616)
- In some cases, the LogFilter would execute when a log message wasn't logged. (Bug #36841009)
- Improved HTTP request handing performance by using the ICU regex implementation instead of std::regex. (Bug #36797250)
- Improved HTTP request handling to better scale for a large number of parallel connections. (Bug #36796808)
- Building with the MSVC "Build Solution" target now excludes building mysqlxmessages_shared, which was already defined as EXCLUDE_FROM_ALL. (Bug #36719728)
- A TLS shutdown was not executed when Read-Write splitting was used and a prepared statement needed to be prepared on the Write node but the current connection was on the Read node. (Bug #36715733)
- Connections in the connection pool were closed without waiting for the server to close the connection which affected the TLS session reuse cache. This affected connection sharing and Read-Write splitting as both let the connection pool close their connections. (Bug #36715372)
- Greatly improved HTTP/2 compatibility for the REST API. (Bug #36697876)
- With Read-Write splitting enabled and after the PRIMARY switched its role to SECONDARY, all write statements would fail with an error indicating that the MySQL server is running in super_read_only mode. Now it drops the client connection like it does without Read-Write splitting. (Bug #114594, Bug #36591958)

Changes in MySQL Router 9.0.1 (2024-07-23)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 9.0.1 release.

Changes in MySQL Router 9.0.0 (2024-07-01)

Important

This release is no longer available for download. It was removed due to a dependency on a version of the server which is also no longer available for download. See MySQL 9.0.0 Release Notes. Please upgrade to MySQL Router 9.0.1 instead.

Bugs Fixed

- System variable changes were not propagated when read-write splitting was enabled. (Bug #36674083)
- Current schema changes were not propagated to shared connections when both read-write splitting and connection sharing were enabled. (Bug #36663727)
- Increased the maximum `router_id` value from 999999 to 4294967295 (2^32-1). This also affects how the internal metadata_cache `user` name is defined. (Bug #36393211)

Changes in MySQL Router 8.4

Changes in MySQL Router 8.4.10 (2026-06-16)

Note

This release is a Critical Security Patch Update. See Oracle Critical Security Patch Update Advisory - June 2026 for more information.

Changes in MySQL Router 8.4.9 (2026-04-21)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.4.9 release.

Changes in MySQL Router 8.4.8 (2026-01-20)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.4.8 release.

Changes in MySQL Router 8.4.7 (2025-10-21)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

- Deprecation and Removal Notes
- Bugs Fixed

Deprecation and Removal Notes

- As of this version, MySQL Router's HTTP/2 feature is disabled, to allow for future refactoring. (Bug #38055103)

Bugs Fixed

- Removed !SSLv3 from the default cipher list. SSLv3 support is disabled explicitly. The !SSLv3 filter incorrectly removed valid ciphers from the allowed cipher list. (Bug #38205463)
- It was not possible for MySQL Router to retriieve metadata if from a secondary node if it was lagging and had not yet received the `router_id` from the primary. Errors were returned similar to the following:

  ```
  Error reading router.options from v2_cs_router_options: did not
  find router entry for router_id, Unable to fetch live
  group_replication member data from any server in cluster
  ```

  As of this release, if a `router_id` is not found, MySQL Router proceeds to the next server on the list until it locates valid metadata. (Bug #38132603)
- Under certain circumstances, restarting MySQL Router could result in an empty state.json file, leading to restart failures. Errors were returned similar to the following:

  ```
  Error parsing file dynamic state file: Parsing JSON failed at
  offset 0: The document is empty.
  ```

  (Bug #38099912)
- The HTTP plugin misinterpreted the `bind_address=*` configuration and bound to the loopback address, only. (Bug #38084833)

Changes in MySQL Router 8.4.6 (2025-07-22)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Binary packages that include `curl` rather than linking to the system `curl` library have been upgraded to use `curl` 8.16.0. (Bug #38448034)
- MySQL Router now generates SSL certificates with a validity period of one year, aligning with best practices that recommend a validity period of no more than 397 days. This change affects the auto-generated certificates created during the bootstrap process. Error messages related to certificate validity may be encountered if using previously generated certificates with longer validity periods. (Bug #37936725)

Bugs Fixed

- Fixed an issue related to debug logging. (Bug #38009073)
- Users created with a comment in their definition were unable to connect using MySQL Router. Error messages were returned similar to the following:

  ```
  ERROR 1045 (28000): Access denied
  ```

```
```

(Bug #37903358)

- It was not possible to build MySQL Router with GCC 15 on Fedora 42 due to missing includes. (Bug #37769606)
- After a DNS failure, the destination was not added to quarantine and could not be checked for availability after the connection was restored. Errors were returned similar to the following:

```
        resolve(host) failed: Name or service not known
```

(Bug #37617712)

- Under certain circumstances, with Connection Sharing enabled, MySQL Router could crash due to a race condition in the connection pool. MySQL Router tried to close a connection while also making that connection available to another thread. Errors were returned similar to the following:

```
Process Core Dump (PID XXXXXX/UID 0)
Resource limits disable core dumping for process XXXXXX (mysqlrouter)
```

(Bug #37303055)

Changes in MySQL Router 8.4.5 (2025-04-15)

Bugs Fixed

- Dollar-quoted strings were not supported. A syntax error was returned. (Bug #37538219)
- The `http_server` plugin would throw an uncaught exception and terminate when given an invalid URL. Now the exception is caught with a 400 HTTP (Bad Request) error returned to the client. (Bug #37499075)
- If a client without the SESSION TRACK capability, or without enabling `trackSessionState` (MySQL Connector/J), connected to the Read/Write splitting port of MySQL Router, updates could fail with an error similar to the following:

```
        Buffer length is less than expected payload length.
```

(Bug #36374232)

- Empty and commented out statements were not allowed with Read-Write splitting enabled. (Bug #116952, Bug #37391353)
- Enabling the `ANSI_QUOTES` `sql_mode` was not allowed with Read-Write splitting enabled, and queries with it enabled would log an 'Unknown column' warning. (Bug #116950, Bug #37391347)

Changes in MySQL Router 8.4.4 (2025-01-21)

Bugs Fixed

- **Important Change:** MySQL Router no longer supports MySQL Server versions from a newer series. The metadata is checked and discarded for servers from a newer series, a check that executes during bootstrap and during periodic metadata refresh operations. A newer version in the same series is supported. For example, MySQL Router 8.4.4 supports MySQL Server 8.4.5 but not MySQL Server 9.0.0. (Bug #36041256)

- Because building with `CMAKE_BUILD_TYPE=Debug` disables optimizations, `std::vector.resize()` attempted to initialize every byte before each read from an encrypted socket. Memory usage was improved to account for this. (Bug #37385923)
- Accessing the `/routes/{name}/connections` REST API endpoint while also benchmarking queries through the router could cause the router to unexpectedly halt. (Bug #37251508)

Changes in MySQL Router 8.4.3 (2024-10-15)

Bugs Fixed

- With connection sharing enabled, changing the password of an active connection yielded a vague "Lost connection" error instead of indicating that reauthentication failed. (Bug #36981282)
- Updated <cstring> and <iostream> header usage by adding or removing their inclusion as needed, and annotated the functions utilized from each. (Bug #36946579, Bug #36951336)
- Replaced most uses of `std::enable_if<>` and `std::enable_if_t<>` with the `requires` keyword introduced in C++20, to limit the visibility of methods. This improves the error messages and stack traces. (Bug #36939919)
- On macOS, AddressSanitizer (ASan) discovered a potential issue with connection pooling that could cause Router to unexpectedly halt. (Bug #36935988)
- Improved the dependency injection mechanism (DIM) to increase performance in a multithreaded environment. DIM is no longer controlled by a single mutex. (Bug #36846616)
- In some cases, the LogFilter would execute when a log message wasn't logged. (Bug #36841009)
- Improved HTTP request handling to better scale for a large number of parallel connections. (Bug #36796808)
- A TLS shutdown was not executed when Read-Write splitting was used and a prepared statement needed to be prepared on the Write node but the current connection was on the Read node. (Bug #36715733)
- Connections in the connection pool were closed without waiting for the server to close the connection which affected the TLS session reuse cache. This affected connection sharing and Read-Write splitting as both let the connection pool close their connections. (Bug #36715372)
- Greatly improved HTTP/2 compatibility for the REST API. (Bug #36697876)
- With Read-Write splitting enabled and after the PRIMARY switched its role to SECONDARY, all write statements would fail with an error indicating that the MySQL server is running in super_read_only mode. Now it drops the client connection like it does without Read-Write splitting. (Bug #114594, Bug #36591958)

Changes in MySQL Router 8.4.2 (2024-07-23)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.4.2 release.

Changes in MySQL Router 8.4.1 (2024-07-01)

Important

This release is no longer available for download. It was removed due to a dependency on a version of the server which is also no longer available for

download. See MySQL 8.4.1 Release Notes. Please upgrade to MySQL Router 8.4.2 instead.

Bugs Fixed

- System variable changes were not propagated when read-write splitting was enabled. (Bug #36674083)
- Current schema changes were not propagated to shared connections when both read-write splitting and connection sharing were enabled. (Bug #36663727)
- MySQL Router always updates the `last_check_in` in the Metadata Schema when it starts, even if the Cluster is `INVALIDATED`, leading to an errant transaction. As of this release, MySQL Router does not update `last_check_in` if the Cluster is `INVALIDATED`. (Bug #36563430)
- Increased the maximum `router_id` value from 999999 to 4294967295 (2^32-1). This also affects how the internal metadata_cache `user` name is defined. (Bug #36393211)

Changes in MySQL Router 8.4.0 (2024-04-30)

- Deprecation and Removal Notes
- Functionality Added or Changed
- Bugs Fixed

Deprecation and Removal Notes

- The configuration option `bootstrap_server_addresses`, deprecated in MySQL Router 8.0.14, is removed in this release.

  If this option is present in a configuration file, MySQL Router generates an error. (WL #15867)
- The configuration option `unreachable_destination_refresh_interval`, deprecated in MySQL Router 8.0.32, is removed in this release.

  If this option is present in a configuration file, MySQL Router generates an error. (WL #15869)
- As of this release, version 1.x of MySQL InnoDB Cluster Metadata is no longer supported. It is recommended to always use the latest version of MySQL Shell and MySQL Router.

  See Upgrading MySQL Router and Upgrade Metadata Schema. (WL #15868)
- The `allow_primary_reads` parameter of the `destinations` URI is removed in this release. (WL #15872)
- The configuration option `mode`, deprecated in MySQL Router 8.0.4, is removed in this release. (WL #15877)

Functionality Added or Changed

- As of this release, MySQL Router exposes its configuration in the Cluster metadata for all routers bootstrapped against it. This information is stored as JSON in the Cluster metadata schema and can be accessed by the MySQL Shell operation, *`object`*`.routerOptions` for Cluster, ClusterSet, and ReplicaSets. (WL #15649)
- As of this release, server connections which were not explicitly closed, but remain idle longer than the defined `connection-sharing-delay`, are no longer placed in the connection pool. Instead, the connections remain open and available for use by new client connections.

It is no longer necessary to enable the connection pool to enable connection sharing. Therefore `max_idle_server_connections` can be zero if connection sharing is enabled. (WL #15742)

Bugs Fixed

- If a hostname was not resolved, due to a DNS failure, MySQL Router did not check if that host became available again, later. (Bug #36246652)
- MySQL Router's bootstrap process checks the `mysql.user` table for the unsupported `mysql_native_password` authentication plugin. If the bootstrap user had no access to the table, the following error was returned:

```
Failed checking the Router account authentication plugin: Error executing MySQL query "select host,
'user'": SELECT command denied to user 'user'@'host'
for table 'user' (1142)
```

  As of this release, this error is not returned. (Bug #36225456)
- If MySQL Router was bootstrapped without the `--account` parameter, a new metadata user was added using the following query:

```
CREATE USER IF NOT EXISTS username@hostname IDENTIFIED BY 'password'
```

  If the server used an authentication plugin which does not accept single-factor or password-based authentication, the account creation failed. As of this release, the `caching_sha2_password plugin` is used in this situation:

```
CREATE USER IF NOT EXISTS username@hostname IDENTIFIED WITH `caching_sha2_password` BY 'password'
```

  MySQL Router used `default_authentication_plugin` to determine the authentication plugin to use. This variable is now deprecated. MySQL Router uses `caching_sha2_password`. (Bug #36220663, Bug #36245132)
- The following error was displayed if MySQL Router was closed before the metadata cache started:

```
Error: routing:_: Metadata Cache not initialized
```

  (Bug #36151125)
- It was not possible to connect to MySQL through MySQL Router, using the Node.js MySQL driver, if MySQL Router was running with both `client_ssl_mode` and `server_ssl_mode` disabled. Authentication failed without a useful error message.

  As of this release, MySQL Router returns an error explaining that the Node.js MySQL driver does not support the requested authentication protocol. (Bug #36105279)
- If an incoming port is opened and closed by a TCP connection, such as a load balancer or a service-monitoring utility performing a health check, the connection counts towards the limit defined by `max_connect_errors`, even though the connection was not established. This could lead to MySQL Router closing the incoming port when the error limit is reached.

  As of this release, `max_connect_errors` is not incremented if the Router's incoming port is opened and closed without establishing a connection. (Bug #36104070)

- If a client sent read-only statements to a destination which was not configured as `super_read_only`, using the Read-Write splitting port, MySQL Router redirected the statement to the primary. The statement did not return the correct result. (Bug #36042078)
- It was not possible to build MySQL Router on 32-bit Linux platforms. (Bug #36040942)
- Queries with trailing semi-colons (;) were treated as multi-statements, which is not permitted if MySQL Router is configured for Read-Write Splitting. (Bug #36036725)
- The following error did not provide enough information for troubleshooting:

  ```
  timestamp routing ERROR [code] connecting to backend  failed: Connection timed out (generic:110)
  ```

  As of this release, it contains the following details:

  - Route name and client source.
  - `resolve()` errors.
  - Hostname, IP addresses, and errors for each connection attempt.
  - The amount of time spent on the connection attempt.

  (Bug #35503245)

Changes in MySQL Router 8.3.0 (2024-01-16)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- The default value of `--server-ssl-mode` is changed from `AS_CLIENT` to `PREFERRED`. (WL #15966)
- MySQL Router now supports client TLS certificates.

  The following configuration options are introduced:

  - `server_ssl_key`
  - `server_ssl_cert`
  - `client_ssl_ca`
  - `client_ssl_capath`
  - `client_ssl_crl`
  - `client_ssl_crlpath`
  - `router_require_enforce`

  (WL #14304)

Bugs Fixed

- If a client sent read-only statements to a destination which was not configured as `super_read_only`, using the Read-Write splitting port, MySQL Router redirected the statement to the primary. The statement did not return the correct result. (Bug #36042078)
- Queries with trailing semi-colons (;) were treated as multi-statements, which is not permitted if MySQL Router is configured for Read-Write Splitting. (Bug #36036725)
- It was not possible to connect to the read-write splitting port with Connector/J. The following error was returned:

  ```
  Unknown character set ''
  ```

  (Bug #35968017)
- If MySQL Router was bootstrapped over an existing configuration, the existing user's credentials were retrieved from the keyring and reused, even if the user used the deprecated authentication plugin, mysql_native_password.

  As of this release, MySQL Router checks the user's authentication method and, if it is set to mysql_native_password, changes it to the Cluster's default if there are no other `user@host` entries for the MySQL Router user. If there is more than one such entry, a warning is returned, advising the user to manually correct the authentication configuration. (Bug #35943415)
- If MySQL Router was bootstrapped against an InnoDB Cluster, without using an existing account or using the `--force-password-verification` parameter, the auto-created metadata user was created using the `mysql_native_password` plugin. This plugin was deprecated in MySQL Server 8.1 and is subject to removal in a future release.

  As of this release, the metadata user is created using the default authorization plugin defined on the InnoDB Cluster. (Bug #35737357)
- In the Docker image for MySQL Router 8.2.0, the read-write splitting port, 6450, was not exposed by default. (Bug #112900, Bug #35964936)

Changes in MySQL Router 8.2.0 (2023-10-25)

- Deprecation and Removal Notes
- Functionality Added or Changed
- Bugs Fixed

Deprecation and Removal Notes

- The `allow_primary_reads` parameter of the `destinations` URI is now deprecated and subject to removal in a future version of MySQL Router. Use the `PRIMARY_AND_SECONDARY` parameter instead. For example:

  ```
  [routing:example]
  destinations=metadata-cache://cache-name/default?role=PRIMARY_AND_SECONDARY
  ```

  (WL #15871)

- Metadata Schema v1.x support is now deprecated and subject to removal in a future version of MySQL Router. Connecting to a Cluster which uses this version now triggers a warning stating that the metadata version is deprecated and the Cluster metadata should be upgraded. (WL #15876)

Functionality Added or Changed

- MySQL Router now recognizes accounts with empty password sent from PHP over the classic MySQL protocol. (Bug #35463338)
- MySQL Router can be configured to route traffic to a partition of a Cluster which does not have quorum. This option is configured in the Cluster metadata, using the `unreachable_quorum_allowed_traffic` option of `cluster.setRoutingOption()` in MySQL Shell's AdminAPI.

  See Routing Options. (WL #15841)
- MySQL Router supports Read-Write splitting. This configuration enables you to direct all read traffic to read-only instances, and all write traffic to read/write instances.

  The following `router` configuration options are added:

  - `access_mode`
  - `wait_for_my_writes`
  - `wait_for_my_writes_timeout`

  Read-Write splitting is enabled by default. A new section, `[router:read_write_split]`, is added automatically to the bootstrap configuration. To disable this configuration, you must bootstrap with `--disable-rw-split`.

  See Read/Write Splitting. (WL #12794)

Bugs Fixed

- Queries larger than 16MB were not properly handled if Connection Sharing was enabled. (Bug #35769702)
- Unclosed comments, `/*` without a corresponding closing `/*`, caused MySQL Router to close unexpectedly if Connection Sharing was enabled. (Bug #35769610)
- Authentication failed for third-party clients using non-SSL connections, with caching-sha2-password and the following SSL options configured:

  - `client_ssl_mode` set to `PREFERRED` or `PASSTHROUGH`
  - `server_ssl_mode=AS_CLIENT`

  An error similar to the following was returned:

  ```
  Couldn't read RSA public key from server
  ```

  (Bug #35737521)
- MySQL Router closed unexpectedly when attempting to connect to a ClusterSet but only had access to members without quorum. (Bug #35705590)

- If the directory used for bootstrapping contained a symlink, the keyring's master key could not be located. An error similar to the following was returned:

```
  Error: Master key for keyring at '/bootstrapPath/data/keyring'
  could not be read
```

  (Bug #35630329)

- Under certain circumstances, MySQL Router did not shutdown when closed with SIGTERM or SIGINT. It was possible for a connection to be in an intermediate state and block the shutdown until that remaining connection was closed by the user. (Bug #35574557)

- If an invalid client greeting was received, the following message was logged:

```
        loop(): Input too short
```

  This message was not helpful to the user. As of this release, an error message is returned to the client and no error message is logged if the packet is invalid. (Bug #35523018)

- MySQL Router maintained the router-server connection until the transaction was complete, even when the client-router connection had closed. This could result in a `max-connection` error.

  As of this release, MySQL Router checks the client-router connection status while waiting for the transaction response. (Bug #35515899)

- Routing on named sockets did not resume after Cluster recovery. Error 2002 was logged. (Bug #35503286)

- MySQL Router error log did not contain MySQL Router version information. (Bug #35503191)

- Server-side TLS session were not reused after multiple consecutive authentication failures due to invalid authentication data. (Bug #35499025)

- It was not possible to connect to MySQL Router with PHP and an account with an empty password using a command similar to the following:

```
php -r 'mysqli_real_connect(mysqli_init(), "127.0.0.1", "empty", "");'
```

  Authentication failed with the following error:

```
PHP Warning:  mysqli_real_connect(): Premature end of data
(mysqlnd_wireprotocol.c:703) in Command line code on line 1
PHP Warning:  mysqli_real_connect(): AUTH_RESPONSE packet 1 bytes
shorter than expected in Command line code on line 1
```

  (Bug #35493871)

- Connection sharing was not possible for clients which do not support session trackers, such as PHP's mysqlnd or Python's pymysql. (Bug #35468897)

- Connection sharing was disabled if a change-user operation occurred over a plaintext connection. (Bug #35467047)

- If a client aborted a TLS handshake due to a certificate which cannot be verified, the following was incorrectly logged as an ERROR by MySQL Router:

```
   ERROR ... classic::loop() processor failed:
```

```
error:0A000418:SSL routines::tlsv1 alert unknown ca
(tls_err:167773208)
```

As of this release, the connection is closed without a `processor failed` error and an INFO message is logged explaining why the TLS handshake failed. (Bug #35443773)

- MySQL Router logs did not contain the correct information for classic MySQL protocol connections. For TCP/IP, the address information was missing, while UNIX socket connections were missing the amount of data transferred. (Bug #35431001)
- MySQL Router did not reject ambiguous port configuration. For example, if both `bind_address` and `bind_port` were specified with different port numbers. (Bug #34972789)
- MySQL Router disconnected all connections to a Cluster if the user added a new instance to an existing Cluster with only one remaining member. This occurred because the new instance was present in the Group Replication metadata but not yet in the Cluster's metadata. MySQL Router assumed there was no quorum and disconnected. It was possible to reconnect after the new instance was represented in the Cluster's metadata.

  As of this release, MySQL Router relies only on the Group Replication metadata for quorum reporting. (Bug #33989165)
- Under certain circumstances, on Microsoft Windows platforms, it was not possible to run MySQL Router as a service. An error message stating the MySQL Router configuration file could not be found was logged even though the configuration file was present and correct. (Bug #33301070)

Changes in MySQL Router 8.1.0 (2023-07-18)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- TLS sessions from client to router and router to server can now be cached and resumed when needed. This shortens the connection handshake, saving time and resources.

  The following configuration options were added:

  - Client TLS session cache:
    - `client_ssl_session_cache_mode`: Enables or disables the cache for client-router TLS sessions.
    - `client_ssl_session_cache_size`: Defines the maximum number of sessions cached.
    - `client_ssl_session_cache_timeout`: Defines the maximum amount of time, in seconds, a session remains in the cache. If the timeout is reached, and the session is not reused, the session is removed from the cache and the connection is closed.
  - Server TLS Session Cache:
    - `server_ssl_session_cache_mode`: Enables or disables the cache for router-server sessions.
    - `server_ssl_session_cache_size`: Defines the maximum number of sessions cached.

  - `server_ssl_session_cache_timeout`: Defines the maximum amount of time, in seconds, a session remains in the cache. If the timeout is reached, and the session is not reused, the session is removed from the cache and the connection is closed.

  The TLS session caches are enabled by default. (WL #15573)

- The `status_update_frequency` changes introduced for ClusterSets in MySQL Router 8.0.31 are extended to apply to Clusters and ReplicaSets, but only for Metadata Schema version 2.2.0 or higher. (WL #15599)

- If MySQL Router connects to a server and the connection is refused with a transient error, such as `max-connections reached`, MySQL Router now retries the connection after a number of seconds defined in the new configuration option `connect_retry_timeout`. (WL #15721)

- MySQL Router supports InnoDB Cluster Read Replicas.

  MySQL Router reads the values defined in the metadata field, `v2_router_options.router_options.read_only_targets`, to retrieve routing information for read-only traffic.

  `v2_router_options.router_options.read_only_targets` is populated by the AdminAPI method *`cluster`*`.setRoutingOption()` which sets the routing policy to one of the following values with the `read_only_targets` option:

  - `all`: all Read Replicas and Secondary cluster members are used for read-only traffic.
  - `read_replicas`: only Read Replicas are used for read-only traffic.
  - `secondaries`: only Secondary cluster members are used for read-only traffic.

  Note

  If `read_only_targets` is not present, or set to a value other than `all`, `read_replicas`, or `secondaries`, MySQL Router defaults to `secondaries`.

  A warning is logged if a value other than `all`, `read_replicas`, or `secondaries` is used.

  (WL #15086)

- MySQL Router now supports tracing of statements as they are processed by MySQL Router from client to server and the response to the client. The trace is returned as JSON.

  This enables debugging, testing, application connection comparisons, and so on.

  See MySQL Router Set Trace. (WL #15582)

Bugs Fixed

- Deprecated ciphers were removed from the default cipher lists of `client_ssl_cipher` and `server_ssl_cipher`. Triple-DES ciphers and DSS ciphers are no longer permitted. (Bug #35489217)

- It was not possible to run two MySQL Routers as services on the same Microsoft Windows host. (Bug #35453506)

- MySQL Router failed to start if configured to use ECC certificates. The following error was displayed: `no RSA certificate`. (Bug #35317484)

- Connections were not shared if the client enabled `CLIENT_MULTI_STATEMENTS` with `COM_SET_OPTION`. (Bug #35263986)
- `SHOW WARNINGS` did not behave as expected if connection sharing was enabled. It did not return all the status-flags, such as `autocommit`. (Bug #35213196)
- Client authentication failed if the client authenticated with a password and a default authentication method other than `caching_sha2_password`. The error message included: `using password: NO`. (Bug #35195287)
- Connection sharing was disabled if a change-user operation occurred, resetting the user's stored password. As of this release, if a change-user operation is called, the existing connection is updated with the new credentials. (Bug #35189721)
- The client's character set was not restored when their connection was restored from the connection pool. (Bug #35184765)

Changes in MySQL Router 8.0

Changes in MySQL Router 8.0.46 (2026-04-21)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.0.46 release.

Changes in MySQL Router 8.0.45 (2026-01-20)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.0.45 release.

Changes in MySQL Router 8.0.44 (2025-10-21)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

Bugs Fixed

- Removed !SSLv3 from the default cipher list. SSLv3 support is disabled explicitly. The !SSLv3 filter incorrectly removed valid ciphers from the allowed cipher list. (Bug #38205463)
- It was not possible for MySQL Router to retriieve metadata if from a secondary node if it was lagging and had not yet received the `router_id` from the primary. Errors were returned similar to the following:

```
Error reading router.options from v2_cs_router_options: did not
find router entry for router_id, Unable to fetch live
group_replication member data from any server in cluster
```

  As of this release, if a `router_id` is not found, MySQL Router proceeds to the next server on the list until it locates valid metadata. (Bug #38132603)

Changes in MySQL Router 8.0.43 (2025-07-22)

Note

These release notes were created with the assistance of MySQL HeatWave GenAI.

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Binary packages that include `curl` rather than linking to the system `curl` library have been upgraded to use `curl` 8.16.0. (Bug #38448034)

Bugs Fixed

- Fixed an issue related to debug logging. (Bug #38009073)
- It was not possible to build MySQL Router with GCC 15 on Fedora 42 due to missing includes. (Bug #37769606)
- After a DNS failure, the destination was not added to quarantine and could not be checked for availability after the connection was restored. Errors were returned similar to the following:

  ```
  resolve(host) failed: Name or service not known
  ```

  (Bug #37617712)

Changes in MySQL Router 8.0.42 (2025-04-15)

Version 8.0.42 has no release notes, or they have not been published because the product version has not been released.

Changes in MySQL Router 8.0.41 (2025-01-21)

Bugs Fixed

- **Important Change:** MySQL Router no longer supports MySQL Server versions from a newer series. The metadata is checked and discarded for servers from a newer series, a check that executes during bootstrap and during periodic metadata refresh operations. A newer version in the same series is supported. For example, MySQL Router 8.4.4 supports MySQL Server 8.4.5 but not MySQL Server 9.0.0. (Bug #36041256)
- Because building with `CMAKE_BUILD_TYPE=Debug` disables optimizations, `std::vector.resize()` attempted to initialize every byte before each read from an encrypted socket. Memory usage was improved to account for this. (Bug #37385923)
- Accessing the `/routes/{name}/connections` REST API endpoint while also benchmarking queries through the router could cause the router to unexpectedly halt. (Bug #37251508)

Changes in MySQL Router 8.0.40 (2024-10-15)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.0.40 release.

Changes in MySQL Router 8.0.39 (2024-07-23)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.0.39 release.

Changes in MySQL Router 8.0.38 (2024-07-01)

Important

This release is no longer available for download. It was removed due to a dependency on a version of the server which is also no longer available for download. See MySQL 8.0.38 Release Notes. Please upgrade to MySQL Router 8.0.39 instead.

Bugs Fixed

- MySQL Router always updates the `last_check_in` in the Metadata Schema when it starts, even if the Cluster is `INVALIDATED`, leading to an errant transaction. As of this release, MySQL Router does not update `last_check_in` if the Cluster is `INVALIDATED`. (Bug #36563430)
- Increased the maximum `router_id` value from 999999 to 4294967295 (2^32-1). This also affects how the internal metadata_cache `user` name is defined. (Bug #36393211)

Changes in MySQL Router 8.0.37 (2024-04-30)

Bugs Fixed

- If a hostname was not resolved, due to a DNS failure, MySQL Router did not check if that host became available again, later. (Bug #36246652)
- MySQL Router's bootstrap process checks the `mysql.user` table for the unsupported `mysql_native_password` authentication plugin. If the bootstrap user had no access to the table, the following error was returned:

  ```
  Failed checking the Router account authentication plugin: Error executing MySQL query "select ho
  'user'": SELECT command denied to user 'user'@'host'
  for table 'user' (1142)
  ```

  As of this release, this error is not returned. (Bug #36225456)
- The following error was displayed if MySQL Router was closed before the metadata cache started:

  ```
  Error: routing:_: Metadata Cache not initialized
  ```

  (Bug #36151125)
- If an incoming port is opened and closed by a TCP connection, such as a load balancer or a service-monitoring utility performing a health check, the connection counts towards the limit defined by `max_connect_errors`, even though the connection was not established. This could lead to MySQL Router closing the incoming port when the error limit is reached.

  As of this release, `max_connect_errors` is not incremented if the Router's incoming port is opened and closed without establishing a connection. (Bug #36104070)
- The following error did not provide enough information for troubleshooting:

  ```
  timestamp routing ERROR [code] connecting to backend  failed: Connection timed out (generic:110)
  ```

  As of this release, it contains the following details:

- Route name and client source.
- `resolve()` errors.
- Hostname, IP addresses, and errors for each connection attempt.
- The amount of time spent on the connection attempt.

(Bug #35503245)

Changes in MySQL Router 8.0.36 (2024-01-16)

Bugs Fixed

- It was not possible to build MySQL Router on 32-bit Linux platforms. (Bug #36040942)
- If MySQL Router was bootstrapped over an existing configuration, the existing user's credentials were retrieved from the keyring and reused, even if the user used the deprecated authentication plugin, mysql_native_password.

  As of this release, MySQL Router checks the user's authentication method and, if it is set to mysql_native_password, changes it to the Cluster's default if there are no other `user@host` entries for the MySQL Router user. If there is more than one such entry, a warning is returned, advising the user to manually correct the authentication configuration. (Bug #35943415)
- If MySQL Router was bootstrapped against an InnoDB Cluster, without using an existing account or using the `--force-password-verification` parameter, the auto-created metadata user was created using the `mysql_native_password` plugin. This plugin was deprecated in MySQL Server 8.1 and is subject to removal in a future release.

  As of this release, the metadata user is created using the default authorization plugin defined on the InnoDB Cluster. (Bug #35737357)
- It was not possible to connect to MySQL Router with PHP and an account with an empty password using a command similar to the following:

  ```
  php -r 'mysqli_real_connect(mysqli_init(), "127.0.0.1", "empty", "");'
  ```

  Authentication failed with the following error:

  ```
  PHP Warning:  mysqli_real_connect(): Premature end of data
  (mysqlnd_wireprotocol.c:703) in Command line code on line 1
  PHP Warning:  mysqli_real_connect(): AUTH_RESPONSE packet 1 bytes
  shorter than expected in Command line code on line 1
  ```

  (Bug #35493871)
- If a client aborted a TLS handshake due to a certificate which cannot be verified, the following was incorrectly logged as an ERROR by MySQL Router:

  ```
  ERROR ... classic::loop() processor failed:
  error:0A000418:SSL routines::tlsv1 alert unknown ca
  (tls_err:167773208)
  ```

  As of this release, the connection is closed without a `processor failed` error and an INFO message is logged explaining why the TLS handshake failed. (Bug #35443773)

- MySQL Router disconnected all connections to a Cluster if the user added a new instance to an existing Cluster with only one remaining member. This occurred because the new instance was present in the Group Replication metadata but not yet in the Cluster's metadata. MySQL Router assumed there was no quorum and disconnected. It was possible to reconnect after the new instance was represented in the Cluster's metadata.

  As of this release, MySQL Router relies only on the Group Replication metadata for quorum reporting. (Bug #33989165)

Changes in MySQL Router 8.0.35 (2023-10-25)

- Deprecation and Removal Notes
- Functionality Added or Changed
- Bugs Fixed

Deprecation and Removal Notes

- The `allow_primary_reads` parameter of the `destinations` URI is now deprecated and subject to removal in a future version of MySQL Router. Use the `PRIMARY_AND_SECONDARY` parameter instead. For example:

  ```
  [routing:example]
  destinations=metadata-cache://cache-name/default?role=PRIMARY_AND_SECONDARY
  ```

  (WL #15871)

- Metadata Schema v1.x support is now deprecated and subject to removal in a future version of MySQL Router. Connecting to a Cluster which uses this version now triggers a warning stating that the metadata version is deprecated and the Cluster metadata should be upgraded. (WL #15876)

Functionality Added or Changed

- MySQL Router now recognizes accounts with empty password sent from PHP over the classic MySQL protocol. (Bug #35463338)

Bugs Fixed

- Queries larger than 16MB were not properly handled if Connection Sharing was enabled. (Bug #35769702)
- Unclosed comments, `/*` without a corresponding closing `/*`, caused MySQL Router to close unexpectedly if Connection Sharing was enabled. (Bug #35769610)
- Authentication failed for third-party clients using non-SSL connections, with caching-sha2-password and the following SSL options configured:

  - `client_ssl_mode` set to `PREFERRED` or `PASSTHROUGH`
  - `server_ssl_mode=AS_CLIENT`

  An error similar to the following was returned:

  ```
  Couldn't read RSA public key from server
  ```

  (Bug #35737521)

- MySQL Router closed unexpectedly when attempting to connect to a ClusterSet but only had access to members without quorum. (Bug #35705590)
- If the directory used for bootstrapping contained a symlink, the keyring's master key could not be located. An error similar to the following was returned:

```
Error: Master key for keyring at '/bootstrapPath/data/keyring'
could not be read
```

  (Bug #35630329)
- Under certain circumstances, MySQL Router did not shutdown when closed with SIGTERM or SIGINT. It was possible for a connection to be in an intermediate state and block the shutdown until that remaining connection was closed by the user. (Bug #35574557)
- If an invalid client greeting was received, the following message was logged:

```
        loop(): Input too short
```

  This message was not helpful to the user. As of this release, an error message is returned to the client and no error message is logged if the packet is invalid. (Bug #35523018)
- MySQL Router maintained the router-server connection until the transaction was complete, even when the client-router connection had closed. This could result in a `max-connection` error.

  As of this release, MySQL Router checks the client-router connection status while waiting for the transaction response. (Bug #35515899)
- Routing on named sockets did not resume after Cluster recovery. Error 2002 was logged. (Bug #35503286)
- MySQL Router error log did not contain MySQL Router version information. (Bug #35503191)
- MySQL Router did not reject ambiguous port configuration. For example, if both `bind_address` and `bind_port` were specified with different port numbers. (Bug #34972789)
- Under certain circumstances, on Microsoft Windows platforms, it was not possible to run MySQL Router as a service. An error message stating the MySQL Router configuration file could not be found was logged even though the configuration file was present and correct. (Bug #33301070)

Changes in MySQL Router 8.0.34 (2023-07-18)

Bugs Fixed

- Deprecated ciphers were removed from the default cipher lists of `client_ssl_cipher` and `server_ssl_cipher`. Triple-DES ciphers and DSS ciphers are no longer permitted. (Bug #35489217)
- MySQL Router failed to start if configured to use ECC certificates. The following error was displayed: `no RSA certificate`. (Bug #35317484)
- Connections were not shared if the client enabled `CLIENT_MULTI_STATEMENTS` with `COM_SET_OPTION`. (Bug #35263986)
- If `USE SCHEMA` was sent by query instead of by the dedicated command, connection sharing was blocked. (Bug #35245250)
- If a client connected to the server through MySQL Router, while a `SUPER` connection was already established, and the server's `max_connections` was reached, the connection was dropped and an

error similar to the following was erroneously returned to the client: `Lost connection to MySQL server during query`. This error was also sent twice.

As of this release, the correct error message is returned. (Bug #35239607)

- `SHOW WARNINGS` did not behave as expected if connection sharing was enabled. It did not return all the status-flags, such as `autocommit`. (Bug #35213196)
- Client authentication failed if the client authenticated with a password and a default authentication method other than `caching_sha2_password`. The error message included: `using password: NO`. (Bug #35195287)
- Connection sharing was disabled if a change-user operation occurred, resetting the user's stored password. As of this release, if a change-user operation is called, the existing connection is updated with the new credentials. (Bug #35189721)
- The client's character set was not restored when their connection was restored from the connection pool. (Bug #35184765)
- Router is now compatible with older metadata, such as metadata created by MySQL Shell 8.0.11. This allows upgrading from these older versions. (Bug #35078886)
- It was not possible to create an InnoDB Cluster with the latest version of MySQL Router, and MySQL Server, and an older version of MySQL Shell, such as 8.0.11. MySQL Router failed to start as a result of a failure to recognize an older version of the metadata view used by MySQL Router. (Bug #35067083)

Changes in MySQL Router 8.0.33 (2023-04-18)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- MySQL Router now reuses SSL connections to the metadata server when reconnecting for metadata updates. (Bug #35057590)
- Multiple performance improvements were made in connection management, memory management, and statement processing. (Bug #34964415, Bug #34863113, Bug #34921527, Bug #34977233, Bug #35006489, Bug #35011055, Bug #35019415)

Bugs Fixed

- Under certain circumstances, if an `ENOENT` system error was returned while MySQL Router was establishing connections to a routing destination, the accepting port was closed for that routing destination, and MySQL Router stopped accepting connections on that port. An error similar to the following was displayed:

```
routing ERROR [...] no backend available to connect to
routing INFO [...] Stop accepting connections for routing
routing:bootstrap_rw listening on 6446
```

As of this release, the port is not closed and additional logging is added for such errors. (Bug #35157953)

- It was not possible to connect to MySQL Router with PHP and an account with an empty password. Authentication failed with the following error:

```
        AUTH_RESPONSE packet 1 bytes shorter than expected.
```

(Bug #35125466)

- Under certain circumstances, if connection sharing was enabled and the establishment of a new connection failed, the resulting server connection was left in an invalid state; the socket was closed, but the connection was kept alive.

  As a result, multiple TLS connection alerts were logged. (Bug #35072554)

- Passwords longer than 20 characters failed authentication through MySQL Router if the client connection was not encrypted and requested the server key. (Bug #35028666)

- It was not possible to connect with pymysql. An error similar to the following was returned:

```
pymysql.err.OperationalError: caching sha2: Unknown packet for public key: b'-'
```

(Bug #35015376)

- The server logs recorded `Aborted connection` if a pooled connection was idle for longer than the value of `idle_timeout` and was closed. (Bug #34983883)

- MySQL Router did not correctly handle requests for compression over unencrypted connections, by clients such as PHP+PDO and pymysql, for example. An error similar to the following was returned:

```
        Packets out of order. Expected 1 received 5. Packet size=26 in
        pdo-compressed.php on line 3
```

  As of this release, MySQL Router returns an appropriate error stating that compression is not supported. (Bug #34960959)

- Under certain circumstances, on Mac OS, Cluster endpoints were not removed from quarantine, even if they were valid and it was possible to connect to them. (Bug #34909071)

- Under certain circumstances, MySQL Router did not close gracefully on Solaris, but crashed while closing. (Bug #34904367)

- MySQL Router did not immediately detect connections to unresponsive ports on Mac OS. As a result, the connection reported a timeout instead of a failed connection. (Bug #34861635)

- MySQL Router queried the metadata from the first server listed regardless of the role of that server. As a result, MySQL Router could retrieve metadata from a current secondary, which had been a primary, instead of the current primary. As of this release, MySQL Router takes the metadata server's current role into account.

  This fix also correct an issue where MySQL Router did not discard configuration metadata relating to offline cluster members. (Bug #34835509, Bug #34857112)

- If an X Protocol client or connector closed a connection, MySQL Router did not respond as expected. As a result, if the client waited for a response, the connection could remain open and unusable.

  (Bug #34428430)

- It was not possible to connect to the server through MySQL Router using older PHP clients if the MySQL account used `caching_sha2_password` and MySQL Router was configured to use `PASSTHROUGH/AS_CLIENT` or `PREFERRED/AS_CLIENT` options. (Bug #110161, Bug #35112431)

- Renaming a cluster, using `cluster.setOption()`, caused routing to fail due to an issue with MySQL Router configuration. This issue was caused by MySQL Router using the cluster name written to the MySQL Router configuration file during bootstrapping. The cluster name was then used in queries to the metadata cache, which failed when the cluster was renamed.

  As of this release, the cluster name is not used, the UUID is used instead. That is, Group Replication UUID for group replication clusters, ClusterSet UUID for ClusterSets, and Cluster UUID for ReplicaSet clusters. The UUID is written to MySQL Router's JSON state file.

  Note

  For backward compatibility, the cluster name is still written to the configuration file and will be used if UUIDs are not available.

  (Bug #95010, Bug #29642686)

Changes in MySQL Router 8.0.32 (2023-01-17)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- CPU usage was optimized by reducing the number of system calls per read/write operation. (Bug #34787879, Bug #34788019)
- A new option, `use_replica_primary_as_rw` is added to the MySQL Shell option `<ClusterSet>.setRoutingOption()`.

  This option is read by MySQL Router and enables it to open or close a read-write (R/W) port on a router targeting a specific Cluster (where `target_cluster` is not set to `primary`), enabling you to use a R/W port on a ReplicaCluster. The ReplicaCluster continues to only accept R/O traffic. In the event of a switchover or failover, the R/W port remains unchanged.

  See MySQL Router Status for InnoDB ClusterSet. (WL #15321)
- The following configuration options are added to a new configuration section, `[destination_status]`, in this release:

  - `error_quarantine_interval`: Defines the interval, in seconds, between checks on quarantined destination connectivity. If a connection is possible, the destination is moved out of quarantine and made available for connections.
  - `error_quarantine_threshold`: Defines the threshold of consecutive, failed attempts to connect to a routing destination before MySQL Router adds the destination to quarantine and stops using it as a destination until it is cleared by the quarantine mechanism. For example, if set to 5, the destination is quarantined after 5 consecutive, failed attempts to connect to it.

  The option `unreachable_destination_refresh_interval` is deprecated in this release. (WL #15329)
- Connection sharing is introduced in this release, extending upon the Connection Pool introduced in MySQL Router 8.0.29.

Enabling connection sharing (`connection_sharing`) lets you define how long a server connection is idle (`connection_sharing_delay`) before it is reset and added to the connection pool, where it can be reused by another client connection.

See Connection Sharing and Reuse. (WL #12772)

Bugs Fixed

- Connections made over Unix socket were not shared, even though connection sharing was enabled. (Bug #34806320)
- Configuring MySQL Router with `client_ssl_mode=PREFERRED` and `server_ssl_mode=AS_CLIENT` resulted in an unencrypted connection over Unix socket connections. (Bug #34801929)
- Connections through MySQL Router were not closed with `COM_QUIT`, incrementing the server's `Aborted_clients` count. (Bug #34801356)
- Under certain circumstances, such as MySQL Router running on an under-resourced server, traffic on one connection could be unfairly prioritized over other connections. (Bug #34787854)
- Pooled connections were not used if the `[io]` option `threads` value was larger than 1. (Bug #34781248)
- It was not possible to connect to the server over Unix socket, through MySQL Router, with a user configured to use `caching_sha2_password`. An error similar to the following was returned:

  ```
  HY000 (2013) Lost connection to MySQL server at 'reading final
  connect information', system error: 95
  ```

  (Bug #34778017)
- Under certain circumstances, when the MySQL Router was setting up the x-protocol connection, if the client sent a valid, but unexpected message (unexpected for this phase of the setup process), the router attempted to forward it to the server, even though the server connection was not yet ready. This caused the router to close unexpectedly.

  As of this release, MySQL Router returns a `Bad message` error to the client, in response to the out-of-sequence message. (Bug #34597056)
- If a routing destination was removed from quarantine, reopening the `bind_port` could fail. If the router is part of an InnoDB cluster, an attempt is made to reopen it during a metadata cache refresh, but this is not available to statically-defined `bind_port` in standalone installations.

  As of this release, for standalone router installations, if reopening the `bind_port` fails, MySQL Router attempts to reopen it every 1 second. (Bug #34569676)
- Under certain circumstances, if `max_connections` was configured, attempting to connect to MySQL Router with X-Protocol resulted in an error, `MySQL server has gone away`, instead of the expected message: `Too many connections to MySQL Router`.

  This issue only occurred on Microsoft Windows platforms. (Bug #34548367)
- MySQL Router did not close connections if they were closed by the server, but not closed by the client. The connection persisted indefinitely.

As of this release, MySQL Router closes the client connection when the server connection is closed. (Bug #34401798)

- If a socket was unexpectedly shutdown on both ends of the connection, but not closed, and the socket was still monitored by `EPOLL_WAIT`, `EPOLLHUP` or `EPOLLERR` events were returned. Neither event was handled, leading to a loop and high CPU usage until the socket was closed. (Bug #33674644)
- MySQL Router's logrotate did not send a HUP signal to the router process. As of this release, logrotate uses native systemctl commands when systemd is enabled. (Bug #108360, Bug #34565239)
- Under certain circumstances, on Microsoft Windows platforms, MySQL Router crashed repeatedly. (Bug #108228, Bug #34536085)

Changes in MySQL Router 8.0.31 (2022-10-11)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- You can now configure MySQL Router to write a core file in the event the MySQL Router process fails. See Configuration File Options for information on the `--core-file`. option. (WL #15185)
- MySQL Router periodically updates the `last_check_in` of the Cluster metadata schema. Under certain circumstances, such as a ClusterSet split-brain scenario, these updates can make rejoin operations impossible due to the creation of errant transactions.

  As of this release, MySQL Router checks the value of a new Metadata schema option, `stats_updates_frequency`, in the JSON field `v2_cs_router_options.router_options`, and updates the check-in behavior based on the value of this option.

  If the target Cluster is a member of a ClusterSet, MySQL Router does the following:

  - MySQL Router always updates `last_check_in` when it starts.
  - If the value of `stats_updates_frequency` is a positive integer N, MySQL Router continues updating `last_check_in` every N seconds.
  - If the value of `stats_updates_frequency` is zero or missing entirely, MySQL Router does not update `last_check_in`.The same is true if the value of `stats_updates_frequency` is not a valid positive integer.

  If the target Cluster is not a member of a ClusterSet, MySQL Router's behavior is unchanged. `last_check_in` is updated every tenth refresh cycle. This cycle is not configurable.

  `stats_updates_frequency` can be updated using the MySQL Shell command, *`clusterSet`*`.setRoutingOption()`. See MySQL Router Status for InnoDB ClusterSet. (WL #15230)

Bugs Fixed

- Connections which were closed by the server were maintained in the connection pool, resulting in an error if the connection was reused. (Bug #34536576)
- MySQL Router rejected compressed connections with the error `error:5000, bad message`.

MySQL Router does not currently support compressed connections. As of this release, if a client requests a compressed connection, MySQL Router replies that it does not support them. The client can then use an uncompressed connection. (Bug #34445287)

- Under certain circumstances, the unreachable destination quarantine mechanism, introduced in MySQL Router 8.0.29, could block new, valid connections for the duration of `unreachable_destination_refresh_interval`, while there is a quarantined, unavailable destination. (Bug #34427559)
- Some configuration options were not correctly validated by the configuration checker. For example, bootstrapping with `--name` resulted in an error although it is a valid configuration option. (Bug #34258782)
- Multiple errors were logged if a client application did not send, or did not support, connection attributes. (Bug #34196750)
- Processing SQL statements of 16MB or larger caused MySQL Router to become unresponsive. (Bug #107982, Bug #34426322)
- MySQL Router stopped responding when calling a stored procedure with a prepared statement. (Bug #107951, Bug #34420764)

Changes in MySQL Router 8.0.30 (2022-07-26)

Bugs Fixed

- Router would block clients if the server backend was unreachable. (Bug #34218994)
- Added Enterprise Linux 9 (EL9) support. (Bug #34203755)
- Fixed potential deadlock issue with the metadata cache plugin's cache_stop() API function. (Bug #34135189)
- Upgraded bundled duktape version from 2.6.0 to 2.7.0 (Bug #34089826)
- Added OpenSSL 3 support, which includes using the OpenSSL 3 API instead of the deprecated OpenSSL 1.x API when compiled with OpenSSL 3. (Bug #34042982)
- Now Router actively cancels the client-side component of a connection if the associated server-side connection was terminated. (Bug #34038187)
- On Solaris, Router would unexpectedly halt when connect_timeout expired after a successful connection. (Bug #34021483)
- Router would emit an "option is not supported" error if `ssl_*` options were defined in the `[metadata_cache]` section. (Bug #33996132)
- Updated the X protocol connection code to better handle file related errors, such as "too many open files" and "no such file or directory" -- this error handling was already present for classic protocol connections. (Bug #33962604)
- On macOS, Router would not shut down (SIGKILL) if a connection to a non-responsive endpoint was initiated until after the associated `connect_timeout` expired. The shutdown process is now more immediate. (Bug #33944074)
- Optimized the ClusterSet metadata refresh mechanism by merging two queries into one. (Bug #33819386)

Changes in MySQL Router 8.0.29 (2022-04-26)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added a new `unknown_config_option` configuration option that defines Router behavior when encountering an unknown configuration option, such as a typo. Behavior defaults to 'warning' if unset, and bootstrapping sets it to 'error' in the generated configuration behavior. Previously, Router ignored unknown configuration options. (Bug #32207191, WL #12771)
- Added connection pooling functionality to reuse server-side connections. This adds the new `max_idle_server_connections` (defaults to 0 seconds; so is disabled) and `idle_timeout` (defaults to 5 seconds) Router configuration options for the new `[connection_pool]` configuration section. Set *[rest_connection_pool]* to enable its REST API functionality. (WL #12771)
- Changed the `connect_timeout` default value to `5` seconds. Previously it defaulted to `15` for the *[DEFAULT]* section and `1` for the *[routing]* section. (WL #14978)
- Extended the quarantine mechanism to the first-available and next-available static destination routing strategies, when previously it only applied to the static round-robin and dynamic metadata-cache policies. Previously first-available would check for connections but now skips unreachable (quarantined) destinations. The next-available strategy behavior did not change to preserve backwards compatibility.

  This adds a new `unreachable_destination_refresh_interval` configuration option that defaults to 1 (second). This determines how often each unreachable destination candidate is probed for availability. (WL #14663)

Bugs Fixed

- Router would unnecessarily remove and recreate existing connections when new nodes were added to a Cluster, and this would potentially block the GR notification thread. (Bug #33874978)
- Closing an SSL connection now cancels all events on the server-side socket instead of passively waiting for it to close. (Bug #33830212)
- The metadata upgrade process (via MySQL Shell's *dba.upgradeMetadata()*) did not recognize when Router was upgraded if the system still used the older metadata 1.x (metadata 2.0 was introduced in v8.0.19); and this stalled the upgrade process. Now Router sets the Router version in metadata during bootstrap for all metadata versions, and it continues to retry updating the version if it failed due to missing privileges of the Router user when before it only tried once. (Bug #33825480)
- On Windows MSI builds, added the missing `INFO_BIN` and `INFO_SRC` files to the `share/doc/mysqlrouter` directory. (Bug #33822549)

  References: See also: Bug #33510726.
- While bootstrapping, the default section name keys for the metadata_cache and routing sections changed from the cluster name to "bootstrap" to help prevent potential invalid character clashes. (Bug #33673803)
- Improved Doxygen support by removing [[maybe_used]] tags and ensuring all parameters are documented. (Bug #33596116)
- A potential race condition occurred when the routing plugin shut down and cleaned up the sockets container when the connector tried using this sockets container afterwards. Connections not yet moved

to the routing plugin container are now counted, and the routing plugin cannot shut down until these connections are handled. (Bug #33593833)

- Split metadata_cache into metadata_cache (library) and metadata_cache_plugin (plugin). (Bug #33574698)
- Refactored BasePluginConfig by adding transformation classes (StringOption, UintOption, DoubleOption, and MilliSecondsOption) and converted plugin configurations to get_option(). (Bug #33570004, Bug #33584470)
- Router now uses metadata to find a PRIMARY rather than rely upon the order of nodes returned by a node list query. Before it would connect to the first node regardless, even if needing a primary and this would waste time and yield unnecessary errors if the node was not a primary. (Bug #33551163)

Changes in MySQL Router 8.0.28 (2022-01-18)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added the `--conf-set-option` command line option to set a value for any generated configuration option during bootstrap. For example, setting `--conf-set-option=logger.level=debug` sets *[logger]level=debug* in the generated `mysqlrouter.conf`. (WL #14706)
- On Windows, the following options now accept a custom service name parameter: `--install-service`, `--install-service-manual`, and `--remove-service`. The previous and default value for each of these is `MySQLRouter`. (WL #14739)
- Added the ability to alter configuration options at runtime via the command line. The format is `--section[:section_key].option_name=option_value`; such as `--DEFAULT.plugin_folder=/home/dev/`. This new feature does not modify the configuration file as it only affects the runtime; and it overrides defaults and configured options. (WL #14684)

Bugs Fixed

- On Windows, removed the `openssl/*.h` includes to allow `tls_context.h` to include them in the correct order. This allows Router to build on Windows with OpenSSL 1.0.x. (Bug #33579528, Bug #105535)
- Two informative text files were added: `INFO_BIN` contains information about the build environment used to produce the distribution, and `INFO_SRC` provides information about the product version and the source repository from which the distribution was produced.

  Update: these files were added to Windows MSI builds in 8.0.29. (Bug #33510726)
- Fixed error reporting related to metadata-cache's role definition for its destination URL. Rather than report "Invalid server role in metadata cache routing" it's now more specific and references the allowed role values, which are PRIMARY, SECONDARY, and PRIMARY_AND_SECONDARY. (Bug #33444102)
- With `logging_folder` set, Router would always output "logging facility initialized, switching logging to loggers specified in configuration" to the console; now this message is only displayed if previous console output was detected. (Bug #33327741)
- Router could continue using a former Primary Cluster for periodic metadata updates despite it being an invalidated target_cluster. (Bug #33300235)

- Router incorrectly accepted non-numeric values for numeric options. For example, 'a' was interpreted as '0'. They are now rejected. (Bug #32248283)

Changes in MySQL Router 8.0.27 (2021-10-19)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added a new `max_total_connections` option that defines the maximum number of connections allowed by all Router destinations combined.

  The existing `max_connections` option still functions and allows setting the maximum number of connections per specific routing destination. (WL #14319)

- Added support for InnoDB ClusterSet topology and failover. This adds two new bootstrap command line configuration options that define the target_cluster metadata option at bootstrap: `--conf-target-cluster` (configure by cluster type) and `--conf-target-cluster-by-name` (configure using a static cluster name).

  The following ClusterSet values are added to Router's state file:

  - `clusterset-id`: ID of the ClusterSet Router was bootstrapped against.
  - `metadata-servers`: Set of all known ClusterSet metadata servers. Typically all nodes of all clusters in the ClusterSet.
  - `view-id`: ID of the last known view of the metadata.

  InnoDB ClusterSet support requires the `cluster_type` option set to `gr`. (WL #12797)

Bugs Fixed

- Now accept Client::Greeting messages that announce PLUGIN_AUTH but don't send a plugin name; this to be more flexible with the spec, like MySQL Server is. (Bug #33357723)
- Bootstrapping on systems with the older metadata version 1.0 now sets backend=file as metadata 1.0 does not support http_auth_backend. (Bug #33308536)
- Support for the following compilers was removed: Sun Studio, C++11, and C++14. (Bug #33307865, Bug #33306219, Bug #33302907)
- Receiving an empty xproto packet would cause Router to unexpectedly halt. (Bug #33240637)
- Updated error logs:

  Max total active connections errors now reference the associated max_total_connections parameter name.

  A failed connection reported "generic:1, operation not permitted." instead of "connection refused". (Bug #33051998, Bug #33059504)
- The Linux epoll IO service dropped events when multiple events fired at the same time. (Bug #32998738)
- Improved HTTP authentication efficiency by caching credentials per connection. (Bug #32981242)

- Defining a Router configuration option using an unsupported value would emit the associated error three times instead of once. (Bug #32949289)
- On Windows, the server_ssl_capath or server_ssl_crlpath Router configuration options did not function, and defining them caused Router to not start. (Bug #32859961)
- Router would repeat error or warning messages every TTL when failing to refresh the metadata thus filling up the logs. Now the log level is lowered (usually to level debug) if a given event had already been reported. (Bug #32423845)

Changes in MySQL Router 8.0.26 (2021-07-20)

- Deprecation and Removal Notes
- Bugs Fixed

Deprecation and Removal Notes

- The TLSv1.0 and TLSv1.1 connection protocols now are deprecated and support for them is subject to removal in a future MySQL Router version. (WL #14582)

Bugs Fixed

- On Ubuntu with AppArmor enabled, AppArmor generated apparmor="DENIED" errors for paths `/usr/share/mysql-8.0/charsets/Index.xml` and `/etc/ssl/openssl.cnf`. The bundled AppArmor profile was updated to include the charset directory, and also changed `openssl.conf` to `openssl.cnf`. (Bug #32939333)
- Reduced the CPU load consumed by HTTP Server processes by eliminating their excessive callbacks. (Bug #32715238)
- Added a POD type and codec for client:Kill. (Bug #32672117)
- Recovering nodes that are not in the metadata (and only reported by Group Replication) are no longer included in the quorum calculation (do not increase the required pool). This fixes a cloning scenario: cloning causes the node to first appear in the Group Replication table, and adds it to metadata only after the clone operation is complete. (Bug #32522398)
- Router unconditionally removed the pid_file on exit, even when the file already existed at startup and/or was write protected. Now it is only removed if created by this invocation of Router. (Bug #32247493)
- Improved log messages for Router plugins, namely to debug plugin-related problems. (Bug #31584192)

Changes in MySQL Router 8.0.25 (2021-05-11)

This release contains no functional changes and is published to align its version number with that of the MySQL Server 8.0.25 release.

Changes in MySQL Router 8.0.24 (2021-04-20)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Changed the default ports used by Router, and default behavior depends on the `--conf-base-port` bootstrap option.

If `--conf-base-port` is not set, then the associated `bind_port` values begin at 6446; Classic (RW 6446, RO 6447) and X Protocol (RW 6448, RO 6449). Additionally, now setting `--conf-base-port` to 0 uses the old default ports of Classic (RW 6446, RO 6447) and X Protocol (RW 64460, RO 64470).

Reason: the previous default X Protocol ports (64460 and 64470) are defined as "Dynamic Ports" as per RFC 6335. (WL #14327)

- Previously, Router bound the incoming socket at startup and kept it open even if no destinations were available. Now Router only binds to the socket if destinations are available, and otherwise closes the incoming sockets. This also means Load-Balancers know whether Router can handle traffic. (WL #13327)

Bugs Fixed

- The `mysqlrouter.conf` file in Debian Router packages did not set the run directory to an absolute path name, resulting in package installation errors. (Bug #32620788)
- Disabled code-cache when compiling on Solaris to avoid 'invalid bytecode' errors; previously it was only disabled for sun-cc builds. (Bug #32567899)
- When using first-available policy and static routing, it was possible that the router wouldn't start and emit an error similar to "plugin 'routing:test_default' start failed: routing:test_default: Failed setting up TCP service"; fixed race condition on start-up between 'is running' and 'start socket acceptor'. (Bug #32565479)
- Fixed assertion that a previous destination list contained primary destinations after connecting to a primary node failed. This assertion was firing because the primary destinations were not properly recognized during refresh. (Bug #32543464)
- Network transfers larger than the socket send buffer, such as large result sets or queries, could terminate the connection. (Bug #32543049)
- Now return an std::errc::operation_would_block error code if write() blocks and no data is written; before 0 was returned. (Bug #32542170)
- Configuring a second Router instance on the same machine without the `--name` parameter would yield unexpected errors related to file cleanup. (Bug #32517802)
- Router would report as READY before the sockets were open; so now reports it after the socket acceptors are set up. (Bug #32429409)
- Network loss before connect() was resulting in long failover times as it depended on the operating system's network timeouts. The `connect_timeout` option was not honored, but is now applied before connecting. (Bug #32428113)
- Router no longer relies upon the MySQL instance's availability logic for wait-primary-failover. Instead, it now checks the metadata-cache's replicaset info for a new Primary. This is because GR membership does not change is the network between Router and the Primary is lost. (Bug #32393421)
- After a network loss between Router and a group replication PRIMARY (but not network loss between group replication members), the wait for the failover by Router did not timeout after 10 seconds, and instead the connection remained locked. (Bug #32338771)
- Configuration options expecting numeric values would allow hex and octal values; but now only completely numeric values are allowed. For example, `--config-base-port=0xff` now reports an error. (Bug #32297657)

- Improved the DEBUG logging mechanism to include the following information: host:port, execution time, OK/ERR information, and row count. In addition, now log one message instead of separate before/after messages. (Bug #32293818)
- The REST endpoint timeout check changed from waiting for "timeout + request time" to waiting until the timeout expires. (Bug #32252500)
- Connector/ODBC report ENUM columns as SQL_CHAR as the ODBC standard does not support ENUM, and MS SQL Server expects CHAR data to always be the same fixed length as specified in the column definition. This fixes errors related to new line and tab symbols present in the UNICODE version of the driver. The workaround is to enable SSPS (default) by not setting NO_SSPS=1. (Bug #28783266, Bug #92748)

  References: See also: Bug #32537000.

Changes in MySQL Router 8.0.23 (2021-01-18)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added configurable server<->router<->client TLS endpoint support, which allows additional configuration for Router, Client, and Server interactions.

  The default behavior changed from client_ssl_mode = PASSTHROUGH to client_ssl_mode = PREFERRED where PASSTHROUGH forwards everything to the server and lets the client and server decide TLS settings, whereas PREFERRED establishes TLS connections between the client and Router if the client desires switching to TLS if the server supports TLS. This also matches the existing behavior for client and server without the Router in-between.

  Many new options were created, such as `client_ssl_mode` and `server_ssl_mode` that are documented under TLS Configuration. (Bug #31141095, WL #12012)

Bugs Fixed

- On Linux, bootstrap would not function if the host had no external interfaces. (Bug #32200253)
- Host names resolving to IPv6 were wrapped in square brackets as it assumed the host name was an IPv6 address. (Bug #32198746)
- Refactored MySQLSession functionality to more consistently report syntax related errors. (Bug #32151782)
- Large SQL statements that were larger than the send buffer would lead errors such as "write error: Resource temporarily unavailable" and drop the connection. (Bug #32081158)
- Queries expected to return a single row were not being added to the debugging SQL log. (Bug #32071807)
- Setting the `--conf-use-gr-notifications` bootstrap option increased the `ttl` value to a value higher than the default `auth_cache_refresh_interval` value allowed thus not creating a valid MySQL Router configuration file. Now, setting `--conf-use-gr-notifications` also adjusts the `auth_cache_refresh_interval` value accordingly. (Bug #32062483)

Changes in MySQL Router 8.0.22 (2020-10-19)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Improved building mechanism by implementing CMake's GenerateExportHeader() functionality for the MySQL Protocol library; which previously was hard coded. (Bug #31503429)
- The strict 1:1 thread-to-connection ratio was replaced by an event-driven + IO-threadpool design. Instead of running blocking socket operations in a thread, non-blocking IO is now used and a thread may be used when a socket is available. This raises the concurrent connection limit by a Router instance from around 5,000 to around 50,000.

  This also adds a new [io] configuration section with two new configuration options: backend that handles async operations (accepts poll or linux_epoll) and threads as the number of IO threads to handles connections (0 for all available, or 1-1024). (WL #10703)
- The bootstrap process now configures REST API functionality into the generated `mysqlrouter.conf` configuration file. The new optional `--https-port` bootstrap argument defines `port`; which is defined as 8443 by default.

  To disable the REST API configuration from being generated, pass in the new `--disable-rest` bootstrap option. (WL #13906)
- Added systemd notify support. If there is a NOTIFY_SOCKET environment variable set when the Router starts, Router treats its value as unix-domain socket name; DGRAM on all unix-based operating systems and as a named pipe path on Windows. (WL #13707)

Bugs Fixed

- When using the recently introduced _hidden instance feature, hiding secondary instances with _disconnect_existing_sessions_when_hidden enabled would close all secondary instances rather than only hidden instances. This issue only applied when using host names instead of IP addresses. (Bug #31665764)
- Refactored acceptor-shutdown synchronization to avoid possible hangs. (Bug #31598112)
- Improved Router's metadata cache refresh mechanism to account for race conditions; such as a refresh request made while the metadata is currently refreshing. (Bug #31597874)
- Improved the round-robin routing strategy quarantine check mechanism. (Bug #31575084)
- Added support for the net_buffer_length routing option. Previously it was accepted but ignored in favor of the default value. (Bug #31575027)
- Added link-local IPv6 address support. Previously values containing a '%' sign failed with an 'invalid address' error. (Bug #31574975)
- Replaced all occurrences of 'master' in the context of the node role with 'primary'. (Bug #31508256)
- On Windows, added socket write support to emulate it by adding an AF_INET variant of socketpair(). (Bug #31414156)
- When Router loses the primary it waits for the failover with a 10 second timeout. Previously it did not check for terminate requests, so could take up to 10 seconds if the new primary was not found until Router honored the shutdown request. (Bug #31397127)

- Hostname detection resolved IP addresses of external network interfaces using code specific to Linux that operated directly with c-style type cases. Improved portability using type safe network-address types from net::ip::tcp::address and ::network thus making it portable for Windows, Solaris, FreebBSD, and macOS. (Bug #31370876)

Changes in MySQL Router 8.0.21 (2020-07-13)

- Packaging Notes
- Functionality Added or Changed
- Bugs Fixed

Packaging Notes

- For Windows, MSI installer packages for MySQL Router now include a check for the required Visual Studio redistributable package, and produce a message asking the user to install it if it is missing. (Bug #30541398)

Functionality Added or Changed

- Added new log functionality:

  - `[filelog]`: this new section includes the optional `filename` option that defaults to `[logger]`'s filename value. This file is written to the `logging_folder` directory; and the value must be a file name and not include a path.

  - `[logger]`: added an optional `filename` option to define Router's log file name, and it also sets `[filelog]`'s default filename value. It is unset by default, while default filename behavior is Router's `mysqlrouter.log`.

  - `[consolelog]`: this new section includes the optional `destination` option that defaults to `/dev/stderr`. Available values are `/dev/stdout`, `/dev/stderr`, or `/dev/null` on *nix; and `CON` or `NUL` on Windows.

  (Bug #29271072, Bug #94095, WL #13838)

- Added support for the InnoDB cluster metadata "tags" property; namely for the "_hidden" and "_disconnect_existing_sessions_when_hidden" tags.

  - `_hidden`: A boolean that indicates if the node should be hidden. Setting "true" makes the node hidden, while "false" or any other value considers it not hidden. Default: false.

  - `_disconnect_existing_sessions_when_hidden`: A boolean that indicates if the existing connections to the node should be dropped in case the node is hidden. A value of "false" means the node is "dont_disconnect_existing", meaning existing connections to hidden nodes are not disconnected. True or any other value means the opposite. Default: true.

    This setting does not affect new client connections, which are never directed to hidden instances.

  Hidden instances only affect user connections; the instance remains available to Router when performing tasks such as fetching metadata and calculating the quorum. (WL #13787)

Bugs Fixed

- Updated mock_server MySQL Server type definitions; fixed NEWDECIMAL and added TIMESTAMP2 and JSON. (Bug #31283079, Bug #99416)

- For testing, the full protobuf dependency was replaced by protobuf-lite. (Bug #31245124)
- For Windows, added necessary internal functions to allow log rotation but it remains unsupported. This functionality is only available on Unix-based systems. (Bug #31212570, Bug #33708504)
- The bootstrap process could not complete when MySQL Server had the optimizer switch derived_merge set to off; because the v2_routers view became non-insertable. Now, derived_merge is set to on for sessions that Router is handling metadata. (Bug #31170721)
- Improved the plugin loading mechanism to not implicitly load plugins; previously the same plugin could be loaded twice. (Bug #31024867)
- Router assumed that each new GR change notified by X Protocol notifications has a new view id, but that is not always the case; for example, for changes like switching the primary or change of the role. The view id is no longer used for notification debouncing. (Bug #31017863, Bug #98863)
- Fixed MSVC 2019 16.6 builds by adding the missing headers. Thanks to Billy O'Neal for the patch. (Bug #31008906, Bug #98880)
- Fixed Clang 9 warnings. (Bug #30920954)
- With use_gr_notifications=1, Router used the old X Protocol namespace name (xplugin) when sending the PING message over the X Protocol connection that was sent to avoid the idle connection from being closed. (Bug #30850734)
- With a high TTL and Group Replication (GR) notifications enabled, MySQL Shell operations such as addInstance() and removeInstance() would go unnoticed until the TTL expired; which would trigger GR notifications in the meantime. Now Router temporarily decreases TTL to 1s when it notices inconsistent metadata until it becomes consistent again. (Bug #30739068)
- On Linux, Router now installs an example logrotate example script; it's located at `/etc/logrotate.d/mysqlrouter`. (Bug #30611485)
- Updated HTTP server logic to function with changes made by libevent 2.1.9. (WL #10703)

Changes in MySQL Router 8.0.20 (2020-04-27)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added additional functionality to configure the PID file location. This adds the `--pid-file` (command-line) and `pid_file` (configuration file) options. Setting the `ROUTER_PID` environment variable remains as the other option.

  The PID file cannot be set while executing the `--bootstrap` option. (Bug #30510827, WL #13705)
- Added *metadata_cache* support for *[http_auth_backend]*; set `backend=metadata_cache` to use it. Also added the optional `auth_cache_refresh_interval` and `auth_cache_ttl` options to configure its use. (WL #12952)
- Added two new log levels: "system", which is higher than "error", and "note", which is between "info" and "debug". (WL #11196)

Bugs Fixed

- Router's default data directory on Debian (`/var/run/mysqlrouter`) was not preserved between system resets. Both the keyring and `state.json` files were stored here, so Router could not function after a system reset. Now `/var/lib/mysqlrouter` is used instead. In addition, the installation process now detects and moves an existing configuration file to the new location. (Bug #31029334, Bug #98914)
- Routing failed for an InnoDB Cluster using metadata 2.0 (Shell 8.0.19+) when the primary was removed using Shell/AdminAPI cluster.remove_instance(). Routing failed because Router flushed the routing table as a precaution. (Bug #30733189)
- Added missing *raise* statement when queue is full. Thanks to Rastislav Masaryk for the patch. (Bug #30643277, Bug #97938)
- Internal metadata queries were affected by global MySQL Server settings; but now Router explicitly sets session parameters to make metadata queries and updates consistent. These settings are group_replication_consistency, autocommit, sql_mode, character_set_client, character_set_results, and character_set_connection. (Bug #30631442, Bug #97764)
- Router renamed its main thread from "mysqlrouter" to "main" to make debugging easier, but this meant executing "killall mysqlrouter" would not find the process; and instead "killall main" did. The process is no longer renamed. (Bug #30611421)
- Reviewed help text and error messages throughout MySQL Router's interface; and improved readability. (Bug #30523166, Bug #30889974, Bug #29138501, Bug #29132761, Bug #30895659, Bug #29428293, Bug #29132728, Bug #29361447)
- Group Replication notifications (`use_gr_notifications`) would log warnings about a missing `mysqlx_wait_timeout` MySQL system variable when used against MySQL 5.7 as this variable was added in MySQL 8.0. This warning is no longer present. (Bug #30478016, Bug #97414)
- With AppArmor active (Ubuntu/Debian), bootstrap failed as it could not write a temporary (state) file as Router's AppArmor profile didn't allow writing to (var)/run/mysqlrouter. The AppArmor profile was updated accordingly.

  With AppArmor active (Ubuntu/Debian), Router ignored the global SSL configuration; the AppArmor profile was updated to read `/etc/ssl/openssl.conf`. (Bug #30339399)
- The MySQL Router configuration file required a trailing newline. (Bug #28970487)
- Improved error reporting when handling dissolved clusters. For example, the error text "The provided server contains an unsupported InnoDB cluster metadata." was changed to "Expected the metadata server to contain configuration for one cluster, found none." (Bug #28365867)

Changes in MySQL Router 8.0.19 (2020-01-13)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Router now utilizes metadata version 2.0 whereas all previous Router versions used metadata v1.0.1; and Router is backwards compatible with metadata v1.0.1. The Router bootstrapping error log was updated to reflect this requirement, in that MySQL Shell's `dba.upgradeMetadata()` exists to perform a metadata upgrade. (Bug #30381549, WL #13188)

- Added Async ReplicaSet Cluster support.

  Added a new `cluster_type` configuration option to the `[metadata_cache]` section. Accepted values are "ar" (Async ReplicaSet) or "gr" (Group Replication). Bootstrapping checks the target instance type and sets this value accordingly. (WL #13188)

- Added new `--account` and `--account-create` options to configure Router's bootstrap user. (WL #13177)

- Metadata version checking functionality was added. Versions checked include 0.0.0 (a metadata upgrade is in process), 1.x.x (old metadata version), and 2.x.x (current metadata version). The metadata version is saved to Router's new routers.version field. In addition, the running router periodically updates the routers.last_check_in metadata field with the current timestamp. (WL #13417)

Bugs Fixed

- Fixed gcc 5.5 compilation warnings. (Bug #30505196, Bug #97475)

- On Windows, when the Windows service created the Router log file (which happens when running router as a service by bootstrap), the log file became unreadable (inaccessible) by anyone else; including the local administrator. The workaround was to manually delete and recreate the log file after installation.

  Related, the `--install-service` parameter attempted to grant r/w rights to an existing log file and failed if it lacked rights to do so. Now it no longer attempts modifying privileges and instead reports an error if LocalService lacks sufficient access. (Bug #30471498, Bug #30916395, Bug #97389)

- The Router's table was extended to include the username that accesses the metadata. (Bug #30435133)

- Improved GCC 5.5.0 support as it does not support constexpr. (Bug #30406328)

- An implicit move-assign generated an error when built with DevStudio 12.6; making it explicit eliminated the error. (Bug #30396902)

- Fixed IPv6 metadata handling. (Bug #30354273)

- Building Router with AddressSanitizer (ASan) now uses ASAN's crash handler on all systems, when before it would use a generic crash handler on POSIX systems. (Bug #30298740)

- The HTTP REST API `bind_address` configuration option only accepted IPv4 addresses. (Bug #30287987)

- The bootstrap process would improperly display text related to a successful setup before showing an error for failing to generate a Router configuration file. (Bug #30055358)

- The bootstrap process did not properly store the configured access ports. (Bug #29969566)

- On shut down, Router now removes the pid-file it generated during start up. (Bug #29441087)

- The source tarball inside SRPM (Source RPM) is now identical to source tarball at the upstream locations (dev.mysql.com/cdn.mysql.com); previously there were differences causing different checksum values. (Bug #17760647, Bug #70847)

Changes in MySQL Router 8.0.18 (2019-10-14)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- Added a `timestamp_precision` logger configuration option to configure logged timestamps. (WL #11194)
- Added a new `mysqlrouter_keyring` utility to help view and manage the Router keyring. (WL #12974)

Bugs Fixed

- On Windows, ProcessLauncher-related error handling was improved. (Bug #30188010)
- Fixed the command line parser to better ensure that arguments are sent with proper quoting and escaping. (Bug #30171528)
- Improved SQL quoting by the bootstrap process, which previously did not quote the username in queries. (Bug #30123992)
- On MacOS, Router failed to start after a successful bootstrap because the loader could not locate the SSL libraries. (Bug #30096843)
- Simplified and removed unnecessary SQL statements related to cluster metadata queries. (Bug #30042526)
- Executing *python2.7 setup.py install* failed to create the `mysqlx` folder for commercial portable packages. (Bug #29959309)
- SIGTRAP is now handled the same way as SIGINT in normal operations, and SIGTRAP allows debugger (such as gdb) to jump in. (Bug #29843245)
- The internal REST API add path functionality did not always remove the current path first, which could cause an unexpected halt. (Bug #29833031)
- Router could halt unexpectedly if unable to spawn another thread. (Bug #29759391)
- On Windows 10, Router built with *-DINSTALL_LAYOUT=WIN* would create a directory named "`ENV{APPDATA}`" during bootstrap. (Bug #29160784)

Changes in MySQL Router 8.0.17 (2019-07-22)

- 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. (WL #10719)

- 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/20190715/". The system follows camelCase naming rules and errors follow

RFC 7807. The system exposes a `swagger.json` file as `/api/ {apiVersion}/swagger.json`. (WL #8965)

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 deinitialization 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)

- Functionality Added or Changed
- Bugs Fixed

Functionality Added or Changed

- 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. (Bug #28636013, WL #12089)
- 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. (WL #12089)
- 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. (WL #8988)
- On Windows, added the ability to report events to the Windows Application Events log. (WL #9552)
- 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. (WL #12733)
- 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.

(WL #11891, WL #12503, WL #12524)

- 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.

  (WL #12503)

- Colored text differentiation was added to MySQL Router's console output using the VT100 standard. (WL #12598, WL #12604)

Bugs Fixed

- AppArmor is now given read/write 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)

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

Changes in MySQL Router 8.0.14 (2019-01-21)

- Deprecation and Removal Notes
- Functionality Added or Changed
- Bugs Fixed

Deprecation and Removal Notes

- The `bootstrap_server_addresses` configuration option is deprecated in favor of the new `dynamic_config` option. (Bug #28082857, Bug #91029, WL #11318)

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, WL #11318)

- 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. (WL #11318)

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 copyright years in the `README` and `LICENSE` files were not synced. (Bug #29045945)
- 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)

- 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". (WL #11127)
- MySQL Router is now included in MySQL Server's source and monolithic binary packages. The MySQL Router standalone packages continue to exist, as before. (WL #10799)

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)
- Bootstrapping 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)

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, WL #11954)
- 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`. (WL #10377)
- Added the optional `--account-host` command-line bootstrap option to configure the host pattern used for MySQL accounts. The default value is '%'. (WL #10987)

- 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. (WL #11943)
- 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. (WL #12030)
- A *mysql-server-mock* tool was added to help make group replication testing more predictable. Execute *mysql-server-mock --help* for usage details. (WL #12118)
- 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)

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, WL #11157)

- 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, WL #11024)

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 accepting 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, WL #9857)
- 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. (WL #10169)

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 (latest) 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. (WL #10306)
- TERM and INT signal handlers were added. (WL #8995)
- 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. (WL #9558, WL #10822)
- 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. (WL #10845)
- 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. (WL #10741)

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)