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# MySQL Enterprise Backup 8.0 Release Notes

## Abstract

This document lists the changes to the MySQL Enterprise Backup 8.0 product, beginning with the most recent release. Each release section covers added or changed functionality, bug fixes, and known issues, if applicable. For information about changes in a different MySQL Enterprise Backup series, see the release notes for that series.

For additional MySQL Enterprise Backup 8.0 documentation, see the [MySQL Enterprise Backup User's Guide \(Version 8.0.16\)](#).

For legal information, see the [Legal Notices](#).

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

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## Preface and Legal Notices

This document lists the changes to the MySQL Enterprise Backup 8.0 product, beginning with the most recent release.

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## Changes in MySQL Enterprise Backup 8.0.17 (Not yet released, General Availability)

Version 8.0.17 has no release notes, or they have not been published because the product version has not been released.

## Changes in MySQL Enterprise Backup 8.0.16 (2019-04-25, General Availability)

MySQL Enterprise Backup 8.0.16 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.16. For earlier versions of MySQL 8.0, use the MySQL Enterprise Backup version with the same version number as the server. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

- [Functionality Added or Changed](#)
- [Bugs Fixed](#)

### Functionality Added or Changed

- `mysqlbackup` now supports [encrypted InnoDB undo logs](#). The encrypted undo tablespaces are handled the same way as the encrypted tablespaces for InnoDB tables. See [Working with Encrypted InnoDB Tablespaces](#) for details.
- Near the end of the backup process, instead of locking the whole server instance for a brief period of time, `mysqlbackup` now applies these locks consecutively:
  1. A [backup lock](#) on the server instance, which blocks DDLs (except those on user-created temporary tables), but not DMLs on InnoDB tables.
  2. A `FLUSH TABLES tbl_name [, tbl_name] ... WITH READ LOCK` operation on all non-InnoDB tables, for copying the relevant ones among them into the backup. This step is skipped if no user-created non-InnoDB tables exist.
  3. A brief blocking of logging activities on the server, for collecting logging-related information.

See [The Backup Process](#) for details. The removal of the lock on the whole server instance reduces disruption to the database service by the backup operation.



#### Important

The change requires that the `BACKUP_ADMIN` and `SELECT` privileges on all tables be granted to the user by which `mysqlbackup` connects to the server (the `BACKUP_ADMIN` privilege is automatically granted to users with the `RELOAD` privilege when an in-place upgrade to MySQL Server 8.0 from an earlier version is performed).

- `mysqlbackup` now supports [dynamic changes to undo tablespaces](#) on the server being backed up. During a restore, the default undo tablespaces, as well as any non-default undo tablespaces resided in the backed-up server's data directory, are restored to the location pointed to by the `mysqlbackup` option `--innodb_undo_directory`. Non-default, external undo tablespaces are restored to the locations they were found on the backed-up server. See [undo log files](#) for details.

- In addition to the requirement that the target data directory for a restore specified by the `--datadir` option must be non-existent or empty, `mysqlbackup` now enforces the same rule for the `--innodb_data_home_dir`, `--innodb_log_group_home_dir`, and `--innodb_undo_directory` options (the `--force` option cannot be used to override the requirement on the three options).

## Bugs Fixed

- Zip packages of `mysqlbackup` contained duplicate files, which have now been removed. (Bug #29497272, Bug #94683)
- `mysqlbackup` might quit unexpectedly if it lost its connection to the server at the middle of a backup operation. With this fix, `mysqlbackup` exits gracefully in the situation after throwing the appropriate errors. (Bug #29376006)
- Restore of an incremental backup failed if, on the server, some binary log files had been purged in between the times the incremental backup and its base backup were made. (Bug #29306026)
- A backup failed for `mysqlbackup` if the path given by the `--backup-dir` option was of the Universal Naming Convention (UNC) format, as `mysqlbackup` failed to create the backup directory then. (Bug #29190803)
- A `mysqlbackup` operation failed when the `backup-image` option was supplied to `mysqlbackup` in a configuration file instead of on the command line. (Bug #29157495)
- A restore operation for a TTS backup failed if the backed-up server has `ANSI_QUOTES` as one of its SQL modes, as specified in its system variable `sql-mode`. (Bug #28979134)
- `mysqlbackup` quit unexpectedly when the `--password` option was used twice, with no argument given at the second time, in a `mysqlbackup` command that was itself invalid aside from the use of the `--password` option. (Bug #28894102)
- When a compressed incremental folder backup was restored, the binary log files created in between the times of the base and the incremental backups were not copied onto the target server. (Bug #28773998)
- A restore operation for a database containing encrypted InnoDB tables failed without returning a proper error message when the `--encrypt-password` option was not used in the `mysqlbackup` command. (Bug #28773077)
- After restoring an incremental backup taken from a MySQL Community Server with encrypted InnoDB tables, the keyring file of the restored server became corrupted, so the server could not be started. (Bug #28422191)
- A restore operation could corrupt a backup when, by mistake, a user specified the source directory to become the target directory for restoring some files (for example, specifying what was the backup's `--backup_innodb_data_home_dir` value as the restore's `--innodb_data_home_dir` value). This fix prevents the problem by having `mysqlbackup` throw an error when the command options make the source and target file paths the same for any file copying during a restore. (Bug #28376873)
- While MySQL Server interprets the system variable setting `--innodb_checksum_algorithm=0` to mean `--innodb_checksum_algorithm=crc32`, a `mysqlbackup` operation (except for backup) failed when `--innodb_checksum_algorithm=0` was set as a configuration option on the backed up server. With this fix, `mysqlbackup` now takes `--innodb_checksum_algorithm=0` as valid and interprets it as `--innodb_checksum_algorithm=crc32`. (Bug #28295519)
- A restore operation failed with the error that the binary log index file could not be opened if the binary log base name for the backed-up server was a substring of the word "index". (Bug #28127023)

- `mysqlbackup` tried to connect to a remote host specified by the `--host` option, while it was supposed to ignore the option (see [Connection Options](#) for details). With this fix, the option is now ignored.

**Note**

As a side-effect of this change, on Unix-like platforms, `mysqlbackup` command that used the `--host` option now needs to use the `--protocol=TCP` option to indicate explicitly that `mysqlbackup` is to connect to `localhost` using TCP/IP.

(Bug #25911987)

- When the option `--no-locking` was used during a backup operation, the backup sometimes failed with `mysqlbackup` complaining that the highest LSN was larger in a copied page than on the backed-up server. It was because `mysqlbackup` did not perform a log flushing before copying the redo log when the option was used. With this fix, log flushing was always performed to prevent the error. (Bug #25412655)

## Changes in MySQL Enterprise Backup 8.0.15 (2019-02-01, General Availability)

MySQL Enterprise Backup 8.0.15 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.15. For earlier versions of MySQL 8.0, use the MySQL Enterprise Backup version with the same version number as the server. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

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

## Changes in MySQL Enterprise Backup 8.0.14 (2019-01-21, General Availability)

MySQL Enterprise Backup 8.0.14 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.14. For earlier versions of MySQL 8.0, use the MySQL Enterprise Backup version with the same version number as the server. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

- [Functionality Added or Changed](#)
- [Bugs Fixed](#)

### Functionality Added or Changed

- `mysqlbackup` now supports encrypted binary and relay log. See [descriptions for the undo log files](#) for details.
- `mysqlbackup` now supports the `--ssl-fips-mode` option, which controls whether `mysqlbackup` operates in FIPS mode. See [FIPS Support](#) for details.

### Bugs Fixed

- When working with a Group Replication cluster, `mysqlbackup` quit unexpectedly near the end of a backup operation when, in order to write to the `backup_history` table, it tried to connect with an unencrypted connection to one of the nodes on which the backup user had not logged on before. It was

because, as a user created with the [caching\\_sha2\\_password](#) plugin (enabled by default on MySQL 8.0 servers), the backup user must log on with an encrypted connection when it connects to the server for the first time; the attempt to log on thus failed, and `mysqlbackup` could not handle the failure. With this fix, at such failures, `mysqlbackup` quits gracefully with the warning that the backup operation is finished without updates to the backup history. (Bug #28893180)

- An `apply-incremental-backup` operation failed with an error (`RDR1 ERROR: Unable to remove relaylog files from full backup`) when the incremental backup was created with the `--compress` option. (Bug #28366241)
- `mysqlbackup` quit unexpectedly during an `apply-incremental-backup` operation if the backed up server had been started using relative paths for `--datadir` and `--log-bin`. (Bug #28334521)
- Attempts to restore a backup of a MySQL 5.7 Server to a MySQL 8.0 Server resulted in a strange error message (`Server_version is not obtained`). With this fix, `mysqlbackup` now indicates that the operation is not supported. For related information, see [Restoring a Backup with a Database Upgrade or Downgrade](#). (Bug #27952379)
- After restoring an incremental folder backup and putting its binary log at a specified location different from that for the base backup, the older binary log files of the base backup were not removed by `mysqlbackup`. (Bug #27890472)
- Partial backups sometimes failed because full-text index files had their file names matched by the regular expression provided by the `--include-tables` option, and the files were then handled as ordinary tablespace files by `mysqlbackup`. With this fix, `mysqlbackup` excludes any full-text index files from backups. (Bug #25044900)

## Changes in MySQL Enterprise Backup 8.0.13 (2018-10-22, General Availability)

MySQL Enterprise Backup 8.0.13 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.13. For earlier versions of MySQL 8.0, use the MySQL Enterprise Backup version with the same version number as the server. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

- [Functionality Added or Changed](#)
- [Bugs Fixed](#)

### Functionality Added or Changed

- `mysqlbackup` now supports backup compression (the use of the `--compress` and `--uncompress` options) for incremental backups (except for incremental backups created with the `--incremental-with-redo-log-only` option).
- `mysqlbackup` now supports [transparent page compression](#) for InnoDB tables. The support is enabled by setting the `mysqlbackup` option `--compress-method=punch-hole`; see description for the option for details.

### Bugs Fixed

- Restoring an incremental backup image using the `copy-back-and-apply-log` command failed with `mysqlbackup` complaining that the server repository configuration (including, e.g., value of `innodb_data_file_path`) was unknown for the target server. With this fix, `mysqlbackup` gets

the required information from the `backup-my.cnf` file already restored with the base backup of the incremental backup. (Bug #28411028)

References: This issue is a regression of: Bug #27429244.

- `mysqlbackup` hung when a backup operation failed due to a full disk. With this fix, `mysqlbackup` quits gracefully in the situation by throwing an error. (Bug #28399821)
- During an `--apply-incremental-backup` operation, `mysqlbackup` attempted to delete the binary log of the backed-up, running server. (Bug #28377502)
- On FreeBSD platforms, using the `--show-progress` option did not make `mysqlbackup` print progress reports. (Bug #28350122)
- A `mysqlbackup` operation on an image stored on an OpenStack cloud storage service sometimes failed with a segmentation fault or a bad URL error. It was because of a race condition caused by an uninitiated variable, which has been eliminated by this fix. (Bug #28189239, Bug #28183729)
- Backups for databases with encrypted InnoDB tables failed when the `--compress` option was used. (Bug #28177466)
- The Windows version of MySQL Enterprise Backup did not display its build ID when invoked. (Bug #27916702)
- A `mysqlbackup` operation on an image stored on an OpenStack cloud storage service failed with a `401 Unauthorized` error when the operation took a long time and the authentication token for the cloud access expired. With this fix, a separate thread in `mysqlbackup` requests a new token from the OpenStack cloud service in that situation, so that the operation can continue. (Bug #27893174)
- When the `--show-progress=table` option was used, `mysqlbackup` gave a warning in the error log on an aborted connection to the server near the end of the operation. It was because the connection to the server for writing to the `backup_progress` table had remained open. With this fix, the connection is properly closed after the `mysqlbackup` operation is finished. (Bug #27647283)
- When an incremental backup was restored without using the `--log-bin` option, the binary log was not restored to its original location on the backed up server, but to the location specified by `--log-bin` earlier during the restore of the base backup. The same occurred for relay logs of incremental backups for slaves when the `--relay-log` option was not used. (Bug #27545745)
- If, when a backup was in progress and `mysqlbackup` was reading the binary log (or the relay log) index file and the server tried to modify the index file (because, for example, a log flush or log purge just took place), the binary logging (or relay logging) stopped; the server also quit unexpectedly on Windows platforms. It was because `mysqlbackup` did not handle well the file sharing violation. With this fix, `mysqlbackup` now reads the index file using the local file system API, which handles the file sharing violation gracefully; also, `mysqlbackup` now copies the index file into its buffer and then closes it, instead of keeping it open for long, so the server can modify or delete the index file more easily. (Bug #22914974, Bug #26047119)

## Changes in MySQL Enterprise Backup 8.0.12 (2018-07-27, General Availability)

MySQL Enterprise Backup 8.0.12 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.12. For earlier versions of MySQL 8.0, use the MySQL Enterprise Backup version with the same version number as the server. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

- [Functionality Added or Changed](#)
- [Bugs Fixed](#)

## Functionality Added or Changed

- **Important Change:** Starting from release 8.0.12, the storage engine of the `mysql.backup_history` table on a backed-up server has switched from CSV to InnoDB, and a new column for server UUIIDs has been added to the table. See [Backup History Table Update](#) for the new user privileges required by `mysqlbackup` due to this change.
- **Important Change:** When working with a [Group Replication](#) setup, `mysqlbackup` now makes the backup history available to all members of the server group by making sure that the `backup_history` table is updated on a primary node after each `mysqlbackup` operation. See [Using MySQL Enterprise Backup with Group Replication](#) for details.

With the implementation of this feature, the new user privilege of `SELECT` on `performance_schema.replication_group_members` is now required by `mysqlbackup` to work with any server, even when it does not belong to a Group Replication setup. See [Grant MySQL Privileges to Backup Administrator](#) for details.

- Version information for `mysqlbackup` is now printed to the `stdout` instead of the `stderr` stream when the `--version` or `--help` option is used. (Bug #27253989)
- OAuth is now supported for Oracle Cloud Storage client authentication. Two new options, `--cloud-storage-url` and `--cloud-oauth-token`, have been introduced for the purpose. See [Cloud Storage Options](#) for details.

## Bugs Fixed

- Backups for a server failed when it had `ANSI_QUOTES` in its values for `sql_mode`. (Bug #27939774)
- The maximum value that could be set for the `--safe-slave-backup-timeout` option was 2700 (seconds), which automatically replaced any larger value. With this fix, there is no longer a maximum limit, even though a high value is not recommended; see the description of `--safe-slave-backup-timeout` for details. (Bug #27883020)
- Restoring an incrementation backup on top of a data directory restored using a compressed backup failed. It was because `mysqlbackup` did not set `is_compressed=0` in the `backup_variables.txt` file inside the restored data directory. (Bug #27787988)
- When `mysqlbackup` performed sanity checks on InnoDB tablespaces and found a space ID mismatch for an FSP header and a page header, the name of the problematic tablespace was not given in the error report. (Bug #27752703)
- If an `ALTER TABLE` statement was executed on the server before an incremental backup was taken, a server restored with the backup on which the incremental backup was applied (using the `apply-incremental-backup` command) could not be started, as the `.ibd` file of the altered table was missing in the restored data. (Bug #27735134)
- After a server has been restored using an incremental backup created with the `--incremental-with-redo-log-only` option, it could not be started. (Bug #27722525)
- `mysqlbackup` issued a warning whenever the number of files specified in the system variable `innodb_data_file_path` of the server to be backed up exceeded 100. With this fix, a warning is



issued only if the number of InnoDB data files to be opened exceeds the number specified by the system variable `innodb_open_files`. (Bug #27701402)

- Backups failed for a server that had been started with a value for `--innodb_log_file_size` different from the one the server was initiated with. (Bug #27571663)
- An `apply-incremental-backup` operation failed when individual tablespaces with relative file paths were involved. (Bug #27278876)
- In a `Group Replication` setting for MySQL servers, when changes were made to one group member and a backup was taken on another, the relay log for the replication applier was missing from the backup, so that the restored server could not be started. (Bug #25534078)
- When a compressed backup was restored with the `--innodb_data_home_dir` option pointing to a restore location outside of the data directory, `.ibd` files were still being copied into the data directory, causing an exception to be thrown at the attempt to start the restored server. (Bug #24826986)

## Changes in MySQL Enterprise Backup 8.0.11 (2018-04-19, General Availability)

MySQL Enterprise Backup 8.0.11 is the latest release for MySQL Enterprise Backup. It only supports MySQL Server 8.0.11. For MySQL server 5.7, please use MySQL Enterprise Backup 4.1, and for MySQL Server 5.6 and 5.5, please use MySQL Enterprise Backup 3.12.

- [Functionality Added or Changed](#)
- [Bugs Fixed](#)

### Functionality Added or Changed

- Offline backups are no longer supported by `mysqlbackup`. As a result, a number of options used for offline backup operations have been removed. See [What's New in MySQL Enterprise Backup 8.0?](#) for details. (Bug #27429244)
- The server option `--secure-auth`, deprecated since MySQL 5.7.5, is no longer supported by `mysqlbackup`. (Bug #27265328)
- Servers' use of the `keyring_encrypted_file` and `keyring_aws` plugins is now supported. See [Working with Encrypted InnoDB Tablespaces](#) for details. (Bug #27127898)
- Information on the executed GTIDs is now included in the `mysqlbackup` output and the backup log when the backed-up server has GTIDs enabled. (Bug #25978803)
- The binary log for a backed-up server, instead of being restored always to the data directory on the target server, is now restored by default to the same location it was found on the backed-up server. It can also be restored to a different location specified with the new `--log-bin` option. (Bug #25141738, Bug #83927)
- The relay log for a backed-up slave server, instead of being restored always to the data directory on the target slave server, is now restored by default to the same location it was found on the backed-up slave server. It can also be restored to a different location specified with the new `--relay-log` option. (Bug #25141738, Bug #83927)
- The `backup_history` table now includes a `server_uuid` column, which stores the value of the `server_uuid` of the backed up server.

- The options `--ssl` and `--ssl-verify-server-cert`, already deprecated in MySQL Enterprise Backup 4.1, have now been removed. Use the `--ssl-mode` option instead to configure the security mode of your connection to the server.
- [MySQL Enterprise Firewall](#) is now supported.
- A new option, `--tls-version`, specifies the protocols `mysqlbackup` permits for encrypted connections to MySQL servers.
- A file now tracks information of [external tablespaces](#) for a backup or restore in JSON format. See description for `tablespace_tracker` in [Types of Files in a Backup](#) for details.
- `mysqlbackup` could not restore the auto increment values in tables and the corruptions flags for indexes onto a server. The tasks are now made possible by having `mysqlbackup` copying onto the target server blocks of redo logs that cover the duration from the latest checkpoint up to the backup end time, so that the restored server can, during the recovery phase at its first start, restore the auto increment values and the corruption flags using those blocks.
- The buffer size for cloud transfers can now be specified using the new `--cloud-buffer-size` option. See [Cloud Storage Options](#) for details.
- HTTP Basic Authentication and non-chunked transfer are now supported for backup and restore using OpenStack Swift-compatible object storage services. Two new options, `--cloud-basicauth-url` and `--cloud-chunked-transfer`, have been introduced for these purposes. See [Cloud Storage Options](#) for details.

## Bugs Fixed

- After restoring a full backup, if the following restore of an incremental backup changed the restore location of the undo log, either `mysqlbackup` hung, or the restored server failed to start. With this fix, `mysqlbackup` quits with a proper error (“Undo tablespace in the base backup not found”) in the situation.  
  
Users should make sure the undo log location does not change between successive restores of a full and an incremental backups, or of two incremental backups. (Bug #27530916)
- When restoring an incremental backup containing encrypted InnoDB tables to a MySQL Community Server, the password provided to `mysqlbackup` with the `--encrypt-password` option was never validated, so that when the wrong password was given, the restore still succeeded, but the restored server could not be started. With this fix, `mysqlbackup` throws an error and stops the restore if the password is wrong. (Bug #27483449)
- `mysqlbackup` failed to backup to an Amazon S3 cloud storage. (Bug #27231229)
- An `apply-incremental-backup` operation corrupted the non-InnoDB files in its target backup when the sizes of those files are smaller in the incremental backup than in the target backup. (Bug #27001934)
- `mysqlbackup` could not establish a connection to the server with a Unix socket using the option `--protocol=SOCKET`. (Bug #26977679)
- A number of memory leaks were observed when running `mysqlbackup`. They have now been fixed. (Bug #26495834, Bug #26373259, Bug #26093563, Bug #26423820, Bug #26497245)
- After applying an incremental backup created with the `--incremental-with-redo-log-only` option to a full backup, the full backup's binary log became corrupted. (Bug #26403452)
- On macOS, `mysqlbackup` failed to determine the relay log file name correctly and thus could not back up the relay log for a slave server. (Bug #25574605)

- `mysqlbackup` only accepts values for `--ssl-mode` in upper case. With this fix, the option's value has become case insensitive. (Bug #25548088)

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