Cloud SQL for MySQL features

MySQL | PostgreSQL (/sql/docs/postgres/features) | SQL Server (/sql/docs/sqlserver/features)

This page describes the major features and capabilities of Cloud SQL for MySQL. Cloud SQL is also available for PostgreSQL (/sql/docs/postgres/features) and SQL Server (/sql/docs/sqlserver/features).

Note: For information about the supported versions of database engines, see Database versions and version policies (/sql/docs/mysql/db-versions).

MySQL features by Cloud SQL editions

For more information about the features for each edition of Cloud SQL for MySQL, see Introduction to Cloud SQL editions (/sql/docs/mysql/editions-intro).

MySQL general feature support for Cloud SQL

- Fully managed MySQL Community Edition databases in the cloud.
- Instances available in the Americas, EU, Asia, and Australia. See all locations where you can create Cloud SQL instances (/sql/docs/mysql/locations).
- Supports migration from source databases to Cloud SQL destination databases using Database Migration Service (DMS) (/database-migration/docs/mysql/configure-source-database).
- Customer data encrypted on Google's internal networks and in database tables, temporary files, and backups.
- Support for secure external connections with the Cloud SQL Auth Proxy or with the SSL/TLS protocol.
- Support for private IP (private services access).
- Data replication between multiple zones with automatic failover.
- Import and export databases using `mysqldump`, or import and export CSV files.
- Support for MySQL wire protocol and standard MySQL connectors.

- Automated backups, on-demand backups, and point-in-time recovery.
- Instance cloning.
- Integration with Google Cloud Observability logging and monitoring.
- ISO/IEC 27001 (http://www.iso.org/iso/home/store/catalogue_ics/catalogue_detail_ics.htm?csnumber=54534) compliant.

Supported languages for Cloud SQL for MySQL

You can use Cloud SQL with App Engine applications running in the flexible environment that are written in:

- C#
- Go
- Java
- Node.js
- PHP
- Python
- Ruby

You can also use Cloud SQL with external applications using the standard MySQL protocol.

How you can connect to Cloud SQL for MySQL instances

You can connect to a Cloud SQL instance from the following:

- A `mysql` client (/sql/docs/mysql/connect-admin-ip).
- Third-party tools like SQL Workbench or Toad for MySQL (/sql/docs/mysql/admin-tools).
- External applications (/sql/docs/mysql/connect-external-app).
- App Engine applications (/sql/docs/mysql/connect-app-engine).
- Applications running on Compute Engine (/sql/docs/mysql/connect-compute-engine).

- Applications running on Google Kubernetes Engine (/sql/docs/mysql/connect-kubernetes-engine).
- Cloud Run functions (/sql/docs/mysql/connect-functions).
- Cloud Run (/sql/docs/mysql/connect-run).
- Google Apps Script scripts (https://developers.google.com/apps-script/jdbc).

Connecting to Cloud SQL with Private Google Access isn't supported. Private services access is supported. For more information, see Private Access Options for Services (/vpc/docs/private-access-options).

User management in Cloud SQL for MySQL 8.0

Due to changes in MySQL 8.0, you can't use `CREATE` or `DELETE` statements for MySQL user management. You also can't modify user privileges using `INSERT`, `UPDATE`, or `DELETE` statements. Instead, use `CREATE`, `DROP USER`, `GRANT`, and `REVOKE` statements to modify user privileges. For more information, see Account management notes (https://dev.mysql.com/doc/relnotes/mysql/8.0/en/news-8-0-0.html#mysqld-8-0-0-account-management)
.

Note: Disregard information under Account management notes about running `mysql_upgrade` to upgrade to version 8.0. Instead, upgrade using the procedure in Upgrading MySQL on an instance (/sql/docs/mysql/upgrade-major-db-version-migrate).

Differences between standard MySQL functionality and Cloud SQL for MySQL

In general, the MySQL functionality provided by a Cloud SQL instance is the same as the functionality provided by a locally-hosted MySQL instance. However, there are a few differences between a standard MySQL instance and a Cloud SQL instance.

Unsupported MySQL features for Cloud SQL

- Federated Engine (https://dev.mysql.com/doc/refman/5.7/en/federated-storage-engine.html)
- Memory Storage Engine (https://dev.mysql.com/doc/refman/5.7/en/memory-storage-engine.html)

The following feature is unsupported for Cloud SQL for MySQL 5.6 and 5.7:

- The SUPER privilege (https://dev.mysql.com/doc/refman/5.7/en/privileges-provided.html#priv_super)

★ **Note:** Because Cloud SQL is a managed service, it restricts access to certain system procedures and tables that require advanced privileges.

The following features are unsupported for Cloud SQL for MySQL 8.0:

- FIPS mode (https://dev.mysql.com/doc/refman/8.0/en/fips-mode.html)
- Resource groups (https://dev.mysql.com/doc/refman/8.0/en/resource-groups.html)

Unsupported MySQL plugins for Cloud SQL

- InnoDB memcached plugin (https://dev.mysql.com/doc/refman/5.7/en/innodb-memcached.html)
- X plugin (https://dev.mysql.com/doc/refman/8.0/en/x-plugin.html)
- Clone plugin (https://dev.mysql.com/doc/refman/8.0/en/clone-plugin.html)
- InnoDB data-at-rest encryption (https://dev.mysql.com/doc/refman/8.0/en/innodb-data-encryption.html)
- validate_password component (https://dev.mysql.com/doc/refman/8.0/en/validate-password.html)

Unsupported MySQL statements for Cloud SQL

The following SQL statements generate an error with the `Error 1290: The MySQL server is running with the Google option so it cannot execute this statement` message:

- `LOAD DATA INFILE`

★ **Note:** `LOAD DATA LOCALINFILE` *is* supported.

- `SELECT ... INTO OUTFILE`
- `SELECT ... INTO DUMPFILE`
- `INSTALL PLUGIN ...`
- `UNINSTALL PLUGIN`

- `CREATE FUNCTION ... SONAME ...`

The following statements aren't supported because MySQL instances use GTID replication:

- `CREATE TABLE ... SELECT` statements
- Transactions or statements that update both transactional and nontransactional tables

The following MySQL statement is unsupported for Cloud SQL for MySQL 5.6 and 5.7, but is supported for Cloud SQL for MySQL 8.0:

- `CREATE TEMPORARY TABLE` statements inside transactions

For more information, see the MySQL documentation (https://dev.mysql.com/doc/refman/5.7/en/replication-gtids-restrictions.html) .

Unsupported MySQL functions for Cloud SQL

- `LOAD_FILE()`

Unsupported MySQL client program features for Cloud SQL

- `mysqldump` (https://dev.mysql.com/doc/refman/5.7/en/mysqldump.html) using the `--tab` option or options that are used with `--tab`. This is because the FILE (https://dev.mysql.com/doc/refman/5.7/en/privileges-provided.html#priv_file) privilege isn't granted for instance users. All other `mysqldump` options are supported. For information on using `mysqldump` options that optimize your file for importing into Cloud SQL, see Export from your local MySQL server using mysqldump (/sql/docs/mysql/import-export/import-export-sql#export-mysqldump).
- `mysqlimport` (https://dev.mysql.com/doc/refman/5.7/en/mysqlimport.html) without using the `--local` option. This is because of the `LOAD DATA INFILE` restriction. To import data into your Cloud SQL instance, see importing using a dump file (/sql/docs/mysql/import-export/import-export-sql#import) or importing using a CSV file (/sql/docs/mysql/import-export/import-export-sql#import).
- If you want to import databases with binary data into your Cloud SQL instance, you must use the `--hex-blob` option with `mysqldump`.

  Although `hex-blob` isn't a required flag when you're using a local MySQL server instance and the `mysql` client, it's required if you want to import any databases with binary data into your Cloud SQL instance. To import data into your Cloud SQL instance, see importing using a dump file

(/sql/docs/mysql/import-export/import-export-sql#import) or importing using a CSV file (/sql/docs/mysql/import-export/import-export-sql#import).

- Not all MySQL options and parameters are enabled for editing as Cloud SQL flags (/sql/docs/mysql/flags).

  To request the addition of a configurable Cloud SQL flag, use the Cloud SQL Discussion group (https://groups.google.com/forum/#!forum/google-cloud-sql-discuss).

- InnoDB is the only supported storage engine. For help with converting tables from MyISAM to InnoDB, see Converting table to InnoDB (https://dev.mysql.com/doc/refman/5.7/en/converting-tables-to-innodb.html) in the MySQL documentation.

MySQL options preset for Cloud SQL

Cloud SQL runs MySQL with a specific set of options. If an option might impact how your applications work, we note it here for your information.

`skip-name-resolve`

This flag impacts how hostnames are resolved for client connections. See `skip-name-resolve` (https://dev.mysql.com/doc/refman/5.7/en/server-system-variables.html#sysvar_skip_name_resolve) in the MySQL documentation.

`log_bin`

This flag reports whether binary logging is enabled. If the `--log-bin` option is used, then the value of this variable is `ON`; otherwise it's `OFF`. See `log_bin` (https://dev.mysql.com/doc/refman/8.0/en/replication-options-binary-log.html#option_mysqld_log-bin) in the MySQL documentation.

MySQL 8.0 authentication for Cloud SQL

Cloud SQL for MySQL 8.0 uses `mysql_native_password` as the default authentication plugin for new users instead of `caching_sha2_password`. The `mysql_native_password` plugin is the default for MySQL 5.6 and 5.7 users.

If you want new users to use the `caching_sha2_password` (https://dev.mysql.com/doc/refman/8.0/en/caching-sha2-pluggable-authentication.html) plugin as the default authentication, you can configure your instance flag for `default_authentication_plugin` to use `caching_sha2_password`.

To configure existing users to use `caching_sha2_password`, use the `ALTER USER` command to change the authentication plugin.

Users that have `caching_sha2_password` authentication might need to use the `get-server-public-key` (https://dev.mysql.com/doc/refman/8.0/en/connection-options.html#option_general_get-server-public-key) flag when connecting. For details, see Using SHA-2 Pluggable Authentication (https://dev.mysql.com/doc/refman/8.0/en/sha256-pluggable-authentication.html#sha256-pluggable-authentication-usage) in the MySQL documentation.

Changes to MySQL system flags in Cloud SQL

For some MySQL system flags, Cloud SQL uses values that differ from the default values. You can't change the values for these flags. For a list of flags, see MySQL system flags changed in Cloud SQL (/sql/docs/mysql/flags#mysql_system_flags_changed_in).

Unsupported Cloud SQL features in Cloud SQL for MySQL 8.0

Cloud SQL for MySQL 8.0 doesn't support the legacy version of MySQL high availability (HA) configuration that uses failover replicas. It supports the new regional HA configuration (/sql/docs/mysql/high-availability).

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