Cloud SQL for PostgreSQL features

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

PostgreSQL features by Cloud SQL editions

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

PostgreSQL feature support for Cloud SQL

- Fully managed PostgreSQL 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/postgres/locations).
- Supports migration from source databases to Cloud SQL destination databases using Database Migration Service (DMS) (/database-migration/docs/postgres/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.
- Data replication between multiple zones with automatic failover.
- Import and export databases using SQL dump files.
- Support for PostgreSQL client-server protocol and standard PostgreSQL connectors.
- Automated backups, on-demand backups, and point-in-time recovery.

- Instance cloning.
- Integration with Google Cloud Observability logging and monitoring.
- Support for multiple PostgreSQL versions (/sql/docs/postgres/db-versions).
- Logical replication

Supported PostgreSQL extensions for Cloud SQL

Cloud SQL supports many PostgreSQL extensions. For a complete list of these extensions, see Configure PostgreSQL extensions (/sql/docs/postgres/extensions).

Supported PostgreSQL procedural languages for Cloud SQL

Cloud SQL supports the `PL/pgSQL` SQL procedural language (https://www.postgresql.org/docs/current/static/plpgsql.html).

Supported languages for Cloud SQL for PostgreSQL

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 PostgreSQL client-server protocol.

How you can connect to Cloud SQL for PostgreSQL instances

You can connect to a Cloud SQL instance from:

- A `psql` client. Learn more (/sql/docs/postgres/connect-admin-ip).
- Third-party tools that use the standard PostgreSQL client-server protocol.
- External applications. Learn more (/sql/docs/postgres/connect-external-app).
- App Engine applications. Learn more (/sql/docs/postgres/connect-app-engine).
- Applications running on Compute Engine. Learn more (/sql/docs/postgres/connect-compute-engine).
- Applications running on Google Kubernetes Engine. Learn more (/sql/docs/postgres/connect-kubernetes-engine).
- Cloud Run functions. Learn more (/sql/docs/postgres/connect-functions).
    - Cloud Run. Learn more (/sql/docs/mysql/connect-run).

Connecting to Cloud SQL with Private Google access isn't supported.

Differences between standard PostgreSQL and Cloud SQL for PostgreSQL

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

Unsupported features for Cloud SQL for PostgreSQL

- Any feature that requires `SUPERUSER` privileges with the following exceptions:
    - You can use the `CREATE EXTENSION` statement only for supported extensions (#extensions).
    - If you are assigned to the `cloudsqlsuperuser` role, then you can perform `CREATE CAST` and `DROP CAST` statements. For more information, see Superuser restrictions and privileges (/sql/docs/postgres/users#superuser-restrictions-and-privileges).

- The `WITHOUT FUNCTION` cast method.
- Custom background workers.
- The `psql` client in Cloud Shell doesn't support operations that require a reconnection, such as connecting to a different database using the `\c` command.
- Low-Level Virtual Machine (LLVM) Just-in-Time (JIT) compilation.

Notable differences between PostgreSQL and Cloud SQL for PostgreSQL

- Some PostgreSQL options and parameters aren't enabled for editing as Cloud SQL flags (/sql/docs/postgres/flags).

  To request the addition of a configurable Cloud SQL flag, use the Cloud SQL for PostgreSQL Forum (https://www.googlecloudcommunity.com/gc/forums/filteredbylabelpage/board-id/cloud-database/label-name/cloud%20sql%20for%20postgres) .

Last updated 2024-09-19 UTC.