Cloud SQL (https://cloud.google.com/sql/)
Documentation (https://cloud.google.com/sql/docs/)
MySQL (https://cloud.google.com/sql/docs/mysql/) Guides

Configuring external masters for first generation

MySQL | PostgreSQL
(https://cloud.google.com/sql/docs/postgres/replication/configure-external-master) | SQL Server

This page describes how to configure an external master that replicates to First Generation replicas.

An `External master` (or `Primary Server`) is a MySQL instance that is external to Cloud SQL and serves as the master (`primary`) First Generation instance. MySQL servers running on Compute Engine are considered to be external to Cloud SQL.

Note: For information about replicating from an external primary server to a Second Generation instance, see Replicating from an External Server (external master) (https://cloud.google.com/sql/docs/mysql/replication/replication-from-external).

Note: Second Generation is replacing First Generation; support for First Generation instances ends January 30, 2020. To upgrade a First Generation instance to Second Generation, see Upgrading a First Generation Instance to Second Generation (https://cloud.google.com/sql/docs/mysql/upgrade-2nd-gen).

About the external master configuration

The Cloud SQL `external master` configuration enables you to create a Cloud SQL First Generation instance that replicates from a master instance that is external to Cloud SQL. The Cloud SQL replica is not accessible to applications; it can be promoted to become a standalone First Generation instance, or it can serve as an up-to-date copy of the data on the master.

This configuration requires a Cloud SQL instance, called the internal master instance, which is shown in Cloud SQL as the master for the Cloud SQL replicas. The internal master instance and the external instance together make up the master instance for the Cloud SQL replica.

Google Cloud SQL

External Master

Internal Master Instance

Cloud SQL Replica

On-premises MySQL Server

Data

Customer site
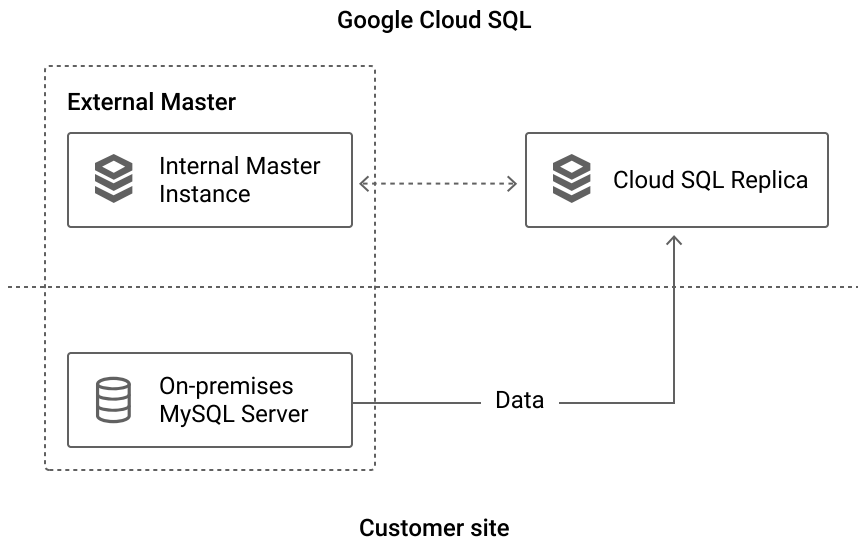
Data is replicated directly from the external master to the Cloud SQL replicas; the internal master instance is not involved with data replication. Although the internal master instance appears to be a standard Cloud SQL instance, you are not charged for the internal master instance. You cannot administer the internal master instance directly.

Before you begin

- You must have an external instance that meets the underlined requirements for an external master instance (#requirements).

- You must have the external IP address and port of the external master instance, and the username and password information for the replication user on the master instance.

- Enable the Cloud SQL Admin API.

  ENABLE THE API (HTTPS://CONSOLE.CLOUD.GOOGLE.COM/FLOWS/ENABLEAPI?APIID=SQLADMIN&

External master configuration requirements

- The internal master instance and the Cloud SQL replicas must be First Generation instances.

- The external master instance and the Cloud SQL replicas must use the same version of MySQL (5.5 or 5.6).

- Binary logging must be enabled on the external master. Learn more
  (https://dev.mysql.com/doc/refman/5.7/en/binary-log.html).

- The `server-id` option must be set to a value of 2 or larger. Learn more
  (https://dev.mysql.com/doc/refman/5.7/en/replication-options.html#option_mysqld_server-id).

- If the external master is on a Compute Engine instance, it must have an assigned public
  IP address.

- The external master must be accessible to public IP addresses.

- The dump file you create of the master, which will be used to provide a starting image for
  the internal master, must conform to the requirements for dump files for Cloud SQL. Learn
  more (https://cloud.google.com/sql/docs/mysql/import-export/creating-sqldump-csv#sqldump).

- You must configure a replication user account on the external master with the
  `REPLICATION SLAVE` privilege
  (https://dev.mysql.com/doc/refman/5.7/en/privileges-provided.html#priv_replication-slave).

Preparing the data

To prepare your data for use in an external master configuration you create a mysqldump file
containing the data from the master instance and upload the dump file to Cloud Storage.

1. Create a Cloud Storage bucket.

   You will use the bucket to hold your dump file for import into the replica. For more
   information, see Creating storage buckets
   (https://cloud.google.com/storage/docs/creating-buckets).

2. Create a mysqldump file from the master instance, following the external replication
   instructions in Creating a SQL dump file
   (https://cloud.google.com/sql/docs/mysql/import-export/creating-sqldump-csv#ext).

3. Upload the file to the Cloud Storage bucket.

   For more information, see Uploading data to a bucket
   (https://cloud.google.com/storage/docs/cloud-console#_uploadingdata).

Creating the external master configuration

1. Create the internal master instance, using the region where you want your replicas to reside and the external IP address and port of the external master instance:

```
gcloud auth login
ACCESS_TOKEN="$(gcloud auth print-access-token)"
curl --header "Authorization: Bearer ${ACCESS_TOKEN}" \
 --header 'Content-Type: application/json' \
 --data '{"name": "[INTERNAL_MASTER_INSTANCE_NAME]",
          "region": "[REGION_NAME]",
          "databaseVersion": "[EXTERNAL_MASTER_DATABASE_VERSION]",
          "onPremisesConfiguration": {"hostPort": "[IP_ADDRESS:PORT]"}}' \
 -X POST \
 https://www.googleapis.com/sql/v1beta4/projects/[PROJECT-ID]/instances
```

The internal master instance is created, with the IP address and port of the external master showing as its IP address.

2. After the internal master instance finishes initializing, create a replica, providing the replication user account information from the external master, and the location of the data you prepared previously:

```
curl --header "Authorization: Bearer ${ACCESS_TOKEN}" \
 --header 'Content-Type: application/json' \
 --data '{"replicaConfiguration":
          {"mysqlReplicaConfiguration":
            {"username": "[REPLICATION_USER]",
             "password": "[REPLICATION_USER_PASSWORD]",
             "dumpFilePath": "[BUCKET_LOCATION]",
             "caCertificate": "[SOURCE_SERVER_CA]",
             "clientCertificate": "[CLIENT_CERT]",
             "clientKey": "[PRIVATE_KEY]"}},
          "settings": {"tier": "[TIER]","activationPolicy": "ALWAYS"},
          "databaseVersion": "[EXTERNAL_MASTER_DATABASE_VERSION]",
          "masterInstanceName": "[INTERNAL_MASTER_INSTANCE_NAME]",
          "name": "[REPLICA_NAME]", "region": "[REGION_NAME]"}' \
 -X POST \
 https://www.googleapis.com/sql/v1beta4/projects/[PROJECT-ID]/instances
```

In the request body, the `dumpFile`, `username`, and `password` fields are mandatory. The `dumpFile` field is of the form `gs://bucket-location/filename`. You must use a First Generation tier, such as `D4`. For `databaseVersion`, provide the MySQL version of the

master instance: `MYSQL_5_5` or `MYSQL_5_6`. The `region` field must be the same as the master.

The SSL/TLS information is optional, but highly recommended for security.

When the replica is first created, it is behind the master, but replication should catch up over time if the replica is properly sized for the workload.

> ★ **Note:** Although the Cloud SQL replica is visible in the console, the console does not provide information about replication status for a First Generation replica with an external master instance.

3. (Optional) Repeat the previous step to create additional replicas.

4. If you have not configured your master instance to use SSL/TLS, you should, at a minimum, update your replication user to allow access only from the replicas. Learn more (https://cloud.google.com/sql/docs/mysql/users).

What's next

Learn about managing replicas (https://cloud.google.com/sql/docs/mysql/replication/manage-replicas).

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