

Create instances

[Release Notes](#)

[MySQL](#) | [PostgreSQL](#) (/sql/docs/postgres/create-instance) | [SQL Server](#) (/sql/docs/sqlserver/create-instance)

This page describes how to create a Cloud SQL for MySQL instance.

For detailed information about all instance settings, see [Instance settings](#) (/sql/docs/mysql/instance-settings).

A newly-created instance has four system databases:

- [information_schema](#) (<https://dev.mysql.com/doc/refman/8.0/en/information-schema.html>): Provides access to database metadata, information about the MySQL server.
- [mysql](#) (<https://dev.mysql.com/doc/refman/8.0/en/system-schema.html>): The system schema. It contains tables that store information required by the MySQL server as it runs.
- [performance_schema](#) (<https://dev.mysql.com/doc/refman/8.0/en/performance-schema.html>): A feature for monitoring MySQL Server execution at a low level.
- [sys](#) (<https://dev.mysql.com/doc/refman/8.0/en/sys-schema.html>): Contains a set of objects that helps DBAs and developers interpret data collected by the performance schema.

The maximum number of instances you can have in a single project depends on the [network architecture](#) (/sql/docs/mysql/upgrade-cloud-sql-instance-new-network-architecture#overview) of those instances:

- New SQL network architecture: You can have up to 1000 instances per project.
- Old SQL network architecture: You can have up to 100 instances per project.
- Using both architectures: Your limit will be somewhere between 100 and 1000, depending on the distribution of your instances across the two architectures.

[File a support case](#) (<https://support.google.com/googlecloud/answer/1041916>) to request an increase. Read replicas are counted as instances.

Note: This page contains features related to Cloud SQL editions. For more information about Cloud SQL editions, see [Introduction to Cloud SQL editions](#) (/sql/docs/mysql/editions-intro).

Before you begin

1. Start by creating a Google Cloud account. With this account, you get \$300 in free credits, plus free usage of over 20 products, up to monthly limits.

[Create an account](#) (<https://console.cloud.google.com/freetrial>)

2. In the Google Cloud console, on the project selector page, select or create a Google Cloud project.

Roles required to select or create a project

- **Select a project:** Selecting a project doesn't require a specific IAM role—you can select any project that you've been granted a role on.
- **Create a project:** To create a project, you need the Project Creator (`roles/resourcemanager.projectCreator`), which contains the `resourcemanager.projects.create` permission. [Learn how to grant roles](#) (/iam/docs/granting-changing-revoking-access).

 **Note:** If you don't plan to keep the resources that you create in this procedure, create a project instead of selecting an existing project. After you finish these steps, you can delete the project, removing all resources associated with the project.

[Go to project selector](#) (<https://console.cloud.google.com/projectselector2/home/dashboard>)

3. [Verify that billing is enabled for your Google Cloud project](#) (/billing/docs/how-to/verify-billing-enabled#confirm_billing_is_enabled_on_a_project).
4. [Install](#) (/sdk/docs/install) the [gcloud CLI](#) (/sdk/gcloud).
5. If you're using an external identity provider (IdP), you must first [sign in to the gcloud CLI with your federated identity](#) (/iam/docs/workforce-log-in-gcloud).
6. To [initialize](#) (/sdk/docs/initializing) the gcloud CLI, run the following command:

```
gcloud init
```

7. Make sure you have the Cloud SQL Admin and Compute Viewer roles on your user account.

[Go to the IAM page](https://console.cloud.google.com/iam-admin/iam) (<https://console.cloud.google.com/iam-admin/iam>)

[Learn more](/sql/docs/mysql/roles-and-permissions) (/sql/docs/mysql/roles-and-permissions) about roles and permissions.

Create a MySQL instance

Important: For your Cloud SQL Enterprise Plus edition instance, Cloud SQL can generate a write endpoint automatically. For more information about this endpoint, including requirements for generating one automatically, see [Generate the write endpoint](#) (#generate-write-endpoint).

Tip: If you plan on using private networking, then you can deploy both the private networking setup of your choice and the Cloud SQL instance along with clients such as Compute Engine VMs by using Terraform. For more information, see [Simplified Cloud Networking Configuration Solutions](#) (<https://github.com/GoogleCloudPlatform/cloudnetworking-config-solutions>).

[Console](#) [gcloud](#) (#gcloud) [Terraform](#) (#terraform) More ▾
(#console)

1. In the Google Cloud console, go to the **Cloud SQL Instances** page.

[Go to Cloud SQL Instances](#) (<https://console.cloud.google.com/sql>)

2. Click **Create instance**.
3. On the **Choose your database engine** panel of the **Create an instance** page, click **Choose MySQL**.
4. In the **Choose a Cloud SQL edition** section of the **Create a SQL Server instance** page, select the Cloud SQL edition for your instance: **Enterprise** or **Enterprise Plus**.

For more information about Cloud SQL editions, see [Introduction to Cloud SQL editions](#) (/sql/docs/mysql/editions-intro).

5. Select the edition preset for your instance. To see the available presets, click the **Edition preset** menu.

★ **Note:** To learn about how edition presets differ from one another, click [Compare edition presets](#).

6. In the **Instance info** section, select the database version for your instance. To see the available versions, click the **Database version** menu.

If you select MySQL 8.0 without a minor version, then automatic minor version upgrade is enabled for your instance. For more information about automatic minor version upgrade, see [Automatic upgrade](#) (/sql/docs/mysql/upgrade-minor-db-version#auto-upgrade).

7. Optional: If you're installing MySQL 8.0, then select **Show minor versions**. You can choose a minor version other than the default minor version. If you select a minor version for your instance, then automatic minor version upgrade is disabled for your instance.

The database version can't be edited after the instance has been created.

★ **Note:** Only MySQL 8.0.31 and later are compatible with Cloud SQL Enterprise Plus edition. By default, MySQL 8.4 is Cloud SQL Enterprise Plus edition.

8. In the **Instance ID** field of the **Instance info** pane, enter an ID for your instance.

! Don't include sensitive or personally identifiable information in your instance name.

You do not need to include the project ID in the instance name. This is done automatically where appropriate (for example, in the log files).

9. Set a password for the **root** user.

Although there's an option to set **No password**, this isn't recommended for security reasons.

To see the password in clear text, click the **Show password** icon.

You can either enter the password manually or click **Generate** to have Cloud SQL create a password for you automatically.

10. Optional: Configure a password policy for the instance as follows:

a. Select the **Enable password policies** checkbox.

★ Note: When you enable a password policy, statements that create users or change user passwords can cause additional latency due to password policy verification.

b. Click the **Set password policy** button, set one or more of the following options, and click **Save**.

- **Minimum length:** Specifies the minimum number of characters that the password must have.
- **Password complexity:** Checks if the password is a combination of lowercase, uppercase, numeric, and non-alphanumeric characters.
- **Restrict password reuse:** Specifies the number of previous passwords that you can't reuse.

Supported only on Cloud SQL for MySQL 8.0 and later.

- **Disallow username:** Prevents the use of the username in the password.

★ Note: When you deselect the **Enable password policies** checkbox, the password policy parameters are reset.

11. In the **Choose region and zonal availability** section, select the region and zone for your instance. Region availability might be different based on your Cloud SQL for MySQL edition. For more information, see [About instance settings](#) (/sql/docs/mysql/instance-settings).

Place your instance in the same region as the resources that access it. The region you select can't be modified in the future. In most cases, you don't need to specify a zone.

★ **Note:** If there is a resource location constraint on your organization policy, you must select one of the regions that the organization policy allows. You see a message about Resource Location Restriction in the **Choose region and zonal availability** section if a constraint exists. [Learn more](#) (/resource-manager/docs/organization-policy/defining-locations).

If you are configuring your instance for [high availability](#) (/sql/docs/mysql/high-availability), you can select both a primary and secondary zone.

The following conditions apply when the secondary zone is used during instance creation:

- The zones default to Any for the primary zone and Any (`different from primary`) for the secondary zone.
- If both the primary and secondary zones are specified, they must be distinct zones.

12. In the **Customize your instance** section, update settings for your instance. Begin by clicking **SHOW CONFIGURATION OPTIONS** to display the groups of settings. Then, expand the groups you want to review and customize settings. A **Summary** of all the options you select is shown on the right. Customizing these instance settings is optional. Defaults are assigned in every case where no customizations are made.

The following table is a quick reference to instance settings. For more details about each setting, see the [instance settings](#) (/sql/docs/mysql/instance-settings) page.

Setting	Notes
Machine type	
Machine type	Select from Shared core or Dedicated core. For Shared core, each machine type is classified by the number of CPUs (cores) and amount of memory for your instance.
Cores	The number of vCPUs for your instance. Learn more (/sql/docs/postgres/instance-settings#cpus-postgres).

Setting	Notes
Memory	The amount of memory for your instance, in GBs. Learn more (/sql/docs/postgres/instance-settings#memory-postgres).
Custom	For the Dedicated core machine type, instead of selecting a predefined configuration, select the Custom button to create an instance with a custom configuration. When you select this option, you need to select the number of cores and amount of memory for your instance. Learn more (/sql/docs/mysql/create-instance#machine-types).
Data cache	
Enable data cache	By default, the option to enable data cache is selected automatically for Cloud SQL for MySQL Enterprise Plus edition instances. If you don't want to enable data cache, then clear the Enable data cache checkbox. For more information about data cache, see data cache (/sql/docs/mysql/instance-settings#data-cache).
Storage	
Storage type	Determines whether your instance uses SSD or HDD storage. Learn more (/sql/docs/mysql/instance-settings#storage-type-2ndgen).
Storage capacity	The amount of storage provisioned for the instance. Learn more (/sql/docs/mysql/instance-settings#storage-capacity-2ndgen)
Enable automatic storage increases	Determines whether Cloud SQL automatically provides more storage for your instance when free space runs low. Learn more (/sql/docs/mysql/instance-settings#automatic-storage-increase-2ndgen)
Encryption	
Google-managed encryption	The default option.
Customer key-managed encryption key (CMEK)	Select to use your key with Google Cloud Key Management Service. Learn more (/sql/docs/mysql/cmek).

Setting	Notes
Connections	
Private IP	<p>Adds a private IP address for your instance. To enable connecting to the instance, additional configuration is required.</p> <p>Optionally, you can specify an allocated IP range for your instances to use for connections.</p> <ol style="list-style-type: none">Expand Show allocated IP range option.Select an IP range from the drop-down menu. <p>Your instance can have both a public and a private IP address.</p>
<p>★ Note: Cloud SQL generates a write endpoint automatically for your Cloud SQL Enterprise Plus edition instance if you do the following:</p> <ol style="list-style-type: none">If you haven't already enabled the Cloud DNS API, enable the Cloud DNS API (/sql/docs/mysql/configure-private-ip#connect-write-endpoint) for your Google Cloud project.Enable the Cloud DNS API (/sql/docs/mysql/configure-private-ip#connect-write-endpoint) for your Google Cloud project (if this API isn't enabled).Add a private IP address to the instance.Specify an associated network for the instance.Optionally, specify an allocated IP range for the instance. <ul style="list-style-type: none">Learn more about using private IP (/sql/docs/mysql/connect-overview#private-ip).Learn more about allocated IP address ranges (/sql/docs/mysql/private-ip#allocated_ip_address_ranges)	

Setting	Notes
Public IP	<p>Adds a public IP address for your instance. You can then add authorized networks to connect to the instance.</p> <p>Your instance can have both a public and a private IP address.</p> <p>Learn more about using public IP (/sql/docs/mysql/connect-overview#public_ip).</p>
Authorized networks	<p>Add the name for the new network and the Network address.</p> <p>Learn more (/sql/docs/postgres/authorize-networks#authorized-networks)</p> <p>.</p>
Private path for Google Cloud services	<p>By selecting this check box, you allow other Google Cloud services, such as BigQuery, to access data in Cloud SQL and make queries against this data over a private connection.</p> <p>★ Note: This check box is enabled only if you select the Private IP check box, and you add or select an authorized network to create a private connection.</p>
Enable Managed Connection Pooling	<p>By selecting this checkbox, you enable Managed Connection Pooling for your instance. Managed Connection Pooling lets you scale your workloads by optimizing resource utilization and connection latency Cloud SQL instances using pooling and multiplexing. For more information about Managed Connection Pooling, see Managed Connection Pooling overview (/sql/docs/mysql/managed-connection-pooling).</p>
Security	
Server certificate authority mode	<p>Choose the type of certificate authority (CA) that signs the server certificate for this Cloud SQL instance. Learn more (/sql/docs/mysql/authorize-ssl#certificate_authority_ca_hierarchies)</p> <p>.</p> <p>By default, when you create an instance in Google Cloud console, the instance uses the Google managed internal certificate authority (GOOGLE_MANAGED_INTERNAL_CA), which is the per-instance CA option.</p>

Setting	Notes
Data protection	
Backup tier	<p>The backup option (/sql/docs/mysql/backup-recovery/backup-options) of your instance. You can choose between enhanced backups (/sql/docs/mysql/backup-recovery/backup-options#enhanced-backups) and standard backups (/sql/docs/mysql/backup-recovery/backup-options#standard-backups)</p> <p>.</p>
Automate backups	<p>The window of time when you would like backups to start. Learn more (/sql/docs/mysql/instance-settings#backups-and-binary-logging-2ndgen)</p> <p>.</p>
Choose where to store your backups	Select Multi-region for most use cases. If you need to store backups in a specific region, for example, if there are regulatory reasons to do so, select Region and select your region from the Location drop-down menu.
Choose how many automated backups to store	The number of automated backups you would like to retain (from 1 to 365 days). Learn more (/sql/docs/mysql/instance-settings#backup-retention).
Enable point-in-time recovery	<p>Enables point-in-time recovery and write-ahead logging. Learn more (/sql/docs/mysql/instance-settings#backups-and-binary-logging-2ndgen)</p> <p>.</p>
<p>★ Note: The following default behavior applies:</p> <ul style="list-style-type: none"> If you create a Cloud SQL Enterprise Plus edition instance, then PITR is enabled by default, regardless of how the instance was created. If you create a Cloud SQL Enterprise edition instance in the Google Cloud console, then PITR is enabled by default. Otherwise, if you create the instance by using the gcloud CLI (/sdk/gcloud), Terraform, or the Cloud SQL Admin API, then PITR is disabled by default. In this 	

Setting	Notes
	case, if you want to use PITR, you must enable it manually.
Enable deletion protection	Determines whether to protect an instance against accidental deletion. Learn more (/sql/docs/mysql/deletion-protection).
Enable retained backups after instance deletion	Determines whether automated and on-demand backups are retained after an instance is deleted. Learn more (/sql/docs/mysql/backup-recovery/backups#retained-backups)
Choose how many days of logs to retain	Configure write-ahead log retention from 1 to 7 days. The default setting is 7 days. Learn more (/sql/docs/mysql/instance-settings#transaction-log-retention)
<hr/>	
Maintenance	
Preferred window	Determines a one-hour window when Cloud SQL can perform disruptive maintenance on your instance. If you do not set the window, then disruptive maintenance can be done at any time. Learn more (/sql/docs/mysql/instance-settings#maintenance-window-2ndgen)
Order of updates	Your preferred timing for instance updates, relative to other instances in the same project. Learn more (/sql/docs/mysql/instance-settings#maintenance-timing-2ndgen)
<hr/>	
Flags	
ADD FLAG	You can use database flags to control settings and parameters for your instance. Learn more (/sql/docs/mysql/flags).
<hr/>	
Labels	
<hr/>	

Setting	Notes
ADD LABEL	Add a key and value for each label that you add. You use labels to help organize your instances.

13. Click **Create Instance**.

Note: It might take a few minutes to create your instance. However, you can [view information about the instance](#) (/sql/docs/mysql/instance-info) while it's being created.

To see how the [underlying REST API request](#)

(/sql/docs/mysql/admin-api/rest/v1beta4/instances/insert) is constructed for this task, see the [APIs Explorer on the instances:insert page](#) (/sql/docs/mysql/admin-api/rest/v1beta4/instances/insert).

Generate the write endpoint

A write endpoint is a global domain name service (DNS) name that resolves to the IP address of the current primary instance automatically. This endpoint redirects incoming connections to the new primary instance automatically in case of a replica [failover or switchover](#) (/sql/docs/mysqlreplication/cross-region-replicas) operation. You can use the write endpoint in a SQL connection string instead of an IP address. By using a write endpoint, you can avoid having to make application connection changes when a region outage occurs.

For more information about using a write endpoint to connect to an instance, see [Connect to an instance using a write endpoint](#) (/sql/docs/mysql/connect-to-instance-using-write-endpoint).

Specify the database minor version for MySQL 8.0

You can specify the minor version of an existing MySQL 8.0 instance by using `gcloud` or the REST API.

`gcloudREST v1 (#rest-v1)REST v1beta4 (#rest-v1beta4)`
`(#gcloud)`

Use the `gcloud sql instances create` (/sdk/gcloud/reference/sql/instances/create) command with the `--database-version` flag.

Replace the following variables before running the command:

- *INSTANCE_NAME*: The name of the instance.
- *DATABASE_VERSION*: The database minor version of the instance: `MYSQL_8_0_18`, `MYSQL_8_0_26`, `MYSQL_8_0_27`, `MYSQL_8_0_28`, `MYSQL_8_0_29`, `MYSQL_8_0_30`, `MYSQL_8_0_31`, `MYSQL_8_0_32`, `MYSQL_8_0_33`, `MYSQL_8_0_34`, `MYSQL_8_0_35`, `MYSQL_8_0_36`, `MYSQL_8_0_37`, `MYSQL_8_0_39`, `MYSQL_8_0_40`, `MYSQL_8_0_41` (default minor version for MySQL 8.0), `MYSQL_8_0_42`, or `MYSQL_8_0_43`. If you specify `MYSQL_8_0`, the default minor version is used.

If you don't specify this flag, then the default major version, `MYSQL_8_0`, is used.

```
gcloud sql instances create INSTANCE_NAME \
--database-version=DATABASE_VERSION
```

For detailed information, see the documentation on [creating an instance by using gcloud](#) (/sql/docs/mysql/create-instance#gcloud).

Database minor version for read replicas, clones, and PITR

When [creating a read replica](#) (/sql/docs/mysql/replication/create-replica), you can specify the database minor version of the read replica. By default, new read replicas are created on the default minor version.

When [cloning an instance](#) (/sql/docs/mysql/clone-instance#cloning-an-instance), the newly created instance has that same minor version as that of the source.

When [performing a point-in-time recovery](#) (/sql/docs/mysql/backup-recovery/pitr#perform-pitr), the newly created instance has the same database minor version as that of the source.

Custom instance configurations

Determines memory and virtual cores available for your Cloud SQL instance. Machine types are part of a machine series, and machine series availability is determined by your Cloud SQL edition.

For Cloud SQL Enterprise Plus edition instances, Cloud SQL offers predefined machine types for your instances in the N2 and C4A machine series.

For Cloud SQL Enterprise edition instances, Cloud SQL offers the **general purpose shared core**, **general purpose dedicated core**, and the N4 machine series.

If you require real-time processing, such as online transaction processing (OLTP), make sure that your instance has enough memory to contain the entire working set. However, there are other factors that can impact memory requirements, such as number of active connections, and internal overhead processes. Perform load testing to avoid performance issues in your production environment.

When you configure your instance, select sufficient memory and vCPUs to handle your needs, and scale up your instance as your requirements increase. A machine configuration with insufficient vCPUs might lose its SLA coverage. For more information, see [Operational guidelines](#) (/sql/docs/mysql/operational-guidelines).

To learn more about the machine types and machine series available for your Cloud SQL instance, see [Machine series overview](#) (/sql/docs/mysql/machine-series-overview).

Tip: If you plan on using private networking, then you can deploy both the private networking setup of your choice and the Cloud SQL instance by using Terraform.

For more information, see [Cloud SQL Simplified Networking](#) (<https://github.com/GoogleCloudPlatform/terraform-google-cloudsqlnetworking>).

Troubleshoot

Issue	Troubleshooting
Error message: Failed to create subnetwork. Couldn't find free blocks in allocated IP ranges. Please allocate new ranges for this service provider.	<p>There are no more available address blocks in the allocated IP range. This can happen for several possible scenarios:</p> <ul style="list-style-type: none">The size of the allocated IP range is too large, for example, larger than /24.The size of the allocated IP range is too small for the number of Cloud SQL instances.

Issue	Troubleshooting
	<ul style="list-style-type: none"> The requirement on the size of IP ranges you can create in a single VPC network. See Allocate an IP range. <p>To resolve this issue, you can either allocate an additional IP range to your instance, or see Allocate an IP range.</p> <p>If you used the <code>--allocated-instance</code> flag when creating your instance, you may only expand the IP range allocated to that instance.</p> <p>If you're allocating a new range, try to avoid overlapping with existing allocations.</p> <p>After creating a new IP range, update the configuration of your instance to use it.</p>
	<pre>gcloud services vpc-peer --service=servicenetwork --ranges=OLD_RESERVED_RANGE --network=VPC_NETWORK --project=PROJECT_ID \ --force</pre>
	<p>If you're expanding an existing allocation, make sure to increase the range and not decrease it. For example, if trying to create a /23 range, then make the new allocation at /22.</p> <p>In general, if starting from a /24 range, you can't decrease the range by more than one bit (additional instance type). For example, if trying to create both /24 and /23 ranges, then starting from /24 to /23 is enough.</p> <p>After expanding an existing IP range, update the configuration of your instance to use it.</p>
	<pre>gcloud services vpc-peer --service=servicenetwork</pre>

Issue	Troubleshooting
	<pre>--ranges=RESERVED_RANGE_ --network=VPC_NETWORK --project=PROJECT_ID</pre>
Error message: Failed to create subnetwork. Router status is temporarily unavailable. Please try again later. Help Token: [token-ID].	Try to create the Cloud SQL instance temporarily unavailable. Please try again later. Help Token: [token-ID].
Error message: HTTPError 400: Invalid request: Incorrect Service Networking config for instance: PROJECT_ID:INSTANCE_NAME:SERVICE_NETWORKING_NOT_ENABLED.	Enable the Service Networking API (/service-infrastructure/docs/service-networking). Following command and try to create the Cloud SQL instance again.
Error message: Failed to create subnetwork. Required 'compute.projects.get' permission for PROJECT_ID.	When you create an instance using the Cloud SQL API, it's created just-in-time using the Service Networking API. If you haven't enabled the Service Networking API in your project, and the instance creation fails. It's because the Service Networking API needs to propagate throughout the system.
Error message: More than 3 subject alternative names are not allowed.	You're trying to use a custom Subject Alternative Name (SAN) certificate of a Cloud SQL instance.
Error message: Subject alternative names %s is too long. The maximum length is 253 characters.	Make sure that any DNS names that you want to use with your Cloud SQL instance don't have more than 253 characters.
Error message: Subject alternative name %s is invalid.	<p>Verify that the DNS names that you want to use with your Cloud SQL instance meet the following requirements:</p> <ul style="list-style-type: none"> They don't have wildcard characters. They don't have trailing dots. They meet RFC 1034 (https://datatracker.ietf.org/doc/html/rfc1034) specifications.

What's next

1. [Create a MySQL database on the instance](#) (/sql/docs/mysql/create-manage-databases).
2. [Create MySQL users on the instance](#) (/sql/docs/mysql/create-manage-users).
3. [Secure and control access to the instance](#) (/sql/docs/mysql/instance-access-control).
4. [Connect to the instance with a MySQL client](#) (/sql/docs/mysql/connect-admin-ip).
5. [Import data into the database](#) (/sql/docs/mysql/import-export).
6. [Learn about instance settings](#) (/sql/docs/mysql/instance-settings).

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