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

Instance settings

MySQL | PostgreSQL (https://cloud.google.com/sql/docs/postgres/instance-settings) | SQL Server (https://cloud.google.com/sql/docs/sqlserver/instance-settings)

This page provides information about all of the settings available for Cloud SQL instances, for both First Generation (#settings-1stgen) and Second Generation (#settings-2ndgen) instances.

Settings for Second Generation instances

Setting	Modifiable after creation?	Possible values
Instance ID (#instance-id-2ndgen)	N	Composed of lowercase letters, numbers, and hyphens; must start with a letter.
Region (#region-2ndgen)	N	**asia-east1** — Taiwan **asia-east2** — Hong Kong **asia-northeast1** — Tokyo **asia-northeast2** — Osaka **asia-south1** — Mumbai **asia-southeast1** — Singapore **australia-southeast1** — Sydney **europe-north1** — Finland **europe-west1** — Belgium **europe-west2** — London **europe-west3** — Frankfurt **europe-west4** — Netherlands **europe-west6** - Zürich **northamerica-northeast1** — Montréal **southamerica-east1** — São Paulo **us-central1** — Iowa **us-east1** — South Carolina **us-east4** — Northern Virginia

		`us-west1` — Oregon `us-west2` — Los Angeles
Zone (#zone-2ndgen)	Y	The possible values depend on the region.
Database version (#database-version- 2ndgen)	N	**MySQL 5.7** (default) **MySQL 5.6**
Private IP (#private-ip)	After it is configured, it cannot be disabled.	Configured or not.
Public IP (#public-ip)	Y	Enabled or disabled.
Authorized networks (#authorized-networks- 2ndgen)	Y	If Public IP is enabled, IP addresses authorized to connect to the instance. You can also specify this value as an IP address range, in CIDR notation (http://en.wikipedia.org/wiki/Classless_Inter- Domain_Routing#CIDR_notation) .

Machine type (Tier)
(#machine-type-2ndgen)
	Y	`db-f1-micro`
		`db-g1-small`
		`db-n1-standard-1`
		`db-n1-standard-2`
		`db-n1-standard-4`
		`db-n1-standard-8`
		`db-n1-standard-16`
		`db-n1-standard-32`
		`db-n1-standard-64`
		`db-n1-highmem-2`
		`db-n1-highmem-4`
		`db-n1-highmem-8`
		`db-n1-highmem-16`
		`db-n1-highmem-32`
		`db-n1-highmem-64`

Storage type (#storage-type-2ndgen)	N	**SSD** (default value) **HDD**
Storage capacity (#storage-capacity- 2ndgen)	Y (Increase only)	Standard and high memory machine types: up to 30,720 GB. Shared-core machine types (`db-f1-micro` and `db-g1-small`): up to 3062 GB.
Automatic storage	Y	**On** (default value)

increase (#automatic-storage-increase-2ndgen)		**Off**
Automatic storage increase limit (#automatic-storage-increase-limit-2ndgen)	Y	In GiBs. 0 (the default) means there is no limit.
Auto backups (#backups-and-binary-logging-2ndgen)	Y (see note (#v2-binlog-note))	**On** (default value) **Off**
Maintenance window (#maintenance-window-2ndgen)	Y	Day of the week, and hour.
Maintenance timing (#maintenance-timing-2ndgen)	Y	**Any** (default value) **Later** **Earlier**
Activation policy (#activation-policy-2ndgen)	Y	**ALWAYS** **NEVER**
Database flags (#mysql-flags-2ndgen)	Y	See Configuring Database Flags (https://cloud.google.com/sql/docs/mysql/flags).

Instance ID

The instance ID is the name of the instance. It is used to uniquely identify your instance within the project. Choose an instance name that is aligned with the purpose of the instance when possible.

The total length of `project-ID:instance-ID` must be 98 characters or less.

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).

You cannot reuse an instance name for up to a week after you have deleted the instance.

★ **Important:** You should be aware that some resource identifiers (such as project IDs) might be retained beyond the life of your project. For this reason, avoid storing sensitive information in resource identifiers.

[...see naming guidelines](#)

Region

The Google Cloud Platform region where your instance is located. To improve performance, keep your data close to the services that need it. For more information, see Instance Locations (https://cloud.google.com/sql/docs/mysql/instance-locations).

Zone

The Google Cloud Platform zone where your instance is located. If you are connecting from a Compute Engine instance, select the zone where the Compute Engine instance is located. Otherwise, you should accept the default zone. For more information, see Instance Locations (https://cloud.google.com/sql/docs/mysql/instance-locations).

Machine Type (Tier)

Determines memory, virtual cores, and other resources available to your Cloud SQL instance.

For performance-sensitive workloads such as online transaction processing (OLTP), a general rule of thumb is to 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. You should perform load testing to avoid performance issues in production.

Be sure to select a machine type that is sufficiently large for your workload, and upgrade as your workload increases. A machine type with insufficient CPUs could lose its SLA coverage. Learn more (https://cloud.google.com/sql/docs/mysql/operational-guidelines).

Your machine type affects the cost of your instance. For more information, see Instance Pricing (https://cloud.google.com/sql/pricing/#2nd-gen-instance-pricing). You can also see

pricing for various scenarios with the Pricing Calculator
(https://cloud.google.com/products/calculator/).

★ **Note:** The `db-f1-micro` and `db-g1-small` machine types are not included in the Cloud SQL SLA. These machine types are designed to provide low-cost test and development instances only. You should not use them for production instances.

Database version

Unless you need a capability provided only by a specific version, you should accept the default database version.

Storage type

Choosing **SSD**, the default value, provides your instance with SSD storage. SSDs provide lower latency and higher data throughput. If you do not need high-performance access to your data, for example for long-term storage or rarely accessed data, you can reduce your costs by choosing **HDD**.

Storage capacity

Choose a capacity to fit your database size. After you have created your instance, you can increase your storage capacity, but you cannot decrease it. The amount of storage capacity allocated for your instance affects the cost of your instance. For more information, see Storage and Networking Pricing
(https://cloud.google.com/sql/pricing#2nd-gen-storage-networking-prices).

★ **Note:** Setting your storage capacity too small without enabling automatic storage increase (#automatic-storage-increase-2ndgen) can cause your instance to lose its SLA. Learn more (https://cloud.google.com/sql/docs/mysql/operational-guidelines).

Automatic storage increase

If you enable this setting, Cloud SQL checks your available storage every 30 seconds. If the available storage falls below a threshold size, Cloud SQL automatically adds

additional storage capacity. If the available storage repeatedly falls below the threshold size, Cloud SQL continues to add storage until it reaches the maximum of 30 TB.

> ★ **Note:** You can increase storage size, but you cannot decrease it; the storage increases are permanent for the life of the instance. When you enable this setting, a spike in storage requirements can permanently increase storage costs (incrementally) for your instance. If an instance runs out of available space, it can cause the instance to go offline, and the Cloud SQL SLA (https://cloud.google.com/sql/sla) might not cover the outage. Learn more (https://cloud.google.com/sql/docs/mysql/operational-guidelines).

Threshold

The threshold size depends on the amount of storage currently provisioned for your instance; it cannot be larger than 25 GB.

For instances provisioned with 500 GB of storage (or more), the threshold is always 25 GB.

For instances provisioned with less than 500 GB of storage, this formula is used to calculate the threshold:

```
5 + (provisioned storage)/25
```

The result of the division is rounded down to the nearest whole number.

Threshold calculation for an instance with 66 GB storage capacity:

```
5 + (1/25th of 66 GB) = 5 + (66/25) = 5 + 2.6 -> 5 + 2 = 7 GB
```

Threshold calculation for an instance with 1000 GB storage capacity:

```
5 + (1/25th of 1000 GB) = 5 + (1000/25) = 5 + 40 = 45 -> maximum value of 25 GB
```

Amount of storage added

The amount of storage added to the instance is equal to the threshold size.

Automatic storage increase limit

If you enable the automatic storage increase setting (#automatic-storage-increase-2ndgen), you can provide a specific limit on how large the storage for your instance can automatically grow. You cannot decrease storage size, so this limit can prevent your instance size from growing unnecessarily large (due to a temporary increase in traffic). Keep in mind that when an instance becomes unable to add storage that it needs, the instance likely will stop accepting incoming connections and could go offline.

Setting this limit to zero, the default value, means that there is no limit (other than the maximum available storage for the instance tier).

Auto backups

These settings determine whether automated backups are performed and whether binary logging is enabled or not. Both options add a small performance cost, but are required for the creation of replicas and clones, and for point-in-time recovery.
For information about point-in-time recovery, see Overview of point-in-time recovery (https://cloud.google.com/sql/docs/mysql/backup-recovery/restore#tips-pitr). For information about replication, see Replication Options (https://cloud.google.com/sql/docs/mysql/replication/). For information about cloning instances, see Cloning Instances (https://cloud.google.com/sql/docs/mysql/clone-instance).

★ **Note:** Enabling or disabling binary logging causes the instance to be restarted. Existing database connections are closed and must be reopened.

Maintenance window

The day and hour when disruptive updates (updates that require an instance restart) to this Cloud SQL instance can be made. If the maintenance window is set for an instance, Cloud SQL does not initiate a disruptive update to that instance outside of the window. The update is not guaranteed to complete before the end of the maintenance window, but restarts typically complete within a couple of minutes.

★ **Note:** Disruptive updates can happen at any time, whether you specify a maintenance window or not, although they generally only occur every few months.

Read replicas do not support the maintenance window setting; they can experience a disruptive upgrade at any time.

Failover events do not occur during a maintenance window.

Maintenance timing

This setting lets you provide a preference about the relative timing of instance updates that require a restart. Receiving updates earlier lets you test your application with an update before your instances that get the update later.

The relative timing of updates is not observed between projects; if you have instances with an earlier timing setting in a different project than your instances with a later timing setting, Cloud SQL makes no attempt to update the instances with the earlier timing setting first.

If you do not set the Maintenance timing setting, Cloud SQL chooses the timing of updates to your instance (within its Maintenance window, if applicable).

The Maintenance timing setting does not affect the software version Cloud SQL applies to your instance.

Private IP

Configures your instance to use private IP. <u>Learn more</u> (https://cloud.google.com/sql/docs/mysql/private-ip).

Public IP

If enabled, your instance is allocated a public IPv4 address. When you disable Public IP, that address is released; you can reenable Public IP later, but you will receive a different IPv4 address. By default, the public IP address is blocked for all addresses. Use <u>Authorized networks</u> (#authorized-networks-2ndgen) to enable access.

Authorized networks

You can add specific IP addresses or ranges of addresses to open your instance to those addresses.

For information about configuring IP addresses, see Configuring IP connectivity (https://cloud.google.com/sql/docs/mysql/configure-ip).

Activation policy

For Second Generation instances, the activation policy is used only to start or stop the instance. You change the activation policy by starting and stopping the instance (https://cloud.google.com/sql/docs/mysql/start-stop-restart-instance). Stopping the instance prevents further instance charges.

Database flags

You can set specific database flags on the Cloud SQL instance.

For a complete list of the database flags you can set, see Configuring Database Flags (https://cloud.google.com/sql/docs/mysql/flags).

Settings for First Generation instances

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).

Setting	Modifiable after creation?	Possible values
Instance ID (#instance-id-1stgen)	N	Composed of lowercase letters, numbers, and hyphens; must start with a letter.
Region (#region-1stgen)	N	`asia-east1` — Taiwan `europe-west1` — Belgium

		`us-central` — Iowa `us-east1` — South Carolina
<u>Tier</u> (#tier-1stgen)	Y	D0 D1 D2 D4 D8 D16 D32
<u>Database version</u> (#database-version-1stgen)	N	**MySQL 5.5** **MySQL 5.6** (default value)
<u>Billing plan</u> (#billing-plan-1stgen)	Y	**Per Use** (default value) **Packages**
<u>Preferred location</u> (#preferred-location-1stgen)	Y	**Follow App Engine app** (default value) **Compute Engine zone** **No preference**
<u>Auto backups</u> (#backups-and-binary-logging-1stgen)	Y (see <u>note</u> (#v1-binlog-note))	**On** or **Off**
<u>Activation policy</u> (#activation-policy-1stgen)	Y	**On Demand** (default value) **Always On** **Off**
<u>File system replication</u> (#file-system-replication-1stgen)	Y	**Synchronous** (default value) **Asynchronous**
<u>IPv4 address</u> (#ipv4-address-1stgen)	Y	Checkbox
<u>Authorized networks</u> (#authorized-networks-1stgen)	Y	IP addresses or ranges of addresses, in <u>CIDR notation</u> (http://en.wikipedia.org/wiki/Classless_Inter-Domain_Routing#CIDR_notation) .
<u>Authorized App Engine applications</u>	Y	Application IDs

(#authorized-app-engine-applications-1stgen)		
Database flags (#mysql-flags-1stgen)	Y	See Configuring Database Flags (https://cloud.google.com/sql/docs/mysql/flags).

Instance ID

The instance ID is the name of the instance. It is used to uniquely identify your instance within the project. Choose an instance name that is aligned with the purpose of the instance when possible. Instance names must have 98 characters or less. 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).

You cannot reuse an instance name for up to a week after you have deleted the instance.

★ **Important:** You should be aware that some resource identifiers (such as project IDs) might be retained beyond the life of your project. For this reason, avoid storing sensitive information in resource identifiers.

...see naming guidelines

Region

The Google Cloud region where your instance is located. To improve performance, keep your data close to the services that need it. For more information, see Instance Locations (https://cloud.google.com/sql/docs/mysql/instance-locations).

Tier

Determines memory, virtual cores, and other resources available to your Cloud SQL instance. If possible, your largest table size should fit in memory. Your machine type affects the cost of your instance. For more information, see First Generation Pricing (https://cloud.google.com/sql/pricing#1st-gen-pricing).

Billing plan

Determines how charges are calculated for your instance. Instances with the Per Use plan are charged only while the instance is running, whereas instances with the Packages plan are charged per hour. For more information, see First Generation Pricing (https://cloud.google.com/sql/pricing#1st-gen-pricing). You can also see pricing for various scenarios with the Pricing Calculator (https://cloud.google.com/products/calculator/).

Database version

Unless you need a capability provided only by a specific version, you should accept the default database version.

Preferred location

If you are using your Cloud SQL instance to provide data to an application running in App Engine or in a Compute Engine instance, you can use this field to tell Cloud SQL about the connection. If there is a zonal outage and your instance is failed over to another zone, Cloud SQL attempts to keep the instance close to its application. For more information about building applications to meet your latency, availability and durability requirements, see Geography and Regions (https://cloud.google.com/docs/geography-and-regions#multi-regional_resources).

Auto backups

These settings determine whether backups are performed and whether binary logging is enabled or not. Both options add a small performance cost, but are required for the creation of replicas and clones, and for point-in-time recovery. For information about backups and point-in-time recovery, see Overview of point-in-time recovery (https://cloud.google.com/sql/docs/mysql/backup-recovery/restore#tips-pitr). For information about replication, see Replication Options (https://cloud.google.com/sql/docs/mysql/replication/). For information about cloning instances, see Cloning Instances (https://cloud.google.com/sql/docs/mysql/clone-instance).

★ **Note:** Enabling or disabling binary logging causes the instance to be restarted. Existing database connections are closed and must be reopened.

Activation policy

For First Generation instances with the Per Use billing plan, setting the activation policy to On Demand can reduce instance charges, depending on usage patterns. For more information about the activation policy, see the FAQ (https://cloud.google.com/sql/start-stop-restart-instance#activation_policy).

File system replication

You can choose the file system replication type for your instance. In most cases, the default value, **Synchronous**, is best. **Asynchronous** provides a slight performance gain, but if an outage occurs with this option set to Asynchronous, you can lose up to a few seconds of updates to your data.

File system replication is *not* the replication type used for data replication. See Replication options (https://cloud.google.com/sql/docs/mysql/replication/) for information about data replication.

IPv4 address

You can request an IPv4 address for your instance. IPv4 instances incur a small charge when the instance is not activated. If you can use IPv6, you can avoid the IPv4 charges. For information about configuring an IP address, see Configuring access for IP connections (https://cloud.google.com/sql/docs/mysql/connect-external-app#appaccessIP).

Authorized networks

You add specific IP addresses or ranges of addresses to enable applications or tools at those addresses to access the instance. For information about configuring IP addresses, see Configuring IP Access (https://cloud.google.com/sql/docs/mysql/configure-ip).

Authorized App Engine applications

You can authorize App Engine applications running in the standard environment to connect to the instance. By default, the App Engine application associated with the project is authorized to connect. For information about connecting from App Engine applications, see Connecting to Cloud SQL from App Engine (https://cloud.google.com/sql/docs/mysql/connect-app-engine).

Database flags

> You can set specific database flags on the Cloud SQL instance. For a complete list of the
> flags you can set, see Configuring Database Flags
> (https://cloud.google.com/sql/docs/mysql/flags).

Impact of changing instance settings

For most instance settings, Cloud SQL applies the change immediately and connectivity to the
instance is unaffected.

For First Generation instances, changing the instance size (tier) causes Cloud SQL to
automatically restart the instance. This means that connections to the instance are dropped,
and new connections cannot be made for the few moments that the instance is restarting. This
is typically not a problem for applications designed to deal with temporary disruptions to
database connectivity.

For Second Generation instances, changing either the machine type or the zone of the instance
results in the instance going offline for several minutes. You should plan to make these kind of
changes when your application can handle an outage of this length.

What's next

- Learn how to edit your instance (https://cloud.google.com/sql/docs/mysql/edit-instance).

- Learn more about database flags (https://cloud.google.com/sql/docs/mysql/flags).

- Learn how to authorize IP access for your instance
  (https://cloud.google.com/sql/docs/mysql/configure-ip).

- Learn more about replication options (https://cloud.google.com/sql/docs/replication/).

- See pricing (https://cloud.google.com/sql/docs/mysql/pricing) for your instance.

- Learn more about options for connecting to your instance
  (https://cloud.google.com/sql/docs/mysql/external-connection-methods).

- Learn how to configure an IP address for your instance
  (https://cloud.google.com/sql/docs/mysql/connect-external-app#appaccessIP).