Cloud Spanner - Database Fundamentals

Activate Cloud Shell

Cloud Shell is a virtual machine that is loaded with development tools. It offers a persistent 5GB home directory and runs on the Google Cloud. Cloud Shell provides command-line access to your Google Cloud resources.

1. Click **Activate Cloud Shell** at the top of the Google Cloud console.

2. Click through the following windows:

    - Continue through the Cloud Shell information window.
    - Authorize Cloud Shell to use your credentials to make Google Cloud API calls.

When you are connected, you are already authenticated, and the project is set to your **Project_ID**, `qwiklabs-gcp-00-cc2ff2653ef5`. The output contains a line that declares the **Project_ID** for this session:

```
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-cc2ff2653ef5
```

`gcloud` is the command-line tool for Google Cloud. It comes pre-installed on Cloud Shell and supports tab-completion.

3. (Optional) You can list the active account name with this command:

```
gcloud auth list
```

4. Click **Authorize**.

Output:

```
ACTIVE: *
ACCOUNT: student-01-a02127997a10@qwiklabs.net

To set the active account, run:
    $ gcloud config set account `ACCOUNT`
```

5. (Optional) You can list the project ID with this command:

```
gcloud config list project
```

Output:

```
[core]
project = qwiklabs-gcp-00-cc2ff2653ef5
```

Note: For full documentation of `gcloud`, in Google Cloud, refer to the gcloud CLI overview guide.

Task 1. Create an instance

6. The first step in using Cloud Spanner is to create an instance. An instance is an allocation of Google Cloud compute and storage resources. From the Console, open the navigation menu (☰) > **View All Products**.
   Under **Databases** section, click **Spanner**.

7. Accept any acknowledgement or information window that may appear.

8. Then click **Create a Provisioned Instance**.

9. Fill in the following fields, leave the remainder with the default values:

Item	Value
Select an edition	Enterprise
Instance Name	banking-instance
Select a configuration	`us-west1`
Configure compute capacity	Unit - Nodes // Quantity - 1

5. Click **Create**. Now you can see your instance on the Instance Details page. Here you have an overview of how the instance is performing, utilization, etc.. The next step is to create a database.

Task 2. Create a database

6. From the instance details page, click **Create database**.

7. For the database name, enter **banking-db**.

8. Skip the **Define your schema (optional)** step for now. You'll define your schema in the next section.

9. Click **Create**.

10. You're now on the **Overview** page for the new database you created. You can see that the page is similar to the Instance one, but the statistics refer to the specific database. Also note the new options on the left menu.

Task 3. Create a table in your database

1. On the Database Details page for your **banking-db** database, scroll down the page and click **Create table**.
2. Click the blue **+** icon to open the **Query** page, enter:

```
CREATE TABLE Customer (
  CustomerId STRING(36) NOT NULL,
  Name STRING(MAX) NOT NULL,
  Location STRING(MAX) NOT NULL,
) PRIMARY KEY (CustomerId);
```

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3. Click **Run**.

4. When the operation is complete, click **Overview** under **Database** in the left menu. Then scroll down to **Tables** and click **Customer** to see the schema details:

Task 4. Insert and modify data

The Cloud Console provides an interface for inserting, editing, and deleting data.

Insert data

1. While on the **Schema** page, click **Data** in the left menu. Then click **Insert**.

2. This takes you to the **Query** tab of the **Spanner Studio** automatically. Click **Clear Query**, paste the query below, and click **Run**:

```
INSERT INTO
  Customer (CustomerId,
    Name,
    Location)
VALUES
  ('bdaaaa97-1b4b-4e58-b4ad-84030de92235',
    'Richard Nelson',
```

```
    'Ada Ohio'
    );
```

3. The lower page of the screen shows the result. The **Customer** table now has one row.

4. Add a second row. Replace the previous statement with the following, and click **Run**:

```
INSERT INTO
  Customer (CustomerId,
    Name,
    Location)
VALUES
  ('b2b4002d-7813-4551-b83b-366ef95f9273',
    'Shana Underwood',
    'Ely Iowa'
    );
```

Run a query

1. You can execute a SQL statement on the query page of your database.

2. In the left pane of the Cloud Platform Console, click **Spanner Studio** to navigate to the Query UI window.

3. Click the blue + icon to open the **Query** page. Click **Clear Query**, paste the query below, and click Run:

```
SELECT * FROM Customer;
```

4. Click **Run**.

5. The Cloud Console displays the result of your query.

Task 5. Use the Google Cloud CLI with Cloud Spanner

The Cloud Console is very useful, but in some use cases you want to manage Spanner instances using other methods. Google Cloud services can also be managed through the command line tool named **gcloud**. The easiest way to use the **gcloud** CLI is via the Cloud Shell but it can also be installed on a wide variety of operating systems.

Create an instance with CLI

1. Creating a Spanner instance via **gcloud** is very simple. The core command is as follows:

```
gcloud spanner instances create [INSTANCE-ID] \
--config=[INSTANCE-CONFIG] \
--description="[INSTANCE-NAME]" \
--nodes=[NODE-COUNT]
```

2. In the Cloud Shell, create a new Cloud Spanner using the command below.

```
gcloud spanner instances create banking-instance-2 \
--config=regional-us-west1  \
--description="Banking Instance 2" \
--nodes=2
```

Listing instances

1. You can run the following command to list the Spanner instances available in your project.

```
gcloud spanner instances list
```

Creating a database

1. You can also create databases in a Spanner instance using **gcloud**.

2. In the Cloud Shell, create a new database using the command below.

```
gcloud spanner databases create banking-db-2 --instance=banking-instance-2
```

Modifying number of nodes

Remember that it is important to provision enough nodes to keep CPU utilization and storage utilization below the recommended maximum values. However, sometimes it is necessary to reduce the number of nodes.

1. You are now going to reduce the number of nodes of the instance **banking-instance-2** from two to one.

2. Use the following gcloud command to adjust the instance:

```
gcloud spanner instances update banking-instance-2 --nodes=1
```

3. After completion, check that the number of nodes has been reduced:

```
gcloud spanner instances list
```