

# Cloud Spanner - Database Fundamentals

GSP1048



- Cloud Spanner delivers globally consistent, horizontally scalable relational database for mission-critical workloads.
- Lab covers core administration: create instance/database/tables, insert/modify data, use gcloud CLI and automation tools.
- **Admin Tasks**
  - Instance Creation: Select regional/multi-region config, node count for processing/memory.
  - Database Setup: DDL for tables with interleaved hierarchies, primary keys.
- **Data Operations**
  - Insert/update via Console SQL editor or gcloud spanner databases execute-sql.
  - Cleanup: Delete instance to avoid charges.



Dashboard – qwiklabs-gcp-00-c38dbfce6c9f x +

https://console.cloud.google.com/home/dashboard?project=qwiklabs-gcp-00-c38dbfce6c9f&pli=1&cloudshell=true

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CLOUD SHELL Terminal (qwiklabs-gcp-00-c38dbfce6c9f) x + Open Editor

Welcome to Cloud Shell! Type "help" to get started, or type "gemini" to try prompting with Gemini CLI.  
Your Cloud Platform project in this session is set to **qwiklabs-gcp-00-c38dbfce6c9f**.  
Use `gcloud config set project [PROJECT\_ID]` to change to a different project.  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ gcloud auth list  
Credentials  
Account: student-02-72fc56229adc@qwiklabs.net  
  
ACTIVE: \*  
ACCOUNT: student-02-72fc56229adc@qwiklabs.net  
  
To set the active account, run:  
\$ gcloud config set account `ACCOUNT`  
  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ gcloud config list project  
[core]  
project = qwiklabs-gcp-00-c38dbfce6c9f  
  
Your active configuration is: [cloudshell-22018]  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$

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Lab setup instructions and requirements

Protect your account and

**End Lab**

01:27:35

? Time limit

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[Learn more.](#)**Open Google Cloud console**

Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## Task 1. Create an instance

1. 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**.
2. Accept any acknowledgement or information window that may appear.
3. Then click **Create a Provisioned Instance**.
4. 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-east1
Configure compute capacity	Unit - Nodes // Quantity - 1

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Username

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Password

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Project ID

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open the navigation menu (≡) > **View All Products**. Under **Databases** section, click **Spanner**.

2. Accept any acknowledgement or information window that may appear.
3. Then click **Create a Provisioned Instance**.
4. 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-east1
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.

Overview

0/100

Setup and requirements

Task 1. Create an instance

Task 2. Create a database

Task 3. Create a table in your database

Task 4. Insert and modify data

Task 5. Use the Google Cloud CLI with Cloud Spanner

Task 6. Use Automation Tools with Cloud Spanner

Task 7. Deleting instances

Congratulations!

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Instances – qwiklabs-gcp-00-c38dbfce6c9f +

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Experience Spanner free for 90 days with no commitment

Instance name \* Instance ID \*

! Required

Select a configuration \*

Create free instance

What's included

- ✓ 90 days free
- ✓ Enterprise edition
- ✓ 1/10th Node
- ✓ Up to 10 GB
- ✓ Pre-loaded sample dataset

\* Upgrade anytime during those 90 days to unlock additional functionality. You will not be charged unless you upgrade.

Ready for production?

Looking for more compute power, increased storage and additional functionality like geo-partitioning and multi-regional configurations in addition to what is offered in the free trial? Create a production resource to unlock all of Spanner's functionality.

Create provisioned instance

Features and benefits

https://console.cloud.google.com/spanner/instances/new?project=qwiklabs-gcp-00-c38dbfc...

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Create an instance

1 Select an edition

2 Name your instance

3 Configure your instance

4 Allocate compute capacity

Select an edition

A Spanner edition offers a tier-based model that provides different capabilities at different price points. Select an edition for your instance based on your needs. [Learn more](#)

Enterprise Plus The highest levels of availability, compliance, and governance for the most demanding workloads.

Enterprise Multi-model and advanced search capabilities with enhanced operational simplicity and efficiency.

Standard A comprehensive suite of established capabilities in single-region configuration.

[Compare Editions](#)

[Continue](#)

[Create](#) [Cancel](#)

Summary

Enterprise edition

Multi-model and advanced search capabilities with enhanced operational simplicity and efficiency

Pricing estimate

\$— per hour

(That's about \$— per day. Estimated, without discounts.) Some feature usage and traffic costs aren't included in estimate. Overall storage is up to 10TB per node.

[Show Breakdown](#)

Replicas --

Availability --

Maximum storage capacity --

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Create an instance

1 Select an edition Enterprise

2 Name your instance banking-instance

3 Configure your instance

4 Allocate compute capacity

Name your instance  
An instance has both a name and an ID. The name is for display purposes only. The ID is a permanent and unique identifier.

Instance name \* banking-instance

Instance ID \* banking-instance  
Lowercase letters, numbers, hyphens allowed

Back Continue

Summary

Enterprise edition  
Multi-model and advanced search capabilities with enhanced operational simplicity and efficiency

Pricing estimate  
\$— per hour  
(That's about \$— per day. Estimated, without discounts.)  
Some feature usage and traffic costs aren't included in estimate. Overall storage is up to 10TB per node.  
Show Breakdown

Replicas --

Availability --

Maximum storage capacity --

Create Cancel

Instances – qwiklabs-gcp-00-c38dbfce6c9f +

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Create an instance

1 Select an edition Enterprise

2 Name your instance banking-instance

3 Configure your instance us-east1 (South Carolina)

4 Allocate compute capacity

**Choose a configuration**

Determines location of nodes and data. A multi-region configuration provides higher availability and enables your application to achieve faster reads in multiple locations. Configuration choice affects cost, performance, and replication. [Learn more](#)

**Compare region configurations**

Regional 99.99% availability SLA, lower write latencies within region

Dual-region 99.999% availability SLA, from across two regions

Multi-region 99.999% availability SLA, from multi-geographic regions

Select a configuration \* us-east1 (South Carolina)

To add read-only replicas to this base configuration, create a new configuration with Cloud Shell. [Learn more](#)

Back Continue

**Create Cancel**

**Summary**

**Enterprise edition**

Multi-model and advanced search capabilities with enhanced operational simplicity and efficiency

**Pricing estimate**

\$1.27 per hour

(That's about \$30.48 per day. Estimated, without discounts.) Some feature usage and traffic costs aren't included in estimate. Overall storage is up to 10TB per node.

Show Breakdown

Replicas	3 read-write replicas in 3 separate zones within the region us-east1
Availability	99.99% availability SLA
Maximum storage capacity	10 TB
	<a href="#">Learn more</a>

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Create an instance

Select an edition Enterprise

Name your instance banking-instance

Configure your instance us-east1 (South Carolina)

Allocate compute capacity Manual allocation (nodes)

**Configure compute capacity**  
Your compute capacity determines the amount of data throughput, queries per second (QPS), and storage limits in your instance. Affects billing.

Select unit Choose a display unit. One node equals 1,000 processing units.

Nodes Select for large instances.

Processing units (PUs) Select for small, granular sized instances.

Choose a scaling mode

Manual allocation Set compute capacity for fixed compute resources and costs.

Quantity \* 1 Nodes

Autoscaling Let Spanner automatically add and remove compute capacity.

Backups

Enable default backup schedules All new databases in this instance are created with a backup schedule that creates full

**Summary**

Enterprise edition Multi-model and advanced search capabilities with enhanced operational simplicity and efficiency

**Pricing estimate**

\$1.27 per hour  
(That's about \$30.48 per day. Estimated, without discounts.)  
Some feature usage and traffic costs aren't included in estimate. Overall storage is up to 10TB per node.

Show Breakdown

Replicas	3 read-write replicas in 3 separate zones within the region us-east1
Availability	99.99% availability SLA
Maximum storage capacity	10 TB
	<a href="#">Learn more</a>

Create Cancel

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banking-instance – Overview -

https://console.cloud.google.com/spanner/instances/banking-instance/details/databases?project=qwiklabs-gcp-00-c38dbfce6c9f

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Spanner All instances > Instance banking-instance: Overview Edit instance Delete instance Open in Dataplex Learn Hide info panel

INSTANCE Overview Import/Export Backup/Restore Instance partitions ... OBSERVABILITY System insights Query insights Lock insights Transaction insights Hotspot insights Release Notes

banking-instance

Edition type Enterprise [Upgrade](#)

Instance ID banking-instance

Configuration us-east1 (South Carolina) [Show details](#)

Scaling mode Manual allocation

Default backup schedule Enabled

No databases selected

Please select at least one resource.

Instance summary

Statistics are updated every 3-5 minutes, which may cause some delay in actual data.

Compute capacity <a href="#">1000 PUs (1 node)</a>	CPU utilization (high) —	Operations Read: —/s Write: —/s	Throughput Read: —/s Write: —/s
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Databases [Create database](#) [Import my own data](#) [Explore datasets](#) [Refresh](#)

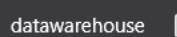
Filter databases

<input type="checkbox"/>	Name <a href="#">↑</a>	Dialect <a href="#">?</a>	CPU utilization	Size	Backup schedules	Version reten
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[Learn more.](#)[Open Google Cloud console](#)

Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## Task 2. Create a database

1. From the instance details page, click **Create database**.
2. For the database name, enter **banking-db**.
3. Skip the **Define your schema (optional)** step for now. You'll define your schema in the next section.
4. Click **Create**.
5. 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.
6. Click **Check my progress** to verify the objective.

Create an instance and database

[Check my progress](#)

Overview

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banking-instance – Overview - X +

https://console.cloud.google.com/spanner/instances/banking-instance/database/create?project=qwiklabs-gcp-00-c38dbfce6c9f

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Create a database in banking-instance

Name your database

Enter a permanent name for your database of at least two characters, starting with a letter.

Database name \* banking-db

Lowercase letters, numbers, hyphens, underscores allowed

Select database dialect

Choose between Google Standard SQL and PostgreSQL dialects for your Spanner database.

Google Standard SQL  PostgreSQL

Define your schema (optional)

Add Spanner Data Definition Language SQL statements below. Separate statements with a semicolon. [Learn more](#)

DDL templates ▾ Shortcuts

Press Alt+F1 for Accessibility Options.

Learn

Sample DDL statements

Spanner's DDL syntax is similar to standard SQL with some distinctions. DDL lets you manipulate databases, tables, and indexes, as well as change streams and fine-grained access controls (FGAC).

Schema and data model

Spanner relies on three core concepts to maximize the efficiency and performance of a database.

Schema updates

Spanner allows you to make schema updates with no downtime.

Data types

Spanner supports simple data types such as integers, as well as more complex types such as ARRAY and STRUCT.

Fine-grained access control

Spanner users that have IAM roles with Spanner admin permissions are able to set up fine-grained access control by creating and granting Spanner database roles that limit access to data for particular Spanner users.

Rest practices

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Spanner All instances > Instance banking-instance: Overview > Google Standard SQL Database banking-db: Overview Write DDL Delete database Open in Dataplex Hide info panel

**DATABASE**

- Overview
- Spanner Studio
- Import/Export
- Backup/Restore
- Operations
- Change streams

**OBSERVABILITY**

- System insights
- Query insights
- Lock insights
- Transaction insights
- Hotspot insights
- Key Visualizer
- Release Notes

**Overview**

Database Name: banking-db  
Database Dialect: Google Standard SQL  
Encryption type: Google-managed  
Scheduled backups: default\_daily\_full\_backup\_schedule  
Schema updates: No recent updates

**Summary**  
Statistics are updated every 3-5 minutes, which may cause some delay in actual data.

CPU utilization (mean)	Operations	Throughput	Total database storage
–	Read: –/s Write: –/s	Read: –/s Write: –/s	–

**Tables** Views

Tables are structured with rows, columns, and values, and they contain primary keys and indexes. Parent-child relationship between tables can be defined through table interleaving or foreign keys. [Learn more](#)

+ Create table

banking-db

Edit or delete roles below, or select "Add principal" to grant new access.

+ Add principal

Show inherited roles in table

Display roles inherited from the parent resources in the table below

Filter Enter property name or value

Role / Principal ↑ Inheritance

- ▶ Editor (2)
- ▶ Owner (3)
- ▶ Viewer (1)

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Summary

Statistics are updated every 3-5 minutes, which may cause some delay in actual data.

CPU utilization (mean)	Operations	Throughput	Total database storage
–	Read: –/s Write: –/s	Read: –/s Write: –/s	–

Tables Views

Tables are structured with rows, columns, and values, and they contain primary keys and indexes. Parent-child relationship between tables can be defined through table interleaving or foreign keys. [Learn more](#)

+ Create table

Filter Filter tables

Name ↑	Schema	Indexes	Interleaved in	Watched by	Table Size
No rows to display					

Show equivalent ddl

banking-db

Edit or delete roles below, or select "Add principal" to grant new access. Add principal

Show inherited roles in table Display roles inherited from the parent resources in the table below

Filter Enter property name or value

Role / Principal ↑	Inheritance
▶ Editor (2)	
▶ Owner (3)	
▶ Viewer (1)	

console.cloud.google.com/spanner/instances/.../query;showWriteDdlOptInBanner=true?proj... 6 16°C Sunny ENG IN 02:59 PM 09-01-2026

banking-db – Spanner Studio – X +

https://console.cloud.google.com/spanner/instances/banking-instance/databases/banking-db/details/query;showWriteDdlOptInBanner=true?pro... | 1

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All instances > Instance banking-instance: Overview > Google Standard SQL Database banking-db: Spanner Studio Open in Dataplex Learn

Explorer Untitled query Untitled query +

Run Save Format Clear Documentation Valid

Search

Schemas 3

Default

- Tables 0
- Change streams 0
- Views 0
- Models 0
- Graphs 0

INFORMATION\_SCHEMA

SPANNER\_SYS

Roles 3

Placements 1

Queries 0 Preview

Results Explanation

```
1 CREATE TABLE Customer (
2   CustomerId STRING(36) NOT NULL,
3   Name STRING(MAX) NOT NULL,
4   Location STRING(MAX) NOT NULL,
5 ) PRIMARY KEY (CustomerId);
```

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All instances > Instance banking-instance: Overview > Google Standard SQL Database banking-db: Spanner Studio Open in Dataplex Learn

Explorer Untitled query Run Save Format Clear Documentation

Search

Schemas 3

- Default
  - Tables 1
  - Change streams 0
  - Views 0
  - Models 0
  - Graphs 0
- INFORMATION\_SCHEMA
- SPANNER\_SYS
- Roles 3
- Placements 1

Queries 0 Preview

1 CREATE TABLE Customer (  
2   CustomerId STRING(36) NOT NULL,  
3   Name STRING(MAX) NOT NULL,  
4   Location STRING(MAX) NOT NULL,  
5 ) PRIMARY KEY (CustomerId);

Results Explanation ?

✓ Update completed  
To view more details, go to [Operations Page](#).  
To view all updates go to [Logging](#).

Low visibility Now

5

Search

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All instances > Instance banking-instance: Overview > Google Standard SQL Database banking-db: Spanner Studio Open in Dataplex Learn

Explorer Untitled query + Run Save Format Clear Documentation

Valid

Search

Schemas 3

- Default
  - Tables 1
    - Customer
      - Columns 3
        - CustomerId
        - Name
        - Location
      - Keys 1
      - Indexes 0

Results Explanation ?

Update completed  
To view more details, go to [Operations Page](#).  
To view all updates go to [Logging](#).

5 Low visibility Now

Search

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Protect your account and

**End Lab**

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? Time limit

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[Learn more.](#)

**Open Google Cloud console**

Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## 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'
  )
```

Overview

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Congratulations!

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Create and Manage Cloud Spanner

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Cloud Spanner - Database Fundamentals

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End Lab 01:14:14 Time limit

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Open Google Cloud console

Username: student-02-72fc56229adc

Password: ugPmJhKaSgY3

Project ID: qwiklabs-gcp-00-c38dbfce

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
```

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[Learn more.](#)

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## 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.

banking-db – Spanner Studio – X +

https://console.cloud.google.com/spanner/instances/banking-instance/databases/banking-db/details/query;showWriteDdlOptInBanner=true... Q | 1

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Explorer Untitled query Run Save Format Clear Documentation

Search Schemas 3 Default Tables 1 Customer Columns 3 Tr Custom... Tr Name Tr Location Keys 1 Indexes 0 Change streams 0 Views 0 Models 0 Graphs 0 INFORMATION\_SCHEMA SPANNER\_SYS Roles 3 Placements 1

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

Results Explanation ②

1 row inserted

This statement inserted 1 row and did not return any rows.

1 row inserted by your query X

Air: Poor Tomorrow

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Search Schemas 3 Default Tables 1 Customer Columns 3 Tr Custom... Tr Name Tr Location Keys 1 Indexes 0 Change streams 0 Views 0 Models 0 Graphs 0 INFORMATION\_SCHEMA SPANNER\_SYS Roles 3 Placements 1

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

Results Explanation ②

1 row inserted

This statement inserted 1 row and did not return any rows.

1 row inserted by your query X

Air: Poor Tomorrow

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https://console.cloud.google.com/spanner/instances/banking-instance/databases/banking-db/details/query;showWriteDdlOptInBanner=true... Q | 1

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Valid

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Schemas 3  
Default  
Tables 1  
Customer  
Columns 3  
CustomerId  
Name  
Location  
Keys 1  
Indexes 0  
Change streams 0  
Views 0  
Models 0  
Graphs 0  
INFORMATION\_SCHEMA  
SPANNER\_SYS  
Roles 3  
Placements 1

Run Explanation Export Rows per page: 30 1 – 2 of 2 < >

Customer  
"b2b4002d-7813-4551-b83b-366ef95f9273"  
"bdaaaa97-1b4b-4e58-b4ad-84030de92235"

Name  
"Shana Underwood"  
"Richard Nelson"

Location  
"Ely Iowa"  
"Ada Ohio"

1 row inserted by your query X

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Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## 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

- 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]
```

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

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Task 3. Create a table in your database

Task 4. Insert and modify data

Task 5. Use the Google Cloud CLI with Cloud Spanner

Task 6. Use Automation Tools with Cloud Spanner

Task 7. Deleting instances

Congratulations!







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Welcome to Cloud Shell! Type "help" to get started, or type "gemini" to try prompting with Gemini CLI.  
Your Cloud Platform project in this session is set to **qwiklabs-gcp-00-c38dbfce6c9f**.  
Use `gcloud config set project [PROJECT\_ID]` to change to a different project.  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ gcloud spanner instances create banking-instance-2 \  
--config=regional-us-east1 \  
--description="Banking Instance 2" \  
--nodes=2  
Creating instance...done.  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$

6 16°C Sunny

Search

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Welcome to Cloud Shell! Type "help" to get started, or type "gemini" to try prompting with Gemini CLI.  
Your Cloud Platform project in this session is set to **qwiklabs-gcp-00-c38dbfce6c9f**.  
Use `gcloud config set project [PROJECT\_ID]` to change to a different project.

```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances create banking-instance-2 \
--config=regional-us-east1 \
--description="Banking Instance 2" \
--nodes=2
Creating instance...done.
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances list
NAME: banking-instance
DISPLAY_NAME: banking-instance
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED

NAME: banking-instance-2
DISPLAY_NAME: Banking Instance 2
CONFIG: regional-us-east1
NODE_COUNT: 2
PROCESSING_UNITS: 2000
STATE: READY
INSTANCE_TYPE: PROVISIONED
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```

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```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner databases create banking-db-2 --instance=banking-instance-2
Creating database...done.
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```

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Instances Create instance + Create free instance View fleet health

Spanner is an always-on, globally consistent database with virtually unlimited scale. Build intelligent applications with a single database that brings together relational, graph, key-value, and search functionalities. The elimination of maintenance windows ensures uninterrupted service for mission-critical applications. [Learn more](#)

Filter Enter property name or value											?	☰
<input type="checkbox"/>	Name <span>↑</span>	ID	Edition	Configuration	Processing units	Nodes	Scaling mode	Storage utilization	Labels	Tags		
<input type="checkbox"/>	<a href="#">Banking Instance 2</a>	banking-instance-2	Standard	us-east1 (South Carolina)	2,000	2	Manual allocation	<div style="width: 100%;"><div style="width: 100%;"> </div></div> / 20 TB	<span>–</span>	<span>–</span>		
<input type="checkbox"/>	<a href="#">banking-instance</a>	banking-instance	Enterprise	us-east1 (South Carolina)	1,000	1	Manual allocation	<div style="width: 100%;"><div style="width: 100%;"> </div></div> 0 B / 10 TB	<span>–</span>	<span>–</span>		

banking-db – Spanner Studio – qwikl... banking-instance-2 – Overview + https://console.cloud.google.com/spanner/instances/banking-instance-2/details/databases?project=qwiklabs-gcp-00-c38dbfce6c9f | 1

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Spanner All instances > Instance banking-instance-2: Overview Edit instance Delete instance Open in Dataplex Learn Hide info panel

INSTANCE Overview Import/Export Backup/Restore Instance partitions ... OBSERVABILITY System insights Query insights Lock insights Transaction insights Hotspot insights

Banking Instance 2

Edition type Standard Upgrade

Instance ID banking-instance-2

Configuration us-east1 (South Carolina) Show details

Scaling mode Manual allocation

Default backup schedule

Instance summary Statistics are updated every 3-5 minutes, which may cause some delay in actual data.

Compute capacity 2000 PUs (2 nodes) CPU utilization (high) Operations Throughput

Read: -/s Read: -/s

Write: -/s Write: -/s

Databases Create database Import my own data Explore datasets Refresh

Filter databases

Name	Dialect	CPU utilization	Size	Backup schedules	Versio...
banking-db-2	Google Standard SQL	-	-	-	1 hour

banking-db-2

Edit or delete roles below, or select "Add principal" to grant new access. Add principal

Show inherited roles in table Display roles inherited from the parent resources in the table below

Filter Enter property name or value

Role / Principal Inheritance

Editor (2)

Owner (3)

Viewer (1)

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DATABASE

- Overview
- Spanner Studio
- Import/Export
- Backup/Restore
- Operations
- Change streams

OBSERVABILITY

- System insights
- Query insights
- Lock insights
- Transaction insights
- Hotspot insights
- Key Visualizer
- Release Notes

Overview

Database Name: banking-db-2  
Database Dialect: Google Standard SQL  
Encryption type: Google-managed  
Scheduled backups: default\_daily\_full\_backup\_schedule  
Schema updates: No recent updates

Summary

Statistics are updated every 3-5 minutes, which may cause some delay in actual data.

CPU utilization (mean)	Operations	Throughput	Total database storage
—	Read: —/s Write: —/s	Read: —/s Write: —/s	—

Tables Views

Tables are structured with rows, columns, and values, and they contain primary keys and indexes. Parent-child relationship between tables can be defined through table interleaving or foreign keys. [Learn more](#)

+ Create table

banking-db-2

Edit or delete roles below, or select "Add principal" to grant new access. [Add principal](#)

Show inherited roles in table  
Display roles inherited from the parent resources in the table below

Filter Enter property name or value

Role / Principal	Inheritance
▶ Editor (2)	
▶ Owner (3)	
▶ Viewer (1)	

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Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## 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
```

## Task 6. Use Automation

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Congratulations!



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```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances update banking-instance-2 --node-count=1
Updating instance...done.
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances list
NAME: banking-instance
DISPLAY_NAME: banking-instance
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED

NAME: banking-instance-2
DISPLAY_NAME: Banking Instance 2
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```



Create and Manage Cloud Spanner

https://partner.skills.google/course\_templates/643/labs/612217

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Cloud Spanner - Database Fundamentals

Verify Terraform installation

Lab setup instructions and requirements

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End Lab 01:06:28 Time limit

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Open Google Cloud console

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Password: ugPmJhKaSgY3

Project ID: qwiklabs-gcp-00-c38dbfce

Overview 100/100

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Task 7. Deleting instances

Congratulations!

Contents Cloud Spanner - Database Fundamentals

terraform -version

Terraform v1.5.6 on linux\_amd64

Note: You may safely ignore any warning about the version of Terraform being out of date.

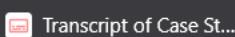
Create Terraform Configuration

Previous Next

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Open Google Cloud console

Username

student-02-72fc56229adc



Password

ugPmJhKaSgY3



Project ID

qwiklabs-gcp-00-c38dbfce



## Create Terraform Configuration

1. In the cloud shell enter the following command to invoke the **Nano** text editor and create a new empty configuration file named **spanner.tf**.

nano spanner.tf



2. In the **Nano** editor, paste the code block listed below.

```
resource "google_spanner_instance" "banking-instance-3" {  
    name        = "banking-instance-3"  
    config      = "regional-us-east1"  
    display_name = "Banking Instance 3"  
    num_nodes   = 2  
    labels      = {}  
}
```



3. Press **Ctrl+X** to exit Nano, **Y** to confirm the update, and press **Enter** to save your changes.

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Task 7. Deleting instances

Congratulations!



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student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ nano spanner.tf

student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$

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GNU nano 7.2 spanner.tf \*

```
resource "google_spanner_instance" "banking-instance-3" {
  name        = "banking-instance-3"
  config      = "regional-us-east1"
  display_name = "Banking Instance 3"
  num_nodes   = 2
  labels      = {}
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark  
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy

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```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ terraform init
```

**Initializing the backend...**

**Initializing provider plugins...**

- Finding latest version of hashicorp/google...
- Installing hashicorp/google v7.15.0...
- Installed hashicorp/google v7.15.0 (signed by HashiCorp)

Terraform has created a lock file **.terraform.lock.hcl** to record the provider selections it made above. Include this file in your version control repository so that Terraform can guarantee to make the same selections by default when you run "terraform init" in the future.

**Terraform has been successfully initialized!**

You may now begin working with Terraform. Try running "terraform plan" to see any changes that are required for your infrastructure. All Terraform commands should now work.

If you ever set or change modules or backend configuration for Terraform, rerun this command to reinitialize your working directory. If you forget, other commands will detect it and remind you to do so if necessary.

```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```

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commands will detect it and remind you to do so if necessary.  
student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ terraform plan

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:

+ create

Terraform will perform the following actions:

```
# google_spanner_instance.banking-instance-3 will be created
+ resource "google_spanner_instance" "banking-instance-3" {
    + config                      = "regional-us-east1"
    + default_backup_schedule_type = (known after apply)
    + display_name                = "Banking Instance 3"
    + edition                     = (known after apply)
    + effective_labels            = {
        + "goog-terraform-provisioned" = "true"
    }
    + force_destroy               = false
    + id                          = (known after apply)
    + instance_type               = (known after apply)
    + name                        = "banking-instance-3"
    + num_nodes                   = 2
    + processing_units            = (known after apply)
    + project                     = "qwiklabs-gcp-00-c38dbfce6c9f"
```

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```
+ display_name = "Banking Instance 3"
+ edition = (known after apply)
+ effective_labels = {
    + "goog-terraform-provisioned" = "true"
}
+ force_destroy = false
+ id = (known after apply)
+ instance_type = (known after apply)
+ name = "banking-instance-3"
+ num_nodes = 2
+ processing_units = (known after apply)
+ project = "qwiklabs-gcp-00-c38dbfce6c9f"
+ state = (known after apply)
+ terraform_labels = {
    + "goog-terraform-provisioned" = "true"
}
```

Plan: 1 to add, 0 to change, 0 to destroy.

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.

student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f) \$

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student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)\$ terraform apply

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:

+ create

Terraform will perform the following actions:

```
# google_spanner_instance.banking-instance-3 will be created
+ resource "google_spanner_instance" "banking-instance-3" {
    + config
        = "regional-us-east1"
    + default_backup_schedule_type
        = (known after apply)
    + display_name
        = "Banking Instance 3"
    + edition
        = (known after apply)
    + effective_labels
        = {
            + "goog-terraform-provisioned" = "true"
        }
    + force_destroy
        = false
    + id
        = (known after apply)
    + instance_type
        = (known after apply)
    + name
        = "banking-instance-3"
    + num_nodes
        = 2
    + processing_units
        = (known after apply)
    + project
        = "qwiklabs-gcp-00-c38dbfce6c9f"
    + state
        = (known after apply)
}
```

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https://console.cloud.google.com/spanner/instances/banking-instance/databases/banking-db/details/query;showWriteDdlOptInBanner=true?pro... | 3

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```
+ instance_type = (known after apply)
+ name = "banking-instance-3"
+ num_nodes = 2
+ processing_units = (known after apply)
+ project = "qwiklabs-gcp-00-c38dbfce6c9f"
+ state = (known after apply)
+ terraform_labels = {
    + "goog-terraform-provisioned" = "true"
}
}
```

**Plan:** 1 to add, 0 to change, 0 to destroy.

**Do you want to perform these actions?**  
Terraform will perform the actions described above.  
Only 'yes' will be accepted to approve.

**Enter a value:** yes

```
google_spanner_instance.banking-instance-3: Creating...
google_spanner_instance.banking-instance-3: Still creating... [10s elapsed]
google_spanner_instance.banking-instance-3: Creation complete after 15s [id=qwiklabs-gcp-00-c38dbfce6c9f/banking-instance-3]
```

**Apply complete! Resources: 1 added, 0 changed, 0 destroyed.**

student\_02\_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f) \$

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```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances list
NAME: banking-instance
DISPLAY_NAME: banking-instance
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED

NAME: banking-instance-2
DISPLAY_NAME: Banking Instance 2
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED

NAME: banking-instance-3
DISPLAY_NAME: Banking Instance 3
CONFIG: regional-us-east1
NODE_COUNT: 2
PROCESSING_UNITS: 2000
STATE: READY
INSTANCE_TYPE: PROVISIONED
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```

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```
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances delete banking-instance-2
Delete instance [banking-instance-2]. Are you sure?

Do you want to continue (Y/n)? Y

student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$ gcloud spanner instances list
NAME: banking-instance
DISPLAY_NAME: banking-instance
CONFIG: regional-us-east1
NODE_COUNT: 1
PROCESSING_UNITS: 1000
STATE: READY
INSTANCE_TYPE: PROVISIONED

NAME: banking-instance-3
DISPLAY_NAME: Banking Instance 3
CONFIG: regional-us-east1
NODE_COUNT: 2
PROCESSING_UNITS: 2000
STATE: READY
INSTANCE_TYPE: PROVISIONED
student_02_72fc56229adc@cloudshell:~ (qwiklabs-gcp-00-c38dbfce6c9f)$
```

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