Create and Manage Cloud SQL for PostgreSQL Instances: Challenge Lab

Task 1. Migrate a stand-alone PostgreSQL database to a Cloud SQL for PostgreSQL instance

In this task you must migrate the stand-alone PostgreSQL orders database running on the postgres-vm virtual machine to a Cloud SQL for PostgreSQL instance using a Database Migration Services continuous migration job and VPC Peering connectivity.

Prepare the stand-alone PostgreSQL database for migration

In this sub-task you must prepare the stand-alone PostgreSQL database so that it satisfies the requirements for migration by Database Migration Services.

To complete this sub-task you must complete the following steps:

1. Enable the Google Cloud APIs required for Database Migration Services.

Database Migration Services require the **Database Migration API** and the **Service Networking API** to be enabled in order to function. You must enable these APIs for your project.

2. Upgrade the target databases on the postgres-vm virtual machine with the pglogical database extension.

3. You must install and configure the **pglogical** database extension on the stand-alone PostgreSQL database on the postgres-vm Compute Instance VM. The pglogical database extension package that you must install is named postgresql-13-pglogical.

4. To complete the configuration of the **pglogical** database extension you must edit the PostgreSQL configuration file /etc/postgresql/13/main/postgresql.conf to enable the **pglogical** database extension and you must edit the /etc/postgresql/13/main/pg_hba.conf to allow access from all hosts.

5. Create a dedicated user for database migration on the stand-alone database.

6. The new user that you create on the stand-alone PostgreSQL installation on the postgres-vm virtual machine must be configured using the following user name and password:

- **Migration user name** : Postgres Migration User

- **Migration user password** : DMS_1s_cool!

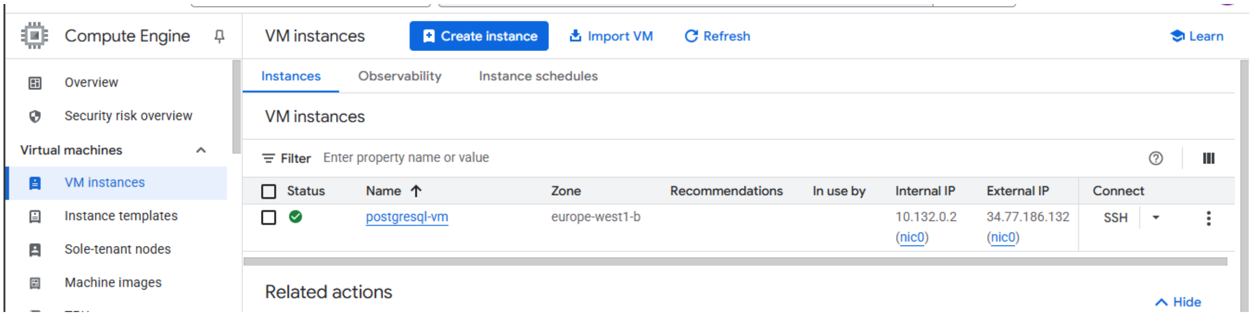
7. Grant that user the required privileges and permissions for databases to be migrated.

Database Migration Services require that the migration user has privileges to specific schemata and relations of the target databases for migration, in this case that is the orders database.

The Database Migration Service requires all tables to be migrated to have a primary key.

8. You must make sure that all of the tables in the orders database have a primary key set before you start the migration.

- distribution_centers
- inventory_items
- order_items
- products
- users



□	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
□	✓	postgresql-vm	europe-west1-b			10.132.0.2 (nic0)	34.77.186.132 (nic0)	SSH

Migrate the stand-alone PostgreSQL database to a Cloud SQL for PostgreSQL instance

In this sub-task you must perform the migration using Database Migration Services.

To complete this sub-task you must complete the following steps:

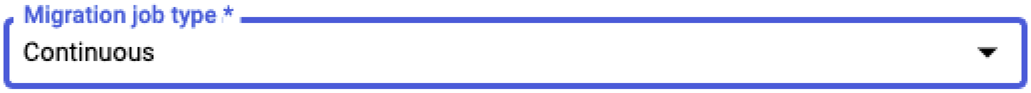
1. Create a new Database Migration Service connection profile for the stand-alone PostgreSQL database, using the credentials of the Postgres Migration User migration user you created earlier.

- **Username** : Postgres Migration User
- **Password** : DMS_1s_cool!

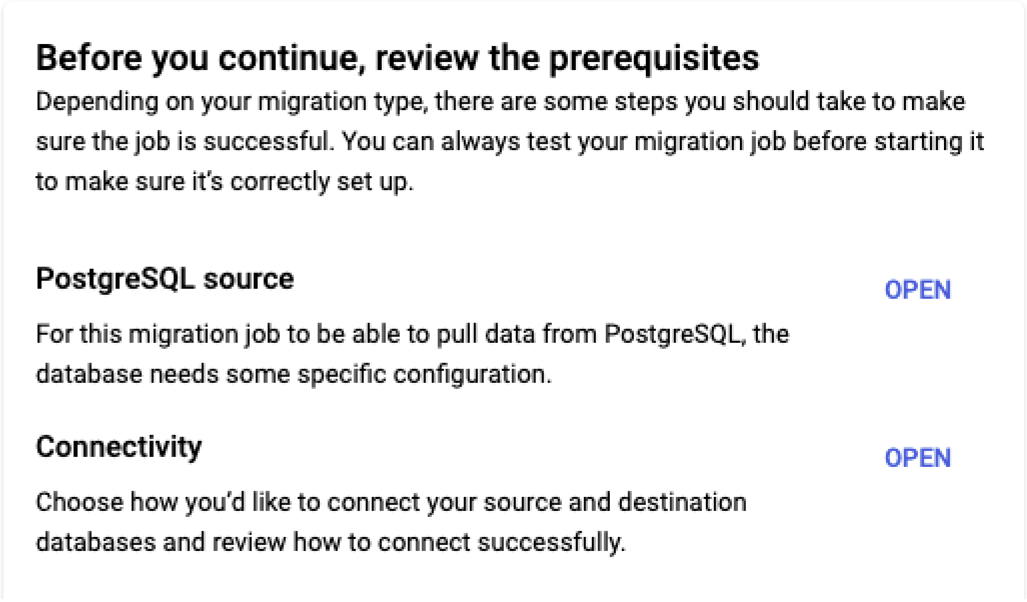
- **Region** must be set to REGION

2. You must configure the connection profile using the internal ip-address of the source compute instance.
3. Create a new continuous Database Migration Service job.

As part of the migration job configuration, make sure that you specify the following properties for the destination Cloud SQL instance:



Migration job type *
Continuous



Before you continue, review the prerequisites

Depending on your migration type, there are some steps you should take to make sure the job is successful. You can always test your migration job before starting it to make sure it's correctly set up.

PostgreSQL source OPEN

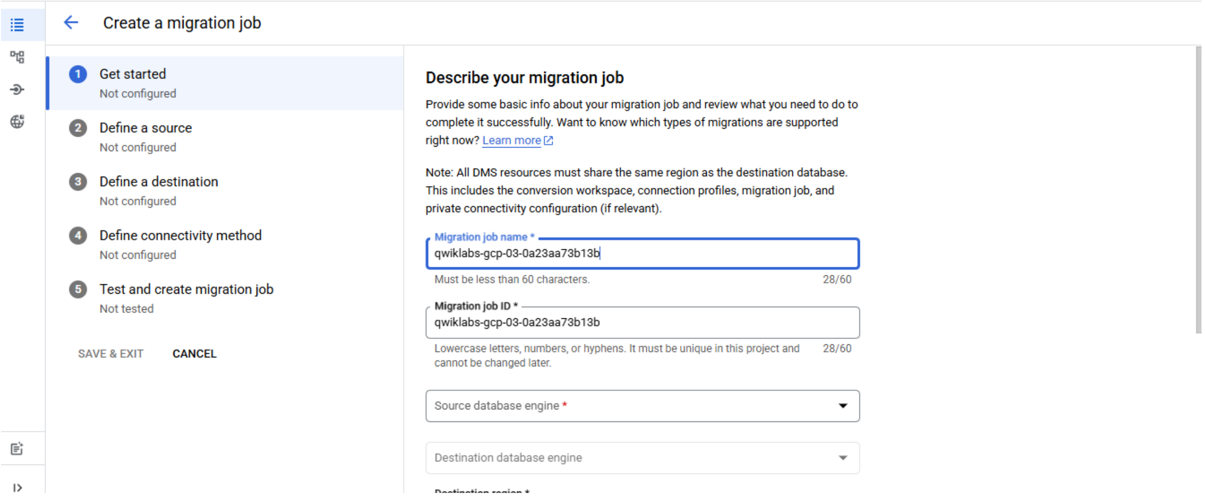
For this migration job to be able to pull data from PostgreSQL, the database needs some specific configuration.

Connectivity OPEN

Choose how you'd like to connect your source and destination databases and review how to connect successfully.

- The **Destination Instance ID** must be set to Migrated Cloud SQL for PostgreSQL Instance ID
- The **Password** for the migrated instance must be set to supersecret!
- **Database version** must be set to **Cloud SQL for PostgreSQL 13**
- **Region** must be set to REGION
- For **Connections** both **Public IP** and **Private IP** must be set.
- For Private IP use an automatically allocated IP range.
- Select **Enterprise** Cloud SQL edition.
- Select a dedicated core machine shapes with 2 vCPU and 8GB of memory.

- For the **Connectivity Method**, you must use **VPC peering** with the **default** VPC network.
- Test and then start the continuous migration job.



Create a migration job

1. Get started
   Not configured
2. Define a source
   Not configured
3. Define a destination
   Not configured
4. Define connectivity method
   Not configured
5. Test and create migration job
   Not tested

SAVE & EXIT   CANCEL

Describe your migration job

Provide some basic info about your migration job and review what you need to do to complete it successfully. Want to know which types of migrations are supported right now? Learn more

Note: All DMS resources must share the same region as the destination database. This includes the conversion workspace, connection profiles, migration job, and private connectivity configuration (if relevant).

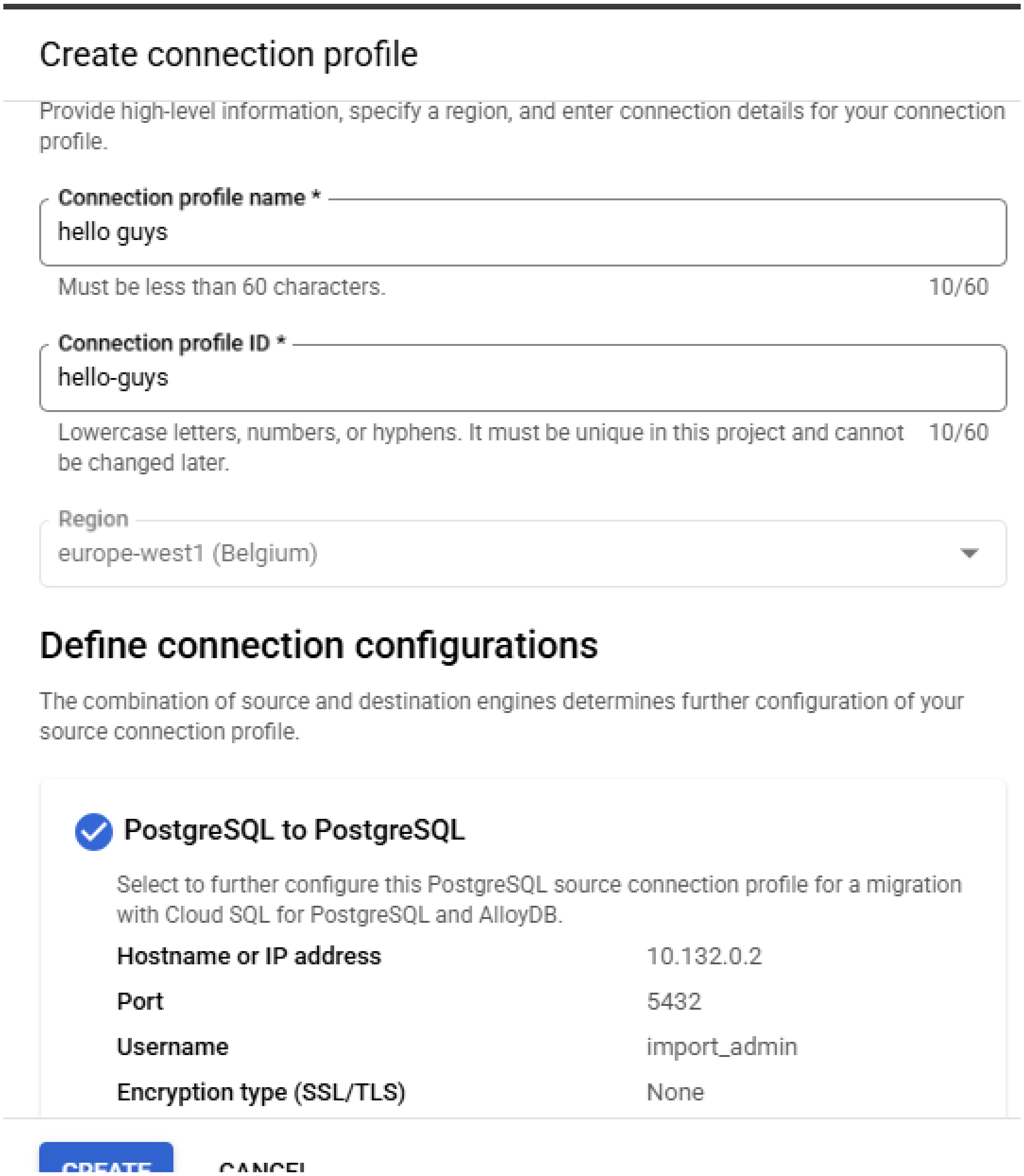
Migration job name *: qwiklabs-gcp-03-0a23aa73b13b
Must be less than 60 characters. 28/60

Migration job ID *: qwiklabs-gcp-03-0a23aa73b13b
Lowercase letters, numbers, or hyphens. It must be unique in this project and cannot be changed later. 28/60

Source database engine *

Destination database engine

-



Create connection profile

Provide high-level information, specify a region, and enter connection details for your connection profile.

Connection profile name *
hello guys
Must be less than 60 characters. 10/60

Connection profile ID *
hello-guys
Lowercase letters, numbers, or hyphens. It must be unique in this project and cannot be changed later. 10/60

Region
europe-west1 (Belgium)

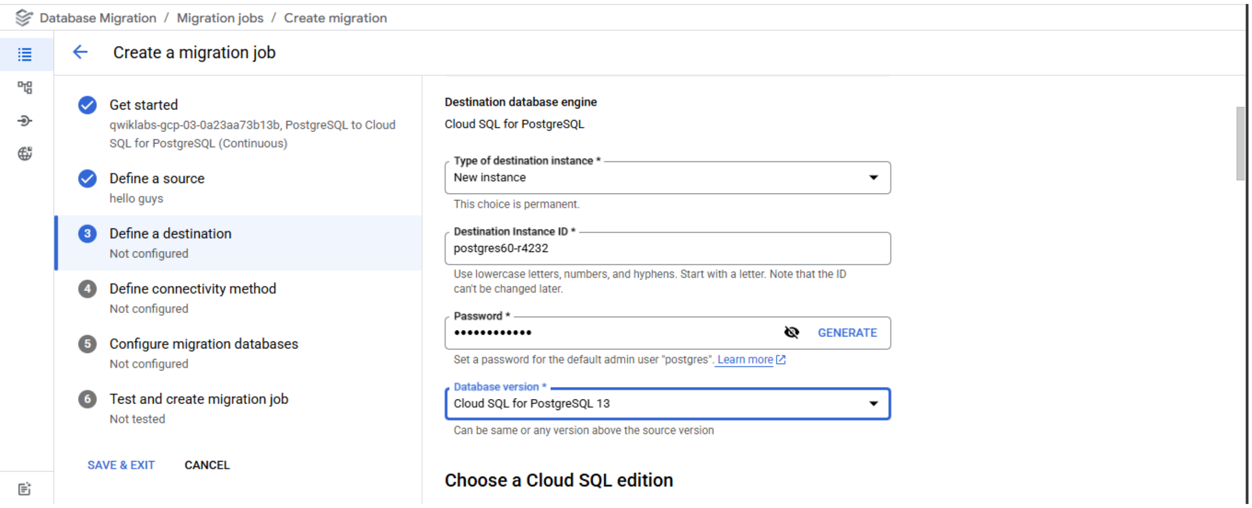
Define connection configurations

The combination of source and destination engines determines further configuration of your source connection profile.

✓ PostgreSQL to PostgreSQL

Select to further configure this PostgreSQL source connection profile for a migration with Cloud SQL for PostgreSQL and AlloyDB.

Hostname or IP address	10.132.0.2
Port	5432
Username	import_admin
Encryption type (SSL/TLS)	None



Database Migration / Migration jobs / Create migration

Create a migration job

- Get started
  qwiklabs-gcp-03-0a23aa73b13b, PostgreSQL to Cloud SQL for PostgreSQL (Continuous)
- Define a source
  hello guys
- 3 Define a destination
  Not configured
- 4 Define connectivity method
  Not configured
- 5 Configure migration databases
  Not configured
- 6 Test and create migration job
  Not tested

SAVE & EXIT CANCEL

Destination database engine
Cloud SQL for PostgreSQL

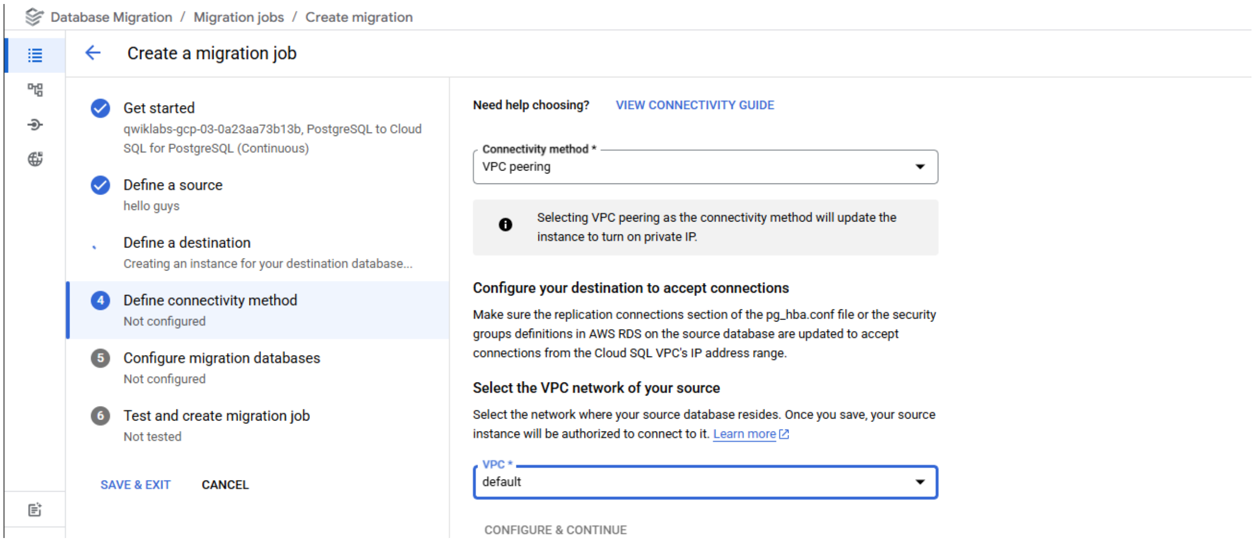
Type of destination instance *
New instance
This choice is permanent.

Destination Instance ID *
postgres60-r4232
Use lowercase letters, numbers, and hyphens. Start with a letter. Note that the ID can't be changed later.

Password *
••••••••••••
GENERATE
Set a password for the default admin user "postgres". Learn more

Database version *
Cloud SQL for PostgreSQL 13
Can be same or any version above the source version

Choose a Cloud SQL edition



Database Migration / Migration jobs / Create migration

Create a migration job

- Get started
  qwiklabs-gcp-03-0a23aa73b13b, PostgreSQL to Cloud SQL for PostgreSQL (Continuous)
- Define a source
  hello guys
- Define a destination
  Creating an instance for your destination database...
- 4 Define connectivity method
  Not configured
- 5 Configure migration databases
  Not configured
- 6 Test and create migration job
  Not tested

SAVE & EXIT CANCEL

Need help choosing? VIEW CONNECTIVITY GUIDE

Connectivity method *
VPC peering

Selecting VPC peering as the connectivity method will update the instance to turn on private IP.

Configure your destination to accept connections

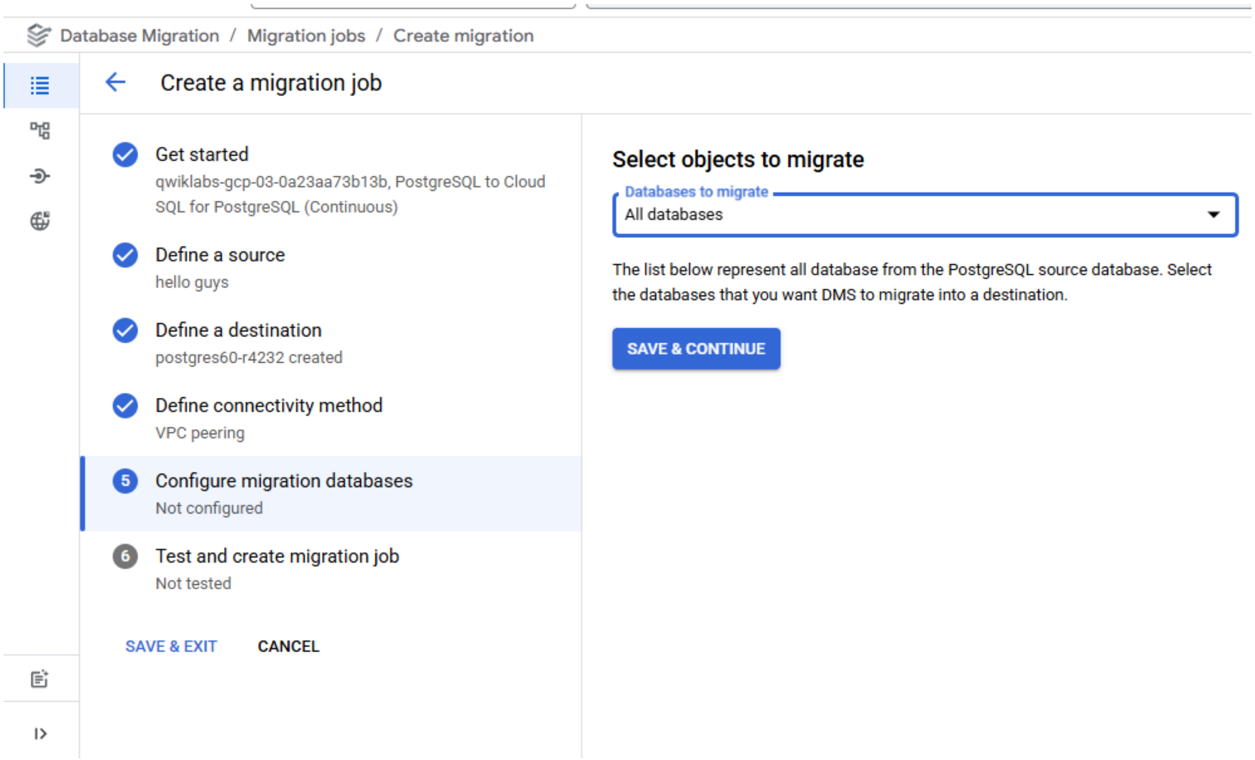
Make sure the replication connections section of the pg_hba.conf file or the security groups definitions in AWS RDS on the source database are updated to accept connections from the Cloud SQL VPC's IP address range.

Select the VPC network of your source

Select the network where your source database resides. Once you save, your source instance will be authorized to connect to it. Learn more

VPC *
default

CONFIGURE & CONTINUE



Database Migration / Migration jobs / Create migration

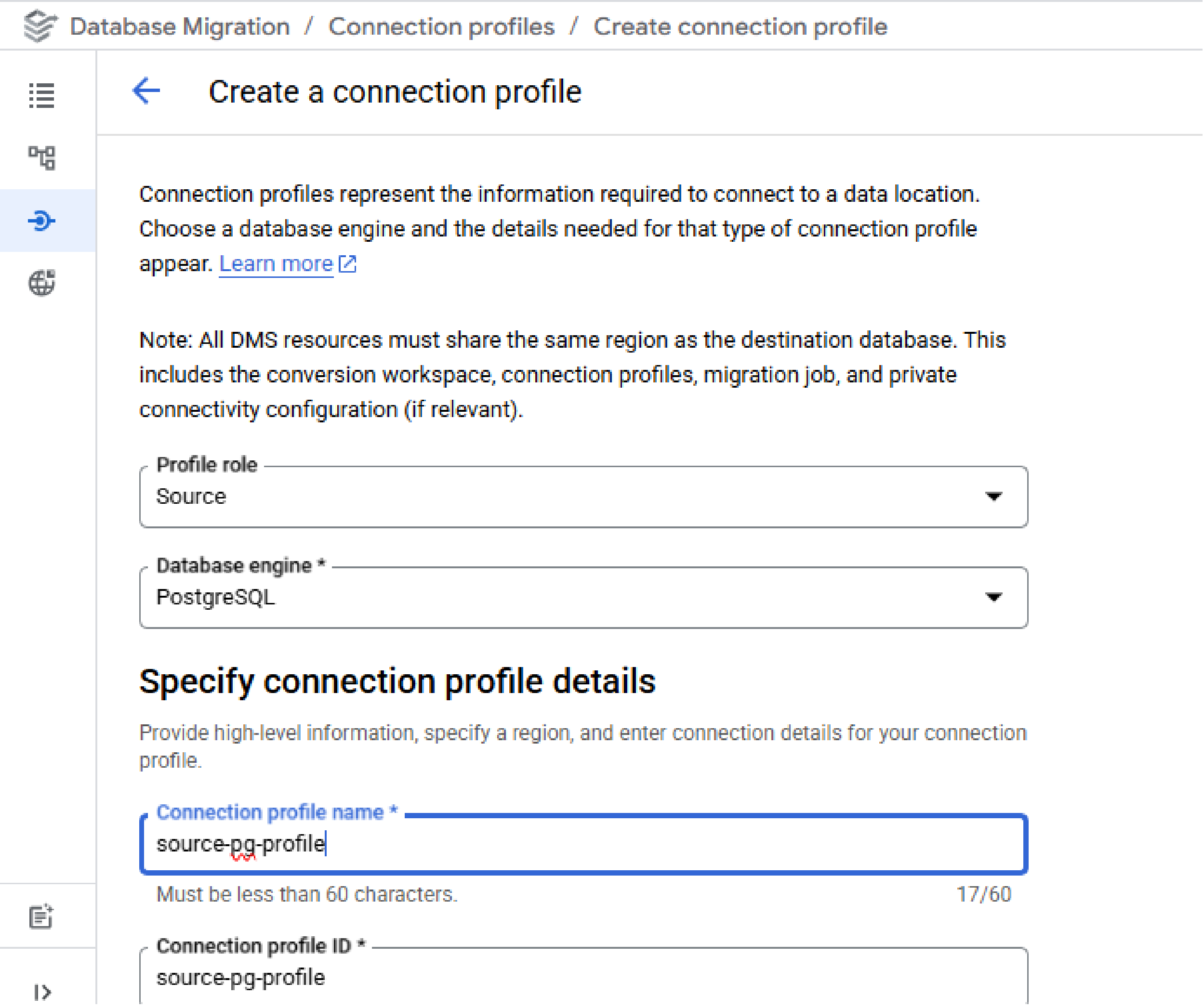
Create a migration job

- Get started
  qwiklabs-gcp-03-0a23aa73b13b, PostgreSQL to Cloud SQL for PostgreSQL (Continuous)
- Define a source
  hello guys
- Define a destination
  postgres60-r4232 created
- Define connectivity method
  VPC peering
- 5 Configure migration databases
  Not configured
- 6 Test and create migration job
  Not tested

Select objects to migrate

Databases to migrate: All databases

The list below represent all database from the PostgreSQL source database. Select the databases that you want DMS to migrate into a destination.



Database Migration / Connection profiles / Create connection profile

Create a connection profile

Connection profiles represent the information required to connect to a data location. Choose a database engine and the details needed for that type of connection profile appear. Learn more

Note: All DMS resources must share the same region as the destination database. This includes the conversion workspace, connection profiles, migration job, and private connectivity configuration (if relevant).

Profile role: Source

Database engine *: PostgreSQL

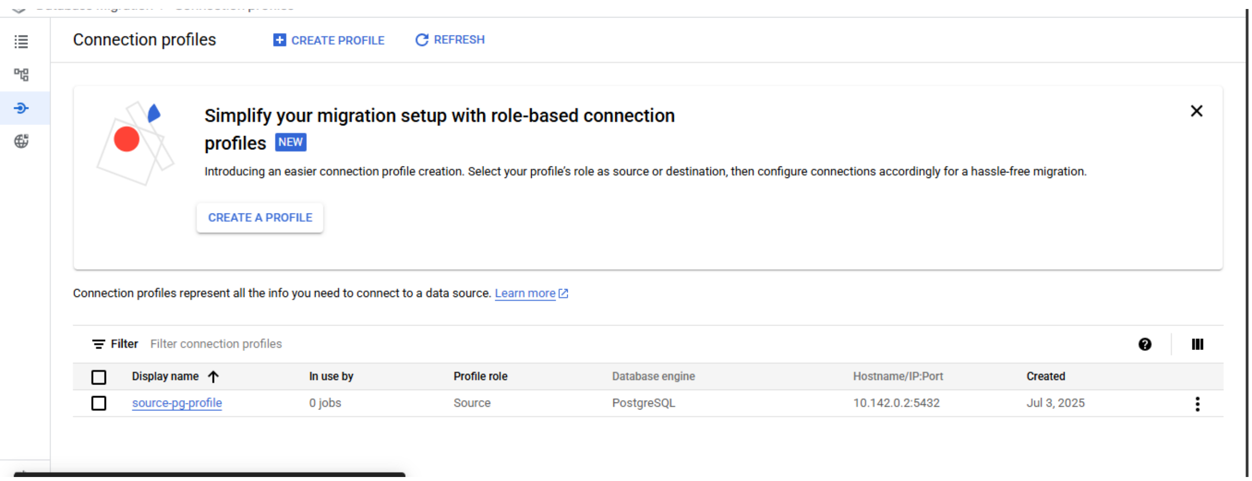
Specify connection profile details

Provide high-level information, specify a region, and enter connection details for your connection profile.

Connection profile name *: source-pg-profile

Must be less than 60 characters. 17/60

Connection profile ID *: source-pg-profile



Connection profiles

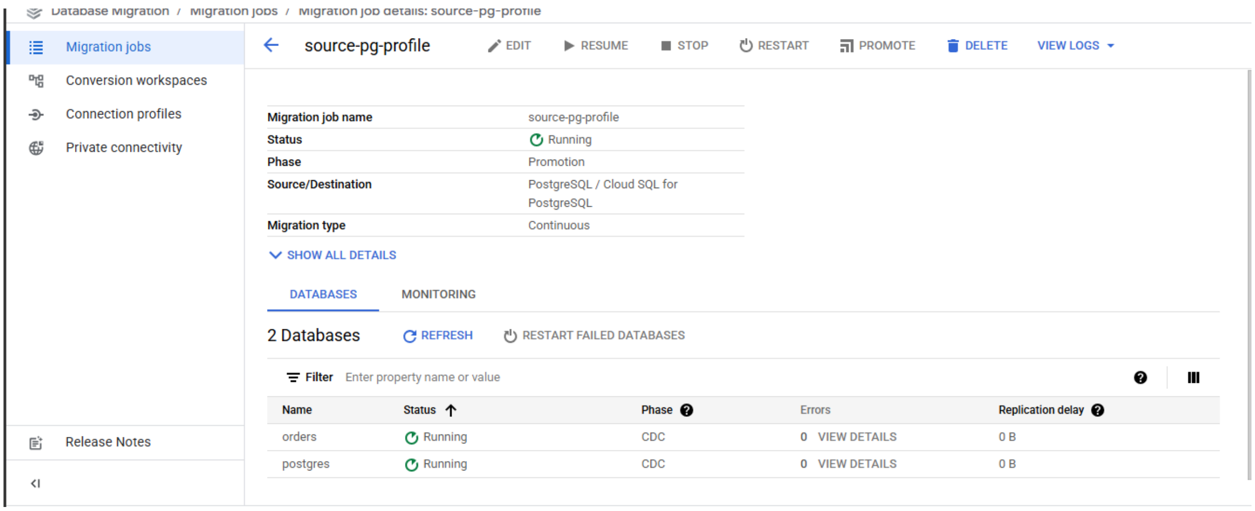
Simplify your migration setup with role-based connection profiles NEW

Introducing an easier connection profile creation. Select your profile's role as source or destination, then configure connections accordingly for a hassle-free migration.

Connection profiles represent all the info you need to connect to a data source. Learn more

Filter: Filter connection profiles

□	Display name ↑	In use by	Profile role	Database engine	Hostname/IP:Port	Created
□	source-pg-profile	0 jobs	Source	PostgreSQL	10.142.0.2:5432	Jul 3, 2025



Database Migration / Migration jobs / Migration job details: source-pg-profile

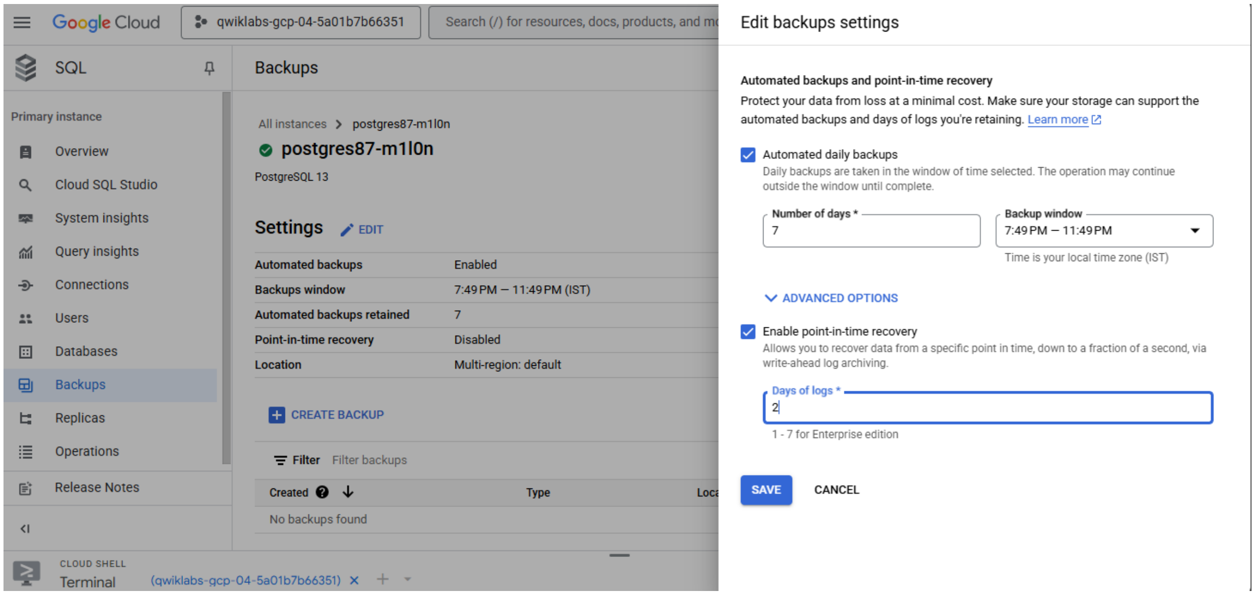
Migration job name	source-pg-profile
Status	Running
Phase	Promotion
Source/Destination	PostgreSQL / Cloud SQL for PostgreSQL
Migration type	Continuous

2 Databases

Name	Status	Phase	Errors		Replication delay
orders	Running	CDC	0	VIEW DETAILS	0 B
postgres	Running	CDC	0	VIEW DETAILS	0 B

Task 2. Promote a Cloud SQL to be a stand-alone instance for reading and writing data

- In this task, you must complete the migration by promoting the Cloud SQL for PostgreSQL instance to a stand-alone instance.
- When the promotion is complete, the status of the job updates to Completed.



postgres87-m1l0n

PostgreSQL 13

Settings

Automated backups	Enabled
Backups window	7:49 PM – 11:49 PM (IST)
Automated backups retained	7
Point-in-time recovery	Disabled
Location	Multi-region: default

No backups found

Edit backups settings

Automated backups and point-in-time recovery

Protect your data from loss at a minimal cost. Make sure your storage can support the automated backups and days of logs you're retaining. Learn more

☑ Automated daily backups

Daily backups are taken in the window of time selected. The operation may continue outside the window until complete.

Number of days * 7

Backup window 7:49 PM – 11:49 PM

Time is your local time zone (IST)

☑ Enable point-in-time recovery

Allows you to recover data from a specific point in time, down to a fraction of a second, via write-ahead log archiving.

Days of logs * 2

1 - 7 for Enterprise edition

Task 3. Implement Cloud SQL for PostgreSQL IAM database authentication

In this task you must configure the newly migrated Cloud SQL for PostgreSQL instance to support Cloud IAM users and IAM database authentication. You are also required to patch the Cloud SQL for PostgreSQL instance, to add the public ip-address of the postgres-vm virtual machine to the list of networks that are allowed to connect to the instance.

To complete this task you must complete the following steps:

1. Patch the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance to allow connections from the public ip-address of the postgres-vm virtual machine.
   a. In the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance, go to **connections > Networking**.
   b. Under the Public IP, click on **ADD A NETWORK**. For the network, use the external IP of the postgres-vm virtual machine.
2. In the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance, create a Cloud SQL IAM user using the lab student ID, Qwiklabs user account name, as the principal account name.
   a. Click **Users > Add user account**, then select **Cloud IAM**.
3. Grant SELECT permission to the Cloud IAM user for the orders table.
   a. In the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance, go to **Overview**. Under **Connect to this instance**, click on **Open Cloud Shell**.
   b. For the password enter supersecret!. Then connect to the orders database using \c orders; command.
   c. Again for the password enter supersecret!.
   d. Use the following command to grant SELECT permission. Replace the **Table_Name** and **Qwiklabs_User_Account_Name** variables with the correct values.

```
GRANT SELECT ON Table_Name TO "Qwiklabs_User_Account_Name";
```

1. Run the following query as the Qwiklabs user account name user in the migrated database to confirm that the Qwiklabs user account name can select data from the orders table.
2. SELECT COUNT(*) FROM orders

Task 4. Configure and test point-in-time recovery

In this task you must configure point-in-time recovery on a Cloud SQL for PostgreSQL instance and then test it by using point-in-time recovery to create a cloned instance at a point in time that rolls back some changes.

To complete this task you must complete the following steps:

1. Enable backups on the Cloud SQL for PostgreSQL instance.

   a. In the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance, go to **Overview**. Click on **edit** > **Data Protection**.

   b. Enable point-in-time recovery and set the number of retained transaction log days to Point-in-time recovery retention days.

2. Make a note of the timestamp for the point-in-time you wish to restore to using the following command.

3. Make some changes to the database after this timestamp.

   a. In the Migrated Cloud SQL for PostgreSQL Instance ID Cloud SQL instance, go to **Overview**. Under **Connect to this instance**, click on **Open Cloud Shell**.

   b. For the password enter supersecret!. Then connect to the orders database using \c orders; command.

   c. Again for the password enter supersecret!.

   d. You must add a row of data to the orders.distribution_centers table.

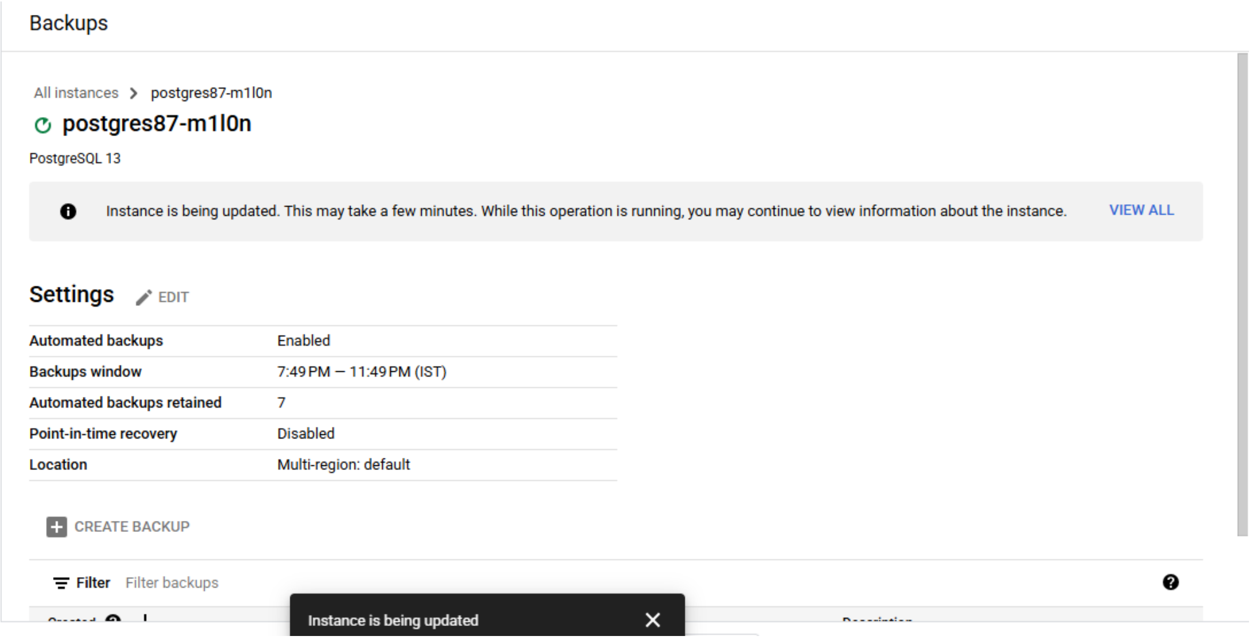
4. Use point-in-time recovery to create a clone that replicates the instance state at your chosen timestamp.

   a. Use the following command to clone the instance by replacing the **CLOUDSQL_INSTANCE**, **NEW_INSTANCE_NAME** and **TIME_STAMP** variables with the correct values.

```
gcloud sql instances clone $CLOUDSQL_INSTANCE $NEW_INSTANCE_NAME \
 --point-in-time $TIME_STAMP
```

   b. For the **Cloned instance name** you must use the name postgres-orders-pitr.

The new instance will not be used, but do not discard it, as it will be required to confirm that you have correctly completed the lab.



Backups

postgres87-m1l0n

PostgreSQL 13

Instance is being updated. This may take a few minutes. While this operation is running, you may continue to view information about the instance.

Settings

Automated backups	Enabled
Backups window	7:49 PM — 11:49 PM (IST)
Automated backups retained	7
Point-in-time recovery	Disabled
Location	Multi-region: default

Instance is being updated